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YOUR DAILY KNOW-HOW EXPERT

2026



- EXPERT SELECTION
- LA SÉLECTION DES EXPERTS
- SELECCIÓN EXPERTO

phantom.eu

■ Bij uitstek geschikt - Très approprié - Muy adecuado - Ideal geeignet - Very adequate

☐ Beperkt geschikt - Approprié - Adecuado - Eingeschränkt geeignet - Adequate

| ISO ■ | ISO ☐ | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|---|
| P 11 ≤600 N/mm² | P 11 ≤600 N/mm² | **Ongelegeerd en gelegeerd staal ≤600 N/mm²**<br>1.0037 (St37), 1.0038 (S235JR G2), 1.00402 (C22), 1.1178 (C30E) | **Aciers non-alliés ou faiblement alliés ≤600 N/mm²**<br>1.0037 (A37), 1.0038 (E 24-2 Ne), 1.00402 (1C20), 1.1178 (1C30) | **Acero no aleado ≤600 N/mm²**<br>1.0037 (S235JR), 1.0038 (S235JR G2), 1.0402 (F.112), 1.1178 (C30E) | **Unlegierter und legierter Stahl ≤600 N/mm²**<br>1.0037 (St37), 1.0038 (S235JR G2), 1.00402 (C22), 1.1178 (C30E) | **Unalloyed and low-alloyed steel ≤600 N/mm²**<br>1.0037 (St37), 1.0038 (S235JR G2), 1.00402 (C22), 1.1178 (C30E) |
| P 12 ≤850 N/mm² | P 12 ≤850 N/mm² | **Ongelegeerd en gelegeerd staal 600 - 850 N/mm²**<br>1.0050 (St50-2), 1.0070 (St70-2), 1.0301 (C10), 1.0503 (C45), 1.1121 (Ck10), 1.1191 (C45E), 1.0718 (11SMnPb30), 1.0736 (11SMn37) | **Aciers non-alliés ou faiblement alliés 600 - 850 N/mm²**<br>1.0050 (A50-2), 1.0070 (A70-2), 1.0301 (1C10), 1.0503 (1C45), 1.1121 (XC10), 1.1191 (2C45), 1.0718 (S250PB), 1.0736 (S300Pb) | **Acero no aleado 600 - 850 N/mm²**<br>1.0050 (Fe490-2), 1.0070 (Fe690-2), 1.0301 (F.1151), 1.0503 (F.114), 1.1121 (F.1510-C10K), 1.1191 (C45K), 1.0718 (F.2112-11SMnPb28), 1.0736 (F.2113-11SMn37) | **Unlegierter und legierter Stahl 600 - 850 N/mm²**<br>1.0050 (St50-2), 1.0070 (St70-2), 1.0301 (C10), 1.0503 (C45), 1.1121 (Ck10), 1.1191 (C45E), 1.0718 (11SMnPb30), 1.0736 (11SMn37) | **Unalloyed and low-alloyed steel 600 - 850 N/mm²**<br>1.0050 (St50-2), 1.0070 (St70-2), 1.0301 (C10), 1.0503 (C45), 1.1121 (Ck10), 1.1191 (C45E), 1.0718 (11SMnPb30), 1.0736 (11SMn37) |
| P 13 ≤1000 N/mm² | P 13 ≤1000 N/mm² | **Gelegeerd staal 850 - 1000 N/mm²**<br>1.0727 (46S20), 1.0728 (60S20), 1.0757 (46SPb20), 1.2080 (X210Cr12), 1.2083 (X42Cr13), 1.2767 (X45NiCrMo4), 1.5131 (50MnSi4), 1.7003 (38Cr2), 1.7030 (28Cr4), 1.7043 (38Cr4) | **Aciers alliés 850 - 1000 N/mm²**<br>1.0727 (45MF4), 1.0728 (60S20), 1.0757 (46SPb20), 1.2080 (Z200C12), 1.2083 (Z40C14), 1.2767 (Y35NCD16), 1.5131 (50MnSi4), 1.7003 (38Cr2), 1.7030 (28Cr4), 1.7043 (38Cr4) | **Acero aleado 850 - 1000 N/mm²**<br>1.0727 (46S20), 1.0728 (60S20), 1.0757 (46SPb20), 1.2080 (F.5212-X210Cr12), 1.2083 (X42Cr13), 1.2767 (X45NiCrMo4), 1.5131 (50MnSi4), 1.7003 (38Cr2), 1.7030 (28Cr4), 1.7043 (38Cr4) | **Legierter Stahl 850 - 1000 N/mm²**<br>1.0727 (46S20), 1.0728 (60S20), 1.0757 (46SPb20), 1.2080 (X210Cr12), 1.2083 (X42Cr13), 1.2767 (X45NiCrMo4), 1.5131 (50MnSi4), 1.7003 (38Cr2), 1.7030 (28Cr4), 1.7043 (38Cr4) | **Alloyed steel 850 - 1000 N/mm²**<br>1.0727 (46S20), 1.0728 (60S20), 1.0757 (46SPb20), 1.2080 (X210Cr12), 1.2083 (X42Cr13), 1.2767 (X45NiCrMo4), 1.5131 (50MnSi4), 1.7003 (38Cr2), 1.7030 (28Cr4), 1.7043 (38Cr4) |
| P 14 ≤1400 N/mm² | P 14 ≤1400 N/mm² | **Gelegeerd staal 1000 - 1400 N/mm²**<br>1.5710 (36NiCr6), 1.7035 (41Cr40), 1.7225 (42CrMo4), 1.8519 (31CrMoV9), 1.8550 (34CrAlNi7), 1.5752 (15NiCr13), 1.7131 (16MnCr5), 1.7264 (20CrMo5) | **Aciers alliés 1000 - 1400 N/mm²**<br>1.5710 (36NiCr6), 1.7035 (41Cr40), 1.7225 (42CrMo4), 1.8519 (31CrMoV9), 1.8550 (34CrAlNi7), 1.5752 (15NiCr13), 1.7131 (16MnCr5), 1.7264 (20CrMo5) | **Acero aleado 1000 - 1400 N/mm²**<br>1.5710 (36NiCr6), 1.7035 (41Cr40), 1.7225 (42CrMo4), 1.8519 (31CrMoV9), 1.8550 (34CrAlNi7), 1.5752 (15NiCr13), 1.7131 (16MnCr5), 1.7264 (20CrMo5) | **Legierter Stahl 1000 - 1400 N/mm²**<br>1.5710 (36NiCr6), 1.7035 (41Cr40), 1.7225 (42CrMo4), 1.8519 (31CrMoV9), 1.8550 (34CrAlNi7), 1.5752 (15NiCr13), 1.7131 (16MnCr5), 1.7264 (20CrMo5) | **Alloyed steel 1000 - 1400 N/mm²**<br>1.5710 (36NiCr6), 1.7035 (41Cr40), 1.7225 (42CrMo4), 1.8519 (31CrMoV9), 1.8550 (34CrAlNi7), 1.5752 (15NiCr13), 1.7131 (16MnCr5), 1.7264 (20CrMo5) |
| H 15 HRC | H 15 HRC | **Gehard en inzetgehard staal 50 - 60 HRC**<br>1.2344 (X40CrMoV5), 1.2767 (X45NiCrMo4), 1.2379 (X155CrVMo12-1), 1.2080 (X210Cr12), 1.3343 (S6-5-2) | **Aciers trempés et Aciers de cémentation alliés 50 - 60 HRC**<br>1.2344 (Z 40 CDV 5), 1.2767 (X45NiCrMo4), 1.2379 (D2), 1.2080 (Z200C12), 1.3343 (Z85WDCV) | **Acero templado 50 - 60 HRC**<br>1.2344 (X40CrMoV5), 1.2767 (X45NiCrMo4), 1.2379 (X155CrVMo12-1), 1.2080 (X210Cr12), 1.3343 (S6-5-2) | **Gehärteter und einsatzgehärteter Stahl, 50-60 HRC**<br>1.2344 (X40CrMoV5), 1.2767 (X45NiCrMo4), 1.2379 (X155CrVMo12-1), 1.2080 (X210Cr12), 1.3343 (S6-5-2) | **Hardened and case hardenend steel 50 - 60 HRC**<br>1.2344 (X40CrMoV5), 1.2767 (X45NiCrMo4), 1.2379 (X155CrVMo12-1), 1.2080 (X210Cr12), 1.3343 (S6-5-2) |
| M 21 INOX ≤850N/mm² | M 21 INOX ≤850N/mm² | **Roestvaststaal, INOX ≤850 N/mm²**<br>1.4005 (X12CrS13), 1.4104 (X14CrMoS17), 1.4105 (X6CrMoS17), 1.4301 (XCrNi18-10)(304), 1.4305 (X8CrNiS18-9)(303) | **Aciers Inoxydables ≤850 N/mm²**<br>1.4005 (Z11CF13), 1.4104 (Z13CF17), 1.4105 (Z8CF17), 1.4301 (XCrNi18-10)(304), 1.4305 (X8CrNiS18-9)(303) | **Acero inoxidable ≤850 N/mm²**<br>1.4006 (F.3401-X10Cr13), 1.4104 (F.3117-X10CrS17), 1.4301 (F.3504-X5CrNi18-10)(304), 1.4305 (F.3508-X10CrNiS18-09)(303) | **Rostfreier Stahl, INOX ≤850 N/mm²**<br>1.4005 (X12CrS13), 1.4104 (X14CrMoS17), 1.4105 (X6CrMoS17), 1.4301 (XCrNi18-10)(304), 1.4305 (X8CrNiS18-9)(303) | **Stainless steel, INOX ≤850 N/mm²**<br>1.4005 (X12CrS13), 1.4104 (X14CrMoS17), 1.4105 (X6CrMoS17), 1.4301 (XCrNi18-10)(304), 1.4305 (X8CrNiS18-9)(303) |
| M 22 INOX >850N/mm² | M 22 INOX >850N/mm² | **Roestvaststaal, INOX >850 N/mm²**<br>1.4438 (X2CrNiMo18-15-4)(317), 1.4404 (X2CrNiMo17-12-2)(316L), 1.4571 (X6CrNiMoTi17-12-2)(316Ti) | **Aciers Inoxydables >850 N/mm²**<br>1.4438 (X2CrNiMo18-15-4)(317), 1.4404 (X2CrNiMo17-12-2)(316L), 1.4571 (X6CrNiMoTi17-12-2)(316Ti) | **Acero inoxidable >850 N/mm²**<br>1.4438 (X2CrNiMo18-15-4)(317), 1.4404 (X2CrNiMo17-12-2)(316L), 1.4571 (F.3535-X6CrNiMoTi17-12-2)(316Ti) | **Rostfreier Stahl, INOX >850 N/mm²**<br>1.4438 (X2CrNiMo18-15-4)(317), 1.4404 (X2CrNiMo17-12-2)(316L), 1.4571 (X6CrNiMoTi17-12-2)(316Ti) | **Stainless steel, INOX >850 N/mm²**<br>1.4438 (X2CrNiMo18-15-4)(317), 1.4404 (X2CrNiMo17-12-2)(316L), 1.4571 (X6CrNiMoTi17-12-2)(316Ti) |
| K 31 GG | K 31 GG | **Grijs gietijzer GG <260 HB30**<br>0.6015 (GG 15), 0.6025 (GG 25), 0.6040 (GG 40) | **Fontes <260 HB30**<br>0.6015 (GG 15), 0.6025 (GG 25), 0.6040 (GG 40) | **Fundición gris con grafito laminado** GG <260 HB30<br>0.6015 (FG15), 0.6025 (FG25), 0.6040 (FG40) | **Grauguss GG <260 HB30**<br>0.6015 (GG 15), 0.6025 (GG 25), 0.6040 (GG 40) | **Grey cast iron GG <260 HB30**<br>0.6015 (GG 15), 0.6025 (GG 25), 0.6040 (GG 40) |
| K 32 GGG GTS-GTW | K 32 GGG GTS-GTW | **Smeedbaar en Nodulair gietijzer <260 HB30**<br>0.8145 (GTS-45), 0.8170 (GTS-70-02), 0.7040 (GGG 40), 0.7070 (GGG 70) | **Fontes à graphites et malléables <260 HB30**<br>0.8145 (GTS-45), 0.8170 (GTS-70-02), 0.7040 (GGG 40), 0.7070 (GGG 70) | **Fundición gris con grafito esferoidal <260 HB30**<br>0.8145 (GTS-45), 0.8170 (GTS-70-02), 0.7040 (GGG 40), 0.7070 (GGG 70) | **Formbar und dehnbares Gusseisen <260 HB30**<br>0.8145 (GTS-45), 0.8170 (GTS-70-02), 0.7040 (GGG 40), 0.7070 (GGG 70) | **Nodular and malleable cast iron <260 HB30**<br>0.8145 (GTS-45), 0.8170 (GTS-70-02), 0.7040 (GGG 40), 0.7070 (GGG 70) |
| N 41 Alu | N 41 Alu | **Aluminium en Aluminiumlegeringen**<br>3.0255 (Al99,5), 3.2315 (AlMgSi1), 3.3515 (AlMg1) | **Aluminium et Alliages d'Aluminium**<br>3.0255 (A59050C), 3.2315 (AlMgSi1), 3.3515 (AlMg1) | **Aluminio y aleaciones de Aluminio**<br>3.0255 (Al99,5), 3.2315 (AlMgSi1), 3.3515 (AlMg1) | **Aluminium und Aluminiumlegierungen**<br>3.0255 (Al99,5), 3.2315 (AlMgSi1), 3.3515 (AlMg1) | **Aluminium and Aluminium alloys**<br>3.0255 (Al99,5), 3.2315 (AlMgSi1), 3.3515 (AlMg1) |
| N 42 Alu Si>10% | N 42 Alu Si>10% | **Gietaluminium Si 10 - 24%**<br>3.2131 (G-AlSi5Cu1), 3.2153 (G-AlSi7Cu3), (3.2573 G-AlSi9),, 3.2581 (G-AlSi12), 3.2583 (G-AlSi12Cu) | **Alliages d'Aluminium Si 10 - 24%**<br>3.2131 (G-AlSi5Cu1), 3.2153 (G-AlSi7Cu3), (3.2573 G-AlSi9), 3.2581 (G-AlSi12), 3.2583 (G-AlSi12Cu) | **Fundición de Aluminio aleada Si 10 - 24%**<br>3.2131 (G-AlSi5Cu1), 3.2153 (G-AlSi7Cu3), (3.2573 G-AlSi9), 3.2581 (L-2520,21), 3.2583 (L2530) | **Druckguss Si 10 - 24%**<br>3.2131 (G-AlSi5Cu1), 3.2153 (G-AlSi7Cu3), (3.2573 G-AlSi9), 3.2581 (G-AlSi12), 3.2583 (G-AlSi12Cu) | **Cast Aluminium Si 10 - 24%**<br>3.2131 (G-AlSi5Cu1), 3.2153 (G-AlSi7Cu3), (3.2573 G-AlSi9),, 3.2581 (G-AlSi12), 3.2583 (G-AlSi12Cu) |
| N 43 Mg | N 43 Mg | **Magnesiumlegeringen**<br>3.5200 (MgMn2), 3.5812 (G-MgAl8Zn1), 3.5612 (G-MgAl6Zn1) | **Alliages de Magnésium**<br>3.5200 (MgMn2), 3.5812 (AZ81hp), 3.5612 (AZ61) | **Aleaciones de Magnesio**<br>3.5200 (MgMn2), 3.5812 (AZ81hp), 3.5612 (AZ61) | **Magnesiumlegierungen**<br>3.5200 (MgMn2), 3.5812 (G-MgAl8Zn1), 3.5612 (G-MgAl6Zn1) | **Magnesium alloys**<br>3.5200 (MgMn2), 3.5812 (G-MgAl8Zn1), 3.5612 (G-MgAl6Zn1) |
| N 51 Cu | N 51 Cu | **Koper en Koperlegeringen**<br>2.0070 (SE-Cu), 2.1020 (CuSn6), 2.1096 (G-CuSn5ZnPb), 2.0380 (CuZn39Pb2), 2.0401 (CuZn39Pb3), 2.0250 (CuZn20), 2.0280 (CuZn33), 2.0332 (CuZn37Pb0,5) | **Cuivres et Alliages de cuivres**<br>2.0070 (SE-Cu), 2.1020 (CuSn6), 2.1096 (G-CuSn5ZnPb), 2.0380 (CuZn40), 2.0401 (Cu-Zn39Pb3), 2.0250 (CuZn20), 2.0280 (CuZn33), 2.0332 (CuZn37Pb0,5) | **Cobre y aleaciones de cobre**<br>2.0070 (SE-Cu), 2.1020 (CuSn6), 2.1096 (G-CuSn5ZnPb), 2.0380 (CuZn39Pb2), 2.0401 (CuZn39Pb3), 2.0250 (CuZn20), 2.0280 (CuZn33), 2.0332 (CuZn37Pb0,5) | **Kupfer und Kupferlegierungen**<br>2.0070 (SE-Cu), 2.1020 (CuSn6), 2.1096 (G-CuSn5ZnPb), 2.0380 (CuZn39Pb2), 2.0401 (CuZn39Pb3), 2.0250 (CuZn20), 2.0280 (CuZn33), 2.0332 (CuZn37Pb0,5) | **Copper and copper alloys**<br>2.0070 (SE-Cu), 2.1020 (CuSn6), 2.1096 (G-CuSn5ZnPb), 2.0380 (CuZn39Pb2), 2.0401 (CuZn39Pb3), 2.0250 (CuZn20), 2.0280 (CuZn33), 2.0332 (CuZn37Pb0,5) |
| N 52 CuAlFe | N 52 CuAlFe | **Koper- en Aluminiumlegering**<br>2.0916 (CuAl5), 2.0960 (CuAl9Mn), 2.1050 (CuSn10), 2.0980 (CuAl11Ni), 2.1247 (CuBe2) AMPCO® 8, AMPCO® 8 15, AMPCO® 18 | **Cuivre et Alliages d'Aluminium**<br>2.0916 (CuAl5), 2.0960 (CuAl9Mn), 2.1050 (CuSn10), 2.0980 (CuAl11Ni), 2.1247 (CuBe1.9) AMPCO® 8, AMPCO® 8 15, AMPCO® 18 | **Cobre y aleaciones de Aluminio**<br>2.0916 (CuAl5), 2.0960 (CuAl9Mn), 2.1050 (CuSn10), 2.0980 (CuAl11Ni), 2.1247 (CuBe2) AMPCO® 8, AMPCO® 8 15, AMPCO® 18 | **Kupfer- und Aluminiumlegierungen**<br>2.0916 (CuAl5), 2.0960 (CuAl9Mn), 2.1050 (CuSn10), 2.0980 (CuAl11Ni), 2.1247 (Cu-Be2) AMPCO® 8, AMPCO® 8 15, AMPCO® 18 | **Copper and Aluminium alloys**<br>2.0916 (CuAl5), 2.0960 (CuAl9Mn), 2.1050 (CuSn10), 2.0980 (CuAl11Ni), 2.1247 (CuBe2) AMPCO® 8, AMPCO® 8 15, AMPCO® 18 |
| N 61 PVC | N 61 PVC | **Duroplastic en Thermoplastic**<br>PMMA, PVC, PE, PP, PTFE | **Duroplastiques et Thermoplastiques**<br>PMMA, PVC, PE, PP, PTFE | **Duroplásticos en Termoplásticos**<br>PMMA, PVC, PE, PP, PTFE | **Duroplaste und Thermoplaste**<br>PMMA, PVC, PE, PP, PTFE | **Duroplastics en Thermoplastics**<br>PMMA, PVC, PE, PP, PTFE |
| N 62 GFK/CFK | N 62 GFK/CFK | **Versterkte kunststoffen**<br>GFK, CFK | **Plastiques réenforcés**<br>GFK, CFK | **Plásticos reforzados**<br>GFK, CFK | **Verstärkte Kunststoffe**<br>GFK, CFK | **Reinforced plastics**<br>GFK, CFK |
| S 71 Ni/Co | S 71 Ni/Co | **Nikkel- en Cobaltlegeringen**<br>Hastelloy, Inconel, Nimonic, Jetalloy | **Alliages de Nickel et de Cobalt**<br>Hastelloy, Inconel, Nimonic, Jetalloy | **Aleaciones de Níquel y Cobalto**<br>Hastelloy, Inconel, Nimonic, Jetalloy | **Nickel und Kobaltlegierungen**<br>Hastelloy, Inconel, Nimonic, Jetalloy | **Nikkel and Cobalt alloys**<br>Hastelloy, Inconel, Nimonic, Jetalloy |
| S 72 Ti | S 72 Ti | **Titaniumlegeringen**<br>3.7024 (Ti99,5), 3.7114 (TiAl5Sn2,5), 3.7124 (TiCu2), 3.7154 (TiAl6Zr5), 3.7165 (TiAl6V4), 3.7184 (TiAl4Mo4Sn2,5) | **Alliages de Titane**<br>3.7024 (T35), 3.7114 (TiAl5Sn2,5), 3.7124 (T-U2), 3.7154 (TiAl6Zr5), 3.7165 (TiAl6V4), 3.7184 (TiAl4Mo4Sn2,5) | **Titanio aleado**<br>3.7024 (Ti99,5), 3.7114 (TiAl5Sn2,5), 3.7124 (TiCu2), 3.7154 (TiAl6Zr5), 3.7165 (TiAl6V4), 3.7184 (TiAl4Mo4Sn2,5) | **Titanlegierungen**<br>3.7024 (Ti99,5), 3.7114 (TiAl5Sn2,5), 3.7124 (TiCu2), 3.7154 (TiAl6Zr5), 3.7165 (TiAl6V4), 3.7184 (TiAl4Mo4Sn2,5) | **Titanium alloys**<br>3.7024 (Ti99,5), 3.7114 (TiAl5Sn2,5), 3.7124 (TiCu2), 3.7154 (TiAl6Zr5), 3.7165 (TiAl6V4), 3.7184 (TiAl4Mo4Sn2,5) |

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*YOUR DAILY KNOW-HOW EXPERT*

# 24/7 KNOWLEDGE PLATFORM

- **More than 30,000 machining tools easy to find**
- **Orders placed before 19.00h are shipped the same day**




NL

- 24/7 kennisplatform gemaakt voor metaalbewerkers door metaalbewerkers
- Meer dan 30.000 verspanenden producten eenvoudig vindbaar
- Bestellen voor 19.00 uur is vandaag verstuurd

DE

- 24/7 Wissensplattform von Metallarbeitern für Metallarbeiter
- Mehr als 30.000 Metallbearbeitungsprodukte leicht auffindbar
- Bestellung vor 19.00 Uhr wird noch gleicher Tag verschickt

FR

- Plateforme de connaissances 24/7 conçue pour des spécialistes par des spécialistes
- Plus de 30.000 outils coupants faciles à trouver
- Les commandes passées avant 19h00 sont expédiées le jour même

ES

- Una plataforma de conocimiento 24/7 hecha por metalúrgicos para metalúrgicos
- Más de 30.000 herramientas de mecanizado fáciles de encontrar
- Los pedidos realizados antes de las 19.00h se envían hoy mismo

Phantom

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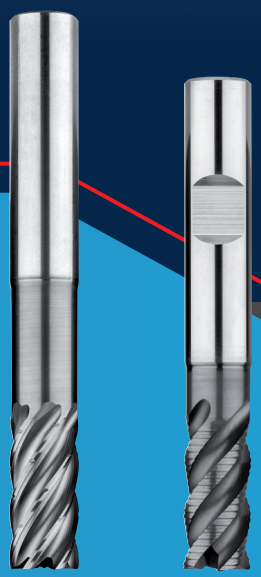
Drilling, milling, full slotting and 45° plunging

*The new generation*

# HP2 SC VARI FLUTE END MILLS



NL | De nieuwe generatie HP2 UNI VHM frezen

FR | La nouvelle génération de fraises vari hp2 carbure uni

DE | Die neue Generation VARI HP2 VHM fräser UNI

ES | La nueva generación de fresas VARI MD HP2

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International Tools

SMART METAL TOOLS FOR YOU



*FOR UNIVERSAL USE IN SMALL BATCH PRODUCTION*

# SOLID CARBIDE TWIST DRILL

NL | Volhardmetaal spiraalboren voor universeel gebruik bij kleine series

FR | Forets carbure monobloc pour une utilisation universelle en petites séries

DE | Vollhartmetall Spiralbohrer für den universellen Einsatz bei Kleinserien

ES | Brocas metal duro para uso universal en series pequeñas

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## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| HSS | HSS | HSS | HSS | HSS | HSS |
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalto) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| HSS-E PM | PM HSS-E | Acier rapide fritté de haute qualité | Acero rápido pulvimetalúrgico con | PM HSS-E | Powder Metal High-speed steel |
| HM-TIP | Hardmetaal Tip | Plaquette carbure brasée | Plaquitas de metal duro soldadas | mit HM-Schneiden | Carbide Tipped |
| HM | Hardmetaal | Carbure monobloc | Metal duro integral | Hartmetall | Solid Carbide |
| VHM SC | Volhardmetaal | Carbure Monobloc | Metal Duro integral | Vollhartmetall | Solid Carbide |
| MG HM | Micro-Grain volhardmetaal | Carbure Micrograin | Metal Duro Micro-Grano | Micro-Grain Vollhartmetall | Micrograin tungsten carbide |
| OX. | Stoomontlaten | Vaporisé | Vaporizado | Dampfangelassen | Steam tempered |
| TiN | TiN gecoat | Revêtement TiN | Recubrimiento TiN | TiN Beschichtung | TiN coated |
| TiAlN | TiAlN gecoat | Revêtement TiAlN | Recubrimiento TiAlN | TiAlN Beschichtung | TiAlN coated |
| AlCrN-X | AlCrN-X gecoat | Revêtement AlCrN-X | Recubrimiento AlCrN-X | AlCrN-X Beschichtung | AlCrN-X coated |
| DLC | DLC gecoat | Revêtement DLC | Recubrimiento DLC | DLC Beschichtung | DLC coated |
| DIN 338 | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| NORM | Fabriek standaard | Standard usine | Estándar de la fábrica | Werksnorm | Factory standard |
| 3xD | Max. boordiepte | Profondeur max. de perçage | Profundidad máx. de perforacion | Max. Bohrtiefe | Max drilling depth |
| N | Type N, standaard spiraaluitvoering | Type N, hélice standard | Tipo N, Versión helicoidal estándar | Type N, standard Spiralwinkel | Type N, standard spiral |
| >N | Spiraalhoek sterker dan standaard | Hélice plus rapide que standard | Ángulo de hélice más rápido que estándar | Spiralwinkel starker wie Standard | Helix quicker than standard |
| TS | Type TS, Tiefloch-spiraal | Type TS, goujure large | Tipo TS, Hélice para perforación profunda | Type TS, Tiefloch Spiral | Type TS, deep hole helix |
| | Cilindrische schacht | Queue cylindrique | Mango cilíndrico | Zylinderschaft | Straight shank |
| h6 | Cilindrische schacht h6 | Queue cylindrique h6 | Mango cilíndrico h6 | Zylinderschaft h6 | Straight shank h6 |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| DIN 6535-HA | Cilindrische schacht | Queue cylindrique | Mango cilíndrico | Zylinderschaft | Straight shank |
| DIN 6535-HB | Cilindrische schacht met Weldon vlak | Queue cylindrique avec méplat type Weldon | Mango cilíndrico con plano de arrastre tipo Weldon | Zylinderschaft mit Mitnahmeflache Typ Weldon | Straight shank, type Weldon (DIN 6535-HA) |
| DIN 6535-HE | Cilindrische schacht met Whistle-Notch | Queue cylindrique avec Whistle-Notch | Mango cilíndrico con Whistle-Notch | Zylinderschaft mit Whistle-Notch | Straight shank with Wistle Notch |
| DIN 228-B | Morse Konus Opname | Cône morse | Mango cónico | Morsekegel | Morse Taper shank |
| | Kruisaanslijping | Affûtage en croix | Afilado en Cruz | Kreuzanschliff | Splitpoint |
| | Viervlaks-aanslijping | Affûtage 4 pentes | Afilado 4 facetas | Vierflachs-Anschliff | 4-facet point |
| | Met verdunde punt | Ame amincie | Con alma delgada | Ausgedünde Spitze | With thinned point |
| | Meervlaks-kruis-aanslijping | Affûtage multi-pentes | Afilado multi facetas | Mehrflachs-Kreuzanschliff | Multi-facet point |
| | Phantom VHM-aanslijping | Affûtage Carbure Phantom | Afilado metal duro Phantom | Phantom VHM-Anschliff | Phantom SC point |
| | Boor met 3 snijkanten | Foret à 3 lèvres | Broca con 3 facetas | Bohrer mit 3 Schneiden | Drill with 3 cutting sides |
| | Lage snijkrachten, sneller boren | Faible force de coupe et perçage plus rapide | Baja fuerza de corte, taladro más rápido | Geringe Schnittkräfte, schnelleres Bohren | Low cutting force, faster drilling |
| | Koelkanaal | A trous d'huile | Canal de refrigeración | Mit Kühlkanal | Coolant feed |
| 118° | Tophoek | Angle au sommet | Ángulo de la punta | Spitzenwinkel | Top angle |
| h7 | Boortolerantie | Tolérance du perçage | Tolerancia de taladrar | Bohrtoleranz | Drilltolerance |
| 60° | Uitvoering centreergat | Angle de lamage | Versión ángulo avellanado | Ausführung Zentrierloch | Centre hole |
| 90° | Centreerhoek | Point de centrage | Ángulo de centrar | Zentrierspitze | Centr angle |
| 180° | Hoek 180° | Angle 180° | Ángulo 180° | Winkel 180° | Angle 180° |
| INOX | T.b.v. roestvaststaal | Pour Inox | Para acero inoxidable | Für Rostfreier Stahl | For stainless steel |
| ALU | T.b.v. aluminium | Pour aluminium | Para aluminio | Für Aluminium | For aluminium |
| HP2 UNI | HP2 Universeel | Haute Performance Universel | Alta Rendimiento Universal | HP2 Universal | HP2 Universal |



## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| HSS | HSS | HSS | HSS | HSS | HSS |
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalto) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| HSS-E PM | PowderMetal HSS-E (5% Cobalt) | Acier rapide fritté de haute qualité | Acero rápido pulvimetalúrgico | Pulvermetall HSS-E (5% Cobalt) | PowderMetal HSS-E (5% Cobalt) |
| MG HM | Micro-Grain volhardmetaal | Carbure micrograin | Metal duro micrograno | Micro-Grain Vollhartmetall | Micrograin tungsten carbide |
| M | Metrisch | Metrique | Métrica | Metrisch | Metric |
| MF | Metrisch Fijn | Métrique pas fin | Métrica Fina | Metrisch Fein | Metric Fine |
| 60° | Tophoek schroefdraad | Angle au sommet | Ángulo de punta de la rosca | Flankenwinkel | Point angle |
| OX. | Stoomontlaten | Vaporisé | Vaporizado | Dampfangelassen | Steam tempered |
| TiN | TiN gecoat | Revêtement TiN | Recubrimiento TiN | TiN Beschichtung | TiN coated |
| TiCN | TiCN gecoat | Revêtement TiCN | Recubrimiento TiCN | TiCN Beschich-tung | TiCN coated |
| HARD LUBE | HARDLUBE-gecoat | Revêtement HARDLUBE | Recubrimiento HARDLUBE | HARDLUBE Beschichtung | HARDLUBE coated |
| DIN 371 | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| NORM | Fabriek standaard | Standard usine | Estándar de la fábrica | Werksnorm | Factory standard |
| ISO 2 6H | ISO norm | Norme ISO | Norma ISO | ISO Norm | ISO norm |
| 2,5xD | Max. draadlengte | Profondeur max. de taraudage | Profundidad máx. de roscar | Max. Gewindelänge | Max. thread length |
| 38° | Spiraalhoek | Angle d'hélice | Angulo de hélice | Spiralwinkel | Spiral angles |
| Form B | Met schilaansnijding | Coupe GUN | Con entrada corregida (GUN) | Schälanschnitt | GUN nosed |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| 2,5 | Aantal gangen aansnijding | Nombre de filets | Número de hilos | Anzahl Gangen Anschnitt | Number of lead chamfers |
| | Koelkanaal | A trous d'huile | Canal de refrigeración | Mit Kühlkanal | Coolant feed |
| | Doorlopende gaten | Trou débouchant | Agujero pasante | Durchgangslöcher | Through holes |
| | Blinde gaten | Trou borgne | Agujero ciego | Sacklöcher | Blind holes |
| 2 xD | Max. draadlengte 2xD | Profondeur max. du filetage 2xD | Profundidad máx. de roscar 2xD | Max. Gewinde-länge 2xD | Max. thread length (2 x D) |
| 1,5 xD | Max. draadlengte 1,5xD | Profondeur max. du filetage 1,5xD | Profundidad máx. de roscar 1,5xD | Max. Gewinde-länge 1,5xD | Max. thread length (1.5 x D) |
| NIT. | Genitreerd | Nitruré | Nitrurado | Nitriert | Nitrated |
| OX. | Stoomontlaten | Vaporisé | Vaporizado | Dampfangelassen | Steam tempered |
| TiN | TiN gecoat | Revêtement TiN | Recubrimiento TiN | TiN Beschichtung | TiN coated |
| TiCN | TiCN gecoat | Revêtement TiCN | Recubrimiento TiCN | TiCN Beschich-tung | TiCN coated |
| HARD LUBE | HARDLUBE-gecoat | Revêtement HARDLUBE | Recubrimiento HARDLUBE | HARDLUBE Beschichtung | HARDLUBE coated |
| INOX | T.b.v. roestvast-staal | Pour Inox | Para acero inoxidable | Für Rostfreier Stahl | For stainless steel |
| ALU | T.b.v. aluminium | Pour aluminium | Para aluminio | Für Aluminium | For aluminium |
| UNI | Universeel | Universel | Universal | Universal High Performance | Universal |
| HP2 UNI | High Performance Universeel | Haute Perfor-mance Universel | Alta Rendimiento Universal | High Performance Universal | High Performance Universal |
| DIN 6535-HA | Cilindrische schacht DIN 6535-HA | Queue cylindrique DIN 6335-HA | Mango cilíndrico DIN 6335-HA | Zylinderschaft DIN 6535-HA | Straight shank DIN 6535-HA |



## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

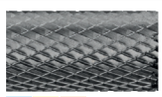
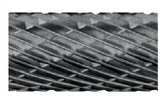
| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| | 2 snijkanten, centrumsnijdend | 2 dents, coupe au centre | 2 dientes, corte con centro | 2 Schneiden, Zentrumschneidend | 2 flutes, centre cutting |
| | 3 snijkanten, centrumsnijdend | 3 dents, coupe au centre | 3 dientes, corte con centro | 3 Schneiden, Zentrumschneidend | 3 flutes, centre cutting |
| | 4 Snijkanten, centrumsnijdend | 4 dents, coupe au centre | 4 dientes, con corte centro | 4 Schneiden, Zentrumschneidend | 4 flutes, centre cutting |
| | 4 Snijkanten, met ongelijke tandverdeling | 4 dents, avec denture à pas différentiel | 4 dientes, con paso irregular | 4 Schneiden, mit ungleicher Zahnteilung | 4 flutes, with irregular pitch |
| | 5 Snijkanten, met ongelijke tandverdeling | 5 dents, avec denture à pas différentiel | 5 dientes, con paso irregular | 5 Schneiden, mit ungleicher Zahnteilung | 5 flutes, with irregular pitch |
| | 6 snijkanten, centrumsnijdend | 6 dents, coupe au centre | 6 dientes, corte con centro | 6 Schneiden, Zentrumschneidend | 6 flutes, centre cutting |
| | 2 snijkanten, volradius | 2 dents, à rayon complet | 2 dientes, con radio completo | 2 Schneiden, Vollradius | 2 flutes, full radius |
| VARI | Ongelijke spiraalhoek | Avec angles d'hélice variables | Con ángulo de hélice desigual | Mit ungleichen Spiralwinkel | With unequal spiral angles |
| VHM SC | Volhardmetaal | Carbure monobloc | Metal duro integral | Vollhartmetall | Solid Carbide |
| MG HM | Micro-Grain volhardmetaal | Carbure micrograin | Metal duro micrograno | Micro-Grain Vollhartmetall | Micrograin tungsten carbide |
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalto) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| TiAlN | TiAlN gecoat | Revêtement TiAlN | Recubrimiento TiAlN | TiAlN Beschichtung | TiAlN coated |
| AlTiN X | AlTiN-X gecoat | Revêtement AlTiN-X | Recubrimiento AlTiN-X | AlTiN-X Beschichtung | AlTiN-X coated |
| AlCrN-X | AlCrN-X gecoat | Revêtement AlCrN-X | Recubrimiento AlCrN-X | AlCrN-X Beschichtung | AlCrN-X coated |
| HR | Ronde tand, fijn | Profil rond, pas fin | Profilo redondo, paso fino | Feiner Verzahnung | Fine teeth |
| WR | Ronde tand, grof | Profil rond, pas ébauche | Profilo redondo | Runder Verzahnung | Rounded profile |
| DIN 6527 | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| NORM | Fabriek standaard | Standard usine | Estándar de la fábrica | Werksnorm | Factory standard |
| r | Snijkantradius | Rayon de coupe | Radio de corte | Radius am Schneidenecke | Protective chamfer |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| 30° | Spiraalhoek | Angle d'Hélice | Angulo de hélice | Spiralwinkel | Helix angle |
| DIN 6535-HB | Cilindrische schacht met Weldon vlak | Queue cylindrique avec méplat type Weldon | Mango cilíndrico con plano de arrastre tipo Weldon | Zylinderschaft mit Mitnahmeflache Tyo Weldon | Straight shank, type Weldon (DIN 6535-HA) |
| h6 | Cilindrische schacht h6 | Queue cylindrique h6 | Mango cilíndrico h6 | Zylinderschaft h6 | Straight shank h6 |
| r ±0,01 | Tolerantie radius | Tolérance rayon | Tolerancia radio | Toleranz Radius | Tolerances radiu |
| d1 h10 | Tolerantie diameter | Tolérance diamètre | Tolerancia diámetro | Toleranz Durchmesser | Tolerance diameter |
| INOX | T.b.v. roestvaststaal | Pour Inox | Para acero inoxidable | Für Rostfreier Stahl | For stainless steel |
| ALU | T.b.v. aluminium | Pour aluminium | Para aluminio | Für Aluminium | For aluminium |
| UNI | Universeel | Universel | Universal | Universal High Performance | Universal |
| | Interpolair frezen | Interpolation | Mecanizado por interpolación | Zirkular Fräsen | Interpolation Drilling |
| | Graveren | Gravure | Grabado | Gravieren | Engraving |
| | Mantelfrezen met fasen | Chanfreins longitudinaux | Chaflanes Longitudinales | Konturfasen | Longitudinal Chamfers |
| | Fase Frezen | Chanfreins longitudinaux | Chaflanes Longitudinales | Konturfasen | Longitudinal Chamfers |
| | Boren en aanschuinen | Chanfreins directs | Chaflanes Directos | Direkt Fasen | Direct Chamfers |
| | V-Sleuf frezen | Rainurage en V | Ranura en "V" | "V"-Nuten Fräsen | V-Grooving |
| | Mantelfrezen | Contournage | Contorneado | Konturfräsen | Countouring |
| | Centeren | Centrage | Centrado | Zentrieren | Centering |
| | Aanschuinen | Chanfreinage | Chaflanado | Fasen | Chamfering |
| | Boren | Perçage | Taladrado | Bohren | Drilling |

## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| HSS-E 8% | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) |
| HM | Hardmetaal | Carbure monobloc | Metal duro integral | Hartmetall | Solid Carbide |
| VHM SC | Volhardmetaal | Carbure monobloc | Metal duro integral | Vollhartmetall | Solid Carbide |
| MG HM | Micro-Grain volhardmetaal | Carbure micrograin | Metal duro micrograno | Micro-Grain Vollhartmetall | Micrograin tungsten carbide |
| TiAlN | TiAlN gecoat | Revêtement TiAlN | Recubrimiento TiAlN | TiAlN Beschichtung | TiAlN coated |
| AlCrN-X | AlCrN-X gecoat | Revêtement AlCrN-X | Recubrimiento AlCrN-X | AlCrN-X Beschichtung | AlCrN-X coated |
| DIN 335-C | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| NORM | Fabriek standaard | Standard usine | Estándar de la fábrica | Werksnorm | Factory standard |
| | Verzinkfrees met schuin gat | Fraise à chanfreiner à trou | Avellanador con agujero | Kegelsenker mit schräger Bohrung | Countersink with through holes |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| 1 | Verzinkfrees met 1 snijkant | Fraise à chanfreiner à un dent | Avellanador con 1 diente | Kegelsenker mit 1 Schneide | Countersink with single flute |
| 3 | Verzinkfrees 3 snijkanten, frezende bewerking | Fraise à chanfreiner à 3 dents, pour fraisage | Avellanador con 3 dientes, para fresar | Kegelsenker mit 3 Schneiden, für fräsen | Countersink with 3 flutes, for milling applications |
| 3 | Verzinkfrees 3 snijkanten, borende bewerking | Fraise à chanfreiner à 3 dents, pour perçage | Avellanador con 3 dientes, para taladar | Kegelsenker mit 3 Schneiden, für Bohren | Countersink with 3 flutes, for drilling applications |
| VARI | Variabele tandsteek | A pas variable | Paso variable | Variabler Verzahnung | Variable pitch |
| 90° | Verzinkhoek | Angle de chanfreinage | Ángulo de avellanar | Senkwinkel | Countersinking angle |
| | Parabolisch geslepen spaankamer | Goujure parabolique | Labios parabólicos | Parabolisch geschliefen Spanraum | Parabolic cut chip chamber |
| | Recht geslepen spaankamer | Goujure droite | Labios rectos | Gerade gesliefen Spanraum | Straight chiproom |
| | Cilindrische schacht | Queue cylindrique | Mango cilíndrico | Zylinderschaft | Straight shank |
| | Schacht met drie platte vlakken | Queue à 3 méplats | Mango con 3 chaflanes | Zylinderschaft mit drei platten Flächen | Shank with 3 flat surfaces |

| 1-ALU | 3-FINE | 4-DIAMOND | 6-UNI | 8-STEEL | 9-INOX |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| N | P M K S H | P M S | P M K S H | P K | M |

## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| HSS | HSS | HSS | HSS | HSS | HSS |
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalto) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| VHM SC | Volhardmetaal | Carbure monobloc | Metal duro integral | Vollhartmetall | Solid Carbide |
| DIN 212-B | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| h8 | Cilindrische schacht h8 | Queue cylindrique h8 | Mango cilíndrico h8 | Zylinderschaft h8 | Straight shank h8 |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| DIN 228-B | Morse Konus Opname | Cône morse | Mango cónico | Morsekegel | Morse Taper shank |
| x0,01 | Oplopend met 0,01 mm | Croissant par 0,01 mm | Creciente por 0,01 mm | Ansteigend mit 0,01 mm | Increasing with 0.01 mm |
| H7 | Passing | Tolérance | Tolerancia | Passung | Tolerance |
| ≤ø3 - 0,000 +0,003 | Tolerantie diameter | Tolérance diamètre | Tolerancia diámetro | Toleranz Durchmesser | Tolerance diameter |



## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| HSS | HSS | HSS | HSS | HSS | HSS |
| HSS-E | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) | HSS-E (5% Cobalto) | HSS-E (5% Cobalt) | HSS-E (5% Cobalt) |
| HSS-E 8% | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) | HSS-E (8% Cobalt) |
| HM-TIP | Hardmetaal Tip | Plaquette carbure brasée | Plaquitas de metal duro soldadas | mit HM-Schneiden | Carbide Tipped |
| VHM SC | Volhardmetaal | Carbure monobloc | Metal duro integral | Hartmetall | Solid Carbide |
| BiM HSS | HSS Bi-Metaal | Bi-métal HSS | HSS Bimetálica | HSS Bi-Metall | HSS Bi-Metall |
| OX. | Stoomontlaten | Vaporisé | Vaporizado | Dampfangelassen | Steam tempered |
| TiN | TiN gecoat | Revêtement TiN | Recubrimiento TiN | TiN Beschichtung | TiN coated |
| TiAlN | TiAlN gecoat | Revêtement TiAlN | Recubrimiento TiAlN | TiAlN Beschichtung | TiAlN coated |
| INOX | T.b.v. roestvaststaal | Pour Inox | Para acero inoxidable | Für Rostfreier Stahl | For stainless steel |
| ALU | T.b.v. aluminium | Pour aluminium | Para aluminio | Für Aluminium | For aluminium |
| Z=0 | Onvertand | Sans dents | Sin dientes | Unverzahnt | Without teeth |
| A | Rechte tand | Denture angulaire | Forma de diente recta | Gerader Zahn | Straight tooth |
| B | Gebogen tand | Denture angulaire moyenne | Forma de diente gruessa | Gebogene Zahn | Cranked tooth |
| BW | Om en om afgeschuinde tand | Denture angulaire moyenne alternée | Forma de diente gruessa alter-nativa | Gebogene Zahn, jeder zweite abgeschrägt | Alternately tapered (BW) |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| C | Met voor- en nasnijder | Denture rectifiée et affutée | Con dientes rectificadas y afiladas | Mit Vor- und Nachschneider | With pre-cutter and post-cutter |
| Const. | Constante tandsteek | A pas constant | Paso constante | Konstanter Verzahnung | Constant pitch |
| VARI | Variabele tandsteek | A pas variable | Paso variable | Variabler Verzahnung | Variable pitch |
| α0° | Normale tand 0° | Angle de coupe 0° | Ángulo de corte 0° | Normaler Zahn 0° | Standard tooth 0° |
| Pos. | Positieve spaanhoek | Angle de coupe positif | Ángulo de corte positivo | Positivem Spannwinkel | Positive cutting edge |
| α 5° | Positieve spaanhoek 5° | Angle de coupe positif 5° | Ángulo de corte positivo 5° | Positivem Spannwinkel 5° | Positive cutting edge 5° |
| α-5° | Negatieve spaanhoek 5° | Angle de coupe négatif 5° | Ángulo de corte negativo 5° | Negativem Spannwinkel 5° | Negative cutting edge 5° |
| | Voor gebundeld massief materiaal | Pour matériaux pleins en paquet | Para material en barras en paquetes | Für gebündelt massiv Material | For bundled solid material |
| | Voor gebundelde profielen | Pour profilés en paquet | Para material de perfiles en paquetes | Für gebündelte Profile | Bundel profiel |
| | Stafmateriaal dun | Matériaux pleins fins | Material en barras delgado | Stangenmaterial dünn | Thin rods |
| | Stafmateriaal dik | Matériaux pleins épais | Material en barras grande | Stangenmaterial dick | Thick rods |
| | Kokerprofiel dunwandig | Profilés fins | Material de perfiles delgado | Schlauchmaterial dünn | Thin tube profile |
| | Kokerprofiel dikwandig | Profilés épais | Material de perfiles grande | Schlauchmaterial dick | Thick tube profile |
| | H-Profiel | Profil H | Perfil H | Profil H | H-Profile |



## ICONEN ICONES ICONOS PIKTOGRAMME ICONS

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| DIN 225 | DIN norm | Norme DIN | Norma DIN | DIN Norm | DIN norm |
| DIN 1835-B | Voor cilindrische schacht met Weldon vlak | Pour queue cylindrique avec méplat type Weldon | Para mango cil-índrico con plano de arrastre tipo Weldon | Für Zylinderschaft mit Mitnahmefla-che Tyo Weldon | Straight shank with Weldon |
| DIN 228-B | Morse Konus Opname | Cône morse | Mango cónico | Morsekegel | Morse Taper shank |
| ER | ER Spantangen volgens DIN 6499 | Pinces ER selon DIN 6499 | Pinzas ER según DIN 6499 | ER Spannzangen gemäss DIN 6499 | Collets ER according to DIN 6499 |
| AUTO REVERSAL | Omkeerinrichting | Avec dispositif d'inversion | Con dispositivo de inversión | Mit Umkehrvor-richtung | With pendular system |
| C T | Druk- en trekcom-pensatie | Compensation de pression et de traction | Compensación de presión y de tracción | Ausgleich für Druck und Zug | Push and pull compensation |
| TYPE XP | Precisie uitvoering | Version de précision | Versión de precisión | Präzision-sausführung | Precision version |
| P | Met pendelin-richting | Avec système pendulaire | Con sistema pendular | Mit Pendelsystem | With pendular system |
| AUTO REVERSAL | Omkeerinrichting | Avec dispositif d'inversion | Con dispositivo de inversión | Mit Umkehrvor-richtung | With pendular system |

| | NL | FR | ES | DE | EN |
|---|---|---|---|---|---|
| C T | Druk- en trekcom-pensatie | Compensation de pression et de traction | Compensación de presión y de tracción | Ausgleich für Druck und Zug | Push and pull compensation |
| SK | Opname volgens DIN 2080 | A queue selon DIN 2080 | Con cono según DIN 2080 | Aufnahme gemäß DIN 2080 | With shank according to DIN 2080 |
| SK | Opname volgens DIN 69871 | A queue selon DIN 69871 | Con cono según DIN 69871 | Aufnahme gemäß DIN 69871 | With shank according to DIN 69871 |
| MAS-BT | Opname volgens MAS 403-BT | A queue selon MAS 403-BT | Con cono según MAS 403-BT | Aufnahme gemäß MAS 403-BT | With shank according to MAS 403-BT |
| AT3 | Tolerantieklasse AT3 | Classe de tolérance AT3 | Clase de tolerancia AT3 | Toleranzklasse AT3 | Tolerance class AT3 |
| 0,005 | Rondloopnauw-keurig 0,005 mm | Concentricitée 0,005 mm | Concentricidad 0,005 mm | Rundlaufgegauig-keit 0,005 mm | Integrated run-out 0.005 mm |
| | Spansleutel | Clé de mandrin | Llave de apriete | Spannschlüssel | Chuck key |
| G6,3 12.000 RPM | Balanceerklasse G6,3 | Classe d'équilibrage G6,3 | Clase de equilibración G6,3 | Ausgewuchtet G6,3 | Balance class G6.3 |

NL Index
FR Index
ES índice
DE Übersicht
EN Index

P K Bij uitstek geschikt
H N Très approprié
M S Muy adecuado
Ideal geeignet
Very adequate

P K Beperkt geschikt
H N Approprié
M S Adecuado
Eingeschränkt geeignet
Adequate

P= pagina
P= page
P= página
P= Seite

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| › 11.245 | Phantom | 5xD | DIN 6537-L | | P | | K | | H | | | | | | P. 12 |
| › 11.250 | Phantom | 3xD | DIN 6537-K | UNI | P | M | K | N | S | H | | | | | P. 12 |
| › 11.252 | International Tools | 3xD | DIN 6537-K | ECO PRO | P | M | K | N | S | H | | | | | P. 13 |
| › 11.253 | Phantom | 3xD | DIN 6537-K | UNI | P | M | K | N | S | H | | | | | P. 13 |
| › 11.262 | Phantom | 3xD | DIN 6537-K | INOX | P | M | | | S | | | | | | P. 14 |
| › 11.270 | Phantom | 5xD | DIN 6537-L | UNI | P | M | K | N | S | H | | | | | P. 15 |
| › 11.272 | International Tools | 5xD | DIN 6537-L | ECO PRO | P | M | K | N | S | H | | | | | P. 15 |
| › 11.273 | Phantom | 5xD | DIN 6537-L | UNI | P | M | K | N | S | H | | | | | P. 16 |
| › 11.279 | Phantom | 5xD | DIN 6537-L | ALU | | | | N | | | | | | | P. 17 |
| › 11.282 | Phantom | 5xD | DIN 6537-L | INOX | P | M | | | S | | | | | | P. 17 |
| › 11.295 | Phantom | 8xD | NORM | UNI | P | M | K | N | S | H | | | | | P. 18 |
| › 11.305 | Phantom | 10xD | NORM | UNI | P | M | K | N | S | H | | | | | P. 18 |
| › 11.310 | Phantom | 15xD | NORM | UNI | P | M | K | N | S | H | | | | | P. 19 |
| › 11.330 | Phantom | 5xD | NORM | UNI | P | M | K | N | S | H | | | | | P. 19 |
| › 11.335 | Phantom | 8xD | NORM | UNI | P | M | K | N | S | H | | | | | P. 20 |
| › 15.144 | Phantom | 60° | DIN 333-A | | P | M | | | | | | | | | P. 20 |
| › 15.624 | Phantom | 90° | DIN 6535-HB | | P | M | K | N | S | H | | | | | P. 20 |
| › 15.724 | Phantom | 120° | DIN 6535-HB | | P | M | K | N | S | H | | | | | P. 21 |
| › 15.764 | Phantom | DIN 6535-HB | | 142° | P | M | K | N | S | H | | | | | P. 21 |
| › 11.168 | Phantom | DIN 1897 | HSS-E | HP2 UNI | P | M | K | N | | | | | | | P. 22 |
| › 11.450 | Phantom | DIN 338 | HSS | | P | M | K | N | | | | | | | P. 22 |
| › 11.451 | Phantom | DIN 338 | HSS | | P | M | K | N | | | | | | | P. 24 |
| › 11.461 | Phantom | DIN 338 | HSS | | P | M | K | N | | | | | | | P. 24 |
| › 11.500 | Phantom | DIN 338 | HSS-E | | P | M | K | N | | | | | | | P. 25 |
| › 11.510 | Phantom | HSS-E 8% | DIN 338 | | P | M | K | N | S | | | | | | P. 26 |
| › 11.568 | Phantom | DIN 338 | HSS-E | HP2 UNI | P | M | K | N | | | | | | | P. 27 |
| › 11.760 | Phantom | DIN 338 | HSS-E | INOX | P | M | | | S | | | | | | P. 28 |
| › 11.764 | Phantom | DIN 338 | HSS-E | INOX | P | M | | | S | | | | | | P. 28 |
| › 11.920 | Phantom | DIN 1869 | HSS | TS | P | M | K | N | | | | | | | P. 29 |
| › 11.940 | Phantom | DIN 1869 | HSS-E | TS | P | M | K | N | | | | | | | P. 30 |
| › 12.440 | Phantom | DIN 228-B | DIN 345 | HSS | P | M | K | N | | | | | | | P. 30 |
| › 12.500 | Phantom | DIN 228-B | DIN 345 | HSS-E | P | M | K | N | | | | | | | P. 31 |
| › 15.100 | Phantom | 60° | DIN 333-A | HSS | P | | K | N | | | | | | | P. 31 |

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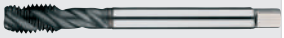
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| › 19.145 | Phantom | DIN 338 | HSS | | | | P | M | K | N | | | | |  | P. 32 |
| › 19.146 | Phantom | DIN 338 | HSS | | | | P | M | K | N | | | | |  | P. 32 |
| › 19.147 | Phantom | DIN 338 | HSS | | | | P | M | K | N | | | | |  | P. 33 |
| › 19.150 | Phantom | DIN 338 | HSS-E | | | | P | M | K | N | | | | |  | P. 33 |
| › 19.176 | Phantom | DIN 338 | HSS-E | INOX | P | M | | | | | S | | | |  | P. 33 |
| › 22.200 | Phantom | DIN 371 | | M | P | M | K | N | S | | | | | |  | P. 34 |
| › 22.201 | Phantom | DIN 376 | | M | P | M | K | N | S | | | | | |  | P. 34 |
| › 22.210 | Phantom | DIN 371 | | M | P | M | K | N | S | | | | | |  | P. 35 |
| › 22.211 | Phantom | DIN 376 | | M | P | M | K | N | S | | | | | |  | P. 35 |
| › 22.230 | Phantom | DIN 371 | | M | P | M | K | N | S | | | | | |  | P. 35 |
| › 22.231 | Phantom | DIN 376 | | M | P | M | K | N | S | | | | | |  | P. 36 |
| › 22.240 | Phantom | DIN 371 | | M | P | M | K | N | S | | | | | |  | P. 36 |
| › 22.241 | Phantom | DIN 376 | | M | P | M | K | N | S | | | | | |  | P. 36 |
| › 22.268 | Phantom | DIN 371 | | M | P | M | K | N | S | | | | | |  | P. 37 |
| › 22.269 | Phantom | DIN 376 | | M | P | M | K | N | S | | | | | |  | P. 37 |
| › 22.350 | Phantom | | | M | NORM | P | M | K | N | S | | | | |  | P. 37 |
| › 22.351 | Phantom | | | M | NORM | P | M | K | N | S | | | | |  | P. 38 |
| › 23.300 | Phantom | | DIN 371 | M | | P | M | K | N | S | | | | |  | P. 38 |
| › 23.301 | Phantom | | DIN 376 | M | | P | M | K | N | S | | | | |  | P. 38 |
| › 23.320 | Phantom | | DIN 371 | M | | P | M | K | N | S | | | | |  | P. 39 |
| › 23.321 | Phantom | | DIN 376 | M | | P | M | K | N | S | | | | |  | P. 39 |
| › 23.324 | Phantom | | DIN 371 | M | | P | M | K | N | S | | | | |  | P. 39 |
| › 23.325 | Phantom | | DIN 376 | M | | P | M | K | N | S | | | | |  | P. 40 |
| › 23.368 | Phantom | | DIN 371 | M | | P | M | K | N | S | | | | |  | P. 40 |
| › 23.369 | Phantom | | DIN 376 | M | | P | M | K | N | S | | | | |  | P. 40 |
| › 23.370 | Phantom | | | M | NORM | P | M | K | N | S | | | | |  | P. 41 |
| › 23.371 | Phantom | | | M | NORM | P | M | K | N | S | | | | |  | P. 41 |
| › 23.620 | Phantom | DIN 374 | | MF | | P | M | K | N | S | | | | |  | P. 41 |
| › 23.840 | Phantom | | DIN 374 | MF | | P | M | K | N | S | | | | |  | P. 42 |
| › 25.097 | Phantom | BSP G | DIN 5156 | | | P | M | K | N | S | | | | |  | P. 43 |
| › 25.297 | Phantom | | BSP G | DIN 5156 | | P | M | K | N | S | | | | |  | P. 43 |

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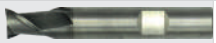
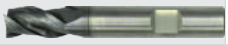
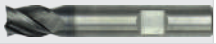
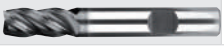
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| › 26.100 | Phantom | | M | DIN 2174 | P | | | | N | | |  | P. 43 |
| › 26.101 | Phantom | | M | DIN 2174 | P | | | | N | | |  | P. 44 |
| › 26.110 | Phantom | | M | DIN 2174 | P | M | | | N | | |  | P. 44 |
| › 26.111 | Phantom | | M | DIN 2174 | P | M | | | N | | |  | P. 44 |
| › 26.160 | Phantom | | M | DIN 2174 | P | M | | | N | | |  | P. 45 |
| › 26.161 | Phantom | | M | DIN 2174 | P | M | | | N | | |  | P. 45 |
| › 26.310 | Phantom | | | M | P | M | K | N | S | H | |  | P. 45 |
| › 26.316 | Phantom | | | M | P | M | K | N | S | H | |  | P. 46 |
| › 26.384 | Phantom | | | M | P | M | K | N | S | H | |  | P. 46 |
| › 29.250 | Phantom | | | | | | | | | | |  | P. 46 |
| › 32.242 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 47 |
| › 32.252 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 47 |
| › 32.256 | Phantom | NORM | UNI | | P | M | K | N | S | | |  | P. 47 |
| › 33.242 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 48 |
| › 33.252 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 48 |
| › 33.256 | Phantom | UNI | | DIN 6528 | P | M | K | N | S | | |  | P. 48 |
| › 33.610 | Phantom | NORM | | ALU | | | | N | | | |  | P. 49 |
| › 34.242 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 49 |
| › 34.246 | Phantom | DIN 6527 | VARI | UNI | P | M | K | N | S | | |  | P. 49 |
| › 34.252 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | |  | P. 50 |
| › 34.256 | Phantom | NORM | UNI | | P | M | K | N | S | | |  | P. 50 |
| › 34.260 | Phantom | DIN 6527 | VARI | UNI | P | M | K | N | S | | |  | P. 50 |
| › 34.302 | Phantom | VARI | HP2 UNI | 1,5xD | P | M | K | | S | | |  | P. 51 |
| › 34.314 | Phantom | VARI | HP2 UNI | 2xD 3xD | P | M | K | | S | | |  | P. 51 |
| › 34.316 | Phantom | VARI | HP2 UNI | 2xD 3xD | P | M | K | | S | | |  | P. 52 |
| › 34.318 | Phantom | VARI | HP2 UNI | 1,5xD 5xD | P | M | K | | S | | |  | P. 52 |
| › 34.330 | Phantom | VARI | HP2 UNI | 2xD | P | M | K | | S | | |  | P. 53 |
| › 34.331 | Phantom | 3xD | VARI | HP2 UNI | P | M | K | | S | | |  | P. 53 |
| › 34.332 | Phantom | VARI | HP2 UNI | 2xD 4xD | P | M | K | | S | | |  | P. 53 |
| › 35.254 | Phantom | HR | | HP2 UNI | P | M | K | | S | | |  | P. 54 |
| › 35.484 | Phantom | HR | INOX | | P | M | | | S | | |  | P. 54 |
| › 35.540 | Phantom | | WR | ALU | | | | N | | | |  | P. 54 |
| › 36.130 | Phantom | NORM | 21° | ALU | | | | N | | | |  | P. 55 |
| › 36.140 | Phantom | NORM | 20° | ALU | | | | N | | | |  | P. 55 |
| › 36.166 | Phantom | 90° | NORM | | P | M | | N | S | | |  | P. 55 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| › 36.242 | International Tools | DIN 6527 | | ECO PRO | P | M | K | N | S | | | | | | | | | | P. 56 |
| › 36.256 | Phantom | NORM | UNI | | P | M | K | N | S | | | | | | | | | | P. 56 |
| › 36.285 | Phantom | HRC | NORM | | P | | | | | | | | | H | | | | | P. 56 |
| › 32.228 | Phantom | DIN 327-B | HSS-E PM | | P | M | K | N | | | | | | | | | | | P. 57 |
| › 33.228 | Phantom | DIN 844-B | HSS-E PM | | P | M | K | N | | | | | | | | | | | P. 57 |
| › 34.228 | Phantom | DIN 844-B | HSS-E PM | | P | M | K | N | | | | | | | | | | | P. 57 |
| › 35.126 | Phantom | DIN 844-B | HSS-E PM | | P | M | K | N | | | | | | | | | | | P. 58 |
| › 35.128 | Phantom | DIN 844-B | HSS-E PM | | P | | | | | | | | | | | | | | P. 58 |
| › 35.726 | Phantom | DIN 844-B | HSS-E PM | | P | M | K | N | | | | | | | | | | | P. 58 |
| › 36.228 | Phantom | DIN 327-B | HSS-E PM | | P | M | K | | | | | | | | | | | | P. 59 |
| › 41.510 | Phantom | Ø6 | A | | | | | | | | | | | | | | | | P. 60 |
| › 41.520 | Phantom | Ø6 | B | | | | | | | | | | | | | | | | P. 60 |
| › 41.530 | Phantom | Ø6 | C | | | | | | | | | | | | | | | | P. 60 |
| › 41.534 | Phantom | HP2 UNI | Ø6 | C | | | | | | | | | | | | | | | NEW P. 61 |
| › 41.536 | Phantom | Ø6 | C | HP2 ALU | | | | | | | | | | | | | | | NEW P. 61 |
| › 41.560 | Phantom | Ø6 | F | | | | | | | | | | | | | | | | P. 61 |
| › 41.564 | Phantom | HP2 UNI | Ø6 | F | | | | | | | | | | | | | | | NEW P. 62 |
| › 41.566 | Phantom | Ø6 | F | HP2 ALU | | | | | | | | | | | | | | | NEW P. 62 |
| › 41.610 | Phantom | Ø6 | K | | | | | | | | | | | | | | | | P. 62 |
| › 42.548 | Phantom | HSS-E | 3 | 90° | P | M | K | N | S | | | | | | | | | | P. 62 |
| › 42.558 | Phantom | HSS-E | 3 | 90° | P | M | K | N | S | | | | | | | | | | P. 63 |
| › 42.560 | Phantom | MG HM | 3 | 90° | P | M | K | N | S | H | | | | | | | | | P. 63 |
| › 42.562 | Phantom | 3 | VHM SC | 90° | P | M | K | N | S | H | | | | | | | | | NEW P. 63 |
| › 42.564 | Phantom | 3 | VHM SC | 90° | P | M | K | N | S | H | | | | | | | | | NEW P. 64 |
| › 42.567 | Phantom | HSS-E | 3 | 90° | P | M | K | N | S | | | | | | | | | | P. 64 |
| › 42.582 | Phantom | HSS-E 8% | 90° | >3 | P | M | K | N | S | H | | | | | | | | | P. 64 |
| › 42.585 | Phantom | VHM SC | 90° | >3 | P | M | K | N | S | H | | | | | | | | | NEW P. 65 |
| › 49.150 | Phantom | VHM SC | Ø6 | | | | | | | | | | | | | | | | P. 65 |
| › 49.164 | Phantom | VHM SC | HP2 UNI | Ø6 | | | | | | | | | | | | | | | NEW P. 65 |
| › 49.264 | Phantom | HSS-E | 3 | 90° | P | M | K | N | S | | | | | | | | | | P. 66 |
| › 49.266 | Phantom | HSS-E | 3 | 90° | P | M | K | N | S | | | | | | | | | | P. 66 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| › 51.320 | Phantom | H7 | HSS-E | DIN 212 B/D | P | M | K | N | S | | | | P. 67 |
| › 51.324 | Phantom | H7 | HSS-E | DIN 212 B/D | P | M | K | N | S | | | | P. 67 |
| › 51.330 | Phantom | H7 | MG HM | DIN 212 B/D | P | M | K | N | S | | | | P. 67 |
| › 51.334 | Phantom | DIN 212-D | H7 | MG HM | P | M | K | N | S | | | | P. 68 |
| › 51.350 | Phantom | HSS-E | x0,01 | DIN 212 B/D | P | M | K | N | S | | | | P. 68 |
| › 51.360 | Phantom | MG HM | NORM | x0,01 | P | M | K | N | S | | | | P. 69 |
| › 63.200 | Phantom | DIN 1837-A | HSS | A | P | M | K | | | | | | P. 70 |
| › 63.220 | Phantom | DIN 1837-A | A | VHM SC | P | M | K | N | S | | | | P. 71 |
| › 63.250 | Phantom | DIN 1838-B | HSS | B | P | M | K | N | | | | | P. 72 |
| › 63.270 | Phantom | DIN 1838-B | A | VHM SC | P | M | K | N | S | | | | P. 73 |
| › 63.400 | Phantom | HSS | OX. | C+BW | P | | K | N | | | | | P. 74 |
| › 63.424 | Phantom | HSS-E | TiAlN | C+BW | P | M | K | N | | | | | P. 75 |
| › 63.450 | Phantom | HM-TIP | α 5° | | | | | N | | | | | P. 75 |
| › 63.460 | Phantom | HM-TIP | α-5° | | | | | N | | | | | P. 75 |
| › 66.110 | Phantom | BiM HSS | | | P | | K | N | | | | | P. 76 |
| › 66.130 | Phantom | BiM HSS | KASTO | | P | | K | N | | | | | P. 76 |
| › 66.160 | Phantom | INOX | BiM 8% Co | | P | M | K | N | | | | | P. 77 |
| › 66.450 | Phantom | BiM 8% Co | VARI | λ α0° | P | M | K | N | S | | | | P. 78 |
| › 66.460 | Phantom | BiM 8% Co | VARI | λ α10° | P | M | K | N | | | | | P. 78 |
| › 66.580 | Phantom | BiM 10% Co | VARI | λ α15° | P | M | | | S | | | | P. 79 |
| › 66.700 | Phantom | BiM 8% Co | VARI | λ α5° | P | M | K | N | S | | | | P. 79 |
| › 72.121 | Phantom | CKJNR/L | | | | | | | | | | | P. 80 |
| › 73.105 | Phantom | KNUX | | | | | | | | | | | P. 81 |
| › 72.156 | Phantom | CTGPR/L | | | | | | | | | | | P. 82 |
| › 73.171<br>› 73.175<br>› 73.180 | Phantom | TPMR<br>TPUN<br>TPUX | | | | | | | | | | | P. 83 |
| › 72.240<br>› 72.245 | Phantom | PCLNR/L<br>DCLNR/L | | | | | | | | | | | P. 84 |
| › 73.200<br>› 73.201<br>› 73.203<br>› 73.204<br>› 73.206 | Phantom | CNMG<br>CNMA | | | | | | | | | | | P. 85 |
| › 72.265<br>› 72.280 | Phantom | DDJNR/L<br>PDNNR/L | | | | | | | | | | | P. 86 |
| › 73.211<br>› 73.213 | Phantom | DNMG | | | | | | | | | | | P. 87 |
| › 72.325 | Phantom | DSSNR/L | | | | | | | | | | | P. 88 |
| › 73.241<br>› 73.243 | Phantom | SNMG | | | | | | | | | | | P. 89 |

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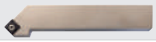
|---|---|---|---|---|
| › 72.340 | Phantom | PTGNR/L |  | P. 90 |
| › 73.250<br>› 73.251<br>› 73.253 | Phantom | TNMG |  | P. 91 |
| › 72.385 | Phantom | DWLNR/L |  | P. 92 |
| › 73.291<br>› 73.293 | Phantom | WNMG |  | P. 93 |
| › 72.420 | Phantom | SCLCR/L |  | P. 94 |
| › 73.500<br>› 73.501<br>› 73.503<br>› 73.505 | Phantom | CCMT<br>CCGT |  | P. 95 |
| › 72.450<br>› 72.455 | Phantom | SDJCR/L<br>SDNCN |  | P. 96 |
| › 73.510<br>› 73.511<br>› 73.513<br>› 73.515 | Phantom | DCMT<br>DCGT |  | P. 97 |
| › 72.461 | Phantom | SRDCN |  | P. 98 |
| › 73.521 | Phantom | RCMT |  | P. 99 |
| › 72.485 | Phantom | SSSCR |  | P. 100 |
| › 73.530<br>› 73.531<br>› 73.535 | Phantom | SCMT<br>SCGT |  | P. 101 |
| › 72.500<br>› 72.505 | Phantom | STFCR<br>STGCR/L |  | P. 102 |
| › 73.540<br>› 73.541<br>› 73.543<br>› 73.545 | Phantom | TCMT<br>TCGT |  | P. 103 |
| › 72.515<br>› 72.520 | Phantom | SVJCR/L<br>SVVCN |  | P. 104 |
| › 73.591<br>› 73.595 | Phantom | VCMT<br>VCGT |  | P. 105 |
| › 72.540 | Phantom | S-CTFPR/L |  | P. 106 |
| › 73.171<br>› 73.175<br>› 73.180 | Phantom | TPMR<br>TPUN<br>TPUX |  | P. 107 |
| › 72.545<br>› 72.550 | Phantom | S-PCLNR<br>A-DCLNR/L |  | P. 108 |
| › 73.200<br>› 73.201<br>› 73.203<br>› 73.204<br>› 73.206 | Phantom | CNMG<br>CNMA |  | P. 109 |
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| › 73.211<br>› 73.213 | Phantom | DNMG |  | P. 111 |
| › 72.565 | Phantom | A-PTFNR/L |  | P. 112 |

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| › 73.250<br>› 73.251<br>› 73.253 | Phantom | TNMG |  | P. 113 |
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| › 73.291<br>› 73.293 | Phantom | WNMG |  | P. 115 |
| › 72.585<br>› 72.590 | Phantom | S-SCLCR<br>A-SCLCR/L |  | P. 116 |
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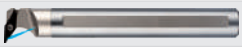
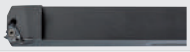
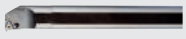
| › 73.530<br>› 73.531<br>› 73.535 | Phantom | SCMT<br>SCGT |  | P. 121 |
| › 72.615<br>› 72.620 | Phantom | S-STFCR<br>A-STFCR/L |  | P. 122 |
| › 73.540<br>› 73.541<br>› 73.543<br>› 73.545 | Phantom | TCMT<br>TCGT |  | P. 123 |
| › 72.630 | Phantom | A-SVUCR |  | P. 124 |
| › 73.591<br>› 73.595 | Phantom | VCMT<br>VCGT |  | P. 125 |
| › 74.101 | Phantom | NL-AL |  | P. 126 |
| › 74.102 | Phantom | AL-LH |  | P. 126 |
| › 74.125 | Phantom | NVR-AVR |  | P. 127 |
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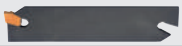
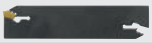
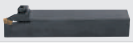
| 74.390 | Phantom | ER DIN 471 |  | P. 134 |
| 74.395 | Phantom | IR DIN 472 |  | P. 134 |
| 74.410 | Phantom | FX |  | P. 135 |
| 74.480 | Phantom | FX |  | P. 135 |
| 74.500 | Phantom | PTNZ |  | P. 136 |
| 74.510 | Phantom | EXN |  | P. 136 |
| 74.517 | Phantom | EXN |  | P. 136 |
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| › 82.927 | Phantom | DIN 6499 | ER-25 | 0,008 | |  | P. 169 |
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| › 83.644 | Phantom | SK | | G2,5 25.000 RPM | | NEW  | P. 170 |
| › 83.646 | Phantom | MAS-BT | | G2.5 25.000 RPM | | NEW  | P. 170 |
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| › 84.160 | International Tools | DIN 238 | B | DIN 228-A | | NEW  | P. 171 |
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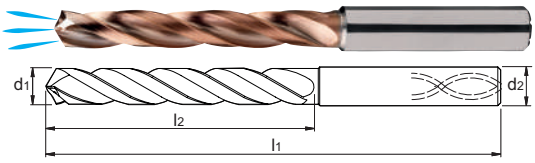
## › 11.245 Phantom




NL **Volhardmetaal Spiraalboor 5xD High-Feed, met koelkanaal, AlCrN-X, 3 snijkanten**
FR **Foret Carbure monobloc 5xD High-Feed, à trou d´huile, AlCrN-X, 3 taillants**
ES **Broca Metal duro 5xD High-Feed, con canal de refrigeración, AlCrN-X, 3 labios**
DE **Vollhartmetall Spiralbohrer 5xD High-Feed, mit Innenkühlung, AlCrN-X, 3 Schneiden**
EN **Solid carbide Twist drill 5xD High-Feed, with coolant holes, AlCrN-X, 3 flute**

140° | 5xD | h6 | DIN 6535-HA | DIN 6537-L | m7 | MG HM | AlCrN-X | HF

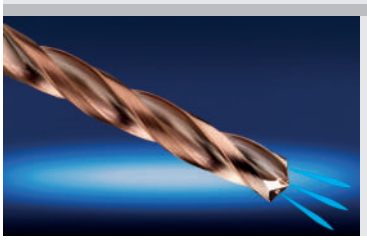
P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | K 31 GG | K 32 GGG GTS-GTW

120-130 K | 90-140 K | 90-110 K | 70-85 J | 35-55 D | 80-110 K | 100-120 L

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.245.0500 | 5 | 6 | 82 | 44 | 128,95 |
| 11.245.0510 | 5.1 | 6 | 82 | 44 | 128,95 |
| 11.245.0520 | 5.2 | 6 | 82 | 44 | 128,95 |
| 11.245.0530 | 5.3 | 6 | 82 | 44 | 128,95 |
| 11.245.0550 | 5.5 | 6 | 82 | 44 | 128,95 |
| 11.245.0580 | 5.8 | 6 | 82 | 44 | 128,95 |
| 11.245.0600 | 6 | 6 | 82 | 44 | 128,95 |
| 11.245.0650 | 6.5 | 8 | 91 | 53 | 142,50 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.245.0680 | 6.8 | 8 | 91 | 53 | 142,50 |
| 11.245.0700 | 7 | 8 | 91 | 53 | 142,50 |
| 11.245.0740 | 7.4 | 8 | 91 | 53 | 142,50 |
| 11.245.0800 | 8 | 8 | 91 | 53 | 142,50 |
| 11.245.0850 | 8.5 | 10 | 103 | 61 | 169,60 |
| 11.245.0900 | 9 | 10 | 103 | 61 | 169,60 |
| 11.245.1000 | 10 | 10 | 103 | 61 | 169,60 |
| 11.245.1020 | 10.2 | 12 | 118 | 71 | 238,50 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.245.1050 | 10.5 | 12 | 118 | 71 | 238,50 |
| 11.245.1100 | 11 | 12 | 118 | 71 | 238,50 |
| 11.245.1200 | 12 | 12 | 118 | 71 | 238,50 |
| 11.245.1300 | 13 | 14 | 124 | 77 | 339,00 |
| 11.245.1400 | 14 | 14 | 124 | 77 | 339,00 |
| 11.245.1500 | 15 | 16 | 133 | 83 | 448,00 |
| 11.245.1600 | 16 | 16 | 133 | 83 | 448,00 |



NL Phantom High Feed VHM-MG 3-snijder spiraalboor
FR Phantom High Feed en carbure monobloc 3 taillants
ES Phantom High Feed de Alto Avance de metal duro con 3 labios
DE Phantom High Feed VHM-Bohrer mit 3 Schneiden
EN Phantom High Feed SC 3-flute cutter

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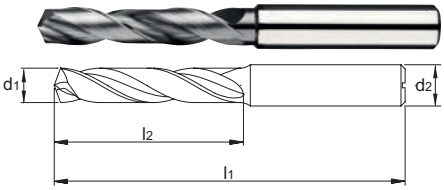
## › 11.250 Phantom




NL **UNI Volhardmetaal Spiraalboor 3xD TiAlN**
FR **Foret Carbure monobloc 3xD UNI TiAlN**
ES **Broca Metal duro 3xD UNI TiAlN**
DE **UNI Vollhartmetall Spiralbohrer 3xD TiAlN**
EN **UNI Solid carbide Twist drill 3xD TiAlN**

140° | 3xD | h6 | DIN 6535-HA | DIN 6537-K | m7 | MG HM | TiAlN | UNI

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 51 Cu | S 71 Ni/Co

120-130 G | 65-145 F | 55-110 F | 45-100 C | 25-45 C | 50-55 C | 35-45 C | 155-210 H | 125-155 G | 60-180 G | 22-25 D

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.0100 | 1 | 3 | 45 | 7 | 48,85 |
| 11.250.0110 | 1.1 | 3 | 45 | 7 | 48,85 |
| 11.250.0120 | 1.2 | 3 | 45 | 7 | 48,85 |
| 11.250.0130 | 1.3 | 3 | 45 | 7 | 48,85 |
| 11.250.0140 | 1.4 | 3 | 45 | 7 | 48,85 |
| 11.250.0150 | 1.5 | 3 | 55 | 14 | 48,85 |
| 11.250.0160 | 1.6 | 3 | 55 | 14 | 48,85 |
| 11.250.0170 | 1.7 | 3 | 55 | 14 | 48,85 |
| 11.250.0180 | 1.8 | 3 | 55 | 14 | 48,85 |
| 11.250.0190 | 1.9 | 3 | 55 | 14 | 48,85 |
| 11.250.0200 | 2 | 4 | 55 | 20 | 48,85 |
| 11.250.0210 | 2.1 | 4 | 55 | 20 | 48,85 |
| 11.250.0220 | 2.2 | 4 | 55 | 20 | 48,85 |
| 11.250.0230 | 2.3 | 4 | 55 | 20 | 48,85 |
| 11.250.0240 | 2.4 | 4 | 55 | 20 | 48,85 |
| 11.250.0250 | 2.5 | 4 | 55 | 20 | 48,85 |
| 11.250.0260 | 2.6 | 4 | 55 | 20 | 48,85 |
| 11.250.0270 | 2.7 | 4 | 55 | 20 | 48,85 |
| 11.250.0280 | 2.8 | 4 | 55 | 20 | 48,85 |
| 11.250.0290 | 2.9 | 4 | 55 | 20 | 48,85 |
| 11.250.0300 | 3 | 6 | 62 | 20 | 48,85 |
| 11.250.0310 | 3.1 | 6 | 62 | 20 | 48,85 |
| 11.250.0320 | 3.2 | 6 | 62 | 20 | 48,85 |
| 11.250.0330 | 3.3 | 6 | 62 | 20 | 48,85 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.0340 | 3.4 | 6 | 62 | 20 | 48,85 |
| 11.250.0350 | 3.5 | 6 | 62 | 20 | 48,85 |
| 11.250.0360 | 3.6 | 6 | 62 | 20 | 48,85 |
| 11.250.0370 | 3.7 | 6 | 62 | 20 | 48,85 |
| 11.250.0380 | 3.8 | 6 | 66 | 24 | 48,85 |
| 11.250.0390 | 3.9 | 6 | 66 | 24 | 48,85 |
| 11.250.0400 | 4 | 6 | 66 | 24 | 48,85 |
| 11.250.0410 | 4.1 | 6 | 66 | 24 | 48,85 |
| 11.250.0420 | 4.2 | 6 | 66 | 24 | 48,85 |
| 11.250.0430 | 4.3 | 6 | 66 | 24 | 48,85 |
| 11.250.0440 | 4.4 | 6 | 66 | 24 | 48,85 |
| 11.250.0450 | 4.5 | 6 | 66 | 24 | 48,85 |
| 11.250.0460 | 4.6 | 6 | 66 | 24 | 48,85 |
| 11.250.0470 | 4.7 | 6 | 66 | 24 | 48,85 |
| 11.250.0480 | 4.8 | 6 | 66 | 28 | 48,85 |
| 11.250.0490 | 4.9 | 6 | 66 | 28 | 48,85 |
| 11.250.0500 | 5 | 6 | 66 | 28 | 48,85 |
| 11.250.0510 | 5.1 | 6 | 66 | 28 | 48,85 |
| 11.250.0520 | 5.2 | 6 | 66 | 28 | 48,85 |
| 11.250.0530 | 5.3 | 6 | 66 | 28 | 48,85 |
| 11.250.0540 | 5.4 | 6 | 66 | 28 | 48,85 |
| 11.250.0550 | 5.5 | 6 | 66 | 28 | 48,85 |
| 11.250.0560 | 5.6 | 6 | 66 | 28 | 48,85 |
| 11.250.0570 | 5.7 | 6 | 66 | 28 | 48,85 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.0590 | 5.9 | 6 | 66 | 28 | 48,85 |
| 11.250.0600 | 6 | 6 | 66 | 28 | 48,85 |
| 11.250.0610 | 6.1 | 8 | 79 | 34 | 57,45 |
| 11.250.0620 | 6.2 | 8 | 79 | 34 | 57,45 |
| 11.250.0630 | 6.3 | 8 | 79 | 34 | 57,45 |
| 11.250.0640 | 6.4 | 8 | 79 | 34 | 57,45 |
| 11.250.0650 | 6.5 | 8 | 79 | 34 | 57,45 |
| 11.250.0660 | 6.6 | 8 | 79 | 34 | 57,45 |
| 11.250.0670 | 6.7 | 8 | 79 | 34 | 57,45 |
| 11.250.0680 | 6.8 | 8 | 79 | 34 | 57,45 |
| 11.250.0690 | 6.9 | 8 | 79 | 34 | 57,45 |
| 11.250.0700 | 7 | 8 | 79 | 34 | 57,45 |
| 11.250.0720 | 7.2 | 8 | 79 | 41 | 57,45 |
| 11.250.0750 | 7.5 | 8 | 79 | 41 | 57,45 |
| 11.250.0800 | 8 | 8 | 79 | 41 | 57,45 |
| 11.250.0850 | 8.5 | 10 | 89 | 47 | 84,00 |
| 11.250.0860 | 8.6 | 10 | 89 | 47 | 84,00 |
| 11.250.0880 | 8.8 | 10 | 89 | 47 | 84,00 |
| 11.250.0900 | 9 | 10 | 89 | 47 | 84,00 |
| 11.250.0950 | 9.5 | 10 | 89 | 47 | 84,00 |
| 11.250.1000 | 10 | 10 | 89 | 47 | 84,00 |
| 11.250.1020 | 10.2 | 12 | 102 | 55 | 105,50 |
| 11.250.1030 | 10.3 | 12 | 102 | 55 | 105,50 |
| 11.250.1050 | 10.5 | 12 | 102 | 55 | 105,50 |

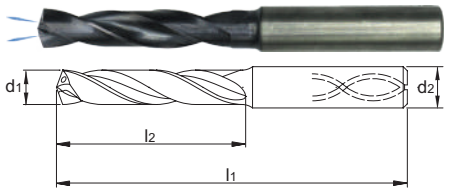
## › 11.250 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.1100 | 11 | 12 | 102 | 55 | 105,50 |
| 11.250.1150 | 11.5 | 12 | 102 | 55 | 105,50 |
| 11.250.1200 | 12 | 12 | 102 | 55 | 105,50 |
| 11.250.1250 | 12.5 | 14 | 107 | 60 | 174,05 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.1300 | 13 | 14 | 107 | 60 | 174,05 |
| 11.250.1350 | 13.5 | 14 | 107 | 60 | 174,05 |
| 11.250.1400 | 14 | 14 | 107 | 60 | 174,05 |
| 11.250.1450 | 14.5 | 16 | 115 | 65 | 213,80 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.250.1500 | 15 | 16 | 115 | 65 | 213,80 |
| 11.250.1550 | 15.5 | 16 | 115 | 65 | 213,80 |
| 11.250.1600 | 16 | 16 | 115 | 65 | 213,80 |

## › 11.252 International Tools




**NL** ECO PRO Volhardmetaal Spiraalboor 3xD met koelkanaal, TiAlN
**FR** Foret Carbure monobloc 3xD ECO PRO à trou d´huile, TiAlN
**ES** Broca Metal duro 3xD ECO PRO con canal de refrigeración, TiAlN
**DE** ECO PRO Vollhartmetall Spiralbohrer 3xD mit Innenkühlung, TiAlN
**EN** ECO PRO Solid carbide Twist drill 3xD with coolant holes, TiAlN

140° | 3xD | h6 | DIN 6535-HA | DIN 6537-K | m7 | MG HM | TiAlN | ECO PRO

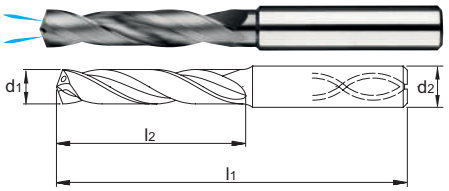
| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 G | 80-170 F | 65-145 F | 60-105 C | 35-55 C | 55-60 C | 35-45 C | 160-210 I | 130-140 H | 80-220 G | 30-35 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.252.0300 | 3 | 6 | 62 | 20 | 34,70 |
| 11.252.0320 | 3.2 | 6 | 62 | 20 | 34,70 |
| 11.252.0330 | 3.3 | 6 | 62 | 20 | 34,70 |
| 11.252.0340 | 3.4 | 6 | 62 | 20 | 34,70 |
| 11.252.0350 | 3.5 | 6 | 62 | 20 | 34,70 |
| 11.252.0400 | 4 | 6 | 66 | 24 | 34,70 |
| 11.252.0420 | 4.2 | 6 | 66 | 24 | 34,70 |
| 11.252.0430 | 4.3 | 6 | 66 | 24 | 34,70 |
| 11.252.0450 | 4.5 | 6 | 66 | 24 | 34,70 |
| 11.252.0480 | 4.8 | 6 | 66 | 28 | 36,65 |
| 11.252.0500 | 5 | 6 | 66 | 28 | 35,20 |
| 11.252.0510 | 5.1 | 6 | 66 | 28 | 35,20 |
| 11.252.0520 | 5.2 | 6 | 66 | 28 | 35,20 |
| 11.252.0550 | 5.5 | 6 | 66 | 28 | 35,20 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.252.0580 | 5.8 | 6 | 66 | 28 | 35,20 |
| 11.252.0600 | 6 | 6 | 66 | 28 | 35,20 |
| 11.252.0620 | 6.2 | 8 | 79 | 34 | 47,25 |
| 11.252.0650 | 6.5 | 8 | 79 | 34 | 47,25 |
| 11.252.0680 | 6.8 | 8 | 79 | 34 | 47,25 |
| 11.252.0690 | 6.9 | 8 | 79 | 34 | 47,25 |
| 11.252.0700 | 7 | 8 | 79 | 34 | 47,25 |
| 11.252.0740 | 7.4 | 8 | 79 | 41 | 47,25 |
| 11.252.0750 | 7.5 | 8 | 79 | 41 | 47,25 |
| 11.252.0780 | 7.8 | 8 | 79 | 41 | 47,25 |
| 11.252.0800 | 8 | 8 | 79 | 41 | 47,25 |
| 11.252.0850 | 8.5 | 10 | 89 | 47 | 56,60 |
| 11.252.0860 | 8.6 | 10 | 89 | 47 | 56,60 |
| 11.252.0880 | 8.8 | 10 | 89 | 47 | 56,60 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.252.0900 | 9 | 10 | 89 | 47 | 56,60 |
| 11.252.0950 | 9.5 | 10 | 89 | 47 | 56,60 |
| 11.252.1000 | 10 | 10 | 89 | 47 | 56,60 |
| 11.252.1020 | 10.2 | 12 | 102 | 55 | 79,35 |
| 11.252.1030 | 10.3 | 12 | 102 | 55 | 79,35 |
| 11.252.1050 | 10.5 | 12 | 102 | 55 | 79,35 |
| 11.252.1100 | 11 | 12 | 102 | 55 | 79,35 |
| 11.252.1150 | 11.5 | 12 | 102 | 55 | 79,35 |
| 11.252.1200 | 12 | 12 | 102 | 55 | 79,35 |
| 11.252.1250 | 12.5 | 14 | 107 | 60 | 116,45 |
| 11.252.1300 | 13 | 14 | 107 | 60 | 116,45 |
| 11.252.1400 | 14 | 14 | 107 | 60 | 116,45 |

## › 11.253 Phantom




**NL** UNI Volhardmetaal Spiraalboor 3xD met koelkanaal, TiAlN
**FR** Foret Carbure monobloc 3xD UNI à trou d´huile, TiAlN
**ES** Broca Metal duro 3xD UNI con canal de refrigeración, TiAlN
**DE** UNI Vollhartmetall Spiralbohrer 3xD mit Innenkühlung, TiAlN
**EN** UNI Solid carbide Twist drill 3xD with coolant holes, TiAlN

140° | 3xD | h6 | DIN 6535-HA | DIN 6537-K | m7 | MG HM | TiAlN | UNI

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 G | 80-170 F | 65-145 F | 60-105 C | 35-55 C | 55-60 C | 35-45 C | 160-210 I | 130-140 H | 80-220 G | 30-35 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.0100 | 1 | 3 | 45 | 7 | 65,05 |
| 11.253.0110 | 1.1 | 3 | 45 | 7 | 65,05 |
| 11.253.0120 | 1.2 | 3 | 45 | 7 | 65,05 |
| 11.253.0130 | 1.3 | 3 | 45 | 7 | 65,05 |
| 11.253.0140 | 1.4 | 3 | 45 | 7 | 65,05 |
| 11.253.0150 | 1.5 | 3 | 55 | 14 | 65,05 |
| 11.253.0160 | 1.6 | 3 | 55 | 14 | 65,05 |
| 11.253.0170 | 1.7 | 3 | 55 | 14 | 65,05 |
| 11.253.0180 | 1.8 | 3 | 55 | 14 | 65,05 |
| 11.253.0190 | 1.9 | 3 | 55 | 14 | 65,05 |
| 11.253.0200 | 2 | 4 | 55 | 20 | 65,05 |
| 11.253.0210 | 2.1 | 4 | 55 | 20 | 65,05 |
| 11.253.0220 | 2.2 | 4 | 55 | 20 | 65,05 |
| 11.253.0230 | 2.3 | 4 | 55 | 20 | 65,05 |
| 11.253.0240 | 2.4 | 4 | 55 | 20 | 65,05 |
| 11.253.0250 | 2.5 | 4 | 55 | 20 | 65,05 |
| 11.253.0260 | 2.6 | 4 | 55 | 20 | 65,05 |
| 11.253.0270 | 2.7 | 4 | 55 | 20 | 65,05 |
| 11.253.0280 | 2.8 | 4 | 55 | 20 | 65,05 |
| 11.253.0290 | 2.9 | 4 | 55 | 20 | 65,05 |
| 11.253.0300 | 3 | 6 | 62 | 20 | 65,05 |
| 11.253.0310 | 3.1 | 6 | 62 | 20 | 65,05 |
| 11.253.0320 | 3.2 | 6 | 62 | 20 | 65,05 |
| 11.253.0330 | 3.3 | 6 | 62 | 20 | 65,05 |
| 11.253.0340 | 3.4 | 6 | 62 | 20 | 65,05 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.0350 | 3.5 | 6 | 62 | 20 | 65,05 |
| 11.253.0360 | 3.6 | 6 | 62 | 20 | 65,05 |
| 11.253.0370 | 3.7 | 6 | 62 | 20 | 65,05 |
| 11.253.0380 | 3.8 | 6 | 66 | 24 | 65,05 |
| 11.253.0390 | 3.9 | 6 | 66 | 24 | 65,05 |
| 11.253.0400 | 4 | 6 | 66 | 24 | 65,05 |
| 11.253.0410 | 4.1 | 6 | 66 | 24 | 65,05 |
| 11.253.0420 | 4.2 | 6 | 66 | 24 | 65,05 |
| 11.253.0430 | 4.3 | 6 | 66 | 24 | 65,05 |
| 11.253.0440 | 4.4 | 6 | 66 | 24 | 65,05 |
| 11.253.0450 | 4.5 | 6 | 66 | 24 | 65,05 |
| 11.253.0460 | 4.6 | 6 | 66 | 24 | 65,05 |
| 11.253.0470 | 4.7 | 6 | 66 | 24 | 65,05 |
| 11.253.0480 | 4.8 | 6 | 66 | 28 | 65,05 |
| 11.253.0490 | 4.9 | 6 | 66 | 28 | 65,05 |
| 11.253.0500 | 5 | 6 | 66 | 28 | 65,05 |
| 11.253.0510 | 5.1 | 6 | 66 | 28 | 65,05 |
| 11.253.0520 | 5.2 | 6 | 66 | 28 | 65,05 |
| 11.253.0530 | 5.3 | 6 | 66 | 28 | 65,05 |
| 11.253.0540 | 5.4 | 6 | 66 | 28 | 65,05 |
| 11.253.0550 | 5.5 | 6 | 66 | 28 | 65,05 |
| 11.253.0560 | 5.6 | 6 | 66 | 28 | 65,05 |
| 11.253.0570 | 5.7 | 6 | 66 | 28 | 65,05 |
| 11.253.0580 | 5.8 | 6 | 66 | 28 | 65,05 |
| 11.253.0590 | 5.9 | 6 | 66 | 28 | 65,05 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.0600 | 6 | 6 | 66 | 28 | 65,05 |
| 11.253.0610 | 6.1 | 8 | 79 | 34 | 85,90 |
| 11.253.0620 | 6.2 | 8 | 79 | 34 | 85,90 |
| 11.253.0630 | 6.3 | 8 | 79 | 34 | 85,90 |
| 11.253.0640 | 6.4 | 8 | 79 | 34 | 85,90 |
| 11.253.0650 | 6.5 | 8 | 79 | 34 | 85,90 |
| 11.253.0660 | 6.6 | 8 | 79 | 34 | 85,90 |
| 11.253.0670 | 6.7 | 8 | 79 | 34 | 85,90 |
| 11.253.0680 | 6.8 | 8 | 79 | 34 | 85,90 |
| 11.253.0690 | 6.9 | 8 | 79 | 34 | 85,90 |
| 11.253.0700 | 7 | 8 | 79 | 34 | 85,90 |
| 11.253.0710 | 7.1 | 8 | 79 | 41 | 85,90 |
| 11.253.0720 | 7.2 | 8 | 79 | 41 | 85,90 |
| 11.253.0730 | 7.3 | 8 | 79 | 41 | 85,90 |
| 11.253.0740 | 7.4 | 8 | 79 | 41 | 85,90 |
| 11.253.0750 | 7.5 | 8 | 79 | 41 | 85,90 |
| 11.253.0760 | 7.6 | 8 | 79 | 41 | 85,90 |
| 11.253.0770 | 7.7 | 8 | 79 | 41 | 85,90 |
| 11.253.0780 | 7.8 | 8 | 79 | 41 | 85,90 |
| 11.253.0790 | 7.9 | 8 | 79 | 41 | 85,90 |
| 11.253.0800 | 8 | 8 | 79 | 41 | 85,90 |
| 11.253.0810 | 8.1 | 10 | 89 | 47 | 102,75 |
| 11.253.0820 | 8.2 | 10 | 89 | 47 | 102,75 |
| 11.253.0830 | 8.3 | 10 | 89 | 47 | 102,75 |
| 11.253.0840 | 8.4 | 10 | 89 | 47 | 102,75 |

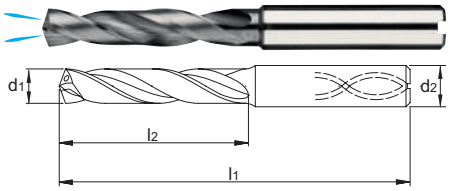
## › 11.253 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.0850 | 8.5 | 10 | 89 | 47 | 102,75 |
| 11.253.0860 | 8.6 | 10 | 89 | 47 | 102,75 |
| 11.253.0870 | 8.7 | 10 | 89 | 47 | 102,75 |
| 11.253.0880 | 8.8 | 10 | 89 | 47 | 102,75 |
| 11.253.0890 | 8.9 | 10 | 89 | 47 | 102,75 |
| 11.253.0900 | 9 | 10 | 89 | 47 | 102,75 |
| 11.253.0910 | 9.1 | 10 | 89 | 47 | 102,75 |
| 11.253.0920 | 9.2 | 10 | 89 | 47 | 102,75 |
| 11.253.0930 | 9.3 | 10 | 89 | 47 | 102,75 |
| 11.253.0940 | 9.4 | 10 | 89 | 47 | 102,75 |
| 11.253.0950 | 9.5 | 10 | 89 | 47 | 102,75 |
| 11.253.0960 | 9.6 | 10 | 89 | 47 | 102,75 |
| 11.253.0970 | 9.7 | 10 | 89 | 47 | 102,75 |
| 11.253.0980 | 9.8 | 10 | 89 | 47 | 102,75 |
| 11.253.0990 | 9.9 | 10 | 89 | 47 | 102,75 |
| 11.253.1000 | 10 | 10 | 89 | 47 | 102,75 |
| 11.253.1020 | 10.2 | 12 | 102 | 55 | 146,15 |

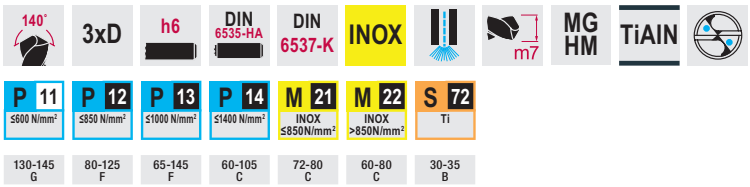
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.1030 | 10.3 | 12 | 102 | 55 | 146,15 |
| 11.253.1050 | 10.5 | 12 | 102 | 55 | 146,15 |
| 11.253.1080 | 10.8 | 12 | 102 | 55 | 146,15 |
| 11.253.1100 | 11 | 12 | 102 | 55 | 146,15 |
| 11.253.1150 | 11.5 | 12 | 102 | 55 | 146,15 |
| 11.253.1180 | 11.8 | 12 | 102 | 55 | 146,15 |
| 11.253.1200 | 12 | 12 | 102 | 55 | 146,15 |
| 11.253.1220 | 12.2 | 14 | 107 | 60 | 216,65 |
| 11.253.1230 | 12.3 | 14 | 107 | 60 | 216,65 |
| 11.253.1250 | 12.5 | 14 | 107 | 60 | 216,65 |
| 11.253.1280 | 12.8 | 14 | 107 | 60 | 216,65 |
| 11.253.1300 | 13 | 14 | 107 | 60 | 216,65 |
| 11.253.1350 | 13.5 | 14 | 107 | 60 | 216,65 |
| 11.253.1380 | 13.8 | 14 | 107 | 60 | 216,65 |
| 11.253.1400 | 14 | 14 | 107 | 60 | 216,65 |
| 11.253.1450 | 14.5 | 16 | 115 | 65 | 273,00 |
| 11.253.1480 | 14.8 | 16 | 115 | 65 | 273,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.253.1500 | 15 | 16 | 115 | 65 | 273,00 |
| 11.253.1550 | 15.5 | 16 | 115 | 65 | 273,00 |
| 11.253.1580 | 15.8 | 16 | 115 | 65 | 273,00 |
| 11.253.1600 | 16 | 16 | 115 | 65 | 273,00 |
| 11.253.1650 | 16.5 | 18 | 123 | 73 | 448,00 |
| 11.253.1680 | 16.8 | 18 | 123 | 73 | 448,00 |
| 11.253.1700 | 17 | 18 | 123 | 73 | 448,00 |
| 11.253.1750 | 17.5 | 18 | 123 | 73 | 448,00 |
| 11.253.1780 | 17.8 | 18 | 123 | 73 | 448,00 |
| 11.253.1800 | 18 | 18 | 123 | 73 | 448,00 |
| 11.253.1850 | 18.5 | 20 | 131 | 79 | 490,00 |
| 11.253.1880 | 18.8 | 20 | 131 | 79 | 490,00 |
| 11.253.1900 | 19 | 20 | 131 | 79 | 490,00 |
| 11.253.1950 | 19.5 | 20 | 131 | 79 | 490,00 |
| 11.253.1980 | 19.8 | 20 | 131 | 79 | 490,00 |
| 11.253.2000 | 20 | 20 | 131 | 79 | 490,00 |

## › 11.262 Phantom




**NL Volhardmetaal Spiraalboor 3xD met koelkanaal, TiAlN, roestvaststaal**
**FR Foret Carbure monobloc 3xD à trou d´huile, TiAlN, Inox**
**ES Broca Metal duro 3xD con canal de refrigeración, TiAlN, acero inoxidable**
**DE Vollhartmetall Spiralbohrer 3xD mit Innenkühlung, TiAlN, rostfreien Stahl**
**EN Solid carbide Twist drill 3xD with coolant holes, TiAlN, stainless steel**

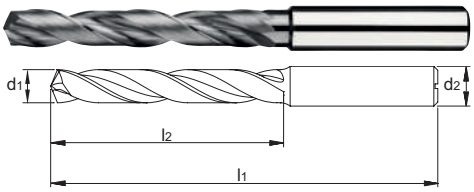



| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.262.0300 | 3 | 6 | 62 | 20 | 64,40 |
| 11.262.0310 | 3.1 | 6 | 62 | 20 | 64,40 |
| 11.262.0320 | 3.2 | 6 | 62 | 20 | 64,40 |
| 11.262.0330 | 3.3 | 6 | 62 | 20 | 64,40 |
| 11.262.0340 | 3.4 | 6 | 62 | 20 | 64,40 |
| 11.262.0350 | 3.5 | 6 | 62 | 20 | 64,40 |
| 11.262.0360 | 3.6 | 6 | 62 | 20 | 64,40 |
| 11.262.0370 | 3.7 | 6 | 62 | 20 | 64,40 |
| 11.262.0380 | 3.8 | 6 | 66 | 24 | 64,40 |
| 11.262.0390 | 3.9 | 6 | 66 | 24 | 64,40 |
| 11.262.0400 | 4 | 6 | 66 | 24 | 64,40 |
| 11.262.0410 | 4.1 | 6 | 66 | 24 | 64,40 |
| 11.262.0420 | 4.2 | 6 | 66 | 24 | 64,40 |
| 11.262.0430 | 4.3 | 6 | 66 | 24 | 64,40 |
| 11.262.0440 | 4.4 | 6 | 66 | 24 | 64,40 |
| 11.262.0450 | 4.5 | 6 | 66 | 24 | 64,40 |
| 11.262.0460 | 4.6 | 6 | 66 | 24 | 64,40 |
| 11.262.0470 | 4.7 | 6 | 66 | 24 | 64,40 |
| 11.262.0480 | 4.8 | 6 | 66 | 28 | 64,40 |
| 11.262.0490 | 4.9 | 6 | 66 | 28 | 64,40 |
| 11.262.0500 | 5 | 6 | 66 | 28 | 64,40 |
| 11.262.0510 | 5.1 | 6 | 66 | 28 | 64,40 |
| 11.262.0520 | 5.2 | 6 | 66 | 28 | 64,40 |
| 11.262.0530 | 5.3 | 6 | 66 | 28 | 64,40 |
| 11.262.0540 | 5.4 | 6 | 66 | 28 | 64,40 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.262.0550 | 5.5 | 6 | 66 | 28 | 64,40 |
| 11.262.0560 | 5.6 | 6 | 66 | 28 | 64,40 |
| 11.262.0570 | 5.7 | 6 | 66 | 28 | 64,40 |
| 11.262.0580 | 5.8 | 6 | 66 | 28 | 64,40 |
| 11.262.0590 | 5.9 | 6 | 66 | 28 | 64,40 |
| 11.262.0600 | 6 | 6 | 66 | 28 | 64,40 |
| 11.262.0610 | 6.1 | 8 | 79 | 34 | 85,90 |
| 11.262.0620 | 6.2 | 8 | 79 | 34 | 85,90 |
| 11.262.0630 | 6.3 | 8 | 79 | 34 | 85,90 |
| 11.262.0650 | 6.5 | 8 | 79 | 34 | 85,90 |
| 11.262.0670 | 6.7 | 8 | 79 | 34 | 85,90 |
| 11.262.0680 | 6.8 | 8 | 79 | 34 | 85,90 |
| 11.262.0690 | 6.9 | 8 | 79 | 34 | 85,90 |
| 11.262.0700 | 7 | 8 | 79 | 34 | 85,90 |
| 11.262.0750 | 7.5 | 8 | 79 | 41 | 85,90 |
| 11.262.0780 | 7.8 | 8 | 79 | 41 | 85,90 |
| 11.262.0800 | 8 | 8 | 79 | 41 | 85,90 |
| 11.262.0850 | 8.5 | 10 | 89 | 47 | 101,65 |
| 11.262.0860 | 8.6 | 10 | 89 | 47 | 101,65 |
| 11.262.0880 | 8.8 | 10 | 89 | 47 | 101,65 |
| 11.262.0900 | 9 | 10 | 89 | 47 | 101,65 |
| 11.262.0920 | 9.2 | 10 | 89 | 47 | 101,65 |
| 11.262.0950 | 9.5 | 10 | 89 | 47 | 101,65 |
| 11.262.0980 | 9.8 | 10 | 89 | 47 | 101,65 |
| 11.262.1000 | 10 | 10 | 89 | 47 | 101,65 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.262.1020 | 10.2 | 12 | 102 | 55 | 144,65 |
| 11.262.1050 | 10.5 | 12 | 102 | 55 | 144,65 |
| 11.262.1080 | 10.8 | 12 | 102 | 55 | 144,65 |
| 11.262.1100 | 11 | 12 | 102 | 55 | 144,65 |
| 11.262.1120 | 11.2 | 12 | 102 | 55 | 144,65 |
| 11.262.1150 | 11.5 | 12 | 102 | 55 | 144,65 |
| 11.262.1180 | 11.8 | 12 | 102 | 55 | 144,65 |
| 11.262.1200 | 12 | 12 | 102 | 55 | 144,65 |
| 11.262.1250 | 12.5 | 14 | 107 | 60 | 223,50 |
| 11.262.1300 | 13 | 14 | 107 | 60 | 223,50 |
| 11.262.1350 | 13.5 | 14 | 107 | 60 | 223,50 |
| 11.262.1400 | 14 | 14 | 107 | 60 | 270,00 |
| 11.262.1450 | 14.5 | 16 | 115 | 65 | 270,00 |
| 11.262.1500 | 15 | 16 | 115 | 65 | 270,00 |
| 11.262.1550 | 15.5 | 16 | 115 | 65 | 270,00 |
| 11.262.1600 | 16 | 16 | 115 | 65 | 270,00 |
| 11.262.1650 | 16.5 | 18 | 123 | 73 | 448,00 |
| 11.262.1700 | 17 | 18 | 123 | 73 | 448,00 |
| 11.262.1750 | 17.5 | 18 | 123 | 73 | 448,00 |
| 11.262.1800 | 18 | 18 | 123 | 73 | 448,00 |
| 11.262.1850 | 18.5 | 20 | 131 | 79 | 485,00 |
| 11.262.1900 | 19 | 20 | 131 | 79 | 485,00 |
| 11.262.1950 | 19.5 | 20 | 131 | 79 | 485,00 |
| 11.262.2000 | 20 | 20 | 131 | 79 | 485,00 |

## › 11.270 Phantom




**NL** UNI Volhardmetaal Spiraalboor 5xD TiAlN
**FR** Foret Carbure monobloc 5xD UNI TiAlN
**ES** Broca Metal duro 5xD UNI TiAlN
**DE** UNI Vollhartmetall Spiralbohrer 5xD TiAlN
**EN** UNI Solid carbide Twist drill 5xD TiAlN

140° | 5xD | h6 | DIN 6535-HA | DIN 6537-L | m7 | MG HM | TiAlN | UNI

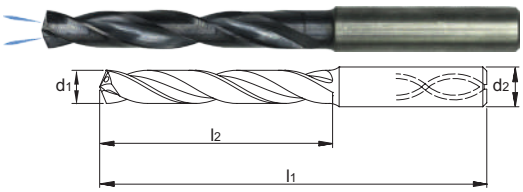
| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 120-130 G | 65-145 F | 55-110 F | 45-100 C | 25-45 C | 50-55 C | 35-45 C | 155-210 H | 125-155 G | 60-180 G | 22-25 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.270.0100 | 1 | 3 | 55 | 8 | 54,05 |
| 11.270.0110 | 1.1 | 3 | 55 | 12 | 54,05 |
| 11.270.0120 | 1.2 | 3 | 55 | 12 | 54,05 |
| 11.270.0130 | 1.3 | 3 | 55 | 12 | 54,05 |
| 11.270.0140 | 1.4 | 3 | 55 | 12 | 54,05 |
| 11.270.0150 | 1.5 | 3 | 55 | 16 | 54,05 |
| 11.270.0160 | 1.6 | 3 | 55 | 16 | 54,05 |
| 11.270.0170 | 1.7 | 3 | 55 | 16 | 54,05 |
| 11.270.0180 | 1.8 | 3 | 55 | 16 | 54,05 |
| 11.270.0190 | 1.9 | 3 | 55 | 16 | 54,05 |
| 11.270.0200 | 2 | 4 | 57 | 21 | 54,05 |
| 11.270.0210 | 2.1 | 4 | 57 | 21 | 54,05 |
| 11.270.0220 | 2.2 | 4 | 57 | 21 | 54,05 |
| 11.270.0230 | 2.3 | 4 | 57 | 21 | 54,05 |
| 11.270.0240 | 2.4 | 4 | 57 | 21 | 54,05 |
| 11.270.0250 | 2.5 | 4 | 57 | 21 | 54,05 |
| 11.270.0260 | 2.6 | 4 | 57 | 21 | 54,05 |
| 11.270.0270 | 2.7 | 4 | 57 | 21 | 54,05 |
| 11.270.0280 | 2.8 | 4 | 57 | 21 | 54,05 |
| 11.270.0290 | 2.9 | 4 | 57 | 21 | 54,05 |
| 11.270.0300 | 3 | 6 | 66 | 28 | 66,85 |
| 11.270.0310 | 3.1 | 6 | 66 | 28 | 66,85 |
| 11.270.0320 | 3.2 | 6 | 66 | 28 | 66,85 |
| 11.270.0330 | 3.3 | 6 | 66 | 28 | 66,85 |
| 11.270.0340 | 3.4 | 6 | 66 | 28 | 66,85 |
| 11.270.0350 | 3.5 | 6 | 66 | 28 | 66,85 |
| 11.270.0360 | 3.6 | 6 | 66 | 28 | 66,85 |
| 11.270.0370 | 3.7 | 6 | 66 | 28 | 66,85 |
| 11.270.0380 | 3.8 | 6 | 74 | 36 | 66,85 |
| 11.270.0390 | 3.9 | 6 | 74 | 36 | 66,85 |
| 11.270.0400 | 4 | 6 | 74 | 36 | 66,85 |
| 11.270.0410 | 4.1 | 6 | 74 | 36 | 66,85 |
| 11.270.0420 | 4.2 | 6 | 74 | 36 | 66,85 |
| 11.270.0430 | 4.3 | 6 | 74 | 36 | 66,85 |
| 11.270.0440 | 4.4 | 6 | 74 | 36 | 66,85 |
| 11.270.0450 | 4.5 | 6 | 74 | 36 | 66,85 |
| 11.270.0460 | 4.6 | 6 | 74 | 36 | 66,85 |
| 11.270.0470 | 4.7 | 6 | 74 | 36 | 66,85 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.270.0480 | 4.8 | 6 | 82 | 44 | 66,85 |
| 11.270.0490 | 4.9 | 6 | 82 | 44 | 66,85 |
| 11.270.0500 | 5 | 6 | 82 | 44 | 66,85 |
| 11.270.0510 | 5.1 | 6 | 82 | 44 | 66,85 |
| 11.270.0520 | 5.2 | 6 | 82 | 44 | 66,85 |
| 11.270.0530 | 5.3 | 6 | 82 | 44 | 66,85 |
| 11.270.0540 | 5.4 | 6 | 82 | 44 | 66,85 |
| 11.270.0550 | 5.5 | 6 | 82 | 44 | 66,85 |
| 11.270.0560 | 5.6 | 6 | 82 | 44 | 66,85 |
| 11.270.0570 | 5.7 | 6 | 82 | 44 | 66,85 |
| 11.270.0580 | 5.8 | 6 | 82 | 44 | 66,85 |
| 11.270.0590 | 5.9 | 6 | 82 | 44 | 66,85 |
| 11.270.0600 | 6 | 6 | 82 | 44 | 66,85 |
| 11.270.0610 | 6.1 | 8 | 91 | 53 | 76,20 |
| 11.270.0620 | 6.2 | 8 | 91 | 53 | 76,20 |
| 11.270.0630 | 6.3 | 8 | 91 | 53 | 76,20 |
| 11.270.0640 | 6.4 | 8 | 91 | 53 | 76,20 |
| 11.270.0650 | 6.5 | 8 | 91 | 53 | 76,20 |
| 11.270.0660 | 6.6 | 8 | 91 | 53 | 76,20 |
| 11.270.0670 | 6.7 | 8 | 91 | 53 | 76,20 |
| 11.270.0680 | 6.8 | 8 | 91 | 53 | 76,20 |
| 11.270.0690 | 6.9 | 8 | 91 | 53 | 76,20 |
| 11.270.0700 | 7 | 8 | 91 | 53 | 76,20 |
| 11.270.0710 | 7.1 | 8 | 91 | 53 | 76,20 |
| 11.270.0720 | 7.2 | 8 | 91 | 53 | 76,20 |
| 11.270.0730 | 7.3 | 8 | 91 | 53 | 76,20 |
| 11.270.0740 | 7.4 | 8 | 91 | 53 | 76,20 |
| 11.270.0750 | 7.5 | 8 | 91 | 53 | 76,20 |
| 11.270.0760 | 7.6 | 8 | 91 | 53 | 76,20 |
| 11.270.0770 | 7.7 | 8 | 91 | 53 | 76,20 |
| 11.270.0780 | 7.8 | 8 | 91 | 53 | 76,20 |
| 11.270.0790 | 7.9 | 8 | 91 | 53 | 76,20 |
| 11.270.0800 | 8 | 8 | 91 | 53 | 76,20 |
| 11.270.0810 | 8.1 | 10 | 103 | 61 | 95,65 |
| 11.270.0820 | 8.2 | 10 | 103 | 61 | 95,65 |
| 11.270.0830 | 8.3 | 10 | 103 | 61 | 95,65 |
| 11.270.0840 | 8.4 | 10 | 103 | 61 | 95,65 |
| 11.270.0850 | 8.5 | 10 | 103 | 61 | 95,65 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.270.0860 | 8.6 | 10 | 103 | 61 | 95,65 |
| 11.270.0870 | 8.7 | 10 | 103 | 61 | 95,65 |
| 11.270.0880 | 8.8 | 10 | 103 | 61 | 95,65 |
| 11.270.0890 | 8.9 | 10 | 103 | 61 | 95,65 |
| 11.270.0900 | 9 | 10 | 103 | 61 | 95,65 |
| 11.270.0910 | 9.1 | 10 | 103 | 61 | 95,65 |
| 11.270.0920 | 9.2 | 10 | 103 | 61 | 95,65 |
| 11.270.0930 | 9.3 | 10 | 103 | 61 | 95,65 |
| 11.270.0940 | 9.4 | 10 | 103 | 61 | 95,65 |
| 11.270.0950 | 9.5 | 10 | 103 | 61 | 95,65 |
| 11.270.0960 | 9.6 | 10 | 103 | 61 | 95,65 |
| 11.270.0970 | 9.7 | 10 | 103 | 61 | 95,65 |
| 11.270.0980 | 9.8 | 10 | 103 | 61 | 95,65 |
| 11.270.0990 | 9.9 | 10 | 103 | 61 | 95,65 |
| 11.270.1000 | 10 | 10 | 103 | 61 | 95,65 |
| 11.270.1020 | 10.2 | 12 | 118 | 71 | 140,10 |
| 11.270.1030 | 10.3 | 12 | 118 | 71 | 140,10 |
| 11.270.1050 | 10.5 | 12 | 118 | 71 | 140,10 |
| 11.270.1080 | 10.8 | 12 | 118 | 71 | 140,10 |
| 11.270.1100 | 11 | 12 | 118 | 71 | 140,10 |
| 11.270.1150 | 11.5 | 12 | 118 | 71 | 140,10 |
| 11.270.1180 | 11.8 | 12 | 118 | 71 | 140,10 |
| 11.270.1200 | 12 | 12 | 118 | 71 | 140,10 |
| 11.270.1230 | 12.3 | 14 | 124 | 77 | 197,85 |
| 11.270.1250 | 12.5 | 14 | 124 | 77 | 197,85 |
| 11.270.1280 | 12.8 | 14 | 124 | 77 | 197,85 |
| 11.270.1300 | 13 | 14 | 124 | 77 | 197,85 |
| 11.270.1350 | 13.5 | 14 | 124 | 77 | 197,85 |
| 11.270.1380 | 13.8 | 14 | 124 | 77 | 197,85 |
| 11.270.1400 | 14 | 14 | 124 | 77 | 197,85 |
| 11.270.1450 | 14.5 | 16 | 133 | 83 | 249,25 |
| 11.270.1480 | 14.8 | 16 | 133 | 83 | 249,25 |
| 11.270.1500 | 15 | 16 | 133 | 83 | 249,25 |
| 11.270.1550 | 15.5 | 16 | 133 | 83 | 249,25 |
| 11.270.1580 | 15.8 | 16 | 133 | 83 | 249,25 |
| 11.270.1600 | 16 | 16 | 133 | 83 | 249,25 |

## › 11.272 International Tools




**NL** ECO PRO Volhardmetaal Spiraalboor 5xD met koelkanaal, TiAlN
**FR** Foret Carbure monobloc 5xD ECO PRO à trou d´huile, TiAlN
**ES** Broca Metal duro 5xD ECO PRO con canal de refrigeración, TiAlN
**DE** ECO PRO Vollhartmetall Spiralbohrer 5xD mit Innenkühlung, TiAlN
**EN** ECO PRO Solid carbide Twist drill 5xD with coolant holes, TiAlN

140° | 5xD | h6 | DIN 6535-HA | DIN 6537-L | m7 | MG HM | TiAlN | ECO PRO

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 G | 80-170 F | 65-145 F | 60-105 C | 35-55 C | 55-60 C | 35-45 C | 160-210 I | 130-140 H | 80-220 G | 30-35 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.0300 | 3 | 6 | 66 | 28 | 45,80 |
| 11.272.0320 | 3.2 | 6 | 66 | 28 | 45,80 |
| 11.272.0330 | 3.3 | 6 | 66 | 28 | 45,80 |
| 11.272.0340 | 3.4 | 6 | 66 | 28 | 45,80 |
| 11.272.0350 | 3.5 | 6 | 66 | 28 | 45,80 |
| 11.272.0400 | 4 | 6 | 74 | 36 | 45,80 |
| 11.272.0420 | 4.2 | 6 | 74 | 36 | 45,80 |
| 11.272.0430 | 4.3 | 6 | 74 | 36 | 45,80 |
| 11.272.0450 | 4.5 | 6 | 74 | 36 | 45,80 |
| 11.272.0480 | 4.8 | 6 | 82 | 44 | 46,40 |
| 11.272.0500 | 5 | 6 | 82 | 44 | 46,40 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.0510 | 5.1 | 6 | 82 | 44 | 46,40 |
| 11.272.0520 | 5.2 | 6 | 82 | 44 | 46,40 |
| 11.272.0550 | 5.5 | 6 | 82 | 44 | 46,40 |
| 11.272.0580 | 5.8 | 6 | 82 | 44 | 46,40 |
| 11.272.0600 | 6 | 6 | 82 | 44 | 46,40 |
| 11.272.0620 | 6.2 | 8 | 91 | 53 | 52,60 |
| 11.272.0650 | 6.5 | 8 | 91 | 53 | 52,60 |
| 11.272.0680 | 6.8 | 8 | 91 | 53 | 52,60 |
| 11.272.0690 | 6.9 | 8 | 91 | 53 | 52,60 |
| 11.272.0700 | 7 | 8 | 91 | 53 | 52,60 |
| 11.272.0740 | 7.4 | 8 | 91 | 53 | 52,60 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.0750 | 7.5 | 8 | 91 | 53 | 52,60 |
| 11.272.0780 | 7.8 | 8 | 91 | 53 | 52,60 |
| 11.272.0800 | 8 | 8 | 91 | 53 | 52,60 |
| 11.272.0850 | 8.5 | 10 | 103 | 61 | 61,75 |
| 11.272.0860 | 8.6 | 10 | 103 | 61 | 61,75 |
| 11.272.0880 | 8.8 | 10 | 103 | 61 | 61,75 |
| 11.272.0900 | 9 | 10 | 103 | 61 | 61,75 |
| 11.272.0950 | 9.5 | 10 | 103 | 61 | 61,75 |
| 11.272.1000 | 10 | 10 | 103 | 61 | 61,75 |
| 11.272.1020 | 10.2 | 12 | 118 | 71 | 84,70 |
| 11.272.1030 | 10.3 | 12 | 118 | 71 | 84,70 |

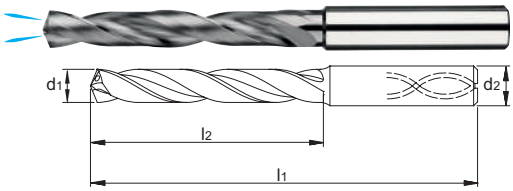
## › 11.272 International Tools

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.1050 | 10.5 | 12 | 118 | 71 | 84,70 |
| 11.272.1100 | 11 | 12 | 118 | 71 | 84,70 |
| 11.272.1150 | 11.5 | 12 | 118 | 71 | 84,70 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.1200 | 12 | 12 | 118 | 71 | 84,70 |
| 11.272.1250 | 12.5 | 14 | 124 | 77 | 131,30 |
| 11.272.1300 | 13 | 14 | 124 | 77 | 131,30 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.272.1400 | 14 | 14 | 124 | 77 | 131,30 |

## › 11.273 Phantom




NL **UNI Volhardmetaal Spiraalboor 5xD met koelkanaal, TiAlN**
FR **Foret Carbure monobloc 5xD UNI à trou d'huile, TiAlN**
ES **Broca Metal duro 5xD UNI con canal de refrigeración, TiAlN**
DE **UNI Vollhartmetall Spiralbohrer 5xD mit Innenkühlung, TiAlN**
EN **UNI Solid carbide Twist drill 5xD with coolant holes, TiAlN**

140° | 5xD | h6 | DIN 6535-HA | DIN 6537-L | m7 | MG HM | TiAlN | UNI

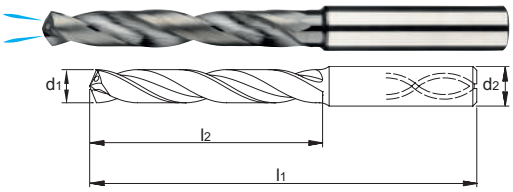
| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 G | 80-170 F | 65-145 F | 60-105 C | 35-55 C | 55-60 C | 35-45 C | 160-210 I | 130-140 H | 80-220 G | 30-35 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.273.0100 | 1 | 3 | 55 | 8 | 79,70 |
| 11.273.0110 | 1.1 | 3 | 55 | 12 | 79,70 |
| 11.273.0120 | 1.2 | 3 | 55 | 12 | 79,70 |
| 11.273.0130 | 1.3 | 3 | 55 | 12 | 79,70 |
| 11.273.0140 | 1.4 | 3 | 55 | 12 | 79,70 |
| 11.273.0150 | 1.5 | 3 | 55 | 16 | 79,70 |
| 11.273.0160 | 1.6 | 3 | 55 | 16 | 79,70 |
| 11.273.0170 | 1.7 | 3 | 55 | 16 | 79,70 |
| 11.273.0180 | 1.8 | 3 | 55 | 16 | 79,70 |
| 11.273.0190 | 1.9 | 3 | 55 | 16 | 79,70 |
| 11.273.0200 | 2 | 4 | 57 | 21 | 79,70 |
| 11.273.0210 | 2.1 | 4 | 57 | 21 | 79,70 |
| 11.273.0220 | 2.2 | 4 | 57 | 21 | 79,70 |
| 11.273.0230 | 2.3 | 4 | 57 | 21 | 79,70 |
| 11.273.0240 | 2.4 | 4 | 57 | 21 | 79,70 |
| 11.273.0250 | 2.5 | 4 | 57 | 21 | 79,70 |
| 11.273.0260 | 2.6 | 4 | 57 | 21 | 79,70 |
| 11.273.0270 | 2.7 | 4 | 57 | 21 | 79,70 |
| 11.273.0280 | 2.8 | 4 | 57 | 21 | 79,70 |
| 11.273.0290 | 2.9 | 4 | 57 | 21 | 79,70 |
| 11.273.0300 | 3 | 6 | 66 | 28 | 86,85 |
| 11.273.0310 | 3.1 | 6 | 66 | 28 | 86,85 |
| 11.273.0320 | 3.2 | 6 | 66 | 28 | 86,85 |
| 11.273.0325 | 3.25 | 6 | 66 | 28 | 86,85 |
| 11.273.0330 | 3.3 | 6 | 66 | 28 | 86,85 |
| 11.273.0340 | 3.4 | 6 | 66 | 28 | 86,85 |
| 11.273.0350 | 3.5 | 6 | 66 | 28 | 86,85 |
| 11.273.0360 | 3.6 | 6 | 66 | 28 | 86,85 |
| 11.273.0365 | 3.65 | 6 | 66 | 28 | 86,85 |
| 11.273.0370 | 3.7 | 6 | 66 | 28 | 86,85 |
| 11.273.0380 | 3.8 | 6 | 74 | 36 | 86,85 |
| 11.273.0390 | 3.9 | 6 | 74 | 36 | 86,85 |
| 11.273.0400 | 4 | 6 | 74 | 36 | 86,85 |
| 11.273.0410 | 4.1 | 6 | 74 | 36 | 86,85 |
| 11.273.0420 | 4.2 | 6 | 74 | 36 | 86,85 |
| 11.273.0430 | 4.3 | 6 | 74 | 36 | 86,85 |
| 11.273.0440 | 4.4 | 6 | 74 | 36 | 86,85 |
| 11.273.0450 | 4.5 | 6 | 74 | 36 | 86,85 |
| 11.273.0460 | 4.6 | 6 | 74 | 36 | 86,85 |
| 11.273.0465 | 4.65 | 6 | 74 | 36 | 93,25 |
| 11.273.0470 | 4.7 | 6 | 74 | 36 | 86,85 |
| 11.273.0480 | 4.8 | 6 | 82 | 44 | 86,85 |
| 11.273.0490 | 4.9 | 6 | 82 | 44 | 86,85 |
| 11.273.0500 | 5 | 6 | 82 | 44 | 86,85 |
| 11.273.0510 | 5.1 | 6 | 82 | 44 | 86,85 |
| 11.273.0520 | 5.2 | 6 | 82 | 44 | 86,85 |
| 11.273.0530 | 5.3 | 6 | 82 | 44 | 86,85 |
| 11.273.0540 | 5.4 | 6 | 82 | 44 | 86,85 |
| 11.273.0550 | 5.5 | 6 | 82 | 44 | 86,85 |
| 11.273.0555 | 5.55 | 6 | 82 | 44 | 93,25 |
| 11.273.0560 | 5.6 | 6 | 82 | 44 | 86,85 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.273.0570 | 5.7 | 6 | 82 | 44 | 86,85 |
| 11.273.0580 | 5.8 | 6 | 82 | 44 | 86,85 |
| 11.273.0590 | 5.9 | 6 | 82 | 44 | 86,85 |
| 11.273.0600 | 6 | 6 | 82 | 44 | 86,85 |
| 11.273.0610 | 6.1 | 8 | 91 | 53 | 97,65 |
| 11.273.0620 | 6.2 | 8 | 91 | 53 | 97,65 |
| 11.273.0630 | 6.3 | 8 | 91 | 53 | 97,65 |
| 11.273.0640 | 6.4 | 8 | 91 | 53 | 97,65 |
| 11.273.0650 | 6.5 | 8 | 91 | 53 | 97,65 |
| 11.273.0660 | 6.6 | 8 | 91 | 53 | 97,65 |
| 11.273.0670 | 6.7 | 8 | 91 | 53 | 97,65 |
| 11.273.0680 | 6.8 | 8 | 91 | 53 | 97,65 |
| 11.273.0690 | 6.9 | 8 | 91 | 53 | 97,65 |
| 11.273.0700 | 7 | 8 | 91 | 53 | 97,65 |
| 11.273.0710 | 7.1 | 8 | 91 | 53 | 97,65 |
| 11.273.0720 | 7.2 | 8 | 91 | 53 | 97,65 |
| 11.273.0730 | 7.3 | 8 | 91 | 53 | 97,65 |
| 11.273.0740 | 7.4 | 8 | 91 | 53 | 97,65 |
| 11.273.0750 | 7.5 | 8 | 91 | 53 | 97,65 |
| 11.273.0755 | 7.55 | 8 | 91 | 53 | 97,65 |
| 11.273.0760 | 7.6 | 8 | 91 | 53 | 97,65 |
| 11.273.0770 | 7.7 | 8 | 91 | 53 | 97,65 |
| 11.273.0780 | 7.8 | 8 | 91 | 53 | 97,65 |
| 11.273.0790 | 7.9 | 8 | 91 | 53 | 97,65 |
| 11.273.0800 | 8 | 8 | 91 | 53 | 97,65 |
| 11.273.0810 | 8.1 | 10 | 103 | 61 | 113,30 |
| 11.273.0820 | 8.2 | 10 | 103 | 61 | 113,30 |
| 11.273.0830 | 8.3 | 10 | 103 | 61 | 113,30 |
| 11.273.0840 | 8.4 | 10 | 103 | 61 | 113,30 |
| 11.273.0850 | 8.5 | 10 | 103 | 61 | 113,30 |
| 11.273.0860 | 8.6 | 10 | 103 | 61 | 113,30 |
| 11.273.0870 | 8.7 | 10 | 103 | 61 | 113,30 |
| 11.273.0880 | 8.8 | 10 | 103 | 61 | 113,30 |
| 11.273.0890 | 8.9 | 10 | 103 | 61 | 113,30 |
| 11.273.0900 | 9 | 10 | 103 | 61 | 113,30 |
| 11.273.0910 | 9.1 | 10 | 103 | 61 | 113,30 |
| 11.273.0920 | 9.2 | 10 | 103 | 61 | 113,30 |
| 11.273.0930 | 9.3 | 10 | 103 | 61 | 113,30 |
| 11.273.0940 | 9.4 | 10 | 103 | 61 | 113,30 |
| 11.273.0950 | 9.5 | 10 | 103 | 61 | 113,30 |
| 11.273.0955 | 9.55 | 10 | 103 | 61 | 113,30 |
| 11.273.0960 | 9.6 | 10 | 103 | 61 | 113,30 |
| 11.273.0970 | 9.7 | 10 | 103 | 61 | 113,30 |
| 11.273.0980 | 9.8 | 10 | 103 | 61 | 113,30 |
| 11.273.0990 | 9.9 | 10 | 103 | 61 | 113,30 |
| 11.273.1000 | 10 | 10 | 103 | 61 | 113,30 |
| 11.273.1010 | 10.1 | 12 | 118 | 71 | 154,65 |
| 11.273.1020 | 10.2 | 12 | 118 | 71 | 154,65 |
| 11.273.1030 | 10.3 | 12 | 118 | 71 | 154,65 |
| 11.273.1040 | 10.4 | 12 | 118 | 71 | 154,65 |
| 11.273.1050 | 10.5 | 12 | 118 | 71 | 154,65 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.273.1060 | 10.6 | 12 | 118 | 71 | 154,65 |
| 11.273.1070 | 10.7 | 12 | 118 | 71 | 154,65 |
| 11.273.1080 | 10.8 | 12 | 118 | 71 | 154,65 |
| 11.273.1090 | 10.9 | 12 | 118 | 71 | 154,65 |
| 11.273.1100 | 11 | 12 | 118 | 71 | 154,65 |
| 11.273.1110 | 11.1 | 12 | 118 | 71 | 154,65 |
| 11.273.1120 | 11.2 | 12 | 118 | 71 | 154,65 |
| 11.273.1130 | 11.3 | 12 | 118 | 71 | 154,65 |
| 11.273.1140 | 11.4 | 12 | 118 | 71 | 154,65 |
| 11.273.1150 | 11.5 | 12 | 118 | 71 | 154,65 |
| 11.273.1155 | 11.55 | 12 | 118 | 71 | 154,65 |
| 11.273.1160 | 11.6 | 12 | 118 | 71 | 154,65 |
| 11.273.1170 | 11.7 | 12 | 118 | 71 | 154,65 |
| 11.273.1180 | 11.8 | 12 | 118 | 71 | 154,65 |
| 11.273.1190 | 11.9 | 12 | 118 | 71 | 154,65 |
| 11.273.1200 | 12 | 12 | 118 | 71 | 154,65 |
| 11.273.1210 | 12.1 | 14 | 124 | 77 | 247,30 |
| 11.273.1220 | 12.2 | 14 | 124 | 77 | 247,30 |
| 11.273.1225 | 12.25 | 14 | 124 | 77 | 247,30 |
| 11.273.1230 | 12.3 | 14 | 124 | 77 | 247,30 |
| 11.273.1240 | 12.4 | 14 | 124 | 77 | 247,30 |
| 11.273.1250 | 12.5 | 14 | 124 | 77 | 247,30 |
| 11.273.1260 | 12.6 | 14 | 124 | 77 | 247,30 |
| 11.273.1270 | 12.7 | 14 | 124 | 77 | 247,30 |
| 11.273.1280 | 12.8 | 14 | 124 | 77 | 247,30 |
| 11.273.1290 | 12.9 | 14 | 124 | 77 | 247,30 |
| 11.273.1300 | 13 | 14 | 124 | 77 | 247,30 |
| 11.273.1350 | 13.5 | 14 | 124 | 77 | 247,30 |
| 11.273.1380 | 13.8 | 14 | 124 | 77 | 247,30 |
| 11.273.1400 | 14 | 14 | 124 | 77 | 247,30 |
| 11.273.1450 | 14.5 | 16 | 133 | 83 | 327,00 |
| 11.273.1480 | 14.8 | 16 | 133 | 83 | 327,00 |
| 11.273.1500 | 15 | 16 | 133 | 83 | 327,00 |
| 11.273.1510 | 15.1 | 16 | 133 | 83 | 327,00 |
| 11.273.1550 | 15.5 | 16 | 133 | 83 | 327,00 |
| 11.273.1580 | 15.8 | 16 | 133 | 83 | 327,00 |
| 11.273.1600 | 16 | 16 | 133 | 83 | 327,00 |
| 11.273.1650 | 16.5 | 18 | 143 | 93 | 488,00 |
| 11.273.1680 | 16.8 | 18 | 143 | 93 | 488,00 |
| 11.273.1700 | 17 | 18 | 143 | 93 | 488,00 |
| 11.273.1750 | 17.5 | 18 | 143 | 93 | 488,00 |
| 11.273.1780 | 17.8 | 18 | 143 | 93 | 488,00 |
| 11.273.1800 | 18 | 18 | 143 | 93 | 488,00 |
| 11.273.1850 | 18.5 | 20 | 153 | 101 | 554,00 |
| 11.273.1880 | 18.8 | 20 | 153 | 101 | 554,00 |
| 11.273.1900 | 19 | 20 | 153 | 101 | 554,00 |
| 11.273.1950 | 19.5 | 20 | 153 | 101 | 554,00 |
| 11.273.1980 | 19.8 | 20 | 153 | 101 | 554,00 |
| 11.273.2000 | 20 | 20 | 153 | 101 | 554,00 |

## › 11.279 Phantom




**NL** Volhardmetaal Spiraalboor 5xD met koelkanaal, DLC, Aluminium
**FR** Foret Carbure monobloc 5xD à trou d´huile, DLC, Aluminium
**ES** Broca Metal duro 5xD con canal de refrigeración, DLC, Aluminio
**DE** Vollhartmetall Spiralbohrer 5xD mit Innenkühlung, DLC, Aluminium
**EN** Solid carbide Twist drill 5xD with coolant holes, DLC, Aluminium

118° | 5xD | h6 | DLC | DIN 6535-HA | DIN 6537-L | m7 | MG HM | ALU

N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu

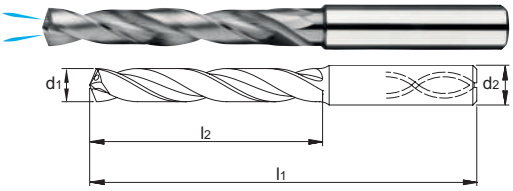
250-310 I | 220-260 I | 200-280 H | 80-310 G

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.279.0300 | 3 | 6 | 66 | 28 | 112,35 |
| 11.279.0310 | 3.1 | 6 | 66 | 28 | 112,35 |
| 11.279.0320 | 3.2 | 6 | 66 | 28 | 112,35 |
| 11.279.0330 | 3.3 | 6 | 66 | 28 | 112,35 |
| 11.279.0340 | 3.4 | 6 | 66 | 28 | 112,35 |
| 11.279.0350 | 3.5 | 6 | 66 | 28 | 112,35 |
| 11.279.0360 | 3.6 | 6 | 66 | 28 | 112,35 |
| 11.279.0370 | 3.7 | 6 | 66 | 28 | 112,35 |
| 11.279.0380 | 3.8 | 6 | 74 | 36 | 112,35 |
| 11.279.0390 | 3.9 | 6 | 74 | 36 | 112,35 |
| 11.279.0400 | 4 | 6 | 74 | 36 | 112,35 |
| 11.279.0410 | 4.1 | 6 | 74 | 36 | 112,35 |
| 11.279.0420 | 4.2 | 6 | 74 | 36 | 112,35 |
| 11.279.0430 | 4.3 | 6 | 74 | 36 | 112,35 |
| 11.279.0440 | 4.4 | 6 | 74 | 36 | 112,35 |
| 11.279.0450 | 4.5 | 6 | 74 | 36 | 112,35 |
| 11.279.0460 | 4.6 | 6 | 74 | 36 | 112,35 |
| 11.279.0470 | 4.7 | 6 | 74 | 36 | 112,35 |
| 11.279.0480 | 4.8 | 6 | 82 | 44 | 112,35 |
| 11.279.0490 | 4.9 | 6 | 82 | 44 | 112,35 |
| 11.279.0500 | 5 | 6 | 82 | 44 | 112,35 |
| 11.279.0510 | 5.1 | 6 | 82 | 44 | 112,35 |
| 11.279.0520 | 5.2 | 6 | 82 | 44 | 112,35 |
| 11.279.0530 | 5.3 | 6 | 82 | 44 | 112,35 |
| 11.279.0540 | 5.4 | 6 | 82 | 44 | 112,35 |
| 11.279.0550 | 5.5 | 6 | 82 | 44 | 112,35 |
| 11.279.0560 | 5.6 | 6 | 82 | 44 | 112,35 |
| 11.279.0570 | 5.7 | 6 | 82 | 44 | 112,35 |
| 11.279.0580 | 5.8 | 6 | 82 | 44 | 112,35 |
| 11.279.0590 | 5.9 | 6 | 82 | 44 | 112,35 |
| 11.279.0600 | 6 | 6 | 82 | 44 | 112,35 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.279.0610 | 6.1 | 8 | 91 | 53 | 131,20 |
| 11.279.0620 | 6.2 | 8 | 91 | 53 | 131,20 |
| 11.279.0630 | 6.3 | 8 | 91 | 53 | 131,20 |
| 11.279.0640 | 6.4 | 8 | 91 | 53 | 131,20 |
| 11.279.0650 | 6.5 | 8 | 91 | 53 | 131,20 |
| 11.279.0660 | 6.6 | 8 | 91 | 53 | 131,20 |
| 11.279.0670 | 6.7 | 8 | 91 | 53 | 131,20 |
| 11.279.0680 | 6.8 | 8 | 91 | 53 | 131,20 |
| 11.279.0690 | 6.9 | 8 | 91 | 53 | 131,20 |
| 11.279.0700 | 7 | 8 | 91 | 53 | 131,20 |
| 11.279.0710 | 7.1 | 8 | 91 | 53 | 131,20 |
| 11.279.0720 | 7.2 | 8 | 91 | 53 | 131,20 |
| 11.279.0730 | 7.3 | 8 | 91 | 53 | 131,20 |
| 11.279.0740 | 7.4 | 8 | 91 | 53 | 131,20 |
| 11.279.0750 | 7.5 | 8 | 91 | 53 | 131,20 |
| 11.279.0760 | 7.6 | 8 | 91 | 53 | 131,20 |
| 11.279.0770 | 7.7 | 8 | 91 | 53 | 131,20 |
| 11.279.0780 | 7.8 | 8 | 91 | 53 | 131,20 |
| 11.279.0790 | 7.9 | 8 | 91 | 53 | 131,20 |
| 11.279.0800 | 8 | 8 | 91 | 53 | 131,20 |
| 11.279.0810 | 8.1 | 10 | 103 | 61 | 200,45 |
| 11.279.0820 | 8.2 | 10 | 103 | 61 | 200,45 |
| 11.279.0830 | 8.3 | 10 | 103 | 61 | 200,45 |
| 11.279.0840 | 8.4 | 10 | 103 | 61 | 200,45 |
| 11.279.0850 | 8.5 | 10 | 103 | 61 | 200,45 |
| 11.279.0860 | 8.6 | 10 | 103 | 61 | 200,45 |
| 11.279.0870 | 8.7 | 10 | 103 | 61 | 200,45 |
| 11.279.0880 | 8.8 | 10 | 103 | 61 | 200,45 |
| 11.279.0890 | 8.9 | 10 | 103 | 61 | 200,45 |
| 11.279.0900 | 9 | 10 | 103 | 61 | 200,45 |
| 11.279.0910 | 9.1 | 10 | 103 | 61 | 200,45 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.279.0920 | 9.2 | 10 | 103 | 61 | 200,45 |
| 11.279.0930 | 9.3 | 10 | 103 | 61 | 200,45 |
| 11.279.0940 | 9.4 | 10 | 103 | 61 | 200,45 |
| 11.279.0950 | 9.5 | 10 | 103 | 61 | 200,45 |
| 11.279.0960 | 9.6 | 10 | 103 | 61 | 200,45 |
| 11.279.0970 | 9.7 | 10 | 103 | 61 | 200,45 |
| 11.279.0980 | 9.8 | 10 | 103 | 61 | 200,45 |
| 11.279.0990 | 9.9 | 10 | 103 | 61 | 200,45 |
| 11.279.1000 | 10 | 10 | 103 | 61 | 200,45 |
| 11.279.1020 | 10.2 | 12 | 118 | 71 | 289,00 |
| 11.279.1030 | 10.3 | 12 | 118 | 71 | 289,00 |
| 11.279.1050 | 10.5 | 12 | 118 | 71 | 289,00 |
| 11.279.1080 | 10.8 | 12 | 118 | 71 | 289,00 |
| 11.279.1090 | 10.9 | 12 | 118 | 71 | 289,00 |
| 11.279.1100 | 11 | 12 | 118 | 71 | 289,00 |
| 11.279.1120 | 11.2 | 12 | 118 | 71 | 289,00 |
| 11.279.1150 | 11.5 | 12 | 118 | 71 | 289,00 |
| 11.279.1180 | 11.8 | 12 | 118 | 71 | 289,00 |
| 11.279.1200 | 12 | 12 | 118 | 71 | 289,00 |
| 11.279.1250 | 12.5 | 14 | 124 | 77 | 376,00 |
| 11.279.1300 | 13 | 14 | 124 | 77 | 376,00 |
| 11.279.1350 | 13.5 | 14 | 124 | 77 | 376,00 |
| 11.279.1380 | 13.8 | 14 | 124 | 77 | 376,00 |
| 11.279.1400 | 14 | 14 | 124 | 77 | 376,00 |
| 11.279.1450 | 14.5 | 16 | 133 | 83 | 466,00 |
| 11.279.1480 | 14.8 | 16 | 133 | 83 | 466,00 |
| 11.279.1500 | 15 | 16 | 133 | 83 | 466,00 |
| 11.279.1600 | 16 | 16 | 133 | 83 | 466,00 |
| 11.279.1800 | 18 | 18 | 143 | 93 | 625,00 |
| 11.279.2000 | 20 | 20 | 153 | 101 | 716,00 |

## › 11.282 Phantom




**NL** Volhardmetaal Spiraalboor 5xD met koelkanaal, TiAlN, roestvaststaal
**FR** Foret Carbure monobloc 5xD à trou d´huile, TiAlN, Inox
**ES** Broca Metal duro 5xD con canal de refrigeración, TiAlN, acero inoxidable
**DE** Vollhartmetall Spiralbohrer 5xD mit Innenkühlung, TiAlN, rostfreien Stahl
**EN** Solid carbide Twist drill 5xD with coolant holes, TiAlN, stainless steel

140° | 5xD | h6 | DIN 6535-HA | DIN 6537-L | INOX | m7 | MG HM | TiAlN

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 72 Ti

130-145 G | 80-125 F | 65-145 F | 60-105 C | 72-80 C | 60-80 C | 30-35 B

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.282.0200 | 2 | 4 | 57 | 21 | 78,95 |
| 11.282.0210 | 2.1 | 4 | 57 | 21 | 78,95 |
| 11.282.0220 | 2.2 | 4 | 57 | 21 | 78,95 |
| 11.282.0230 | 2.3 | 4 | 57 | 21 | 78,95 |
| 11.282.0240 | 2.4 | 4 | 57 | 21 | 78,95 |
| 11.282.0250 | 2.5 | 4 | 57 | 21 | 78,95 |
| 11.282.0260 | 2.6 | 4 | 57 | 21 | 78,95 |
| 11.282.0270 | 2.7 | 4 | 57 | 21 | 78,95 |
| 11.282.0280 | 2.8 | 4 | 57 | 21 | 78,95 |
| 11.282.0290 | 2.9 | 4 | 57 | 21 | 78,95 |
| 11.282.0300 | 3 | 6 | 66 | 28 | 85,90 |
| 11.282.0310 | 3.1 | 6 | 66 | 28 | 85,90 |
| 11.282.0320 | 3.2 | 6 | 66 | 28 | 85,90 |
| 11.282.0330 | 3.3 | 6 | 66 | 28 | 85,90 |

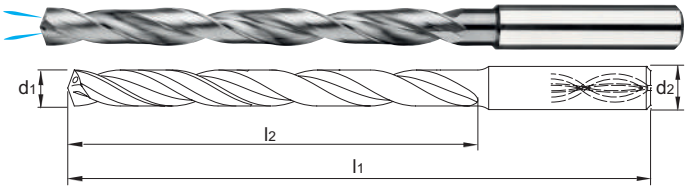
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.282.0340 | 3.4 | 6 | 66 | 28 | 85,90 |
| 11.282.0350 | 3.5 | 6 | 66 | 28 | 85,90 |
| 11.282.0360 | 3.6 | 6 | 66 | 28 | 85,90 |
| 11.282.0370 | 3.7 | 6 | 66 | 28 | 85,90 |
| 11.282.0380 | 3.8 | 6 | 74 | 36 | 85,90 |
| 11.282.0390 | 3.9 | 6 | 74 | 36 | 85,90 |
| 11.282.0400 | 4 | 6 | 74 | 36 | 85,90 |
| 11.282.0410 | 4.1 | 6 | 74 | 36 | 85,90 |
| 11.282.0420 | 4.2 | 6 | 74 | 36 | 85,90 |
| 11.282.0430 | 4.3 | 6 | 74 | 36 | 85,90 |
| 11.282.0440 | 4.4 | 6 | 74 | 36 | 85,90 |
| 11.282.0450 | 4.5 | 6 | 74 | 36 | 85,90 |
| 11.282.0460 | 4.6 | 6 | 74 | 36 | 85,90 |
| 11.282.0470 | 4.7 | 6 | 74 | 36 | 85,90 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.282.0480 | 4.8 | 6 | 82 | 44 | 85,90 |
| 11.282.0490 | 4.9 | 6 | 82 | 44 | 85,90 |
| 11.282.0500 | 5 | 6 | 82 | 44 | 85,90 |
| 11.282.0510 | 5.1 | 6 | 82 | 44 | 85,90 |
| 11.282.0520 | 5.2 | 6 | 82 | 44 | 85,90 |
| 11.282.0530 | 5.3 | 6 | 82 | 44 | 85,90 |
| 11.282.0540 | 5.4 | 6 | 82 | 44 | 85,90 |
| 11.282.0550 | 5.5 | 6 | 82 | 44 | 85,90 |
| 11.282.0560 | 5.6 | 6 | 82 | 44 | 85,90 |
| 11.282.0570 | 5.7 | 6 | 82 | 44 | 85,90 |
| 11.282.0580 | 5.8 | 6 | 82 | 44 | 85,90 |
| 11.282.0590 | 5.9 | 6 | 82 | 44 | 85,90 |
| 11.282.0600 | 6 | 6 | 82 | 44 | 85,90 |
| 11.282.0610 | 6.1 | 8 | 91 | 53 | 97,65 |

## › 11.282 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.282.0620 | 6.2 | 8 | 91 | 53 | 97,65 |
| 11.282.0630 | 6.3 | 8 | 91 | 53 | 97,65 |
| 11.282.0640 | 6.4 | 8 | 91 | 53 | 97,65 |
| 11.282.0650 | 6.5 | 8 | 91 | 53 | 97,65 |
| 11.282.0660 | 6.6 | 8 | 91 | 53 | 97,65 |
| 11.282.0670 | 6.7 | 8 | 91 | 53 | 97,65 |
| 11.282.0680 | 6.8 | 8 | 91 | 53 | 97,65 |
| 11.282.0690 | 6.9 | 8 | 91 | 53 | 97,65 |
| 11.282.0700 | 7 | 8 | 91 | 53 | 97,65 |
| 11.282.0710 | 7.1 | 8 | 91 | 53 | 97,65 |
| 11.282.0720 | 7.2 | 8 | 91 | 53 | 97,65 |
| 11.282.0730 | 7.3 | 8 | 91 | 53 | 97,65 |
| 11.282.0740 | 7.4 | 8 | 91 | 53 | 97,65 |
| 11.282.0750 | 7.5 | 8 | 91 | 53 | 97,65 |
| 11.282.0760 | 7.6 | 8 | 91 | 53 | 97,65 |
| 11.282.0770 | 7.7 | 8 | 91 | 53 | 97,65 |
| 11.282.0780 | 7.8 | 8 | 91 | 53 | 97,65 |
| 11.282.0790 | 7.9 | 8 | 91 | 53 | 97,65 |
| 11.282.0800 | 8 | 8 | 91 | 53 | 97,65 |
| 11.282.0810 | 8.1 | 10 | 103 | 61 | 113,30 |
| 11.282.0820 | 8.2 | 10 | 103 | 61 | 113,30 |
| 11.282.0830 | 8.3 | 10 | 103 | 61 | 113,30 |
| 11.282.0840 | 8.4 | 10 | 103 | 61 | 113,30 |
| 11.282.0850 | 8.5 | 10 | 103 | 61 | 113,30 |
| 11.282.0860 | 8.6 | 10 | 103 | 61 | 113,30 |
| 11.282.0870 | 8.7 | 10 | 103 | 61 | 113,30 |
| 11.282.0880 | 8.8 | 10 | 103 | 61 | 113,30 |
| 11.282.0890 | 8.9 | 10 | 103 | 61 | 113,30 |
| 11.282.0900 | 9 | 10 | 103 | 61 | 113,30 |
| 11.282.0910 | 9.1 | 10 | 103 | 61 | 113,30 |
| 11.282.0920 | 9.2 | 10 | 103 | 61 | 113,30 |
| 11.282.0930 | 9.3 | 10 | 103 | 61 | 113,30 |
| 11.282.0940 | 9.4 | 10 | 103 | 61 | 113,30 |
| 11.282.0950 | 9.5 | 10 | 103 | 61 | 113,30 |
| 11.282.0960 | 9.6 | 10 | 103 | 61 | 113,30 |
| 11.282.0970 | 9.7 | 10 | 103 | 61 | 113,30 |
| 11.282.0980 | 9.8 | 10 | 103 | 61 | 113,30 |
| 11.282.0990 | 9.9 | 10 | 103 | 61 | 113,30 |
| 11.282.1000 | 10 | 10 | 103 | 61 | 113,30 |
| 11.282.1020 | 10.2 | 12 | 118 | 71 | 156,30 |
| 11.282.1050 | 10.5 | 12 | 118 | 71 | 156,30 |
| 11.282.1080 | 10.8 | 12 | 118 | 71 | 156,30 |
| 11.282.1100 | 11 | 12 | 118 | 71 | 156,30 |
| 11.282.1120 | 11.2 | 12 | 118 | 71 | 156,30 |
| 11.282.1150 | 11.5 | 12 | 118 | 71 | 156,30 |
| 11.282.1180 | 11.8 | 12 | 118 | 71 | 156,30 |
| 11.282.1200 | 12 | 12 | 118 | 71 | 156,30 |
| 11.282.1250 | 12.5 | 14 | 124 | 77 | 242,35 |
| 11.282.1300 | 13 | 14 | 124 | 77 | 242,35 |
| 11.282.1350 | 13.5 | 14 | 124 | 77 | 242,35 |
| 11.282.1400 | 14 | 14 | 124 | 77 | 242,35 |
| 11.282.1450 | 14.5 | 16 | 133 | 83 | 317,00 |
| 11.282.1500 | 15 | 16 | 133 | 83 | 317,00 |
| 11.282.1550 | 15.5 | 16 | 133 | 83 | 317,00 |
| 11.282.1600 | 16 | 16 | 133 | 83 | 317,00 |
| 11.282.1650 | 16.5 | 18 | 143 | 93 | 475,00 |
| 11.282.1700 | 17 | 18 | 143 | 93 | 475,00 |
| 11.282.1750 | 17.5 | 18 | 143 | 93 | 475,00 |
| 11.282.1800 | 18 | 18 | 143 | 93 | 475,00 |
| 11.282.1850 | 18.5 | 20 | 153 | 101 | 537,00 |
| 11.282.1900 | 19 | 20 | 153 | 101 | 537,00 |
| 11.282.1950 | 19.5 | 20 | 153 | 101 | 537,00 |
| 11.282.2000 | 20 | 20 | 153 | 101 | 537,00 |

## › 11.295 Phantom



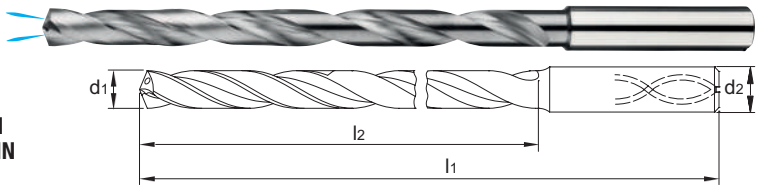

**NL UNI Volhardmetaal Spiraalboor 8xD met koelkanaal, TiAlN**
**FR Foret Carbure monobloc 8xD UNI à trou d´huile, TiAlN**
**ES Broca Metal duro 8xD UNI con canal de refrigeración, TiAlN**
**DE UNI Vollhartmetall Spiralbohrer 8xD mit Innenkühlung, TiAlN**
**EN UNI Solid carbide Twist drill 8xD with coolant holes, TiAlN**

140° | 8xD | h6 | DIN 6535-HA | m7 | MG HM | NORM | TiAlN | UNI

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 F | 80-170 F | 65-145 F | 60-105 B | 55-60 B | 35-45 C | 155-210 H | 130-160 G | 80-220 F | 30-35 C |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.295.0300 | 3 | 6 | 72 | 34 | 171,90 |
| 11.295.0330 | 3.3 | 6 | 72 | 34 | 171,90 |
| 11.295.0350 | 3.5 | 6 | 72 | 34 | 171,90 |
| 11.295.0400 | 4 | 6 | 81 | 43 | 171,90 |
| 11.295.0420 | 4.2 | 6 | 81 | 43 | 171,90 |
| 11.295.0450 | 4.5 | 6 | 81 | 43 | 171,90 |
| 11.295.0500 | 5 | 6 | 95 | 57 | 171,90 |
| 11.295.0550 | 5.5 | 6 | 95 | 57 | 171,90 |
| 11.295.0600 | 6 | 6 | 95 | 57 | 171,90 |
| 11.295.0650 | 6.5 | 8 | 114 | 76 | 186,85 |
| 11.295.0680 | 6.8 | 8 | 114 | 76 | 186,85 |
| 11.295.0700 | 7 | 8 | 114 | 76 | 186,85 |
| 11.295.0750 | 7.5 | 8 | 114 | 76 | 186,85 |
| 11.295.0800 | 8 | 8 | 114 | 76 | 186,85 |
| 11.295.0850 | 8.5 | 10 | 142 | 95 | 250,00 |
| 11.295.0900 | 9 | 10 | 142 | 95 | 250,00 |
| 11.295.0950 | 9.5 | 10 | 142 | 95 | 250,00 |
| 11.295.1000 | 10 | 10 | 142 | 95 | 250,00 |
| 11.295.1020 | 10.2 | 12 | 162 | 114 | 332,00 |
| 11.295.1050 | 10.5 | 12 | 162 | 114 | 332,00 |
| 11.295.1100 | 11 | 12 | 162 | 114 | 332,00 |
| 11.295.1150 | 11.5 | 12 | 162 | 114 | 332,00 |
| 11.295.1200 | 12 | 12 | 162 | 114 | 332,00 |
| 11.295.1250 | 12.5 | 14 | 178 | 133 | 473,00 |
| 11.295.1300 | 13 | 14 | 178 | 133 | 473,00 |
| 11.295.1350 | 13.5 | 14 | 178 | 133 | 473,00 |
| 11.295.1400 | 14 | 14 | 178 | 133 | 473,00 |
| 11.295.1500 | 15 | 16 | 203 | 152 | 610,00 |
| 11.295.1600 | 16 | 16 | 203 | 152 | 610,00 |
| 11.295.1800 | 18 | 18 | 222 | 171 | 706,00 |
| 11.295.2000 | 20 | 20 | 243 | 190 | 788,00 |

## › 11.305 Phantom




**NL UNI Volhardmetaal Spiraalboor 10xD met koelkanaal, TiAlN**
**FR Foret Carbure monobloc 10xD UNI à trou d´huile, TiAlN**
**ES Broca Metal duro 10xD UNI con canal de refrigeración, TiAlN**
**DE UNI Vollhartmetall Spiralbohrer 10xD mit Innenkühlung, TiAlN**
**EN UNI Solid carbide Twist drill 10xD with coolant holes, TiAlN**

10xD | 140° | h6 | DIN 6535-HA | h7 | MG HM | NORM | TiAlN | UNI

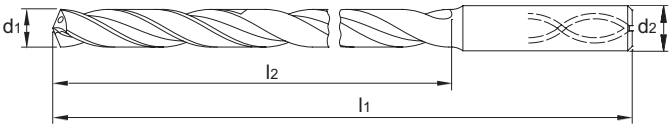
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 E | 80-170 F | 65-145 F | 60-105 B | 55-60 B | 35-45 D | 160-210 H | 130-160 G | 80-220 F | 30-35 C |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.305.0300 | 3 | 6 | 80 | 40 | 212,85 |
| 11.305.0330 | 3.3 | 6 | 87 | 47 | 212,85 |
| 11.305.0350 | 3.5 | 6 | 87 | 47 | 212,85 |
| 11.305.0400 | 4 | 6 | 93 | 53 | 212,85 |
| 11.305.0420 | 4.2 | 6 | 100 | 60 | 212,85 |
| 11.305.0450 | 4.5 | 6 | 100 | 60 | 212,85 |
| 11.305.0500 | 5 | 6 | 106 | 66 | 212,85 |
| 11.305.0550 | 5.5 | 6 | 113 | 73 | 212,85 |
| 11.305.0600 | 6 | 6 | 119 | 79 | 212,85 |
| 11.305.0650 | 6.5 | 8 | 126 | 86 | 263,00 |
| 11.305.0680 | 6.8 | 8 | 132 | 92 | 263,00 |
| 11.305.0700 | 7 | 8 | 132 | 92 | 263,00 |
| 11.305.0750 | 7.5 | 8 | 139 | 99 | 263,00 |
| 11.305.0800 | 8 | 8 | 145 | 105 | 263,00 |
| 11.305.0850 | 8.5 | 10 | 156 | 112 | 339,00 |
| 11.305.0900 | 9 | 10 | 162 | 118 | 339,00 |
| 11.305.0950 | 9.5 | 10 | 170 | 123 | 339,00 |
| 11.305.1000 | 10 | 10 | 176 | 132 | 339,00 |
| 11.305.1050 | 10.5 | 12 | 188 | 139 | 464,00 |
| 11.305.1100 | 11 | 12 | 194 | 145 | 464,00 |
| 11.305.1150 | 11.5 | 12 | 201 | 152 | 464,00 |
| 11.305.1200 | 12 | 12 | 207 | 158 | 464,00 |
| 11.305.1250 | 12.5 | 14 | 214 | 165 | 630,00 |
| 11.305.1300 | 13 | 14 | 220 | 171 | 630,00 |
| 11.305.1350 | 13.5 | 14 | 227 | 178 | 630,00 |
| 11.305.1400 | 14 | 14 | 233 | 184 | 630,00 |

## › 11.310 Phantom



NL **UNI Volhardmetaal Spiraalboor 15xD met koelkanaal, TiAlN**
FR **Foret Carbure monobloc 15xD UNI à trou d´huile, TiAlN**
ES **Broca Metal duro 15xD UNI con canal de refrigeración, TiAlN**
DE **UNI Vollhartmetall Spiralbohrer 15xD mit Innenkühlung, TiAlN**
EN **UNI Solid carbide Twist drill 15xD with coolant holes, TiAlN**




140° | 15xD | h6 | DIN 6535-HA | h7 | MG HM | NORM | TiAlN | UNI

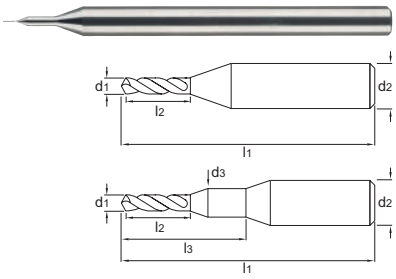
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | S 71 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | Ni/Co |
| 130-145 E | 80-170 F | 65-145 F | 60-105 B | 55-60 B | 35-45 D | 160-210 H | 130-160 G | 80-220 F | 30-35 C |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.310.0300 | 3 | 6 | 95 | 55 | 268,00 |
| 11.310.0350 | 3.5 | 6 | 104 | 64 | 268,00 |
| 11.310.0400 | 4 | 6 | 113 | 73 | 271,00 |
| 11.310.0450 | 4.5 | 6 | 122 | 82 | 291,00 |
| 11.310.0500 | 5 | 6 | 131 | 91 | 291,00 |
| 11.310.0550 | 5.5 | 6 | 140 | 100 | 291,00 |
| 11.310.0600 | 6 | 6 | 149 | 109 | 291,00 |
| 11.310.0650 | 6.5 | 8 | 158 | 118 | 337,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.310.0700 | 7 | 8 | 167 | 127 | 337,00 |
| 11.310.0750 | 7.5 | 8 | 176 | 136 | 337,00 |
| 11.310.0800 | 8 | 8 | 185 | 145 | 337,00 |
| 11.310.0850 | 8.5 | 10 | 198 | 154 | 434,00 |
| 11.310.0900 | 9 | 10 | 207 | 163 | 434,00 |
| 11.310.0950 | 9.5 | 10 | 217 | 173 | 434,00 |
| 11.310.1000 | 10 | 10 | 226 | 182 | 434,00 |
| 11.310.1050 | 10.5 | 12 | 240 | 191 | 582,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.310.1100 | 11 | 12 | 249 | 200 | 582,00 |
| 11.310.1150 | 11.5 | 12 | 258 | 209 | 582,00 |
| 11.310.1200 | 12 | 12 | 267 | 218 | 582,00 |
| 11.310.1250 | 12.5 | 14 | 276 | 227 | 769,00 |
| 11.310.1300 | 13 | 14 | 285 | 236 | 769,00 |
| 11.310.1350 | 13.5 | 14 | 294 | 245 | 769,00 |
| 11.310.1400 | 14 | 14 | 303 | 254 | 769,00 |

## › 11.330 Phantom




NL **UNI Volhardmetaal Microboor 5xD**
FR **Micro-foret Carbure monobloc 5xD UNI**
ES **Micro-Broca Metal duro 5xD UNI**
DE **UNI Vollhartmetall Kleinstbohrer 5xD**
EN **UNI Solid carbide Micro Drill 5xD**

130° | 5xD | MG HM | NORM | UNI | h5 | d1 +0,000/ -0,004

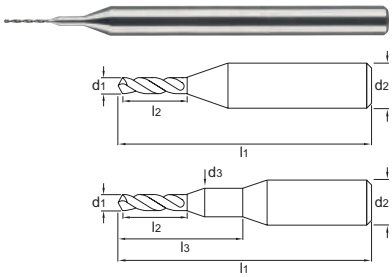
| P 11 | P 12 | P 13 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 | N 62 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC | GFK/CFK | Ni/Co | Ti |
| 55-65 S | 40-50 S | 30-40 R | 20-30 Q | 15-25 Q | 55-75 S | 40-60 S | 80-100 U | 60-100 U | 80-100 T | 30-40 Q | 55-60 S | 12-15 P | 25-40 P |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | € |
|---|---|---|---|---|---|---|---|
| 11.330.0100 | 0.1 | 3 | 1 | 39 | 0.5 | 5 | 33,90 |
| 11.330.0150 | 0.15 | 3 | 1 | 39 | 0.8 | 5 | 32,90 |
| 11.330.0200 | 0.2 | 3 | 1 | 39 | 1 | 5 | 31,35 |
| 11.330.0250 | 0.25 | 3 | 1 | 39 | 1.25 | 5 | 29,20 |
| 11.330.0300 | 0.3 | 3 | 1 | 39 | 1.5 | 5 | 27,10 |
| 11.330.0350 | 0.35 | 3 | 1 | 39 | 1.75 | 5 | 26,65 |
| 11.330.0400 | 0.4 | 3 | 1 | 39 | 2 | 5 | 26,10 |
| 11.330.0450 | 0.45 | 3 | 1 | 39 | 2.25 | 5 | 25,55 |
| 11.330.0500 | 0.5 | 3 | 1.5 | 39 | 2.5 | 10 | 25,55 |
| 11.330.0550 | 0.55 | 3 | 1.5 | 39 | 3 | 10 | 25,55 |
| 11.330.0600 | 0.6 | 3 | 1.5 | 39 | 3 | 10 | 25,55 |
| 11.330.0650 | 0.65 | 3 | 1.5 | 39 | 3.5 | 10 | 25,55 |
| 11.330.0700 | 0.7 | 3 | 1.5 | 39 | 3.5 | 10 | 25,55 |
| 11.330.0750 | 0.75 | 3 | 1.5 | 39 | 4 | 10 | 25,55 |
| 11.330.0800 | 0.8 | 3 | 1.5 | 39 | 4 | 10 | 25,55 |
| 11.330.0850 | 0.85 | 3 | 1.5 | 39 | 4.5 | 10 | 25,55 |
| 11.330.0900 | 0.9 | 3 | 1.5 | 39 | 4.5 | 10 | 25,55 |
| 11.330.1000 | 1 | 3 | 2 | 39 | 5 | 10 | 25,55 |
| 11.330.1100 | 1.1 | 3 | 2 | 39 | 5.5 | 10 | 27,65 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | € |
|---|---|---|---|---|---|---|---|
| 11.330.1200 | 1.2 | 3 | 2 | 39 | 6 | 10 | 27,65 |
| 11.330.1300 | 1.3 | 3 | 2 | 39 | 6.5 | 10 | 27,65 |
| 11.330.1400 | 1.4 | 3 | 2 | 39 | 7 | 10 | 27,65 |
| 11.330.1500 | 1.5 | 3 | | 39 | 7.5 | | 27,65 |
| 11.330.1600 | 1.6 | 3 | | 39 | 8 | | 27,65 |
| 11.330.1700 | 1.7 | 3 | | 39 | 8.5 | | 27,65 |
| 11.330.1800 | 1.8 | 3 | | 39 | 9 | | 27,65 |
| 11.330.1900 | 1.9 | 3 | | 39 | 9.5 | | 27,65 |
| 11.330.2000 | 2 | 3 | | 39 | 10 | | 27,65 |
| 11.330.2100 | 2.1 | 3 | | 39 | 10.5 | | 28,70 |
| 11.330.2200 | 2.2 | 3 | | 39 | 11 | | 28,70 |
| 11.330.2300 | 2.3 | 3 | | 39 | 11.5 | | 28,70 |
| 11.330.2400 | 2.4 | 3 | | 39 | 12 | | 28,70 |
| 11.330.2500 | 2.5 | 3 | | 39 | 12.5 | | 28,70 |
| 11.330.2600 | 2.6 | 3 | | 39 | 13 | | 28,70 |
| 11.330.2700 | 2.7 | 3 | | 39 | 13.5 | | 28,70 |
| 11.330.2800 | 2.8 | 3 | | 39 | 14 | | 28,70 |
| 11.330.2900 | 2.9 | 3 | | 39 | 14.5 | | 28,70 |
| 11.330.3000 | 3 | 3 | | 39 | 15 | | 28,70 |

## › 11.335 Phantom

NL **UNI Volhardmetaal Microboor 8xD**
FR **Micro-foret Carbure monobloc 8xD UNI**
ES **Micro-Broca Metal duro 8xD UNI**
DE **UNI Vollhartmetall Kleinstbohrer 8xD**
EN **UNI Solid carbide Micro Drill 8xD**




130° | 8xD | MG HM | NORM | UNI | h5 | d1 +0,000/ -0,004

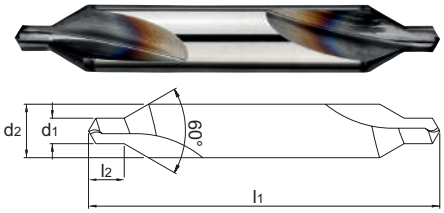
| P 11 | P 12 | P 13 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 | N 62 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC | GFK/CFK | Ni/Co | Ti |
| 55-65 S | 40-50 S | 30-40 R | 20-30 Q | 15-25 Q | 55-75 S | 40-60 S | 80-100 U | 60-100 U | 80-100 T | 30-40 Q | 55-60 S | 12-15 P | 25-40 P |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | € |
|---|---|---|---|---|---|---|---|
| 11.335.0100 | 0.1 | 3 | 1 | 39 | 0.8 | 5 | 37,10 |
| 11.335.0150 | 0.15 | 3 | 1 | 39 | 1.3 | 5 | 36,00 |
| 11.335.0200 | 0.2 | 3 | 1 | 39 | 1.6 | 7 | 34,45 |
| 11.335.0250 | 0.25 | 3 | 1 | 39 | 2 | 7 | 31,35 |
| 11.335.0300 | 0.3 | 3 | 1 | 39 | 2.4 | 7 | 29,20 |
| 11.335.0350 | 0.35 | 3 | 1 | 39 | 2.8 | 7 | 28,70 |
| 11.335.0400 | 0.4 | 3 | 1 | 39 | 3.2 | 7 | 28,20 |
| 11.335.0450 | 0.45 | 3 | 1 | 39 | 3.6 | 7 | 28,20 |
| 11.335.0500 | 0.5 | 3 | 1.5 | 39 | 4 | 15 | 28,20 |
| 11.335.0550 | 0.55 | 3 | 1.5 | 39 | 4.8 | 15 | 29,75 |
| 11.335.0600 | 0.6 | 3 | 1.5 | 39 | 4.8 | 15 | 29,75 |
| 11.335.0650 | 0.65 | 3 | 1.5 | 39 | 5.6 | 15 | 29,75 |
| 11.335.0700 | 0.7 | 3 | 1.5 | 39 | 5.6 | 15 | 29,75 |
| 11.335.0750 | 0.75 | 3 | 1.5 | 39 | 6.4 | 15 | 29,75 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | € |
|---|---|---|---|---|---|---|---|
| 11.335.0800 | 0.8 | 3 | 1.5 | 39 | 6.4 | 15 | 29,75 |
| 11.335.0850 | 0.85 | 3 | 1.5 | 39 | 7.2 | 15 | 29,75 |
| 11.335.0900 | 0.9 | 3 | 1.5 | 39 | 7.2 | 15 | 29,75 |
| 11.335.1000 | 1 | 3 | 2 | 39 | 8 | 15 | 29,75 |
| 11.335.1100 | 1.1 | 3 | 2 | 39 | 8.8 | 15 | 33,90 |
| 11.335.1200 | 1.2 | 3 | 2 | 39 | 9.6 | 15 | 33,90 |
| 11.335.1300 | 1.3 | 3 | 2 | 39 | 10.4 | 15 | 33,90 |
| 11.335.1400 | 1.4 | 3 | 2 | 39 | 11.2 | 15 | 33,90 |
| 11.335.1500 | 1.5 | 3 | | 39 | 12 | | 33,90 |
| 11.335.1600 | 1.6 | 3 | | 39 | 12.8 | | 33,90 |
| 11.335.1700 | 1.7 | 3 | | 39 | 13.6 | | 33,90 |
| 11.335.1800 | 1.8 | 3 | | 39 | 14.4 | | 33,90 |
| 11.335.1900 | 1.9 | 3 | | 39 | 15.2 | | 33,90 |
| 11.335.2000 | 2 | 3 | | 39 | 16 | | 33,90 |

## › 15.144 Phantom

NL **Volhardmetaal Centerboor TiAlN, 60°**
FR **Foret à centrer Carbure monobloc TiAlN, 60°**
ES **Broca escalonada Metal duro TiAlN, 60°**
DE **Vollhartmetall Zentrierbohrer TiAlN, 60°**
EN **Solid carbide Centre Drill TiAlN, 60°**




60° | DIN 333-A | MG HM | NFE 66051-A | TiAlN | h5

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 |
|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² |
| 100-110 D | 65-105 D | 82-95 D | 32-95 B | 10-20 C | 20-45 B |

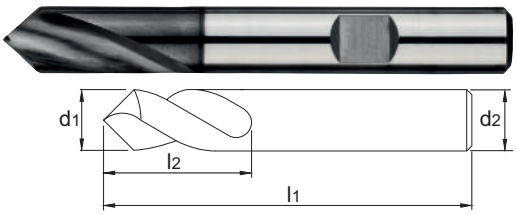
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.144.1031 | 1 | 3.15 | 31.5 | 1,3-1,7 | 72,20 |
| 15.144.1231 | 1.25 | 3.15 | 31.5 | 1,6-2,0 | 72,20 |
| 15.144.1640 | 1.6 | 4 | 35.5 | 2,0-2,6 | 74,60 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.144.2050 | 2 | 5 | 40 | 2,5-3,1 | 75,70 |
| 15.144.2563 | 2.5 | 6.3 | 45 | 3,1-3,8 | 81,70 |
| 15.144.3180 | 3.15 | 8 | 50 | 3,9-4,6 | 95,20 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.144.4010 | 4 | 10 | 56 | 5,0-5,9 | 125,30 |
| 15.144.5013 | 5 | 12.5 | 63 | 6,3-7,2 | 202,75 |

## › 15.624 Phantom

NL **Volhardmetaal NC-Centreerboor TiAlN, 90°**
FR **Foret à pointer NC Carbure monobloc TiAlN, 90°**
ES **Broca de puntear NC Metal duro TiAlN, 90°**
DE **Vollhartmetall NC Anbohrer TiAlN, 90°**
EN **Solid carbide NC Spotting Drill TiAlN, 90°**




90° | DIN 6535-HB | MG HM | TiAlN | h5

| P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 70-80 F | 34-70 F | 25-35 B | 10-28 A | 14-22 E | 15-20 E | 72-90 D | 70-80 D | 90-140 G | 80-100 F | 120-180 E | 120-150 G | 8-10 B | 15-20 E |

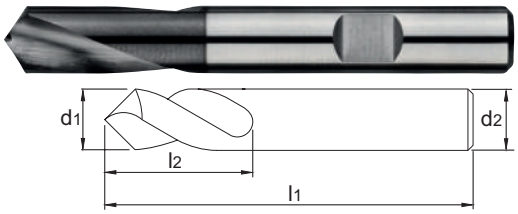
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.624.0200 | 2 | 2 | 40 | 8 | 31,10 |
| 15.624.0300 | 3 | 3 | 45 | 10 | 31,10 |
| 15.624.0400 | 4 | 4 | 50 | 12 | 32,40 |
| 15.624.0500 | 5 | 5 | 50 | 13 | 36,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.624.0600 | 6 | 6 | 50 | 13 | 43,60 |
| 15.624.0800 | 8 | 8 | 60 | 23 | 62,40 |
| 15.624.1000 | 10 | 10 | 70 | 24 | 88,25 |
| 15.624.1200 | 12 | 12 | 70 | 24 | 108,95 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.624.1600 | 16 | 16 | 75 | 29 | 191,10 |
| 15.624.2000 | 20 | 20 | 100 | 35 | 349,00 |

## › 15.724 Phantom

NL **Volhardmetaal NC-Centreerboor TiAlN, 120°**
FR **Foret à pointer NC Carbure monobloc TiAlN, 120°**
ES **Broca de puntear NC Metal duro TiAlN, 120°**
DE **Vollhartmetall NC Anbohrer TiAlN, 120°**
EN **Solid carbide NC Spotting Drill TiAlN, 120°**




120° | DIN 6535-HB | MG HM | TiAlN | h5

P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

70-80 F | 34-70 F | 25-35 B | 10-28 A | 14-22 E | 15-20 E | 72-90 D | 70-80 D | 90-140 G | 80-100 F | 120-180 E | 120-150 G | 8-10 B | 15-20 E

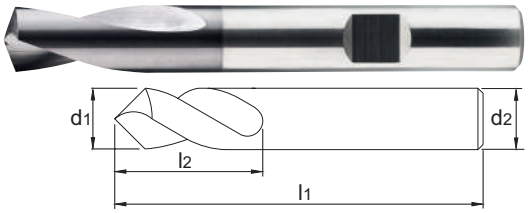
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.724.0200 | 2 | 2 | 32 | 8 | 31,10 |
| 15.724.0300 | 3 | 3 | 32 | 8 | 31,10 |
| 15.724.0400 | 4 | 4 | 40 | 10 | 32,40 |
| 15.724.0500 | 5 | 5 | 50 | 13 | 36,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.724.0600 | 6 | 6 | 50 | 13 | 43,60 |
| 15.724.0800 | 8 | 8 | 60 | 23 | 63,75 |
| 15.724.1000 | 10 | 10 | 70 | 24 | 86,35 |
| 15.724.1200 | 12 | 12 | 70 | 24 | 107,70 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.724.1600 | 16 | 16 | 75 | 29 | 200,40 |
| 15.724.2000 | 20 | 20 | 100 | 35 | 350,00 |

## › 15.764 Phantom

NL **Volhardmetaal NC-Centreerboor TiAlN, 142°**
FR **Foret à pointer NC Carbure monobloc TiAlN, 142°**
ES **Broca de puntear NC Metal duro TiAlN, 142°**
DE **Vollhartmetall NC Anbohrer TiAlN, 142°**
EN **Solid carbide NC Spotting Drill TiAlN, 142°**




DIN 6535-HB | MG HM | TiAlN | 142° | h5

P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

70-80 F | 34-70 F | 25-35 B | 10-28 A | 14-22 E | 15-20 E | 72-90 D | 70-80 D | 90-140 G | 80-100 F | 120-180 E | 120-150 G | 8-10 B | 15-20 E

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.764.0300 | 3 | 3 | 45 | 10 | 32,65 |
| 15.764.0400 | 4 | 4 | 50 | 12 | 33,85 |
| 15.764.0500 | 5 | 5 | 50 | 15 | 37,70 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.764.0600 | 6 | 6 | 50 | 18 | 45,80 |
| 15.764.0800 | 8 | 8 | 60 | 18 | 66,90 |
| 15.764.1000 | 10 | 10 | 70 | 23 | 90,50 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.764.1200 | 12 | 12 | 70 | 24 | 112,90 |
| 15.764.1600 | 16 | 16 | 80 | 26 | 200,65 |



NL Verschil tussen centerboor en centreerboor
FR La différence entre un foret à centrer et un foret à pointer
ES Diferencia entre broca de centrar y broca de puntear
DE Unterschied zwischen Zentrierbohrer und Anbohrer
EN The difference between centre drills and spot drills

Read me

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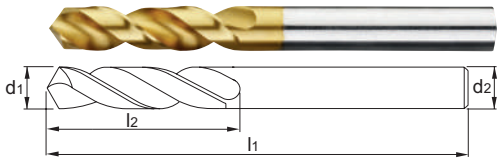
## › 11.168 Phantom

NL **HP2 UNI HSS-E Spiraalboor TiN**
FR **Foret HSS-E HP2 UNI TiN**
ES **Broca HSS-E HP2 UNI TiN**
DE **HP2 UNI HSS-E Spiralbohrer TiN**
EN **HP2 UNI HSS-E Twist drill TiN**



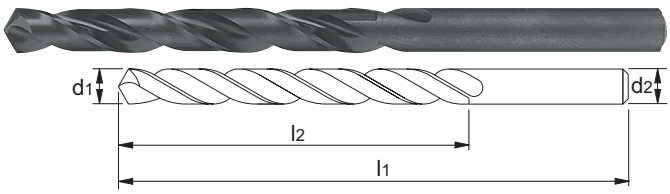

118° | DIN 1897 | HSS-E | >N | TiN | HP2 UNI

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 52 | N 61 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | CuAlFe | PVC |
| 38-42 F | 20-44 E | 20-40 E | 16-22 C | 15-20 D | 12-18 C | 40-45 F | 35-40 F | 50-70 E | 40-60 F | 60-80 F | 40-44 E | 15-20 D | 24-28 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.168.0100 | 1 | 1 | 26 | 6 | 7,71 |
| 11.168.0110 | 1.1 | 1.1 | 28 | 7 | 7,71 |
| 11.168.0120 | 1.2 | 1.2 | 30 | 8 | 7,95 |
| 11.168.0130 | 1.3 | 1.3 | 30 | 8 | 8,32 |
| 11.168.0140 | 1.4 | 1.4 | 32 | 9 | 7,62 |
| 11.168.0150 | 1.5 | 1.5 | 32 | 9 | 7,31 |
| 11.168.0160 | 1.6 | 1.6 | 34 | 10 | 7,48 |
| 11.168.0170 | 1.7 | 1.7 | 34 | 10 | 7,62 |
| 11.168.0180 | 1.8 | 1.8 | 36 | 11 | 7,48 |
| 11.168.0190 | 1.9 | 1.9 | 36 | 11 | 7,48 |
| 11.168.0200 | 2 | 2 | 38 | 12 | 6,36 |
| 11.168.0210 | 2.1 | 2.1 | 38 | 12 | 7,71 |
| 11.168.0220 | 2.2 | 2.2 | 40 | 13 | 7,71 |
| 11.168.0230 | 2.3 | 2.3 | 40 | 13 | 6,49 |
| 11.168.0240 | 2.4 | 2.4 | 43 | 14 | 7,74 |
| 11.168.0250 | 2.5 | 2.5 | 43 | 14 | 6,95 |
| 11.168.0260 | 2.6 | 2.6 | 43 | 14 | 8,08 |
| 11.168.0270 | 2.7 | 2.7 | 46 | 16 | 8,59 |
| 11.168.0280 | 2.8 | 2.8 | 46 | 16 | 7,95 |
| 11.168.0290 | 2.9 | 2.9 | 46 | 16 | 8,38 |
| 11.168.0300 | 3 | 3 | 46 | 16 | 7,22 |
| 11.168.0310 | 3.1 | 3.1 | 49 | 18 | 7,62 |
| 11.168.0320 | 3.2 | 3.2 | 49 | 18 | 7,31 |
| 11.168.0330 | 3.3 | 3.3 | 49 | 18 | 7,31 |
| 11.168.0340 | 3.4 | 3.4 | 52 | 20 | 8,35 |
| 11.168.0350 | 3.5 | 3.5 | 52 | 20 | 7,31 |
| 11.168.0360 | 3.6 | 3.6 | 52 | 20 | 9,03 |
| 11.168.0370 | 3.7 | 3.7 | 52 | 20 | 8,26 |
| 11.168.0380 | 3.8 | 3.8 | 55 | 22 | 8,82 |
| 11.168.0390 | 3.9 | 3.9 | 55 | 22 | 10,10 |
| 11.168.0400 | 4 | 4 | 55 | 22 | 8,21 |
| 11.168.0410 | 4.1 | 4.1 | 55 | 22 | 9,52 |
| 11.168.0420 | 4.2 | 4.2 | 55 | 22 | 8,21 |
| 11.168.0430 | 4.3 | 4.3 | 58 | 24 | 9,39 |
| 11.168.0440 | 4.4 | 4.4 | 58 | 24 | 10,10 |
| 11.168.0450 | 4.5 | 4.5 | 58 | 24 | 9,39 |
| 11.168.0460 | 4.6 | 4.6 | 58 | 24 | 9,52 |
| 11.168.0470 | 4.7 | 4.7 | 58 | 24 | 10,10 |
| 11.168.0480 | 4.8 | 4.8 | 62 | 26 | 10,63 |
| 11.168.0490 | 4.9 | 4.9 | 62 | 26 | 10,85 |
| 11.168.0500 | 5 | 5 | 62 | 26 | 9,03 |
| 11.168.0510 | 5.1 | 5.1 | 62 | 26 | 10,10 |
| 11.168.0520 | 5.2 | 5.2 | 62 | 26 | 10,85 |
| 11.168.0530 | 5.3 | 5.3 | 62 | 26 | 11,25 |
| 11.168.0540 | 5.4 | 5.4 | 66 | 28 | 11,97 |
| 11.168.0550 | 5.5 | 5.5 | 66 | 28 | 10,24 |
| 11.168.0560 | 5.6 | 5.6 | 66 | 28 | 12,11 |
| 11.168.0570 | 5.7 | 5.7 | 66 | 28 | 13,12 |
| 11.168.0580 | 5.8 | 5.8 | 66 | 28 | 12,53 |
| 11.168.0590 | 5.9 | 5.9 | 66 | 28 | 13,12 |
| 11.168.0600 | 6 | 6 | 66 | 28 | 11,00 |
| 11.168.0610 | 6.1 | 6.1 | 70 | 31 | 12,84 |
| 11.168.0620 | 6.2 | 6.2 | 70 | 31 | 12,91 |
| 11.168.0630 | 6.3 | 6.3 | 70 | 31 | 13,58 |
| 11.168.0640 | 6.4 | 6.4 | 70 | 31 | 13,58 |
| 11.168.0650 | 6.5 | 6.5 | 70 | 31 | 12,91 |
| 11.168.0660 | 6.6 | 6.6 | 70 | 31 | 14,31 |
| 11.168.0670 | 6.7 | 6.7 | 70 | 31 | 14,62 |
| 11.168.0680 | 6.8 | 6.8 | 74 | 34 | 15,80 |
| 11.168.0690 | 6.9 | 6.9 | 74 | 34 | 15,31 |
| 11.168.0700 | 7 | 7 | 74 | 34 | 14,45 |
| 11.168.0710 | 7.1 | 7.1 | 74 | 34 | 17,57 |
| 11.168.0720 | 7.2 | 7.2 | 74 | 34 | 17,91 |
| 11.168.0730 | 7.3 | 7.3 | 74 | 34 | 17,91 |
| 11.168.0740 | 7.4 | 7.4 | 74 | 34 | 18,07 |
| 11.168.0750 | 7.5 | 7.5 | 74 | 34 | 15,03 |
| 11.168.0760 | 7.6 | 7.6 | 79 | 37 | 19,17 |
| 11.168.0770 | 7.7 | 7.7 | 79 | 37 | 19,36 |
| 11.168.0780 | 7.8 | 7.8 | 79 | 37 | 18,96 |
| 11.168.0790 | 7.9 | 7.9 | 79 | 37 | 19,17 |
| 11.168.0800 | 8 | 8 | 79 | 37 | 17,88 |
| 11.168.0810 | 8.1 | 8.1 | 79 | 37 | 22,83 |
| 11.168.0820 | 8.2 | 8.2 | 79 | 37 | 23,84 |
| 11.168.0830 | 8.3 | 8.3 | 79 | 37 | 24,05 |
| 11.168.0840 | 8.4 | 8.4 | 79 | 37 | 24,05 |
| 11.168.0850 | 8.5 | 8.5 | 79 | 37 | 20,91 |
| 11.168.0860 | 8.6 | 8.6 | 84 | 40 | 26,20 |
| 11.168.0870 | 8.7 | 8.7 | 84 | 40 | 26,20 |
| 11.168.0880 | 8.8 | 8.8 | 84 | 40 | 26,20 |
| 11.168.0890 | 8.9 | 8.9 | 84 | 40 | 27,30 |
| 11.168.0900 | 9 | 9 | 84 | 40 | 21,30 |
| 11.168.0910 | 9.1 | 9.1 | 84 | 40 | 27,30 |
| 11.168.0920 | 9.2 | 9.2 | 84 | 40 | 27,30 |
| 11.168.0930 | 9.3 | 9.3 | 84 | 40 | 24,05 |
| 11.168.0940 | 9.4 | 9.4 | 84 | 40 | 27,30 |
| 11.168.0950 | 9.5 | 9.5 | 84 | 40 | 23,36 |
| 11.168.0960 | 9.6 | 9.6 | 89 | 43 | 27,85 |
| 11.168.0970 | 9.7 | 9.7 | 89 | 43 | 27,85 |
| 11.168.0980 | 9.8 | 9.8 | 89 | 43 | 27,85 |
| 11.168.0990 | 9.9 | 9.9 | 89 | 43 | 27,85 |
| 11.168.1000 | 10 | 10 | 89 | 43 | 23,00 |
| 11.168.1010 | 10.1 | 10.1 | 89 | 43 | 30,55 |
| 11.168.1020 | 10.2 | 10.2 | 89 | 43 | 29,30 |
| 11.168.1030 | 10.3 | 10.3 | 89 | 43 | 29,30 |
| 11.168.1050 | 10.5 | 10.5 | 89 | 43 | 27,80 |
| 11.168.1100 | 11 | 11 | 95 | 47 | 30,80 |
| 11.168.1150 | 11.5 | 11.5 | 95 | 47 | 35,55 |
| 11.168.1200 | 12 | 12 | 102 | 51 | 34,75 |
| 11.168.1250 | 12.5 | 12.5 | 102 | 51 | 38,05 |
| 11.168.1300 | 13 | 13 | 102 | 51 | 38,05 |
| 11.168.1350 | 13.5 | 13.5 | 107 | 54 | 42,50 |
| 11.168.1400 | 14 | 14 | 107 | 54 | 52,90 |

## › 11.450 Phantom

NL **HSS Spiraalboor**
FR **Foret HSS**
ES **Broca HSS**
DE **HSS Spiralbohrer**
EN **HSS Twist drill**




118° | DIN 338 | HSS | N | ≥1 | OX. ≥ 2mm

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu Si>10% | Cu | PVC |
| 25-27 F | 22-30 F | 15-20 E | 8-12 D | 15-20 E | 25-30 E | 45-50 G | 25-40 D | 22-28 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.450.0020 | 0.2 | 0.2 | 19 | 2.5 | 6,02 |
| 11.450.0025 | 0.25 | 0.25 | 19 | 3 | 5,92 |
| 11.450.0030 | 0.3 | 0.3 | 19 | 3 | 5,05 |
| 11.450.0035 | 0.35 | 0.35 | 19 | 4 | 5,59 |
| 11.450.0040 | 0.4 | 0.4 | 20 | 5 | 5,25 |
| 11.450.0045 | 0.45 | 0.45 | 20 | 5 | 5,28 |
| 11.450.0050 | 0.5 | 0.5 | 22 | 6 | 4,64 |
| 11.450.0055 | 0.55 | 0.55 | 24 | 7 | 4,61 |
| 11.450.0060 | 0.6 | 0.6 | 24 | 7 | 4,16 |
| 11.450.0065 | 0.65 | 0.65 | 26 | 8 | 4,25 |
| 11.450.0070 | 0.7 | 0.7 | 28 | 9 | 3,24 |
| 11.450.0075 | 0.75 | 0.75 | 28 | 9 | 3,24 |
| 11.450.0080 | 0.8 | 0.8 | 30 | 10 | 3,24 |
| 11.450.0085 | 0.85 | 0.85 | 30 | 10 | 3,24 |
| 11.450.0090 | 0.9 | 0.9 | 32 | 11 | 3,24 |
| 11.450.0095 | 0.95 | 0.95 | 32 | 11 | 3,24 |
| 11.450.0100 | 1 | 1 | 34 | 12 | 1,89 |
| 11.450.0105 | 1.05 | 1.05 | 34 | 12 | 2,88 |
| 11.450.0110 | 1.1 | 1.1 | 36 | 14 | 2,14 |
| 11.450.0115 | 1.15 | 1.15 | 36 | 14 | 2,45 |
| 11.450.0120 | 1.2 | 1.2 | 38 | 16 | 2,14 |
| 11.450.0125 | 1.25 | 1.25 | 38 | 16 | 2,30 |
| 11.450.0130 | 1.3 | 1.3 | 38 | 16 | 2,19 |
| 11.450.0135 | 1.35 | 1.35 | 40 | 18 | 2,77 |
| 11.450.0140 | 1.4 | 1.4 | 40 | 18 | 2,19 |
| 11.450.0145 | 1.45 | 1.45 | 40 | 18 | 2,45 |
| 11.450.0150 | 1.5 | 1.5 | 40 | 18 | 2,10 |
| 11.450.0155 | 1.55 | 1.55 | 43 | 20 | 2,25 |
| 11.450.0160 | 1.6 | 1.6 | 43 | 20 | 2,04 |
| 11.450.0165 | 1.65 | 1.65 | 43 | 20 | 2,25 |
| 11.450.0170 | 1.7 | 1.7 | 43 | 20 | 2,10 |
| 11.450.0175 | 1.75 | 1.75 | 46 | 22 | 2,32 |
| 11.450.0180 | 1.8 | 1.8 | 46 | 22 | 2,23 |
| 11.450.0185 | 1.85 | 1.85 | 46 | 22 | 3,07 |
| 11.450.0190 | 1.9 | 1.9 | 46 | 22 | 2,23 |
| 11.450.0195 | 1.95 | 1.95 | 49 | 24 | 2,32 |
| 11.450.0200 | 2 | 2 | 49 | 24 | 1,90 |
| 11.450.0205 | 2.05 | 2.05 | 49 | 24 | 2,07 |
| 11.450.0210 | 2.1 | 2.1 | 49 | 24 | 1,95 |
| 11.450.0215 | 2.15 | 2.15 | 53 | 27 | 2,07 |
| 11.450.0220 | 2.2 | 2.2 | 53 | 27 | 1,89 |
| 11.450.0225 | 2.25 | 2.25 | 53 | 27 | 2,04 |
| 11.450.0230 | 2.3 | 2.3 | 53 | 27 | 1,89 |
| 11.450.0235 | 2.35 | 2.35 | 53 | 27 | 2,04 |
| 11.450.0240 | 2.4 | 2.4 | 57 | 30 | 1,89 |

# › 11.450 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.450.0245 | 2.45 | 2.45 | 57 | 30 | 2,04 |
| 11.450.0250 | 2.5 | 2.5 | 57 | 30 | 1,57 |
| 11.450.0255 | 2.55 | 2.55 | 57 | 30 | 2,38 |
| 11.450.0260 | 2.6 | 2.6 | 57 | 30 | 2,17 |
| 11.450.0265 | 2.65 | 2.65 | 57 | 30 | 2,38 |
| 11.450.0270 | 2.7 | 2.7 | 61 | 33 | 2,17 |
| 11.450.0275 | 2.75 | 2.75 | 61 | 33 | 2,38 |
| 11.450.0280 | 2.8 | 2.8 | 61 | 33 | 2,17 |
| 11.450.0285 | 2.85 | 2.85 | 61 | 33 | 2,38 |
| 11.450.0290 | 2.9 | 2.9 | 61 | 33 | 2,17 |
| 11.450.0295 | 2.95 | 2.95 | 61 | 33 | 2,38 |
| 11.450.0300 | 3 | 3 | 61 | 33 | 2,11 |
| 11.450.0305 | 3.05 | 3.05 | 65 | 36 | 2,38 |
| 11.450.0310 | 3.1 | 3.1 | 65 | 36 | 2,28 |
| 11.450.0315 | 3.15 | 3.15 | 65 | 36 | 2,38 |
| 11.450.0320 | 3.2 | 3.2 | 65 | 36 | 2,28 |
| 11.450.0325 | 3.25 | 3.25 | 65 | 36 | 2,38 |
| 11.450.0330 | 3.3 | 3.3 | 65 | 36 | 2,28 |
| 11.450.0335 | 3.35 | 3.35 | 65 | 36 | 2,38 |
| 11.450.0340 | 3.4 | 3.4 | 70 | 39 | 2,28 |
| 11.450.0345 | 3.45 | 3.45 | 70 | 39 | 2,38 |
| 11.450.0350 | 3.5 | 3.5 | 70 | 39 | 2,11 |
| 11.450.0355 | 3.55 | 3.55 | 70 | 39 | 2,43 |
| 11.450.0360 | 3.6 | 3.6 | 70 | 39 | 2,38 |
| 11.450.0365 | 3.65 | 3.65 | 70 | 39 | 2,43 |
| 11.450.0370 | 3.7 | 3.7 | 70 | 39 | 2,38 |
| 11.450.0375 | 3.75 | 3.75 | 70 | 39 | 2,68 |
| 11.450.0380 | 3.8 | 3.8 | 75 | 43 | 2,42 |
| 11.450.0385 | 3.85 | 3.85 | 75 | 43 | 2,84 |
| 11.450.0390 | 3.9 | 3.9 | 75 | 43 | 2,42 |
| 11.450.0395 | 3.95 | 3.95 | 75 | 43 | 2,84 |
| 11.450.0400 | 4 | 4 | 75 | 43 | 2,22 |
| 11.450.0405 | 4.05 | 4.05 | 75 | 43 | 2,99 |
| 11.450.0410 | 4.1 | 4.1 | 75 | 43 | 2,60 |
| 11.450.0415 | 4.15 | 4.15 | 75 | 43 | 2,99 |
| 11.450.0420 | 4.2 | 4.2 | 75 | 43 | 2,60 |
| 11.450.0425 | 4.25 | 4.25 | 75 | 43 | 2,99 |
| 11.450.0430 | 4.3 | 4.3 | 80 | 47 | 2,60 |
| 11.450.0435 | 4.35 | 4.35 | 80 | 47 | 2,99 |
| 11.450.0440 | 4.4 | 4.4 | 80 | 47 | 2,60 |
| 11.450.0445 | 4.45 | 4.45 | 80 | 47 | 2,99 |
| 11.450.0450 | 4.5 | 4.5 | 80 | 47 | 2,48 |
| 11.450.0455 | 4.55 | 4.55 | 80 | 47 | 3,34 |
| 11.450.0460 | 4.6 | 4.6 | 80 | 47 | 3,09 |
| 11.450.0465 | 4.65 | 4.65 | 80 | 47 | 3,34 |
| 11.450.0470 | 4.7 | 4.7 | 80 | 47 | 3,09 |
| 11.450.0475 | 4.75 | 4.75 | 80 | 47 | 3,34 |
| 11.450.0480 | 4.8 | 4.8 | 86 | 52 | 3,09 |
| 11.450.0485 | 4.85 | 4.85 | 86 | 52 | 3,34 |
| 11.450.0490 | 4.9 | 4.9 | 86 | 52 | 3,09 |
| 11.450.0495 | 4.95 | 4.95 | 86 | 52 | 3,34 |
| 11.450.0500 | 5 | 5 | 86 | 52 | 2,88 |
| 11.450.0510 | 5.1 | 5.1 | 86 | 52 | 3,37 |
| 11.450.0520 | 5.2 | 5.2 | 86 | 52 | 3,37 |
| 11.450.0525 | 5.25 | 5.25 | 86 | 52 | 3,56 |
| 11.450.0530 | 5.3 | 5.3 | 86 | 52 | 3,57 |
| 11.450.0540 | 5.4 | 5.4 | 93 | 57 | 3,57 |
| 11.450.0550 | 5.5 | 5.5 | 93 | 57 | 3,19 |
| 11.450.0555 | 5.55 | 5.55 | 93 | 57 | 3,76 |
| 11.450.0560 | 5.6 | 5.6 | 93 | 57 | 3,76 |
| 11.450.0570 | 5.7 | 5.7 | 93 | 57 | 3,76 |
| 11.450.0575 | 5.75 | 5.75 | 93 | 57 | 4,78 |
| 11.450.0580 | 5.8 | 5.8 | 93 | 57 | 3,76 |
| 11.450.0590 | 5.9 | 5.9 | 93 | 57 | 3,76 |
| 11.450.0600 | 6 | 6 | 93 | 57 | 3,53 |
| 11.450.0610 | 6.1 | 6.1 | 101 | 63 | 4,45 |
| 11.450.0620 | 6.2 | 6.2 | 101 | 63 | 4,45 |
| 11.450.0625 | 6.25 | 6.25 | 101 | 63 | 5,06 |
| 11.450.0630 | 6.3 | 6.3 | 101 | 63 | 4,45 |
| 11.450.0635 | 6.35 | 6.35 | 101 | 63 | 5,06 |
| 11.450.0640 | 6.4 | 6.4 | 101 | 63 | 4,45 |
| 11.450.0650 | 6.5 | 6.5 | 101 | 63 | 4,11 |
| 11.450.0660 | 6.6 | 6.6 | 101 | 63 | 5,35 |
| 11.450.0670 | 6.7 | 6.7 | 101 | 63 | 5,35 |
| 11.450.0675 | 6.75 | 6.75 | 109 | 69 | 5,42 |
| 11.450.0680 | 6.8 | 6.8 | 109 | 69 | 5,42 |
| 11.450.0690 | 6.9 | 6.9 | 109 | 69 | 5,42 |
| 11.450.0700 | 7 | 7 | 109 | 69 | 4,67 |
| 11.450.0710 | 7.1 | 7.1 | 109 | 69 | 5,78 |
| 11.450.0720 | 7.2 | 7.2 | 109 | 69 | 5,78 |
| 11.450.0725 | 7.25 | 7.25 | 109 | 69 | 6,32 |
| 11.450.0730 | 7.3 | 7.3 | 109 | 69 | 5,78 |
| 11.450.0740 | 7.4 | 7.4 | 109 | 69 | 6,01 |
| 11.450.0750 | 7.5 | 7.5 | 109 | 69 | 5,16 |
| 11.450.0760 | 7.6 | 7.6 | 117 | 75 | 6,63 |
| 11.450.0770 | 7.7 | 7.7 | 117 | 75 | 6,71 |
| 11.450.0775 | 7.75 | 7.75 | 117 | 75 | 6,71 |
| 11.450.0780 | 7.8 | 7.8 | 117 | 75 | 6,71 |
| 11.450.0790 | 7.9 | 7.9 | 117 | 75 | 6,71 |
| 11.450.0800 | 8 | 8 | 117 | 75 | 6,25 |
| 11.450.0810 | 8.1 | 8.1 | 117 | 75 | 7,42 |
| 11.450.0820 | 8.2 | 8.2 | 117 | 75 | 7,42 |
| 11.450.0825 | 8.25 | 8.25 | 117 | 75 | 7,75 |
| 11.450.0830 | 8.3 | 8.3 | 117 | 75 | 7,57 |
| 11.450.0840 | 8.4 | 8.4 | 117 | 75 | 7,57 |
| 11.450.0850 | 8.5 | 8.5 | 117 | 75 | 6,97 |
| 11.450.0860 | 8.6 | 8.6 | 125 | 81 | 8,97 |
| 11.450.0870 | 8.7 | 8.7 | 125 | 81 | 8,97 |
| 11.450.0875 | 8.75 | 8.75 | 125 | 81 | 9,81 |
| 11.450.0880 | 8.8 | 8.8 | 125 | 81 | 8,97 |
| 11.450.0890 | 8.9 | 8.9 | 125 | 81 | 8,97 |
| 11.450.0900 | 9 | 9 | 125 | 81 | 8,14 |
| 11.450.0910 | 9.1 | 9.1 | 125 | 81 | 9,89 |
| 11.450.0920 | 9.2 | 9.2 | 125 | 81 | 9,89 |
| 11.450.0925 | 9.25 | 9.25 | 125 | 81 | 10,44 |
| 11.450.0930 | 9.3 | 9.3 | 125 | 81 | 9,89 |
| 11.450.0940 | 9.4 | 9.4 | 125 | 81 | 9,89 |
| 11.450.0950 | 9.5 | 9.5 | 125 | 81 | 8,96 |
| 11.450.0960 | 9.6 | 9.6 | 133 | 87 | 10,91 |
| 11.450.0970 | 9.7 | 9.7 | 133 | 87 | 10,91 |
| 11.450.0975 | 9.75 | 9.75 | 133 | 87 | 10,85 |
| 11.450.0980 | 9.8 | 9.8 | 133 | 87 | 10,91 |
| 11.450.0990 | 9.9 | 9.9 | 133 | 87 | 10,91 |
| 11.450.1000 | 10 | 10 | 133 | 87 | 9,87 |
| 11.450.1010 | 10.1 | 10.1 | 133 | 87 | 12,41 |
| 11.450.1020 | 10.2 | 10.2 | 133 | 87 | 12,41 |
| 11.450.1025 | 10.25 | 10.25 | 133 | 87 | 12,86 |
| 11.450.1030 | 10.3 | 10.3 | 133 | 87 | 12,86 |
| 11.450.1040 | 10.4 | 10.4 | 133 | 87 | 12,86 |
| 11.450.1050 | 10.5 | 10.5 | 133 | 87 | 10,74 |
| 11.450.1060 | 10.6 | 10.6 | 133 | 87 | 14,24 |
| 11.450.1070 | 10.7 | 10.7 | 142 | 94 | 14,24 |
| 11.450.1075 | 10.75 | 10.75 | 142 | 94 | 14,24 |
| 11.450.1080 | 10.8 | 10.8 | 142 | 94 | 14,24 |
| 11.450.1090 | 10.9 | 10.9 | 142 | 94 | 14,24 |
| 11.450.1100 | 11 | 11 | 142 | 94 | 11,01 |
| 11.450.1110 | 11.1 | 11.1 | 142 | 94 | 16,12 |
| 11.450.1120 | 11.2 | 11.2 | 142 | 94 | 16,12 |
| 11.450.1125 | 11.25 | 11.25 | 142 | 94 | 16,12 |
| 11.450.1130 | 11.3 | 11.3 | 142 | 94 | 16,12 |
| 11.450.1140 | 11.4 | 11.4 | 142 | 94 | 16,12 |
| 11.450.1150 | 11.5 | 11.5 | 142 | 94 | 11,82 |
| 11.450.1160 | 11.6 | 11.6 | 142 | 94 | 16,55 |
| 11.450.1170 | 11.7 | 11.7 | 142 | 94 | 16,55 |
| 11.450.1175 | 11.75 | 11.75 | 142 | 94 | 16,55 |
| 11.450.1180 | 11.8 | 11.8 | 142 | 94 | 16,55 |
| 11.450.1190 | 11.9 | 11.9 | 151 | 101 | 16,55 |
| 11.450.1200 | 12 | 12 | 151 | 101 | 14,38 |
| 11.450.1210 | 12.1 | 12.1 | 151 | 101 | 17,63 |
| 11.450.1220 | 12.2 | 12.2 | 151 | 101 | 17,63 |
| 11.450.1225 | 12.25 | 12.25 | 151 | 101 | 17,63 |
| 11.450.1230 | 12.3 | 12.3 | 151 | 101 | 17,63 |
| 11.450.1240 | 12.4 | 12.4 | 151 | 101 | 18,31 |
| 11.450.1250 | 12.5 | 12.5 | 151 | 101 | 15,40 |
| 11.450.1260 | 12.6 | 12.6 | 151 | 101 | 18,98 |
| 11.450.1270 | 12.7 | 12.7 | 151 | 101 | 18,98 |
| 11.450.1275 | 12.75 | 12.75 | 151 | 101 | 18,98 |
| 11.450.1280 | 12.8 | 12.8 | 151 | 101 | 18,98 |
| 11.450.1290 | 12.9 | 12.9 | 151 | 101 | 18,98 |
| 11.450.1300 | 13 | 13 | 151 | 101 | 15,95 |
| 11.450.1310 | 13.1 | 13.1 | 151 | 101 | 28,15 |
| 11.450.1320 | 13.2 | 13.2 | 151 | 101 | 28,15 |
| 11.450.1325 | 13.25 | 13.25 | 160 | 108 | 28,15 |
| 11.450.1330 | 13.3 | 13.3 | 160 | 108 | 28,15 |
| 11.450.1340 | 13.4 | 13.4 | 160 | 108 | 28,15 |
| 11.450.1350 | 13.5 | 13.5 | 160 | 108 | 24,69 |
| 11.450.1360 | 13.6 | 13.6 | 160 | 108 | 28,15 |
| 11.450.1370 | 13.7 | 13.7 | 160 | 108 | 28,15 |
| 11.450.1375 | 13.75 | 13.75 | 160 | 108 | 28,15 |
| 11.450.1380 | 13.8 | 13.8 | 160 | 108 | 28,15 |
| 11.450.1390 | 13.9 | 13.9 | 160 | 108 | 28,15 |
| 11.450.1400 | 14 | 14 | 160 | 108 | 25,20 |
| 11.450.1425 | 14.25 | 14.25 | 169 | 114 | 43,45 |
| 11.450.1450 | 14.5 | 14.5 | 169 | 114 | 38,50 |
| 11.450.1475 | 14.75 | 14.75 | 169 | 114 | 43,45 |
| 11.450.1500 | 15 | 15 | 169 | 114 | 38,55 |
| 11.450.1510 | 15.1 | 15.1 | 178 | 120 | 45,65 |
| 11.450.1525 | 15.25 | 15.25 | 178 | 120 | 46,40 |
| 11.450.1550 | 15.5 | 15.5 | 178 | 120 | 41,95 |
| 11.450.1575 | 15.75 | 15.75 | 178 | 120 | 47,95 |
| 11.450.1580 | 15.8 | 15.8 | 178 | 120 | 47,95 |
| 11.450.1600 | 16 | 16 | 178 | 120 | 43,00 |
| 11.450.1650 | 16.5 | 16.5 | 184 | 125 | 48,55 |
| 11.450.1690 | 16.9 | 16.9 | 184 | 125 | 48,85 |
| 11.450.1700 | 17 | 17 | 184 | 125 | 49,20 |
| 11.450.1750 | 17.5 | 17.5 | 191 | 130 | 52,80 |
| 11.450.1800 | 18 | 18 | 191 | 130 | 60,20 |
| 11.450.1850 | 18.5 | 18.5 | 198 | 135 | 63,95 |
| 11.450.1890 | 18.9 | 18.9 | 198 | 135 | 65,00 |
| 11.450.1900 | 19 | 19 | 198 | 135 | 66,05 |
| 11.450.1950 | 19.5 | 19.5 | 205 | 140 | 69,50 |
| 11.450.2000 | 20 | 20 | 205 | 140 | 71,80 |




NL Uitleg calculatietool
FR Regardez la vidéo d'instruction de l'outil de calcul
ES Explicación de la herramienta de cálculo
DE Erläuterung Rechner
EN Calculation tool explained

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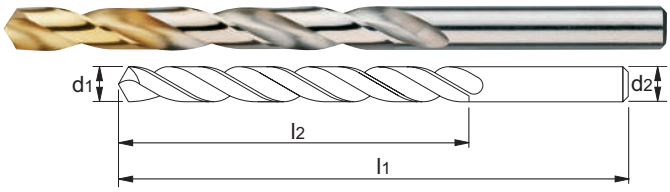
## › 11.451 Phantom



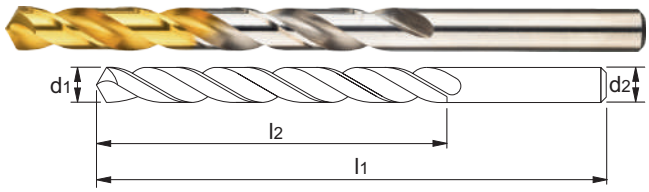

NL **HSS Spiraalboor TiN-tip**
FR **Foret HSS avec revêtement TiN sur la partie utile**
ES **Broca HSS con punta TiN**
DE **HSS Spiralbohrer TiN-Tip**
EN **HSS Twist drill TiN coated tip**

118° | DIN 338 | HSS | TiN | N | ≥1,6

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC |
| 27-30 F | 25-28 F | 17-22 E | 10-14 D | 20-33 E | 20-28 E | 50-80 E | 45-70 G | 40-65 D | 25-36 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.451.0100 | 1 | 1 | 34 | 12 | 1,97 |
| 11.451.0110 | 1.1 | 1.1 | 36 | 14 | 2,27 |
| 11.451.0120 | 1.2 | 1.2 | 38 | 16 | 2,27 |
| 11.451.0130 | 1.3 | 1.3 | 38 | 16 | 2,27 |
| 11.451.0140 | 1.4 | 1.4 | 40 | 18 | 2,27 |
| 11.451.0150 | 1.5 | 1.5 | 40 | 18 | 2,27 |
| 11.451.0160 | 1.6 | 1.6 | 43 | 20 | 2,35 |
| 11.451.0170 | 1.7 | 1.7 | 43 | 20 | 2,35 |
| 11.451.0180 | 1.8 | 1.8 | 46 | 22 | 2,35 |
| 11.451.0190 | 1.9 | 1.9 | 46 | 22 | 2,35 |
| 11.451.0200 | 2 | 2 | 49 | 24 | 2,35 |
| 11.451.0210 | 2.1 | 2.1 | 49 | 24 | 2,35 |
| 11.451.0220 | 2.2 | 2.2 | 53 | 27 | 2,27 |
| 11.451.0230 | 2.3 | 2.3 | 53 | 27 | 2,27 |
| 11.451.0240 | 2.4 | 2.4 | 57 | 30 | 2,27 |
| 11.451.0250 | 2.5 | 2.5 | 57 | 30 | 2,27 |
| 11.451.0260 | 2.6 | 2.6 | 57 | 30 | 2,35 |
| 11.451.0270 | 2.7 | 2.7 | 61 | 33 | 2,35 |
| 11.451.0280 | 2.8 | 2.8 | 61 | 33 | 2,35 |
| 11.451.0290 | 2.9 | 2.9 | 61 | 33 | 2,35 |
| 11.451.0300 | 3 | 3 | 61 | 33 | 2,35 |
| 11.451.0310 | 3.1 | 3.1 | 65 | 36 | 2,55 |
| 11.451.0320 | 3.2 | 3.2 | 65 | 36 | 2,55 |
| 11.451.0330 | 3.3 | 3.3 | 65 | 36 | 2,55 |
| 11.451.0340 | 3.4 | 3.4 | 70 | 39 | 2,55 |
| 11.451.0350 | 3.5 | 3.5 | 70 | 39 | 2,55 |
| 11.451.0360 | 3.6 | 3.6 | 70 | 39 | 2,77 |
| 11.451.0370 | 3.7 | 3.7 | 70 | 39 | 2,77 |
| 11.451.0380 | 3.8 | 3.8 | 75 | 43 | 2,77 |
| 11.451.0390 | 3.9 | 3.9 | 75 | 43 | 2,77 |
| 11.451.0400 | 4 | 4 | 75 | 43 | 2,83 |
| 11.451.0410 | 4.1 | 4.1 | 75 | 43 | 3,20 |
| 11.451.0420 | 4.2 | 4.2 | 75 | 43 | 3,20 |
| 11.451.0430 | 4.3 | 4.3 | 80 | 47 | 3,20 |
| 11.451.0440 | 4.4 | 4.4 | 80 | 47 | 3,20 |
| 11.451.0450 | 4.5 | 4.5 | 80 | 47 | 3,20 |
| 11.451.0460 | 4.6 | 4.6 | 80 | 47 | 3,63 |
| 11.451.0470 | 4.7 | 4.7 | 80 | 47 | 3,63 |
| 11.451.0480 | 4.8 | 4.8 | 86 | 52 | 3,63 |
| 11.451.0490 | 4.9 | 4.9 | 86 | 52 | 3,63 |
| 11.451.0500 | 5 | 5 | 86 | 52 | 3,83 |
| 11.451.0510 | 5.1 | 5.1 | 86 | 52 | 3,90 |
| 11.451.0520 | 5.2 | 5.2 | 86 | 52 | 3,90 |
| 11.451.0530 | 5.3 | 5.3 | 86 | 52 | 4,62 |
| 11.451.0540 | 5.4 | 5.4 | 93 | 57 | 4,62 |
| 11.451.0550 | 5.5 | 5.5 | 93 | 57 | 4,62 |
| 11.451.0560 | 5.6 | 5.6 | 93 | 57 | 4,62 |
| 11.451.0570 | 5.7 | 5.7 | 93 | 57 | 4,62 |
| 11.451.0580 | 5.8 | 5.8 | 93 | 57 | 4,62 |
| 11.451.0590 | 5.9 | 5.9 | 93 | 57 | 4,62 |
| 11.451.0600 | 6 | 6 | 93 | 57 | 5,32 |
| 11.451.0610 | 6.1 | 6.1 | 101 | 63 | 5,32 |
| 11.451.0620 | 6.2 | 6.2 | 101 | 63 | 5,32 |
| 11.451.0630 | 6.3 | 6.3 | 101 | 63 | 5,32 |
| 11.451.0640 | 6.4 | 6.4 | 101 | 63 | 5,32 |
| 11.451.0650 | 6.5 | 6.5 | 101 | 63 | 5,39 |
| 11.451.0660 | 6.6 | 6.6 | 101 | 63 | 5,48 |
| 11.451.0670 | 6.7 | 6.7 | 101 | 63 | 5,57 |
| 11.451.0680 | 6.8 | 6.8 | 109 | 69 | 5,96 |
| 11.451.0690 | 6.9 | 6.9 | 109 | 69 | 5,96 |
| 11.451.0700 | 7 | 7 | 109 | 69 | 6,54 |
| 11.451.0710 | 7.1 | 7.1 | 109 | 69 | 6,88 |
| 11.451.0720 | 7.2 | 7.2 | 109 | 69 | 6,88 |
| 11.451.0730 | 7.3 | 7.3 | 109 | 69 | 6,88 |
| 11.451.0740 | 7.4 | 7.4 | 109 | 69 | 6,88 |
| 11.451.0750 | 7.5 | 7.5 | 109 | 69 | 6,88 |
| 11.451.0760 | 7.6 | 7.6 | 117 | 75 | 6,88 |
| 11.451.0770 | 7.7 | 7.7 | 117 | 75 | 7,45 |
| 11.451.0780 | 7.8 | 7.8 | 117 | 75 | 7,45 |
| 11.451.0790 | 7.9 | 7.9 | 117 | 75 | 7,45 |
| 11.451.0800 | 8 | 8 | 117 | 75 | 8,24 |
| 11.451.0810 | 8.1 | 8.1 | 117 | 75 | 9,23 |
| 11.451.0820 | 8.2 | 8.2 | 117 | 75 | 9,23 |
| 11.451.0830 | 8.3 | 8.3 | 117 | 75 | 9,93 |
| 11.451.0840 | 8.4 | 8.4 | 117 | 75 | 9,93 |
| 11.451.0850 | 8.5 | 8.5 | 117 | 75 | 9,93 |
| 11.451.0860 | 8.6 | 8.6 | 125 | 81 | 10,92 |
| 11.451.0870 | 8.7 | 8.7 | 125 | 81 | 10,92 |
| 11.451.0880 | 8.8 | 8.8 | 125 | 81 | 10,92 |
| 11.451.0890 | 8.9 | 8.9 | 125 | 81 | 10,92 |
| 11.451.0900 | 9 | 9 | 125 | 81 | 10,92 |
| 11.451.0910 | 9.1 | 9.1 | 125 | 81 | 11,43 |
| 11.451.0920 | 9.2 | 9.2 | 125 | 81 | 11,43 |
| 11.451.0930 | 9.3 | 9.3 | 125 | 81 | 12,14 |
| 11.451.0940 | 9.4 | 9.4 | 125 | 81 | 12,14 |
| 11.451.0950 | 9.5 | 9.5 | 125 | 81 | 12,14 |
| 11.451.0960 | 9.6 | 9.6 | 133 | 87 | 12,42 |
| 11.451.0970 | 9.7 | 9.7 | 133 | 87 | 12,42 |
| 11.451.0980 | 9.8 | 9.8 | 133 | 87 | 12,58 |
| 11.451.0990 | 9.9 | 9.9 | 133 | 87 | 12,58 |
| 11.451.1000 | 10 | 10 | 133 | 87 | 12,70 |
| 11.451.1010 | 10.1 | 10.1 | 133 | 87 | 13,38 |
| 11.451.1020 | 10.2 | 10.2 | 133 | 87 | 13,62 |
| 11.451.1030 | 10.3 | 10.3 | 133 | 87 | 13,78 |
| 11.451.1040 | 10.4 | 10.4 | 133 | 87 | 13,78 |
| 11.451.1050 | 10.5 | 10.5 | 133 | 87 | 13,78 |
| 11.451.1060 | 10.6 | 10.6 | 133 | 87 | 15,56 |
| 11.451.1070 | 10.7 | 10.7 | 142 | 94 | 15,56 |
| 11.451.1080 | 10.8 | 10.8 | 142 | 94 | 15,56 |
| 11.451.1090 | 10.9 | 10.9 | 142 | 94 | 15,56 |
| 11.451.1100 | 11 | 11 | 142 | 94 | 14,41 |
| 11.451.1110 | 11.1 | 11.1 | 142 | 94 | 17,47 |
| 11.451.1120 | 11.2 | 11.2 | 142 | 94 | 17,47 |
| 11.451.1130 | 11.3 | 11.3 | 142 | 94 | 17,47 |
| 11.451.1140 | 11.4 | 11.4 | 142 | 94 | 17,47 |
| 11.451.1150 | 11.5 | 11.5 | 142 | 94 | 17,47 |
| 11.451.1160 | 11.6 | 11.6 | 142 | 94 | 18,03 |
| 11.451.1170 | 11.7 | 11.7 | 142 | 94 | 18,03 |
| 11.451.1180 | 11.8 | 11.8 | 142 | 94 | 18,03 |
| 11.451.1190 | 11.9 | 11.9 | 151 | 101 | 18,03 |
| 11.451.1200 | 12 | 12 | 151 | 101 | 17,76 |
| 11.451.1210 | 12.1 | 12.1 | 151 | 101 | 19,72 |
| 11.451.1220 | 12.2 | 12.2 | 151 | 101 | 19,72 |
| 11.451.1230 | 12.3 | 12.3 | 151 | 101 | 19,72 |
| 11.451.1240 | 12.4 | 12.4 | 151 | 101 | 19,87 |
| 11.451.1250 | 12.5 | 12.5 | 151 | 101 | 20,94 |
| 11.451.1260 | 12.6 | 12.6 | 151 | 101 | 22,20 |
| 11.451.1270 | 12.7 | 12.7 | 151 | 101 | 22,20 |
| 11.451.1280 | 12.8 | 12.8 | 151 | 101 | 22,20 |
| 11.451.1290 | 12.9 | 12.9 | 151 | 101 | 22,20 |
| 11.451.1300 | 13 | 13 | 151 | 101 | 21,72 |

## › 11.461 Phantom




NL **HSS Spiraalboor TiN-tip, (handgebruik)**
FR **Foret HSS avec revêtement TiN sur la partie utile, (usage à la main)**
ES **Broca HSS con punta TiN, (uso manual)**
DE **HSS Spiralbohrer TiN-Tip, (handgebrauch)**
EN **HSS Twist drill TiN coated tip, (handuse)**

118° | DIN 338 | HSS | >N | TiN | ≥1,6

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC |
| 27-30 F | 25-28 F | 17-22 E | 10-14 D | 20-33 E | 20-28 E | 50-80 E | 45-70 G | 40-65 D | 25-36 D |

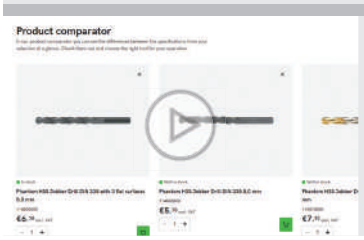
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.461.0100 | 1 | 1 | 34 | 12 | 2,10 |
| 11.461.0110 | 1.1 | 1.1 | 36 | 14 | 2,42 |
| 11.461.0120 | 1.2 | 1.2 | 38 | 16 | 2,42 |
| 11.461.0130 | 1.3 | 1.3 | 38 | 16 | 2,42 |
| 11.461.0140 | 1.4 | 1.4 | 40 | 18 | 2,42 |
| 11.461.0150 | 1.5 | 1.5 | 40 | 18 | 2,42 |
| 11.461.0160 | 1.6 | 1.6 | 43 | 20 | 2,51 |
| 11.461.0170 | 1.7 | 1.7 | 43 | 20 | 2,51 |
| 11.461.0180 | 1.8 | 1.8 | 46 | 22 | 2,51 |
| 11.461.0190 | 1.9 | 1.9 | 46 | 22 | 2,51 |
| 11.461.0200 | 2 | 2 | 49 | 24 | 2,51 |
| 11.461.0210 | 2.1 | 2.1 | 49 | 24 | 2,51 |
| 11.461.0220 | 2.2 | 2.2 | 53 | 27 | 2,51 |
| 11.461.0230 | 2.3 | 2.3 | 53 | 27 | 2,51 |
| 11.461.0240 | 2.4 | 2.4 | 57 | 30 | 2,51 |
| 11.461.0250 | 2.5 | 2.5 | 57 | 30 | 2,51 |
| 11.461.0260 | 2.6 | 2.6 | 57 | 30 | 2,51 |
| 11.461.0270 | 2.7 | 2.7 | 61 | 33 | 2,51 |
| 11.461.0280 | 2.8 | 2.8 | 61 | 33 | 2,51 |
| 11.461.0290 | 2.9 | 2.9 | 61 | 33 | 2,51 |
| 11.461.0300 | 3 | 3 | 61 | 33 | 2,35 |
| 11.461.0310 | 3.1 | 3.1 | 65 | 36 | 2,55 |
| 11.461.0320 | 3.2 | 3.2 | 65 | 36 | 2,55 |
| 11.461.0330 | 3.3 | 3.3 | 65 | 36 | 2,55 |

## › 11.461 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.461.0340 | 3.4 | 3.4 | 70 | 39 | 2,55 |
| 11.461.0350 | 3.5 | 3.5 | 70 | 39 | 2,55 |
| 11.461.0360 | 3.6 | 3.6 | 70 | 39 | 2,77 |
| 11.461.0370 | 3.7 | 3.7 | 70 | 39 | 2,77 |
| 11.461.0380 | 3.8 | 3.8 | 75 | 43 | 2,77 |
| 11.461.0390 | 3.9 | 3.9 | 75 | 43 | 2,77 |
| 11.461.0400 | 4 | 4 | 75 | 43 | 2,82 |
| 11.461.0410 | 4.1 | 4.1 | 75 | 43 | 3,19 |
| 11.461.0420 | 4.2 | 4.2 | 75 | 43 | 3,19 |
| 11.461.0430 | 4.3 | 4.3 | 80 | 47 | 3,19 |
| 11.461.0440 | 4.4 | 4.4 | 80 | 47 | 3,19 |
| 11.461.0450 | 4.5 | 4.5 | 80 | 47 | 3,19 |
| 11.461.0460 | 4.6 | 4.6 | 80 | 47 | 3,59 |
| 11.461.0470 | 4.7 | 4.7 | 80 | 47 | 3,59 |
| 11.461.0480 | 4.8 | 4.8 | 86 | 52 | 3,59 |
| 11.461.0490 | 4.9 | 4.9 | 86 | 52 | 3,59 |
| 11.461.0500 | 5 | 5 | 86 | 52 | 3,83 |
| 11.461.0510 | 5.1 | 5.1 | 86 | 52 | 3,86 |
| 11.461.0520 | 5.2 | 5.2 | 86 | 52 | 3,86 |
| 11.461.0530 | 5.3 | 5.3 | 86 | 52 | 4,57 |
| 11.461.0540 | 5.4 | 5.4 | 93 | 57 | 4,57 |
| 11.461.0550 | 5.5 | 5.5 | 93 | 57 | 4,57 |
| 11.461.0560 | 5.6 | 5.6 | 93 | 57 | 4,62 |
| 11.461.0570 | 5.7 | 5.7 | 93 | 57 | 4,62 |
| 11.461.0580 | 5.8 | 5.8 | 93 | 57 | 4,62 |
| 11.461.0590 | 5.9 | 5.9 | 93 | 57 | 4,62 |
| 11.461.0600 | 6 | 6 | 93 | 57 | 5,32 |
| 11.461.0610 | 6.1 | 6.1 | 101 | 63 | 5,28 |
| 11.461.0620 | 6.2 | 6.2 | 101 | 63 | 5,28 |
| 11.461.0630 | 6.3 | 6.3 | 101 | 63 | 5,32 |
| 11.461.0640 | 6.4 | 6.4 | 101 | 63 | 5,32 |
| 11.461.0650 | 6.5 | 6.5 | 101 | 63 | 5,39 |
| 11.461.0660 | 6.6 | 6.6 | 101 | 63 | 5,48 |
| 11.461.0670 | 6.7 | 6.7 | 101 | 63 | 5,57 |
| 11.461.0680 | 6.8 | 6.8 | 109 | 69 | 5,93 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.461.0690 | 6.9 | 6.9 | 109 | 69 | 5,93 |
| 11.461.0700 | 7 | 7 | 109 | 69 | 6,54 |
| 11.461.0710 | 7.1 | 7.1 | 109 | 69 | 6,83 |
| 11.461.0720 | 7.2 | 7.2 | 109 | 69 | 6,83 |
| 11.461.0730 | 7.3 | 7.3 | 109 | 69 | 6,83 |
| 11.461.0740 | 7.4 | 7.4 | 109 | 69 | 6,88 |
| 11.461.0750 | 7.5 | 7.5 | 109 | 69 | 6,88 |
| 11.461.0760 | 7.6 | 7.6 | 117 | 75 | 6,88 |
| 11.461.0770 | 7.7 | 7.7 | 117 | 75 | 7,41 |
| 11.461.0780 | 7.8 | 7.8 | 117 | 75 | 7,41 |
| 11.461.0790 | 7.9 | 7.9 | 117 | 75 | 7,41 |
| 11.461.0800 | 8 | 8 | 117 | 75 | 8,24 |
| 11.461.0810 | 8.1 | 8.1 | 117 | 75 | 9,17 |
| 11.461.0820 | 8.2 | 8.2 | 117 | 75 | 9,17 |
| 11.461.0830 | 8.3 | 8.3 | 117 | 75 | 9,93 |
| 11.461.0840 | 8.4 | 8.4 | 117 | 75 | 9,93 |
| 11.461.0850 | 8.5 | 8.5 | 117 | 75 | 9,93 |
| 11.461.0860 | 8.6 | 8.6 | 125 | 81 | 10,92 |
| 11.461.0870 | 8.7 | 8.7 | 125 | 81 | 10,92 |
| 11.461.0880 | 8.8 | 8.8 | 125 | 81 | 10,92 |
| 11.461.0890 | 8.9 | 8.9 | 125 | 81 | 10,92 |
| 11.461.0900 | 9 | 9 | 125 | 81 | 10,92 |
| 11.461.0910 | 9.1 | 9.1 | 125 | 81 | 11,43 |
| 11.461.0920 | 9.2 | 9.2 | 125 | 81 | 11,43 |
| 11.461.0930 | 9.3 | 9.3 | 125 | 81 | 12,14 |
| 11.461.0940 | 9.4 | 9.4 | 125 | 81 | 12,14 |
| 11.461.0950 | 9.5 | 9.5 | 125 | 81 | 12,14 |
| 11.461.0960 | 9.6 | 9.6 | 133 | 87 | 12,32 |
| 11.461.0970 | 9.7 | 9.7 | 133 | 87 | 12,32 |
| 11.461.0980 | 9.8 | 9.8 | 133 | 87 | 12,58 |
| 11.461.0990 | 9.9 | 9.9 | 133 | 87 | 12,58 |
| 11.461.1000 | 10 | 10 | 133 | 87 | 12,70 |
| 11.461.1010 | 10.1 | 10.1 | 133 | 87 | 13,38 |
| 11.461.1020 | 10.2 | 10.2 | 133 | 87 | 13,62 |
| 11.461.1030 | 10.3 | 10.3 | 133 | 87 | 13,78 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.461.1040 | 10.4 | 10.4 | 133 | 87 | 13,78 |
| 11.461.1050 | 10.5 | 10.5 | 133 | 87 | 13,78 |
| 11.461.1060 | 10.6 | 10.6 | 133 | 87 | 15,56 |
| 11.461.1070 | 10.7 | 10.7 | 142 | 94 | 15,56 |
| 11.461.1080 | 10.8 | 10.8 | 142 | 94 | 15,56 |
| 11.461.1090 | 10.9 | 10.9 | 142 | 94 | 15,56 |
| 11.461.1100 | 11 | 11 | 142 | 94 | 14,41 |
| 11.461.1110 | 11.1 | 11.1 | 142 | 94 | 17,47 |
| 11.461.1120 | 11.2 | 11.2 | 142 | 94 | 17,47 |
| 11.461.1130 | 11.3 | 11.3 | 142 | 94 | 17,47 |
| 11.461.1140 | 11.4 | 11.4 | 142 | 94 | 17,47 |
| 11.461.1150 | 11.5 | 11.5 | 142 | 94 | 17,47 |
| 11.461.1160 | 11.6 | 11.6 | 142 | 94 | 18,03 |
| 11.461.1170 | 11.7 | 11.7 | 142 | 94 | 18,03 |
| 11.461.1180 | 11.8 | 11.8 | 142 | 94 | 18,03 |
| 11.461.1190 | 11.9 | 11.9 | 151 | 101 | 18,03 |
| 11.461.1200 | 12 | 12 | 151 | 101 | 17,76 |
| 11.461.1210 | 12.1 | 12.1 | 151 | 101 | 19,72 |
| 11.461.1220 | 12.2 | 12.2 | 151 | 101 | 19,72 |
| 11.461.1230 | 12.3 | 12.3 | 151 | 101 | 19,72 |
| 11.461.1240 | 12.4 | 12.4 | 151 | 101 | 19,87 |
| 11.461.1250 | 12.5 | 12.5 | 151 | 101 | 20,94 |
| 11.461.1260 | 12.6 | 12.6 | 151 | 101 | 22,20 |
| 11.461.1270 | 12.7 | 12.7 | 151 | 101 | 22,20 |
| 11.461.1280 | 12.8 | 12.8 | 151 | 101 | 22,20 |
| 11.461.1290 | 12.9 | 12.9 | 151 | 101 | 22,20 |
| 11.461.1300 | 13 | 13 | 151 | 101 | 21,72 |
| 11.461.1350 | 13.5 | 13.5 | 160 | 108 | 34,20 |
| 11.461.1400 | 14 | 14 | 160 | 108 | 34,20 |
| 11.461.1450 | 14.5 | 14.5 | 169 | 114 | 40,35 |
| 11.461.1500 | 15 | 15 | 169 | 114 | 40,35 |
| 11.461.1550 | 15.5 | 15.5 | 178 | 120 | 46,80 |
| 11.461.1600 | 16 | 16 | 178 | 120 | 46,80 |

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ES Comparador de productos en phantom.eu
DE Produktvergleich auf phantom.eu
EN Product comparator on phantom.eu

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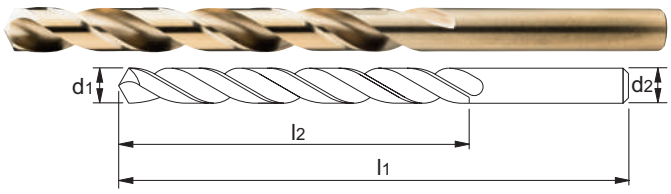
## › 11.500 Phantom




**NL HSS-E Spiraalboor**
**FR Foret HSS-E**
**ES Broca HSS-E**
**DE HSS-E Spiralbohrer**
**EN HSS-E Twist drill**

135° | DIN 338 | HSS-E | N | ≥2

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | N 52 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | CuAlFe |
| 28-35 E | 30-36 E | 20-27 E | 12-20 D | 14-18 D | 10-15 C | 30-35 F | 24-30 F | 30-40 E | 8-15 C |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.500.0020 | 0.2 | 0.2 | 19 | 2.5 | 4,18 |
| 11.500.0025 | 0.25 | 0.25 | 19 | 3 | 4,12 |
| 11.500.0030 | 0.3 | 0.3 | 19 | 3 | 3,78 |
| 11.500.0040 | 0.4 | 0.4 | 20 | 5 | 3,29 |
| 11.500.0045 | 0.45 | 0.45 | 20 | 5 | 3,24 |
| 11.500.0050 | 0.5 | 0.5 | 22 | 6 | 3,11 |
| 11.500.0060 | 0.6 | 0.6 | 24 | 7 | 2,98 |
| 11.500.0065 | 0.65 | 0.65 | 26 | 8 | 2,98 |
| 11.500.0070 | 0.7 | 0.7 | 28 | 9 | 2,98 |
| 11.500.0075 | 0.75 | 0.75 | 28 | 9 | 2,98 |
| 11.500.0080 | 0.8 | 0.8 | 30 | 10 | 2,85 |
| 11.500.0090 | 0.9 | 0.9 | 32 | 11 | 2,70 |
| 11.500.0095 | 0.95 | 0.95 | 32 | 11 | 2,70 |
| 11.500.0100 | 1 | 1 | 34 | 12 | 2,70 |
| 11.500.0110 | 1.1 | 1.1 | 36 | 14 | 3,22 |
| 11.500.0120 | 1.2 | 1.2 | 38 | 16 | 3,22 |
| 11.500.0125 | 1.25 | 1.25 | 38 | 16 | 3,22 |
| 11.500.0130 | 1.3 | 1.3 | 38 | 16 | 3,22 |

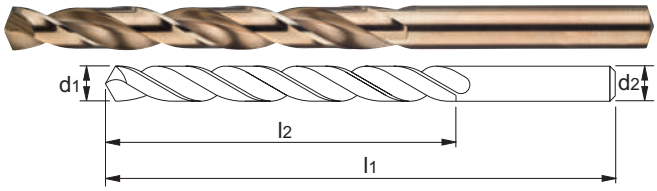
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.500.0140 | 1.4 | 1.4 | 40 | 18 | 3,22 |
| 11.500.0150 | 1.5 | 1.5 | 40 | 18 | 2,70 |
| 11.500.0160 | 1.6 | 1.6 | 43 | 20 | 3,34 |
| 11.500.0170 | 1.7 | 1.7 | 43 | 20 | 3,34 |
| 11.500.0175 | 1.75 | 1.75 | 46 | 22 | 3,34 |
| 11.500.0180 | 1.8 | 1.8 | 46 | 22 | 3,34 |
| 11.500.0190 | 1.9 | 1.9 | 46 | 22 | 3,34 |
| 11.500.0200 | 2 | 2 | 49 | 24 | 2,50 |
| 11.500.0205 | 2.05 | 2.05 | 49 | 24 | 4,49 |
| 11.500.0210 | 2.1 | 2.1 | 49 | 24 | 4,49 |
| 11.500.0220 | 2.2 | 2.2 | 53 | 27 | 4,49 |
| 11.500.0225 | 2.25 | 2.25 | 53 | 27 | 4,49 |
| 11.500.0230 | 2.3 | 2.3 | 53 | 27 | 4,49 |
| 11.500.0240 | 2.4 | 2.4 | 57 | 30 | 4,49 |
| 11.500.0250 | 2.5 | 2.5 | 57 | 30 | 2,55 |
| 11.500.0260 | 2.6 | 2.6 | 57 | 30 | 5,10 |
| 11.500.0270 | 2.7 | 2.7 | 61 | 33 | 5,10 |
| 11.500.0275 | 2.75 | 2.75 | 61 | 33 | 5,10 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.500.0280 | 2.8 | 2.8 | 61 | 33 | 3,93 |
| 11.500.0290 | 2.9 | 2.9 | 61 | 33 | 3,93 |
| 11.500.0300 | 3 | 3 | 61 | 33 | 2,76 |
| 11.500.0310 | 3.1 | 3.1 | 65 | 36 | 3,26 |
| 11.500.0320 | 3.2 | 3.2 | 65 | 36 | 3,26 |
| 11.500.0325 | 3.25 | 3.25 | 65 | 36 | 3,29 |
| 11.500.0330 | 3.3 | 3.3 | 65 | 36 | 3,26 |
| 11.500.0340 | 3.4 | 3.4 | 70 | 39 | 4,71 |
| 11.500.0350 | 3.5 | 3.5 | 70 | 39 | 3,22 |
| 11.500.0360 | 3.6 | 3.6 | 70 | 39 | 3,93 |
| 11.500.0370 | 3.7 | 3.7 | 70 | 39 | 3,93 |
| 11.500.0375 | 3.75 | 3.75 | 70 | 39 | 3,98 |
| 11.500.0380 | 3.8 | 3.8 | 75 | 43 | 4,29 |
| 11.500.0390 | 3.9 | 3.9 | 75 | 43 | 4,29 |
| 11.500.0400 | 4 | 4 | 75 | 43 | 3,38 |
| 11.500.0410 | 4.1 | 4.1 | 75 | 43 | 4,38 |
| 11.500.0420 | 4.2 | 4.2 | 75 | 43 | 4,38 |
| 11.500.0425 | 4.25 | 4.25 | 75 | 43 | 4,38 |

## › 11.500 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.500.0430 | 4.3 | 4.3 | 80 | 47 | 5,19 |
| 11.500.0440 | 4.4 | 4.4 | 80 | 47 | 5,19 |
| 11.500.0450 | 4.5 | 4.5 | 80 | 47 | 3,68 |
| 11.500.0460 | 4.6 | 4.6 | 80 | 47 | 6,20 |
| 11.500.0465 | 4.65 | 4.65 | 80 | 47 | 6,31 |
| 11.500.0470 | 4.7 | 4.7 | 80 | 47 | 6,20 |
| 11.500.0475 | 4.75 | 4.75 | 80 | 47 | 6,20 |
| 11.500.0480 | 4.8 | 4.8 | 86 | 52 | 4,92 |
| 11.500.0490 | 4.9 | 4.9 | 86 | 52 | 4,92 |
| 11.500.0500 | 5 | 5 | 86 | 52 | 4,12 |
| 11.500.0510 | 5.1 | 5.1 | 86 | 52 | 6,19 |
| 11.500.0520 | 5.2 | 5.2 | 86 | 52 | 6,19 |
| 11.500.0525 | 5.25 | 5.25 | 86 | 52 | 6,19 |
| 11.500.0530 | 5.3 | 5.3 | 86 | 52 | 6,19 |
| 11.500.0540 | 5.4 | 5.4 | 93 | 57 | 6,19 |
| 11.500.0550 | 5.5 | 5.5 | 93 | 57 | 4,89 |
| 11.500.0555 | 5.55 | 5.55 | 93 | 57 | 6,75 |
| 11.500.0560 | 5.6 | 5.6 | 93 | 57 | 6,75 |
| 11.500.0570 | 5.7 | 5.7 | 93 | 57 | 6,75 |
| 11.500.0575 | 5.75 | 5.75 | 93 | 57 | 6,75 |
| 11.500.0580 | 5.8 | 5.8 | 93 | 57 | 6,75 |
| 11.500.0590 | 5.9 | 5.9 | 93 | 57 | 6,75 |
| 11.500.0600 | 6 | 6 | 93 | 57 | 5,47 |
| 11.500.0610 | 6.1 | 6.1 | 101 | 63 | 8,74 |
| 11.500.0620 | 6.2 | 6.2 | 101 | 63 | 8,74 |
| 11.500.0625 | 6.25 | 6.25 | 101 | 63 | 8,90 |
| 11.500.0630 | 6.3 | 6.3 | 101 | 63 | 8,90 |
| 11.500.0635 | 6.35 | 6.35 | 101 | 63 | 8,90 |
| 11.500.0640 | 6.4 | 6.4 | 101 | 63 | 8,90 |
| 11.500.0650 | 6.5 | 6.5 | 101 | 63 | 6,64 |
| 11.500.0660 | 6.6 | 6.6 | 101 | 63 | 10,63 |
| 11.500.0670 | 6.7 | 6.7 | 101 | 63 | 10,63 |
| 11.500.0675 | 6.75 | 6.75 | 109 | 69 | 10,63 |
| 11.500.0680 | 6.8 | 6.8 | 109 | 69 | 9,47 |
| 11.500.0690 | 6.9 | 6.9 | 109 | 69 | 10,63 |
| 11.500.0700 | 7 | 7 | 109 | 69 | 7,68 |
| 11.500.0710 | 7.1 | 7.1 | 109 | 69 | 16,32 |
| 11.500.0720 | 7.2 | 7.2 | 109 | 69 | 16,32 |
| 11.500.0725 | 7.25 | 7.25 | 109 | 69 | 15,33 |
| 11.500.0730 | 7.3 | 7.3 | 109 | 69 | 15,33 |
| 11.500.0740 | 7.4 | 7.4 | 109 | 69 | 15,33 |
| 11.500.0750 | 7.5 | 7.5 | 109 | 69 | 8,78 |
| 11.500.0760 | 7.6 | 7.6 | 117 | 75 | 16,97 |
| 11.500.0770 | 7.7 | 7.7 | 117 | 75 | 16,97 |
| 11.500.0775 | 7.75 | 7.75 | 117 | 75 | 12,37 |
| 11.500.0780 | 7.8 | 7.8 | 117 | 75 | 12,37 |
| 11.500.0790 | 7.9 | 7.9 | 117 | 75 | 12,37 |
| 11.500.0800 | 8 | 8 | 117 | 75 | 9,57 |
| 11.500.0810 | 8.1 | 8.1 | 117 | 75 | 16,32 |
| 11.500.0820 | 8.2 | 8.2 | 117 | 75 | 16,32 |
| 11.500.0825 | 8.25 | 8.25 | 117 | 75 | 15,87 |
| 11.500.0830 | 8.3 | 8.3 | 117 | 75 | 15,87 |
| 11.500.0840 | 8.4 | 8.4 | 117 | 75 | 15,87 |
| 11.500.0850 | 8.5 | 8.5 | 117 | 75 | 11,58 |
| 11.500.0860 | 8.6 | 8.6 | 125 | 81 | 20,32 |
| 11.500.0870 | 8.7 | 8.7 | 125 | 81 | 20,32 |
| 11.500.0875 | 8.75 | 8.75 | 125 | 81 | 20,32 |
| 11.500.0880 | 8.8 | 8.8 | 125 | 81 | 20,32 |
| 11.500.0890 | 8.9 | 8.9 | 125 | 81 | 20,32 |
| 11.500.0900 | 9 | 9 | 125 | 81 | 12,73 |
| 11.500.0910 | 9.1 | 9.1 | 125 | 81 | 23,21 |
| 11.500.0920 | 9.2 | 9.2 | 125 | 81 | 23,21 |
| 11.500.0925 | 9.25 | 9.25 | 125 | 81 | 23,21 |
| 11.500.0930 | 9.3 | 9.3 | 125 | 81 | 23,21 |
| 11.500.0940 | 9.4 | 9.4 | 125 | 81 | 23,21 |
| 11.500.0950 | 9.5 | 9.5 | 125 | 81 | 14,04 |
| 11.500.0960 | 9.6 | 9.6 | 133 | 87 | 26,85 |
| 11.500.0970 | 9.7 | 9.7 | 133 | 87 | 26,85 |
| 11.500.0975 | 9.75 | 9.75 | 133 | 87 | 20,11 |
| 11.500.0980 | 9.8 | 9.8 | 133 | 87 | 20,11 |
| 11.500.0990 | 9.9 | 9.9 | 133 | 87 | 20,11 |
| 11.500.1000 | 10 | 10 | 133 | 87 | 16,19 |
| 11.500.1010 | 10.1 | 10.1 | 133 | 87 | 20,11 |
| 11.500.1020 | 10.2 | 10.2 | 133 | 87 | 20,11 |
| 11.500.1025 | 10.25 | 10.25 | 133 | 87 | 20,39 |
| 11.500.1030 | 10.3 | 10.3 | 133 | 87 | 20,11 |
| 11.500.1040 | 10.4 | 10.4 | 133 | 87 | 20,11 |
| 11.500.1050 | 10.5 | 10.5 | 133 | 87 | 18,27 |
| 11.500.1060 | 10.6 | 10.6 | 133 | 87 | 20,30 |
| 11.500.1070 | 10.7 | 10.7 | 142 | 94 | 20,30 |
| 11.500.1080 | 10.8 | 10.8 | 142 | 94 | 18,27 |
| 11.500.1100 | 11 | 11 | 142 | 94 | 19,45 |
| 11.500.1110 | 11.1 | 11.1 | 142 | 94 | 22,63 |
| 11.500.1120 | 11.2 | 11.2 | 142 | 94 | 22,63 |
| 11.500.1130 | 11.3 | 11.3 | 142 | 94 | 22,96 |
| 11.500.1140 | 11.4 | 11.4 | 142 | 94 | 22,96 |
| 11.500.1150 | 11.5 | 11.5 | 142 | 94 | 22,63 |
| 11.500.1160 | 11.6 | 11.6 | 142 | 94 | 23,61 |
| 11.500.1170 | 11.7 | 11.7 | 142 | 94 | 23,61 |
| 11.500.1175 | 11.75 | 11.75 | 142 | 94 | 21,81 |
| 11.500.1180 | 11.8 | 11.8 | 142 | 94 | 21,81 |
| 11.500.1190 | 11.9 | 11.9 | 151 | 101 | 23,61 |
| 11.500.1200 | 12 | 12 | 151 | 101 | 22,75 |
| 11.500.1210 | 12.1 | 12.1 | 151 | 101 | 25,95 |
| 11.500.1220 | 12.2 | 12.2 | 151 | 101 | 24,46 |
| 11.500.1230 | 12.3 | 12.3 | 151 | 101 | 25,95 |
| 11.500.1240 | 12.4 | 12.4 | 151 | 101 | 25,95 |
| 11.500.1250 | 12.5 | 12.5 | 151 | 101 | 25,10 |
| 11.500.1260 | 12.6 | 12.6 | 151 | 101 | 26,50 |
| 11.500.1270 | 12.7 | 12.7 | 151 | 101 | 26,50 |
| 11.500.1280 | 12.8 | 12.8 | 151 | 101 | 26,50 |
| 11.500.1290 | 12.9 | 12.9 | 151 | 101 | 26,50 |
| 11.500.1300 | 13 | 13 | 151 | 101 | 24,96 |
| 11.500.1310 | 13.1 | 13.1 | 151 | 101 | 42,25 |
| 11.500.1350 | 13.5 | 13.5 | 160 | 108 | 42,25 |
| 11.500.1400 | 14 | 14 | 160 | 108 | 43,90 |
| 11.500.1450 | 14.5 | 14.5 | 169 | 114 | 50,95 |
| 11.500.1500 | 15 | 15 | 169 | 114 | 55,25 |
| 11.500.1510 | 15.1 | 15.1 | 178 | 120 | 59,40 |
| 11.500.1550 | 15.5 | 15.5 | 178 | 120 | 59,40 |
| 11.500.1600 | 16 | 16 | 178 | 120 | 59,40 |
| 11.500.1650 | 16.5 | 16.5 | 184 | 125 | 64,50 |
| 11.500.1690 | 16.9 | 16.9 | 184 | 125 | 63,30 |
| 11.500.1700 | 17 | 17 | 184 | 125 | 63,30 |
| 11.500.1750 | 17.5 | 17.5 | 191 | 130 | 67,15 |
| 11.500.1800 | 18 | 18 | 191 | 130 | 71,70 |
| 11.500.1850 | 18.5 | 18.5 | 198 | 135 | 85,05 |
| 11.500.1890 | 18.9 | 18.9 | 198 | 135 | 83,35 |
| 11.500.1900 | 19 | 19 | 198 | 135 | 83,35 |
| 11.500.1950 | 19.5 | 19.5 | 205 | 140 | 90,70 |
| 11.500.2000 | 20 | 20 | 205 | 140 | 98,65 |

## › 11.510 Phantom




**NL HSS-E 8% Spiraalboor Aero**
**FR Foret HSS-E 8% Aéro**
**ES Broca HSS-E 8% Aero**
**DE HSS-E 8% Spiralbohrer Aero**
**EN HSS-E 8% Twist drill Aero**

135° | HSS-E 8% | DIN 338 | N | NAS 907 | P3

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 52 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | CuAlFe | PVC | Ni/Co | Ti |
| 35-40 E | 30-40 E | 12-30 E | 12-20 C | 14-20 D | 10-15 C | 30-35 F | 24-30 F | 50-90 F | 40-60 F | 60-80 F | 30-40 E | 15-20 D | 20-30 D | 6-8 A | 6-10 B |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.510.0100 | 1 | 1 | 34 | 12 | 8,33 |
| 11.510.0110 | 1.1 | 1.1 | 36 | 14 | 8,14 |
| 11.510.0120 | 1.2 | 1.2 | 38 | 16 | 8,33 |
| 11.510.0130 | 1.3 | 1.3 | 38 | 16 | 7,97 |
| 11.510.0140 | 1.4 | 1.4 | 40 | 18 | 7,72 |
| 11.510.0150 | 1.5 | 1.5 | 40 | 18 | 7,08 |
| 11.510.0160 | 1.6 | 1.6 | 43 | 20 | 6,94 |
| 11.510.0170 | 1.7 | 1.7 | 43 | 20 | 6,94 |
| 11.510.0180 | 1.8 | 1.8 | 46 | 22 | 6,28 |
| 11.510.0190 | 1.9 | 1.9 | 46 | 22 | 6,34 |
| 11.510.0200 | 2 | 2 | 49 | 24 | 5,55 |
| 11.510.0210 | 2.1 | 2.1 | 49 | 24 | 6,34 |
| 11.510.0220 | 2.2 | 2.2 | 53 | 27 | 6,39 |
| 11.510.0230 | 2.3 | 2.3 | 53 | 27 | 6,39 |
| 11.510.0240 | 2.4 | 2.4 | 57 | 30 | 6,58 |
| 11.510.0250 | 2.5 | 2.5 | 57 | 30 | 6,58 |
| 11.510.0260 | 2.6 | 2.6 | 57 | 30 | 6,94 |
| 11.510.0270 | 2.7 | 2.7 | 61 | 33 | 6,94 |
| 11.510.0280 | 2.8 | 2.8 | 61 | 33 | 6,94 |
| 11.510.0290 | 2.9 | 2.9 | 61 | 33 | 6,94 |
| 11.510.0300 | 3 | 3 | 61 | 33 | 6,03 |
| 11.510.0310 | 3.1 | 3.1 | 65 | 36 | 7,12 |
| 11.510.0320 | 3.2 | 3.2 | 65 | 36 | 7,12 |
| 11.510.0330 | 3.3 | 3.3 | 65 | 36 | 7,30 |
| 11.510.0340 | 3.4 | 3.4 | 70 | 39 | 7,12 |
| 11.510.0350 | 3.5 | 3.5 | 70 | 39 | 6,58 |
| 11.510.0360 | 3.6 | 3.6 | 70 | 39 | 7,72 |
| 11.510.0370 | 3.7 | 3.7 | 70 | 39 | 7,97 |
| 11.510.0380 | 3.8 | 3.8 | 75 | 43 | 8,33 |
| 11.510.0390 | 3.9 | 3.9 | 75 | 43 | 8,58 |
| 11.510.0400 | 4 | 4 | 75 | 43 | 6,94 |
| 11.510.0410 | 4.1 | 4.1 | 75 | 43 | 9,12 |
| 11.510.0420 | 4.2 | 4.2 | 75 | 43 | 8,14 |
| 11.510.0430 | 4.3 | 4.3 | 80 | 47 | 9,29 |
| 11.510.0440 | 4.4 | 4.4 | 80 | 47 | 9,29 |
| 11.510.0450 | 4.5 | 4.5 | 80 | 47 | 8,58 |
| 11.510.0460 | 4.6 | 4.6 | 80 | 47 | 9,29 |
| 11.510.0470 | 4.7 | 4.7 | 80 | 47 | 9,35 |
| 11.510.0480 | 4.8 | 4.8 | 86 | 52 | 9,54 |
| 11.510.0490 | 4.9 | 4.9 | 86 | 52 | 9,96 |
| 11.510.0500 | 5 | 5 | 86 | 52 | 8,33 |
| 11.510.0510 | 5.1 | 5.1 | 86 | 52 | 9,96 |
| 11.510.0520 | 5.2 | 5.2 | 86 | 52 | 10,19 |
| 11.510.0530 | 5.3 | 5.3 | 86 | 52 | 10,19 |
| 11.510.0540 | 5.4 | 5.4 | 93 | 57 | 11,47 |
| 11.510.0550 | 5.5 | 5.5 | 93 | 57 | 11,11 |
| 11.510.0560 | 5.6 | 5.6 | 93 | 57 | 11,47 |
| 11.510.0570 | 5.7 | 5.7 | 93 | 57 | 11,83 |
| 11.510.0580 | 5.8 | 5.8 | 93 | 57 | 12,07 |
| 11.510.0590 | 5.9 | 5.9 | 93 | 57 | 12,26 |
| 11.510.0600 | 6 | 6 | 93 | 57 | 11,11 |
| 11.510.0610 | 6.1 | 6.1 | 101 | 63 | 13,22 |
| 11.510.0620 | 6.2 | 6.2 | 101 | 63 | 13,22 |
| 11.510.0630 | 6.3 | 6.3 | 101 | 63 | 13,22 |
| 11.510.0640 | 6.4 | 6.4 | 101 | 63 | 14,01 |
| 11.510.0650 | 6.5 | 6.5 | 101 | 63 | 13,41 |
| 11.510.0660 | 6.6 | 6.6 | 101 | 63 | 14,73 |
| 11.510.0670 | 6.7 | 6.7 | 101 | 63 | 14,91 |
| 11.510.0680 | 6.8 | 6.8 | 109 | 69 | 17,45 |
| 11.510.0690 | 6.9 | 6.9 | 109 | 69 | 17,45 |
| 11.510.0700 | 7 | 7 | 109 | 69 | 16,12 |
| 11.510.0710 | 7.1 | 7.1 | 109 | 69 | 17,57 |
| 11.510.0720 | 7.2 | 7.2 | 109 | 69 | 18,17 |
| 11.510.0730 | 7.3 | 7.3 | 109 | 69 | 18,17 |
| 11.510.0740 | 7.4 | 7.4 | 109 | 69 | 18,77 |
| 11.510.0750 | 7.5 | 7.5 | 109 | 69 | 17,45 |
| 11.510.0760 | 7.6 | 7.6 | 117 | 75 | 19,92 |
| 11.510.0770 | 7.7 | 7.7 | 117 | 75 | 19,92 |
| 11.510.0780 | 7.8 | 7.8 | 117 | 75 | 20,10 |

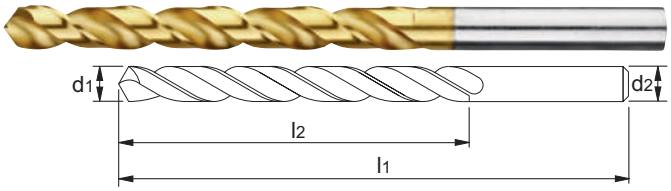
## › 11.510 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.510.0790 | 7.9 | 7.9 | 117 | 75 | 20,28 |
| 11.510.0800 | 8 | 8 | 117 | 75 | 17,45 |
| 11.510.0810 | 8.1 | 8.1 | 117 | 75 | 20,70 |
| 11.510.0820 | 8.2 | 8.2 | 117 | 75 | 21,61 |
| 11.510.0830 | 8.3 | 8.3 | 117 | 75 | 23,17 |
| 11.510.0840 | 8.4 | 8.4 | 117 | 75 | 23,17 |
| 11.510.0850 | 8.5 | 8.5 | 117 | 75 | 22,57 |
| 11.510.0860 | 8.6 | 8.6 | 125 | 81 | 25,40 |
| 11.510.0870 | 8.7 | 8.7 | 125 | 81 | 25,40 |
| 11.510.0880 | 8.8 | 8.8 | 125 | 81 | 26,00 |
| 11.510.0890 | 8.9 | 8.9 | 125 | 81 | 27,05 |
| 11.510.0900 | 9 | 9 | 125 | 81 | 24,51 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.510.0910 | 9.1 | 9.1 | 125 | 81 | 27,05 |
| 11.510.0920 | 9.2 | 9.2 | 125 | 81 | 27,05 |
| 11.510.0930 | 9.3 | 9.3 | 125 | 81 | 27,30 |
| 11.510.0940 | 9.4 | 9.4 | 125 | 81 | 27,30 |
| 11.510.0950 | 9.5 | 9.5 | 125 | 81 | 27,30 |
| 11.510.0960 | 9.6 | 9.6 | 133 | 87 | 29,70 |
| 11.510.0970 | 9.7 | 9.7 | 133 | 87 | 29,70 |
| 11.510.0980 | 9.8 | 9.8 | 133 | 87 | 32,55 |
| 11.510.0990 | 9.9 | 9.9 | 133 | 87 | 32,55 |
| 11.510.1000 | 10 | 10 | 133 | 87 | 28,70 |
| 11.510.1020 | 10.2 | 10.2 | 133 | 87 | 36,40 |
| 11.510.1050 | 10.5 | 10.5 | 133 | 87 | 38,30 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.510.1100 | 11 | 11 | 142 | 94 | 42,10 |
| 11.510.1150 | 11.5 | 11.5 | 142 | 94 | 47,85 |
| 11.510.1200 | 12 | 12 | 151 | 101 | 53,60 |
| 11.510.1250 | 12.5 | 12.5 | 151 | 101 | 57,45 |
| 11.510.1300 | 13 | 13 | 151 | 101 | 63,15 |
| 11.510.1350 | 13.5 | 13.5 | 160 | 108 | 73,70 |
| 11.510.1400 | 14 | 14 | 160 | 108 | 81,35 |
| 11.510.1450 | 14.5 | 14.5 | 169 | 114 | 87,10 |
| 11.510.1500 | 15 | 15 | 169 | 114 | 94,70 |
| 11.510.1600 | 16 | 16 | 178 | 120 | 111,05 |

## › 11.568 Phantom




**NL** HP2 UNI HSS-E Spiraalboor TiN
**FR** Foret HSS-E HP2 UNI TiN
**ES** Broca HSS-E HP2 UNI TiN
**DE** HP2 UNI HSS-E Spiralbohrer TiN
**EN** HP2 UNI HSS-E Twist drill TiN

118° | DIN 338 | HSS-E | >N | TiN | HP2 UNI

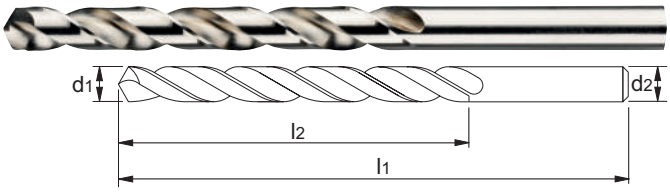
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 52 | N 61 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | CuAlFe | PVC |
| 38-42 F | 20-44 E | 20-40 E | 16-22 C | 15-20 D | 12-18 C | 40-45 F | 35-40 F | 50-70 E | 40-60 F | 60-80 F | 40-44 E | 15-20 D | 24-28 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.568.0100 | 1 | 1 | 34 | 12 | 5,70 |
| 11.568.0110 | 1.1 | 1.1 | 36 | 14 | 6,34 |
| 11.568.0120 | 1.2 | 1.2 | 38 | 16 | 6,16 |
| 11.568.0130 | 1.3 | 1.3 | 38 | 16 | 6,34 |
| 11.568.0140 | 1.4 | 1.4 | 40 | 18 | 6,47 |
| 11.568.0150 | 1.5 | 1.5 | 40 | 18 | 6,01 |
| 11.568.0160 | 1.6 | 1.6 | 43 | 20 | 5,97 |
| 11.568.0170 | 1.7 | 1.7 | 43 | 20 | 6,51 |
| 11.568.0180 | 1.8 | 1.8 | 46 | 22 | 6,47 |
| 11.568.0190 | 1.9 | 1.9 | 46 | 22 | 6,47 |
| 11.568.0200 | 2 | 2 | 49 | 24 | 6,16 |
| 11.568.0210 | 2.1 | 2.1 | 49 | 24 | 6,51 |
| 11.568.0220 | 2.2 | 2.2 | 53 | 27 | 6,78 |
| 11.568.0230 | 2.3 | 2.3 | 53 | 27 | 6,59 |
| 11.568.0240 | 2.4 | 2.4 | 57 | 30 | 6,16 |
| 11.568.0250 | 2.5 | 2.5 | 57 | 30 | 6,34 |
| 11.568.0260 | 2.6 | 2.6 | 57 | 30 | 6,59 |
| 11.568.0270 | 2.7 | 2.7 | 61 | 33 | 6,97 |
| 11.568.0280 | 2.8 | 2.8 | 61 | 33 | 6,89 |
| 11.568.0290 | 2.9 | 2.9 | 61 | 33 | 6,97 |
| 11.568.0300 | 3 | 3 | 61 | 33 | 6,74 |
| 11.568.0310 | 3.1 | 3.1 | 65 | 36 | 7,28 |
| 11.568.0320 | 3.2 | 3.2 | 65 | 36 | 7,12 |
| 11.568.0330 | 3.3 | 3.3 | 65 | 36 | 7,28 |
| 11.568.0340 | 3.4 | 3.4 | 70 | 39 | 7,82 |
| 11.568.0350 | 3.5 | 3.5 | 70 | 39 | 7,91 |
| 11.568.0360 | 3.6 | 3.6 | 70 | 39 | 8,05 |
| 11.568.0370 | 3.7 | 3.7 | 70 | 39 | 8,05 |
| 11.568.0380 | 3.8 | 3.8 | 75 | 43 | 8,53 |
| 11.568.0390 | 3.9 | 3.9 | 75 | 43 | 8,80 |
| 11.568.0400 | 4 | 4 | 75 | 43 | 8,29 |
| 11.568.0410 | 4.1 | 4.1 | 75 | 43 | 8,53 |
| 11.568.0420 | 4.2 | 4.2 | 75 | 43 | 8,53 |
| 11.568.0430 | 4.3 | 4.3 | 80 | 47 | 9,10 |
| 11.568.0440 | 4.4 | 4.4 | 80 | 47 | 9,10 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.568.0450 | 4.5 | 4.5 | 80 | 47 | 8,97 |
| 11.568.0460 | 4.6 | 4.6 | 80 | 47 | 9,52 |
| 11.568.0470 | 4.7 | 4.7 | 80 | 47 | 9,52 |
| 11.568.0480 | 4.8 | 4.8 | 86 | 52 | 9,65 |
| 11.568.0490 | 4.9 | 4.9 | 86 | 52 | 9,79 |
| 11.568.0500 | 5 | 5 | 86 | 52 | 9,57 |
| 11.568.0510 | 5.1 | 5.1 | 86 | 52 | 9,79 |
| 11.568.0520 | 5.2 | 5.2 | 86 | 52 | 9,79 |
| 11.568.0530 | 5.3 | 5.3 | 86 | 52 | 10,69 |
| 11.568.0540 | 5.4 | 5.4 | 93 | 57 | 11,74 |
| 11.568.0550 | 5.5 | 5.5 | 93 | 57 | 11,27 |
| 11.568.0560 | 5.6 | 5.6 | 93 | 57 | 11,91 |
| 11.568.0570 | 5.7 | 5.7 | 93 | 57 | 11,91 |
| 11.568.0580 | 5.8 | 5.8 | 93 | 57 | 11,95 |
| 11.568.0590 | 5.9 | 5.9 | 93 | 57 | 12,16 |
| 11.568.0600 | 6 | 6 | 93 | 57 | 11,40 |
| 11.568.0610 | 6.1 | 6.1 | 101 | 63 | 12,81 |
| 11.568.0620 | 6.2 | 6.2 | 101 | 63 | 12,68 |
| 11.568.0630 | 6.3 | 6.3 | 101 | 63 | 12,53 |
| 11.568.0640 | 6.4 | 6.4 | 101 | 63 | 12,68 |
| 11.568.0650 | 6.5 | 6.5 | 101 | 63 | 13,73 |
| 11.568.0660 | 6.6 | 6.6 | 101 | 63 | 14,13 |
| 11.568.0670 | 6.7 | 6.7 | 101 | 63 | 14,42 |
| 11.568.0680 | 6.8 | 6.8 | 109 | 69 | 15,50 |
| 11.568.0690 | 6.9 | 6.9 | 109 | 69 | 15,72 |
| 11.568.0700 | 7 | 7 | 109 | 69 | 15,50 |
| 11.568.0710 | 7.1 | 7.1 | 109 | 69 | 17,15 |
| 11.568.0720 | 7.2 | 7.2 | 109 | 69 | 17,12 |
| 11.568.0730 | 7.3 | 7.3 | 109 | 69 | 18,02 |
| 11.568.0740 | 7.4 | 7.4 | 109 | 69 | 18,02 |
| 11.568.0750 | 7.5 | 7.5 | 109 | 69 | 16,42 |
| 11.568.0760 | 7.6 | 7.6 | 117 | 75 | 19,62 |
| 11.568.0770 | 7.7 | 7.7 | 117 | 75 | 19,32 |
| 11.568.0780 | 7.8 | 7.8 | 117 | 75 | 19,48 |
| 11.568.0790 | 7.9 | 7.9 | 117 | 75 | 20,34 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.568.0800 | 8 | 8 | 117 | 75 | 18,55 |
| 11.568.0810 | 8.1 | 8.1 | 117 | 75 | 20,21 |
| 11.568.0820 | 8.2 | 8.2 | 117 | 75 | 19,91 |
| 11.568.0830 | 8.3 | 8.3 | 117 | 75 | 19,91 |
| 11.568.0840 | 8.4 | 8.4 | 117 | 75 | 21,07 |
| 11.568.0850 | 8.5 | 8.5 | 117 | 75 | 19,08 |
| 11.568.0860 | 8.6 | 8.6 | 125 | 81 | 21,78 |
| 11.568.0870 | 8.7 | 8.7 | 125 | 81 | 21,37 |
| 11.568.0880 | 8.8 | 8.8 | 125 | 81 | 22,32 |
| 11.568.0890 | 8.9 | 8.9 | 125 | 81 | 32,20 |
| 11.568.0900 | 9 | 9 | 125 | 81 | 21,07 |
| 11.568.0910 | 9.1 | 9.1 | 125 | 81 | 21,78 |
| 11.568.0920 | 9.2 | 9.2 | 125 | 81 | 22,59 |
| 11.568.0930 | 9.3 | 9.3 | 125 | 81 | 22,59 |
| 11.568.0940 | 9.4 | 9.4 | 125 | 81 | 22,56 |
| 11.568.0950 | 9.5 | 9.5 | 125 | 81 | 22,01 |
| 11.568.0960 | 9.6 | 9.6 | 133 | 87 | 23,53 |
| 11.568.0970 | 9.7 | 9.7 | 133 | 87 | 24,08 |
| 11.568.0980 | 9.8 | 9.8 | 133 | 87 | 25,70 |
| 11.568.0990 | 9.9 | 9.9 | 133 | 87 | 29,30 |
| 11.568.1000 | 10 | 10 | 133 | 87 | 24,80 |
| 11.568.1010 | 10.1 | 10.1 | 133 | 87 | 32,00 |
| 11.568.1020 | 10.2 | 10.2 | 133 | 87 | 28,70 |
| 11.568.1030 | 10.3 | 10.3 | 133 | 87 | 33,05 |
| 11.568.1040 | 10.4 | 10.4 | 133 | 87 | 29,40 |
| 11.568.1050 | 10.5 | 10.5 | 133 | 87 | 28,90 |
| 11.568.1100 | 11 | 11 | 142 | 94 | 29,80 |
| 11.568.1150 | 11.5 | 11.5 | 142 | 94 | 33,15 |
| 11.568.1200 | 12 | 12 | 151 | 101 | 35,35 |
| 11.568.1230 | 12.3 | 12.3 | 151 | 101 | 37,30 |
| 11.568.1250 | 12.5 | 12.5 | 151 | 101 | 36,55 |
| 11.568.1300 | 13 | 13 | 151 | 101 | 39,25 |
| 11.568.1350 | 13.5 | 13.5 | 160 | 108 | 49,95 |
| 11.568.1400 | 14 | 14 | 160 | 108 | 50,60 |

## › 11.760 Phantom




NL **HSS-E Spiraalboor roestvaststaal**
FR **Foret HSS-E Inox**
ES **Broca HSS-E acero inoxidable**
DE **HSS-E Spiralbohrer rostfreien Stahl**
EN **HSS-E Twist drill stainless steel**

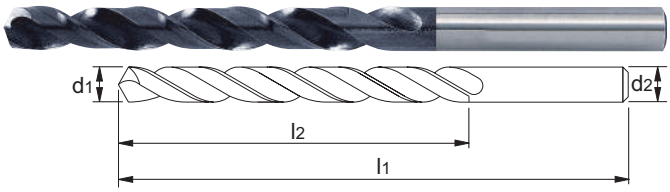
130° | DIN 338 | HSS-E | INOX | >N

P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 71 Ni/Co | S 72 Ti

12-16 E | 14-18 D | 12-16 C | 6-8 A | 6-10 B

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.760.0100 | 1 | 1 | 34 | 12 | 4,75 |
| 11.760.0110 | 1.1 | 1.1 | 36 | 14 | 3,82 |
| 11.760.0120 | 1.2 | 1.2 | 38 | 16 | 3,82 |
| 11.760.0130 | 1.3 | 1.3 | 38 | 16 | 3,82 |
| 11.760.0140 | 1.4 | 1.4 | 40 | 18 | 3,82 |
| 11.760.0150 | 1.5 | 1.5 | 40 | 18 | 3,82 |
| 11.760.0160 | 1.6 | 1.6 | 43 | 20 | 3,82 |
| 11.760.0170 | 1.7 | 1.7 | 43 | 20 | 3,82 |
| 11.760.0180 | 1.8 | 1.8 | 46 | 22 | 3,89 |
| 11.760.0190 | 1.9 | 1.9 | 46 | 22 | 4,20 |
| 11.760.0200 | 2 | 2 | 49 | 24 | 3,49 |
| 11.760.0210 | 2.1 | 2.1 | 49 | 24 | 3,68 |
| 11.760.0220 | 2.2 | 2.2 | 53 | 27 | 3,82 |
| 11.760.0230 | 2.3 | 2.3 | 53 | 27 | 3,82 |
| 11.760.0240 | 2.4 | 2.4 | 57 | 30 | 4,05 |
| 11.760.0250 | 2.5 | 2.5 | 57 | 30 | 3,82 |
| 11.760.0260 | 2.6 | 2.6 | 57 | 30 | 4,08 |
| 11.760.0270 | 2.7 | 2.7 | 61 | 33 | 4,20 |
| 11.760.0280 | 2.8 | 2.8 | 61 | 33 | 3,99 |
| 11.760.0290 | 2.9 | 2.9 | 61 | 33 | 4,08 |
| 11.760.0300 | 3 | 3 | 61 | 33 | 3,82 |
| 11.760.0310 | 3.1 | 3.1 | 65 | 36 | 4,31 |
| 11.760.0320 | 3.2 | 3.2 | 65 | 36 | 4,11 |
| 11.760.0330 | 3.3 | 3.3 | 65 | 36 | 4,11 |
| 11.760.0340 | 3.4 | 3.4 | 70 | 39 | 4,31 |
| 11.760.0350 | 3.5 | 3.5 | 70 | 39 | 4,05 |
| 11.760.0360 | 3.6 | 3.6 | 70 | 39 | 4,35 |
| 11.760.0370 | 3.7 | 3.7 | 70 | 39 | 4,49 |
| 11.760.0380 | 3.8 | 3.8 | 75 | 43 | 4,50 |
| 11.760.0390 | 3.9 | 3.9 | 75 | 43 | 4,76 |
| 11.760.0400 | 4 | 4 | 75 | 43 | 4,46 |
| 11.760.0410 | 4.1 | 4.1 | 75 | 43 | 4,75 |
| 11.760.0420 | 4.2 | 4.2 | 75 | 43 | 4,75 |
| 11.760.0430 | 4.3 | 4.3 | 80 | 47 | 5,18 |
| 11.760.0440 | 4.4 | 4.4 | 80 | 47 | 5,32 |
| 11.760.0450 | 4.5 | 4.5 | 80 | 47 | 4,94 |
| 11.760.0460 | 4.6 | 4.6 | 80 | 47 | 5,70 |
| 11.760.0470 | 4.7 | 4.7 | 80 | 47 | 5,44 |
| 11.760.0480 | 4.8 | 4.8 | 86 | 52 | 5,64 |
| 11.760.0490 | 4.9 | 4.9 | 86 | 52 | 5,70 |
| 11.760.0500 | 5 | 5 | 86 | 52 | 5,13 |
| 11.760.0510 | 5.1 | 5.1 | 86 | 52 | 5,79 |
| 11.760.0520 | 5.2 | 5.2 | 86 | 52 | 5,99 |
| 11.760.0530 | 5.3 | 5.3 | 86 | 52 | 6,12 |
| 11.760.0540 | 5.4 | 5.4 | 93 | 57 | 6,97 |
| 11.760.0550 | 5.5 | 5.5 | 93 | 57 | 6,92 |
| 11.760.0560 | 5.6 | 5.6 | 93 | 57 | 7,26 |
| 11.760.0570 | 5.7 | 5.7 | 93 | 57 | 7,26 |
| 11.760.0580 | 5.8 | 5.8 | 93 | 57 | 7,26 |
| 11.760.0590 | 5.9 | 5.9 | 93 | 57 | 7,26 |
| 11.760.0600 | 6 | 6 | 93 | 57 | 6,92 |
| 11.760.0610 | 6.1 | 6.1 | 101 | 63 | 8,27 |
| 11.760.0620 | 6.2 | 6.2 | 101 | 63 | 8,27 |
| 11.760.0630 | 6.3 | 6.3 | 101 | 63 | 8,27 |
| 11.760.0640 | 6.4 | 6.4 | 101 | 63 | 8,55 |
| 11.760.0650 | 6.5 | 6.5 | 101 | 63 | 8,27 |
| 11.760.0660 | 6.6 | 6.6 | 101 | 63 | 8,47 |
| 11.760.0670 | 6.7 | 6.7 | 101 | 63 | 8,60 |
| 11.760.0680 | 6.8 | 6.8 | 109 | 69 | 9,22 |
| 11.760.0690 | 6.9 | 6.9 | 109 | 69 | 9,92 |
| 11.760.0700 | 7 | 7 | 109 | 69 | 9,37 |
| 11.760.0710 | 7.1 | 7.1 | 109 | 69 | 10,23 |
| 11.760.0720 | 7.2 | 7.2 | 109 | 69 | 11,27 |
| 11.760.0730 | 7.3 | 7.3 | 109 | 69 | 11,27 |
| 11.760.0740 | 7.4 | 7.4 | 109 | 69 | 10,77 |
| 11.760.0750 | 7.5 | 7.5 | 109 | 69 | 9,89 |
| 11.760.0760 | 7.6 | 7.6 | 117 | 75 | 12,34 |
| 11.760.0770 | 7.7 | 7.7 | 117 | 75 | 12,59 |
| 11.760.0780 | 7.8 | 7.8 | 117 | 75 | 11,39 |
| 11.760.0790 | 7.9 | 7.9 | 117 | 75 | 12,54 |
| 11.760.0800 | 8 | 8 | 117 | 75 | 10,55 |
| 11.760.0810 | 8.1 | 8.1 | 117 | 75 | 13,17 |
| 11.760.0820 | 8.2 | 8.2 | 117 | 75 | 12,52 |
| 11.760.0830 | 8.3 | 8.3 | 117 | 75 | 13,13 |
| 11.760.0840 | 8.4 | 8.4 | 117 | 75 | 13,24 |
| 11.760.0850 | 8.5 | 8.5 | 117 | 75 | 12,29 |
| 11.760.0860 | 8.6 | 8.6 | 125 | 81 | 15,66 |
| 11.760.0870 | 8.7 | 8.7 | 125 | 81 | 15,66 |
| 11.760.0880 | 8.8 | 8.8 | 125 | 81 | 15,66 |
| 11.760.0890 | 8.9 | 8.9 | 125 | 81 | 16,39 |
| 11.760.0900 | 9 | 9 | 125 | 81 | 15,66 |
| 11.760.0910 | 9.1 | 9.1 | 125 | 81 | 16,39 |
| 11.760.0920 | 9.2 | 9.2 | 125 | 81 | 16,39 |
| 11.760.0930 | 9.3 | 9.3 | 125 | 81 | 16,39 |
| 11.760.0940 | 9.4 | 9.4 | 125 | 81 | 17,29 |
| 11.760.0950 | 9.5 | 9.5 | 125 | 81 | 16,53 |
| 11.760.0960 | 9.6 | 9.6 | 133 | 87 | 18,25 |
| 11.760.0970 | 9.7 | 9.7 | 133 | 87 | 18,65 |
| 11.760.0980 | 9.8 | 9.8 | 133 | 87 | 19,57 |
| 11.760.0990 | 9.9 | 9.9 | 133 | 87 | 19,96 |
| 11.760.1000 | 10 | 10 | 133 | 87 | 17,76 |
| 11.760.1020 | 10.2 | 10.2 | 133 | 87 | 20,10 |
| 11.760.1040 | 10.4 | 10.4 | 133 | 87 | 23,48 |
| 11.760.1050 | 10.5 | 10.5 | 133 | 87 | 20,76 |
| 11.760.1070 | 10.7 | 10.7 | 142 | 94 | 32,25 |
| 11.760.1100 | 11 | 11 | 142 | 94 | 25,15 |
| 11.760.1120 | 11.2 | 11.2 | 142 | 94 | 28,65 |
| 11.760.1150 | 11.5 | 11.5 | 142 | 94 | 27,95 |
| 11.760.1200 | 12 | 12 | 151 | 101 | 31,35 |
| 11.760.1210 | 12.1 | 12.1 | 151 | 101 | 40,95 |
| 11.760.1230 | 12.3 | 12.3 | 151 | 101 | 40,95 |
| 11.760.1250 | 12.5 | 12.5 | 151 | 101 | 34,50 |
| 11.760.1300 | 13 | 13 | 151 | 101 | 38,60 |
| 11.760.1350 | 13.5 | 13.5 | 160 | 108 | 44,45 |
| 11.760.1400 | 14 | 14 | 160 | 108 | 48,50 |
| 11.760.1450 | 14.5 | 14.5 | 169 | 114 | 51,35 |
| 11.760.1500 | 15 | 15 | 169 | 114 | 56,90 |
| 11.760.1550 | 15.5 | 15.5 | 178 | 120 | 58,70 |
| 11.760.1600 | 16 | 16 | 178 | 120 | 66,10 |
| 11.760.1650 | 16.5 | 16.5 | 184 | 125 | 103,90 |
| 11.760.1700 | 17 | 17 | 184 | 125 | 101,90 |
| 11.760.1750 | 17.5 | 17.5 | 191 | 130 | 107,70 |
| 11.760.1800 | 18 | 18 | 191 | 130 | 97,00 |
| 11.760.1900 | 19 | 19 | 198 | 135 | 137,30 |
| 11.760.2000 | 20 | 20 | 205 | 140 | 170,60 |

## › 11.764 Phantom




NL **HSS-E Spiraalboor TiAlN, roestvaststaal**
FR **Foret HSS-E TiAlN, Inox**
ES **Broca HSS-E TiAlN, acero inoxidable**
DE **HSS-E Spiralbohrer TiAlN, rostfreien Stahl**
EN **HSS-E Twist drill TiAlN, stainless steel**

130° | DIN 338 | HSS-E | INOX | >N | TiAlN

P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 71 Ni/Co | S 72 Ti

28-34 E | 17-22 D | 16-20 C | 8-10 A | 12-16 B

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.764.0100 | 1 | 1 | 34 | 12 | 6,20 |
| 11.764.0110 | 1.1 | 1.1 | 36 | 14 | 9,63 |
| 11.764.0120 | 1.2 | 1.2 | 38 | 16 | 6,88 |
| 11.764.0130 | 1.3 | 1.3 | 38 | 16 | 9,54 |
| 11.764.0140 | 1.4 | 1.4 | 40 | 18 | 7,26 |
| 11.764.0150 | 1.5 | 1.5 | 40 | 18 | 6,88 |
| 11.764.0160 | 1.6 | 1.6 | 43 | 20 | 6,97 |
| 11.764.0170 | 1.7 | 1.7 | 43 | 20 | 8,95 |
| 11.764.0180 | 1.8 | 1.8 | 46 | 22 | 8,71 |
| 11.764.0190 | 1.9 | 1.9 | 46 | 22 | 8,87 |
| 11.764.0200 | 2 | 2 | 49 | 24 | 6,95 |
| 11.764.0210 | 2.1 | 2.1 | 49 | 24 | 8,70 |
| 11.764.0220 | 2.2 | 2.2 | 53 | 27 | 9,04 |
| 11.764.0230 | 2.3 | 2.3 | 53 | 27 | 8,02 |
| 11.764.0240 | 2.4 | 2.4 | 57 | 30 | 8,78 |
| 11.764.0250 | 2.5 | 2.5 | 57 | 30 | 7,50 |
| 11.764.0260 | 2.6 | 2.6 | 57 | 30 | 7,70 |
| 11.764.0270 | 2.7 | 2.7 | 61 | 33 | 8,02 |
| 11.764.0280 | 2.8 | 2.8 | 61 | 33 | 7,95 |
| 11.764.0290 | 2.9 | 2.9 | 61 | 33 | 9,28 |
| 11.764.0300 | 3 | 3 | 61 | 33 | 7,26 |
| 11.764.0310 | 3.1 | 3.1 | 65 | 36 | 9,42 |
| 11.764.0320 | 3.2 | 3.2 | 65 | 36 | 8,39 |
| 11.764.0330 | 3.3 | 3.3 | 65 | 36 | 9,50 |
| 11.764.0340 | 3.4 | 3.4 | 70 | 39 | 8,48 |
| 11.764.0350 | 3.5 | 3.5 | 70 | 39 | 8,56 |
| 11.764.0360 | 3.6 | 3.6 | 70 | 39 | 10,90 |
| 11.764.0370 | 3.7 | 3.7 | 70 | 39 | 8,84 |
| 11.764.0380 | 3.8 | 3.8 | 75 | 43 | 10,93 |
| 11.764.0390 | 3.9 | 3.9 | 75 | 43 | 11,51 |

## › 11.764 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.764.0400 | 4 | 4 | 75 | 43 | 9,10 |
| 11.764.0410 | 4.1 | 4.1 | 75 | 43 | 11,90 |
| 11.764.0420 | 4.2 | 4.2 | 75 | 43 | 9,33 |
| 11.764.0430 | 4.3 | 4.3 | 80 | 47 | 8,02 |
| 11.764.0440 | 4.4 | 4.4 | 80 | 47 | 8,48 |
| 11.764.0450 | 4.5 | 4.5 | 80 | 47 | 8,02 |
| 11.764.0460 | 4.6 | 4.6 | 80 | 47 | 10,53 |
| 11.764.0470 | 4.7 | 4.7 | 80 | 47 | 12,13 |
| 11.764.0480 | 4.8 | 4.8 | 86 | 52 | 12,13 |
| 11.764.0490 | 4.9 | 4.9 | 86 | 52 | 13,17 |
| 11.764.0500 | 5 | 5 | 86 | 52 | 8,48 |
| 11.764.0510 | 5.1 | 5.1 | 86 | 52 | 12,97 |
| 11.764.0520 | 5.2 | 5.2 | 86 | 52 | 12,97 |
| 11.764.0530 | 5.3 | 5.3 | 86 | 52 | 13,34 |
| 11.764.0540 | 5.4 | 5.4 | 93 | 57 | 14,07 |
| 11.764.0550 | 5.5 | 5.5 | 93 | 57 | 13,15 |
| 11.764.0560 | 5.6 | 5.6 | 93 | 57 | 17,03 |
| 11.764.0570 | 5.7 | 5.7 | 93 | 57 | 17,03 |
| 11.764.0580 | 5.8 | 5.8 | 93 | 57 | 16,10 |
| 11.764.0590 | 5.9 | 5.9 | 93 | 57 | 17,35 |
| 11.764.0600 | 6 | 6 | 93 | 57 | 11,15 |
| 11.764.0610 | 6.1 | 6.1 | 101 | 63 | 17,79 |
| 11.764.0620 | 6.2 | 6.2 | 101 | 63 | 16,82 |
| 11.764.0630 | 6.3 | 6.3 | 101 | 63 | 17,87 |

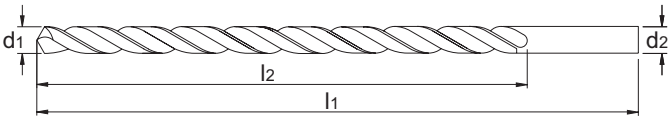
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.764.0640 | 6.4 | 6.4 | 101 | 63 | 18,33 |
| 11.764.0650 | 6.5 | 6.5 | 101 | 63 | 12,52 |
| 11.764.0660 | 6.6 | 6.6 | 101 | 63 | 20,91 |
| 11.764.0670 | 6.7 | 6.7 | 101 | 63 | 21,17 |
| 11.764.0680 | 6.8 | 6.8 | 109 | 69 | 14,15 |
| 11.764.0690 | 6.9 | 6.9 | 109 | 69 | 22,58 |
| 11.764.0700 | 7 | 7 | 109 | 69 | 14,34 |
| 11.764.0710 | 7.1 | 7.1 | 109 | 69 | 22,72 |
| 11.764.0720 | 7.2 | 7.2 | 109 | 69 | 23,36 |
| 11.764.0730 | 7.3 | 7.3 | 109 | 69 | 23,36 |
| 11.764.0740 | 7.4 | 7.4 | 109 | 69 | 23,47 |
| 11.764.0750 | 7.5 | 7.5 | 109 | 69 | 20,66 |
| 11.764.0760 | 7.6 | 7.6 | 117 | 75 | 24,25 |
| 11.764.0770 | 7.7 | 7.7 | 117 | 75 | 24,25 |
| 11.764.0780 | 7.8 | 7.8 | 117 | 75 | 24,16 |
| 11.764.0790 | 7.9 | 7.9 | 117 | 75 | 24,37 |
| 11.764.0800 | 8 | 8 | 117 | 75 | 17,59 |
| 11.764.0810 | 8.1 | 8.1 | 117 | 75 | 26,80 |
| 11.764.0820 | 8.2 | 8.2 | 117 | 75 | 27,00 |
| 11.764.0830 | 8.3 | 8.3 | 117 | 75 | 27,85 |
| 11.764.0840 | 8.4 | 8.4 | 117 | 75 | 27,85 |
| 11.764.0850 | 8.5 | 8.5 | 117 | 75 | 19,01 |
| 11.764.0860 | 8.6 | 8.6 | 125 | 81 | 29,35 |
| 11.764.0870 | 8.7 | 8.7 | 125 | 81 | 29,35 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.764.0880 | 8.8 | 8.8 | 125 | 81 | 29,75 |
| 11.764.0890 | 8.9 | 8.9 | 125 | 81 | 30,35 |
| 11.764.0900 | 9 | 9 | 125 | 81 | 28,85 |
| 11.764.0910 | 9.1 | 9.1 | 125 | 81 | 30,35 |
| 11.764.0920 | 9.2 | 9.2 | 125 | 81 | 30,35 |
| 11.764.0930 | 9.3 | 9.3 | 125 | 81 | 30,55 |
| 11.764.0940 | 9.4 | 9.4 | 125 | 81 | 30,55 |
| 11.764.0950 | 9.5 | 9.5 | 125 | 81 | 30,40 |
| 11.764.0960 | 9.6 | 9.6 | 133 | 87 | 32,10 |
| 11.764.0970 | 9.7 | 9.7 | 133 | 87 | 32,10 |
| 11.764.0980 | 9.8 | 9.8 | 133 | 87 | 33,75 |
| 11.764.0990 | 9.9 | 9.9 | 133 | 87 | 33,75 |
| 11.764.1000 | 10 | 10 | 133 | 87 | 25,45 |
| 11.764.1020 | 10.2 | 10.2 | 133 | 87 | 26,70 |
| 11.764.1030 | 10.3 | 10.3 | 133 | 87 | 41,55 |
| 11.764.1050 | 10.5 | 10.5 | 133 | 87 | 27,55 |
| 11.764.1100 | 11 | 11 | 142 | 94 | 31,80 |
| 11.764.1150 | 11.5 | 11.5 | 142 | 94 | 45,50 |
| 11.764.1200 | 12 | 12 | 151 | 101 | 48,15 |
| 11.764.1250 | 12.5 | 12.5 | 151 | 101 | 54,55 |
| 11.764.1300 | 13 | 13 | 151 | 101 | 40,80 |
| 11.764.1350 | 13.5 | 13.5 | 160 | 108 | 61,70 |
| 11.764.1400 | 14 | 14 | 160 | 108 | 62,60 |

## › 11.920 Phantom



**NL HSS Spiraalboor type TS**
**FR Foret HSS type TS**
**ES Broca HSS tipo TS**
**DE HSS Spiralbohrer Typ TS**
**EN HSS Twist drill type TS**




130° | DIN 1869 | HSS | TS

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC

20-25 D | 16-25 D | 16-22 C | 6-10 C | 18-22 E | 14-20 E | 35-40 F | 50-55 E | 20-28 D | 18-30 E

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.920.0201 | 2 | 2 | 125 | 85 | 16,06 |
| 11.920.0251 | 2.5 | 2.5 | 140 | 95 | 15,27 |
| 11.920.0301 | 3 | 3 | 150 | 100 | 15,98 |
| 11.920.0303 | 3 | 3 | 190 | 130 | 24,74 |
| 11.920.0305 | 3 | 3 | 240 | 160 | 34,60 |
| 11.920.0351 | 3.5 | 3.5 | 165 | 115 | 17,38 |
| 11.920.0353 | 3.5 | 3.5 | 210 | 145 | 22,37 |
| 11.920.0355 | 3.5 | 3.5 | 265 | 180 | 33,40 |
| 11.920.0401 | 4 | 4 | 175 | 120 | 17,71 |
| 11.920.0403 | 4 | 4 | 220 | 150 | 22,37 |
| 11.920.0405 | 4 | 4 | 280 | 190 | 32,25 |
| 11.920.0407 | 4 | 4 | 400 | 300 | 159,85 |
| 11.920.0451 | 4.5 | 4.5 | 185 | 125 | 18,29 |
| 11.920.0453 | 4.5 | 4.5 | 235 | 160 | 25,50 |
| 11.920.0455 | 4.5 | 4.5 | 295 | 200 | 39,15 |
| 11.920.0501 | 5 | 5 | 195 | 135 | 19,58 |
| 11.920.0503 | 5 | 5 | 245 | 170 | 28,25 |
| 11.920.0505 | 5 | 5 | 315 | 210 | 42,50 |
| 11.920.0507 | 5 | 5 | 500 | 350 | 231,00 |
| 11.920.0551 | 5.5 | 5.5 | 205 | 140 | 20,63 |
| 11.920.0553 | 5.5 | 5.5 | 260 | 180 | 33,75 |
| 11.920.0557 | 5.5 | 5.5 | 330 | 225 | 48,85 |
| 11.920.0601 | 6 | 6 | 205 | 140 | 21,10 |

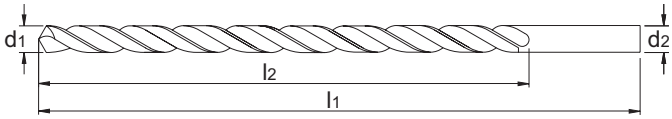
| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.920.0603 | 6 | 6 | 260 | 180 | 31,90 |
| 11.920.0605 | 6 | 6 | 330 | 225 | 47,85 |
| 11.920.0607 | 6 | 6 | 600 | 400 | 221,10 |
| 11.920.0608 | 6 | 6 | 500 | 400 | 73,70 |
| 11.920.0651 | 6.5 | 6.5 | 215 | 150 | 25,35 |
| 11.920.0653 | 6.5 | 6.5 | 275 | 190 | 38,50 |
| 11.920.0655 | 6.5 | 6.5 | 350 | 235 | 50,55 |
| 11.920.0701 | 7 | 7 | 225 | 155 | 27,95 |
| 11.920.0703 | 7 | 7 | 290 | 200 | 42,10 |
| 11.920.0705 | 7 | 7 | 370 | 250 | 58,70 |
| 11.920.0751 | 7.5 | 7.5 | 225 | 155 | 33,25 |
| 11.920.0753 | 7.5 | 7.5 | 290 | 200 | 47,00 |
| 11.920.0755 | 7.5 | 7.5 | 370 | 250 | 68,80 |
| 11.920.0801 | 8 | 8 | 240 | 165 | 33,50 |
| 11.920.0803 | 8 | 8 | 305 | 210 | 46,20 |
| 11.920.0805 | 8 | 8 | 390 | 265 | 62,30 |
| 11.920.0809 | 8 | 8 | 500 | 400 | 85,00 |
| 11.920.0851 | 8.5 | 8.5 | 240 | 165 | 36,50 |
| 11.920.0853 | 8.5 | 8.5 | 305 | 210 | 50,60 |
| 11.920.0901 | 9 | 9 | 250 | 175 | 49,30 |
| 11.920.0903 | 9 | 9 | 320 | 220 | 56,55 |
| 11.920.0905 | 9 | 9 | 410 | 280 | 81,70 |
| 11.920.0951 | 9.5 | 9.5 | 250 | 175 | 60,45 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.920.0953 | 9.5 | 9.5 | 320 | 220 | 65,40 |
| 11.920.0955 | 9.5 | 9.5 | 410 | 280 | 102,45 |
| 11.920.1001 | 10 | 10 | 265 | 185 | 60,10 |
| 11.920.1003 | 10 | 10 | 340 | 235 | 66,80 |
| 11.920.1005 | 10 | 10 | 430 | 295 | 86,40 |
| 11.920.1008 | 10 | 10 | 600 | 500 | 114,90 |
| 11.920.1051 | 10.5 | 10.5 | 265 | 185 | 69,90 |
| 11.920.1053 | 10.5 | 10.5 | 340 | 235 | 73,90 |
| 11.920.1054 | 10.5 | 10.5 | 430 | 295 | 121,60 |
| 11.920.1101 | 11 | 11 | 280 | 195 | 82,55 |
| 11.920.1103 | 11 | 11 | 365 | 250 | 90,35 |
| 11.920.1104 | 11 | 11 | 455 | 310 | 128,00 |
| 11.920.1151 | 11.5 | 11.5 | 280 | 195 | 90,35 |
| 11.920.1153 | 11.5 | 11.5 | 365 | 250 | 107,60 |
| 11.920.1201 | 12 | 12 | 295 | 205 | 93,95 |
| 11.920.1203 | 12 | 12 | 375 | 260 | 107,25 |
| 11.920.1205 | 12 | 12 | 480 | 330 | 132,05 |
| 11.920.1206 | 12 | 12 | 600 | 500 | 162,30 |
| 11.920.1251 | 12.5 | 12.5 | 295 | 205 | 90,60 |
| 11.920.1253 | 12.5 | 12.5 | 375 | 260 | 99,35 |
| 11.920.1301 | 13 | 13 | 295 | 205 | 96,90 |
| 11.920.1303 | 13 | 13 | 375 | 260 | 105,05 |
| 11.920.1401 | 14 | 14 | 300 | 200 | 190,75 |

## › 11.940 Phantom



NL **HSS-E Spiraalboor type TS**
FR **Foret HSS-E type TS**
ES **Broca HSS-E tipo TS**
DE **HSS-E Spiralbohrer Typ TS**
EN **HSS-E Twist drill type TS**




130° | DIN 1869 | HSS-E | TS

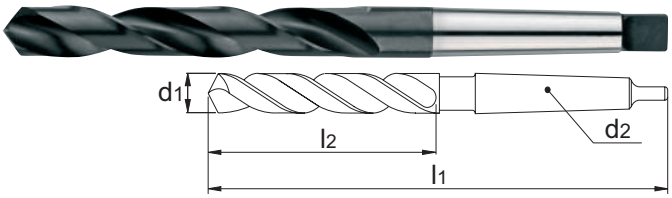
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 42 | N 51 | N 52 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu Si>10% | Cu | CuAlFe |
| 30-35 D | 20-30 D | 10-20 C | 8-10 B | 8-10 C | 6-10 B | 25-30 D | 20-25 D | 40-50 F | 20-30 D | 25-30 C |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.940.0301 | 3 | 3 | 150 | 100 | 19,33 |
| 11.940.0303 | 3 | 3 | 190 | 130 | 30,65 |
| 11.940.0351 | 3.5 | 3.5 | 165 | 115 | 21,02 |
| 11.940.0353 | 3.5 | 3.5 | 210 | 145 | 27,05 |
| 11.940.0355 | 3.5 | 3.5 | 265 | 180 | 41,40 |
| 11.940.0401 | 4 | 4 | 175 | 120 | 21,88 |
| 11.940.0403 | 4 | 4 | 220 | 150 | 27,05 |
| 11.940.0405 | 4 | 4 | 280 | 190 | 39,75 |
| 11.940.0451 | 4.5 | 4.5 | 185 | 125 | 22,14 |
| 11.940.0453 | 4.5 | 4.5 | 235 | 160 | 31,60 |
| 11.940.0501 | 5 | 5 | 195 | 135 | 24,17 |
| 11.940.0503 | 5 | 5 | 245 | 170 | 35,05 |
| 11.940.0505 | 5 | 5 | 315 | 210 | 53,60 |
| 11.940.0551 | 5.5 | 5.5 | 205 | 140 | 25,45 |
| 11.940.0553 | 5.5 | 5.5 | 260 | 180 | 41,60 |
| 11.940.0601 | 6 | 6 | 205 | 140 | 26,05 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.940.0603 | 6 | 6 | 260 | 180 | 38,65 |
| 11.940.0605 | 6 | 6 | 330 | 225 | 59,25 |
| 11.940.0651 | 6.5 | 6.5 | 215 | 150 | 30,70 |
| 11.940.0653 | 6.5 | 6.5 | 275 | 190 | 46,60 |
| 11.940.0701 | 7 | 7 | 225 | 155 | 33,85 |
| 11.940.0703 | 7 | 7 | 290 | 200 | 52,00 |
| 11.940.0705 | 7 | 7 | 370 | 250 | 71,10 |
| 11.940.0751 | 7.5 | 7.5 | 225 | 155 | 40,30 |
| 11.940.0753 | 7.5 | 7.5 | 290 | 200 | 57,90 |
| 11.940.0801 | 8 | 8 | 240 | 165 | 41,55 |
| 11.940.0803 | 8 | 8 | 305 | 210 | 55,95 |
| 11.940.0805 | 8 | 8 | 390 | 265 | 77,15 |
| 11.940.0851 | 8.5 | 8.5 | 240 | 165 | 44,15 |
| 11.940.0853 | 8.5 | 8.5 | 305 | 210 | 61,25 |
| 11.940.0901 | 9 | 9 | 250 | 175 | 59,70 |
| 11.940.0903 | 9 | 9 | 320 | 220 | 68,50 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 11.940.0905 | 9 | 9 | 410 | 280 | 98,90 |
| 11.940.0951 | 9.5 | 9.5 | 250 | 175 | 73,05 |
| 11.940.0953 | 9.5 | 9.5 | 320 | 220 | 79,25 |
| 11.940.1001 | 10 | 10 | 265 | 185 | 72,65 |
| 11.940.1003 | 10 | 10 | 340 | 235 | 80,80 |
| 11.940.1005 | 10 | 10 | 430 | 295 | 104,50 |
| 11.940.1101 | 11 | 11 | 280 | 195 | 99,95 |
| 11.940.1103 | 11 | 11 | 365 | 250 | 109,45 |
| 11.940.1104 | 11 | 11 | 455 | 310 | 155,00 |
| 11.940.1201 | 12 | 12 | 295 | 205 | 116,75 |
| 11.940.1203 | 12 | 12 | 375 | 260 | 129,70 |
| 11.940.1205 | 12 | 12 | 480 | 330 | 159,85 |
| 11.940.1301 | 13 | 13 | 295 | 205 | 139,90 |
| 11.940.1303 | 13 | 13 | 375 | 260 | 155,45 |

## › 12.440 Phantom




NL **HSS Spiraalboor MK**
FR **Foret HSS CM**
ES **Broca HSS CM**
DE **HSS Spiralbohrer MK**
EN **HSS Twist drill MT**

118° | DIN 228-B | DIN 345 | HSS | OX. | N | ≥14

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu Si>10% | Cu | PVC |
| 25-27 F | 22-30 F | 15-20 E | 8-12 D | 15-20 E | 25-30 E | 45-50 G | 25-40 D | 22-28 D |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.0375 | 3.75 | MK 1 | 120 | 39 | 18,48 |
| 12.440.0500 | 5 | MK 1 | 133 | 52 | 56,35 |
| 12.440.0550 | 5.5 | MK 1 | 138 | 57 | 63,50 |
| 12.440.0600 | 6 | MK 1 | 138 | 57 | 59,45 |
| 12.440.0625 | 6.25 | MK 1 | 144 | 63 | 82,80 |
| 12.440.0650 | 6.5 | MK 1 | 144 | 63 | 65,60 |
| 12.440.0675 | 6.75 | MK 1 | 150 | 69 | 70,75 |
| 12.440.0700 | 7 | MK 1 | 150 | 69 | 67,65 |
| 12.440.0725 | 7.25 | MK 1 | 150 | 69 | 22,03 |
| 12.440.0750 | 7.5 | MK 1 | 150 | 69 | 69,60 |
| 12.440.0775 | 7.75 | MK 1 | 156 | 75 | 55,90 |
| 12.440.0800 | 8 | MK 1 | 156 | 75 | 38,80 |
| 12.440.0825 | 8.25 | MK 1 | 156 | 75 | 56,35 |
| 12.440.0850 | 8.5 | MK 1 | 156 | 75 | 40,95 |
| 12.440.0875 | 8.75 | MK 1 | 162 | 81 | 48,05 |
| 12.440.0900 | 9 | MK 1 | 162 | 81 | 40,80 |
| 12.440.0925 | 9.25 | MK 1 | 162 | 81 | 60,55 |
| 12.440.0950 | 9.5 | MK 1 | 162 | 81 | 45,30 |
| 12.440.0975 | 9.75 | MK 1 | 168 | 87 | 59,20 |
| 12.440.1000 | 10 | MK 1 | 168 | 87 | 41,55 |
| 12.440.1025 | 10.25 | MK 1 | 168 | 87 | 54,85 |
| 12.440.1050 | 10.5 | MK 1 | 168 | 87 | 33,65 |
| 12.440.1075 | 10.75 | MK 1 | 175 | 94 | 55,00 |
| 12.440.1100 | 11 | MK 1 | 175 | 94 | 41,60 |
| 12.440.1125 | 11.25 | MK 1 | 175 | 94 | 62,30 |
| 12.440.1150 | 11.5 | MK 1 | 175 | 94 | 50,65 |
| 12.440.1175 | 11.75 | MK 1 | 175 | 94 | 55,35 |
| 12.440.1200 | 12 | MK 1 | 182 | 101 | 43,75 |
| 12.440.1225 | 12.25 | MK 1 | 182 | 101 | 54,50 |
| 12.440.1250 | 12.5 | MK 1 | 182 | 101 | 37,50 |
| 12.440.1275 | 12.75 | MK 1 | 182 | 101 | 52,40 |
| 12.440.1300 | 13 | MK 1 | 182 | 101 | 41,30 |
| 12.440.1325 | 13.25 | MK 1 | 189 | 108 | 51,65 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.1350 | 13.5 | MK 1 | 189 | 108 | 46,20 |
| 12.440.1375 | 13.75 | MK 1 | 189 | 108 | 49,25 |
| 12.440.1400 | 14 | MK 1 | 189 | 108 | 44,15 |
| 12.440.1425 | 14.25 | MK 2 | 212 | 114 | 57,95 |
| 12.440.1450 | 14.5 | MK 2 | 212 | 114 | 50,90 |
| 12.440.1475 | 14.75 | MK 2 | 212 | 114 | 61,80 |
| 12.440.1500 | 15 | MK 2 | 212 | 114 | 50,90 |
| 12.440.1525 | 15.25 | MK 2 | 218 | 120 | 57,25 |
| 12.440.1550 | 15.5 | MK 2 | 218 | 120 | 54,05 |
| 12.440.1575 | 15.75 | MK 2 | 218 | 120 | 57,70 |
| 12.440.1600 | 16 | MK 2 | 218 | 120 | 54,05 |
| 12.440.1625 | 16.25 | MK 2 | 223 | 125 | 68,75 |
| 12.440.1650 | 16.5 | MK 2 | 223 | 125 | 59,30 |
| 12.440.1675 | 16.75 | MK 2 | 223 | 125 | 65,55 |
| 12.440.1700 | 17 | MK 2 | 223 | 125 | 60,85 |
| 12.440.1725 | 17.25 | MK 2 | 228 | 130 | 68,70 |
| 12.440.1750 | 17.5 | MK 2 | 228 | 130 | 65,60 |
| 12.440.1775 | 17.75 | MK 2 | 228 | 130 | 72,15 |
| 12.440.1800 | 18 | MK 2 | 228 | 130 | 65,60 |
| 12.440.1825 | 18.25 | MK 2 | 233 | 135 | 74,55 |
| 12.440.1850 | 18.5 | MK 2 | 233 | 135 | 71,85 |
| 12.440.1875 | 18.75 | MK 2 | 233 | 135 | 78,50 |
| 12.440.1900 | 19 | MK 2 | 233 | 135 | 71,85 |
| 12.440.1925 | 19.25 | MK 2 | 238 | 140 | 83,65 |
| 12.440.1950 | 19.5 | MK 2 | 238 | 140 | 80,65 |
| 12.440.1975 | 19.75 | MK 2 | 238 | 140 | 85,20 |
| 12.440.2000 | 20 | MK 2 | 238 | 140 | 78,20 |
| 12.440.2025 | 20.25 | MK 2 | 243 | 145 | 88,80 |
| 12.440.2050 | 20.5 | MK 2 | 243 | 145 | 84,85 |
| 12.440.2075 | 20.75 | MK 2 | 243 | 145 | 92,45 |
| 12.440.2100 | 21 | MK 2 | 243 | 145 | 87,05 |
| 12.440.2125 | 21.25 | MK 2 | 248 | 150 | 95,25 |
| 12.440.2150 | 21.5 | MK 2 | 248 | 150 | 91,35 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.2175 | 21.75 | MK 2 | 248 | 150 | 97,45 |
| 12.440.2200 | 22 | MK 2 | 248 | 150 | 94,00 |
| 12.440.2225 | 22.25 | MK 2 | 248 | 150 | 111,70 |
| 12.440.2250 | 22.5 | MK 2 | 253 | 155 | 99,05 |
| 12.440.2275 | 22.75 | MK 2 | 253 | 155 | 108,90 |
| 12.440.2300 | 23 | MK 2 | 253 | 155 | 104,35 |
| 12.440.2325 | 23.25 | MK 3 | 276 | 155 | 139,00 |
| 12.440.2350 | 23.5 | MK 3 | 276 | 155 | 110,25 |
| 12.440.2375 | 23.75 | MK 3 | 281 | 160 | 130,55 |
| 12.440.2400 | 24 | MK 3 | 281 | 160 | 112,35 |
| 12.440.2425 | 24.25 | MK 3 | 281 | 160 | 133,20 |
| 12.440.2450 | 24.5 | MK 3 | 281 | 160 | 117,40 |
| 12.440.2475 | 24.75 | MK 3 | 281 | 160 | 138,95 |
| 12.440.2500 | 25 | MK 3 | 281 | 160 | 122,45 |
| 12.440.2525 | 25.25 | MK 3 | 286 | 165 | 145,65 |
| 12.440.2550 | 25.5 | MK 3 | 286 | 165 | 125,50 |
| 12.440.2575 | 25.75 | MK 3 | 286 | 165 | 155,95 |
| 12.440.2600 | 26 | MK 3 | 286 | 165 | 135,20 |
| 12.440.2625 | 26.25 | MK 3 | 286 | 165 | 161,20 |
| 12.440.2650 | 26.5 | MK 3 | 286 | 165 | 140,55 |
| 12.440.2675 | 26.75 | MK 3 | 291 | 170 | 181,05 |
| 12.440.2700 | 27 | MK 3 | 291 | 170 | 144,65 |
| 12.440.2725 | 27.25 | MK 3 | 291 | 170 | 214,75 |
| 12.440.2750 | 27.5 | MK 3 | 291 | 170 | 155,95 |
| 12.440.2775 | 27.75 | MK 3 | 291 | 170 | 178,40 |
| 12.440.2800 | 28 | MK 3 | 291 | 170 | 154,40 |
| 12.440.2825 | 28.25 | MK 3 | 296 | 175 | 184,50 |
| 12.440.2850 | 28.5 | MK 3 | 296 | 175 | 170,35 |
| 12.440.2875 | 28.75 | MK 3 | 296 | 175 | 233,10 |
| 12.440.2900 | 29 | MK 3 | 296 | 175 | 161,75 |
| 12.440.2925 | 29.25 | MK 3 | 296 | 175 | 236,30 |
| 12.440.2950 | 29.5 | MK 3 | 296 | 175 | 169,05 |
| 12.440.2975 | 29.75 | MK 3 | 296 | 175 | 193,75 |

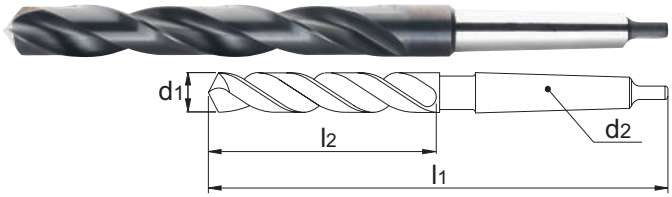
## › 12.440 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.3000 | 30 | MK 3 | 296 | 175 | 169,05 |
| 12.440.3025 | 30.25 | MK 3 | 301 | 180 | 226,75 |
| 12.440.3050 | 30.5 | MK 3 | 301 | 180 | 204,10 |
| 12.440.3075 | 30.75 | MK 3 | 301 | 180 | 225,75 |
| 12.440.3100 | 31 | MK 3 | 301 | 180 | 202,80 |
| 12.440.3125 | 31.25 | MK 3 | 301 | 180 | 295,00 |
| 12.440.3150 | 31.5 | MK 3 | 301 | 180 | 223,45 |
| 12.440.3200 | 32 | MK 4 | 334 | 185 | 222,30 |
| 12.440.3250 | 32.5 | MK 4 | 334 | 185 | 246,25 |
| 12.440.3300 | 33 | MK 4 | 334 | 185 | 246,25 |
| 12.440.3350 | 33.5 | MK 4 | 334 | 185 | 261,00 |
| 12.440.3400 | 34 | MK 4 | 339 | 190 | 268,00 |
| 12.440.3450 | 34.5 | MK 4 | 339 | 190 | 283,00 |
| 12.440.3500 | 35 | MK 4 | 339 | 190 | 271,00 |
| 12.440.3550 | 35.5 | MK 4 | 339 | 190 | 301,00 |
| 12.440.3600 | 36 | MK 4 | 344 | 195 | 286,00 |
| 12.440.3650 | 36.5 | MK 4 | 344 | 195 | 310,00 |
| 12.440.3700 | 37 | MK 4 | 344 | 195 | 301,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.3750 | 37.5 | MK 4 | 344 | 195 | 339,00 |
| 12.440.3800 | 38 | MK 4 | 349 | 200 | 323,00 |
| 12.440.3850 | 38.5 | MK 4 | 349 | 200 | 388,00 |
| 12.440.3900 | 39 | MK 4 | 349 | 200 | 349,00 |
| 12.440.3950 | 39.5 | MK 4 | 349 | 200 | 427,00 |
| 12.440.4000 | 40 | MK 4 | 349 | 200 | 368,00 |
| 12.440.4050 | 40.5 | MK 4 | 354 | 205 | 557,00 |
| 12.440.4100 | 41 | MK 4 | 354 | 205 | 426,00 |
| 12.440.4150 | 41.5 | MK 4 | 354 | 205 | 592,00 |
| 12.440.4200 | 42 | MK 4 | 354 | 205 | 423,00 |
| 12.440.4250 | 42.5 | MK 4 | 354 | 205 | 616,00 |
| 12.440.4300 | 43 | MK 4 | 359 | 210 | 509,00 |
| 12.440.4350 | 43.5 | MK 4 | 359 | 210 | 639,00 |
| 12.440.4400 | 44 | MK 4 | 359 | 210 | 520,00 |
| 12.440.4450 | 44.5 | MK 4 | 359 | 210 | 672,00 |
| 12.440.4500 | 45 | MK 4 | 359 | 210 | 524,00 |
| 12.440.4550 | 45.5 | MK 4 | 364 | 215 | 726,00 |
| 12.440.4600 | 46 | MK 4 | 364 | 215 | 567,00 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.440.4650 | 46.5 | MK 4 | 364 | 215 | 720,00 |
| 12.440.4700 | 47 | MK 4 | 364 | 215 | 595,00 |
| 12.440.4750 | 47.5 | MK 4 | 364 | 215 | 724,00 |
| 12.440.4800 | 48 | MK 4 | 369 | 220 | 607,00 |
| 12.440.4850 | 48.5 | MK 4 | 369 | 220 | 752,00 |
| 12.440.4900 | 49 | MK 4 | 369 | 220 | 646,00 |
| 12.440.4950 | 49.5 | MK 4 | 369 | 220 | 793,00 |
| 12.440.5000 | 50 | MK 4 | 369 | 220 | 640,00 |
| 12.440.5100 | 51 | MK 5 | 412 | 225 | 1.183,00 |
| 12.440.5200 | 52 | MK 5 | 412 | 225 | 1.162,00 |
| 12.440.5300 | 53 | MK 5 | 412 | 225 | 1.443,00 |
| 12.440.5400 | 54 | MK 5 | 417 | 230 | 1.333,00 |
| 12.440.5500 | 55 | MK 5 | 417 | 230 | 1.271,00 |
| 12.440.5600 | 56 | MK 5 | 417 | 230 | 1.523,00 |
| 12.440.5700 | 57 | MK 5 | 422 | 235 | 1.582,00 |
| 12.440.5800 | 58 | MK 5 | 422 | 235 | 1.387,00 |
| 12.440.5900 | 59 | MK 5 | 422 | 235 | 1.527,00 |
| 12.440.6000 | 60 | MK 5 | 422 | 235 | 1.399,00 |

## › 12.500 Phantom




**NL** HSS-E Spiraalboor MK
**FR** Foret HSS-E CM
**ES** Broca HSS-E CM
**DE** HSS-E Spiralbohrer MK
**EN** HSS-E Twist drill MT

118° | DIN 228-B | DIN 345 | HSS-E | OX. | N

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 51 Cu | N 52 CuAlFe

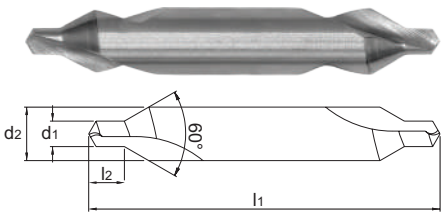
28-35 E | 30-36 E | 20-27 E | 12-20 D | 14-18 D | 10-15 C | 30-35 F | 24-30 F | 30-40 E | 8-15 C

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.500.0700 | 7 | MK 1 | 150 | 69 | 64,30 |
| 12.500.0800 | 8 | MK 1 | 156 | 75 | 59,35 |
| 12.500.0900 | 9 | MK 1 | 162 | 81 | 60,55 |
| 12.500.1000 | 10 | MK 1 | 168 | 87 | 59,20 |
| 12.500.1100 | 11 | MK 1 | 175 | 94 | 63,15 |
| 12.500.1200 | 12 | MK 1 | 182 | 101 | 62,60 |
| 12.500.1250 | 12.5 | MK 1 | 182 | 101 | 66,05 |
| 12.500.1300 | 13 | MK 1 | 182 | 101 | 66,35 |
| 12.500.1350 | 13.5 | MK 1 | 189 | 108 | 77,65 |
| 12.500.1400 | 14 | MK 1 | 189 | 108 | 73,45 |
| 12.500.1450 | 14.5 | MK 2 | 212 | 114 | 87,40 |
| 12.500.1500 | 15 | MK 2 | 212 | 114 | 88,05 |
| 12.500.1550 | 15.5 | MK 2 | 218 | 120 | 96,00 |
| 12.500.1600 | 16 | MK 2 | 218 | 120 | 88,60 |
| 12.500.1650 | 16.5 | MK 2 | 223 | 125 | 95,80 |
| 12.500.1700 | 17 | MK 2 | 223 | 125 | 91,35 |
| 12.500.1750 | 17.5 | MK 2 | 228 | 130 | 98,35 |
| 12.500.1800 | 18 | MK 2 | 228 | 130 | 95,25 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.500.1850 | 18.5 | MK 2 | 233 | 135 | 108,10 |
| 12.500.1900 | 19 | MK 2 | 233 | 135 | 107,00 |
| 12.500.1950 | 19.5 | MK 2 | 238 | 140 | 129,15 |
| 12.500.2000 | 20 | MK 2 | 238 | 140 | 112,15 |
| 12.500.2050 | 20.5 | MK 2 | 243 | 145 | 124,25 |
| 12.500.2100 | 21 | MK 2 | 243 | 145 | 115,40 |
| 12.500.2150 | 21.5 | MK 2 | 248 | 150 | 132,35 |
| 12.500.2200 | 22 | MK 2 | 248 | 150 | 132,25 |
| 12.500.2250 | 22.5 | MK 2 | 253 | 155 | 157,85 |
| 12.500.2300 | 23 | MK 2 | 253 | 155 | 146,50 |
| 12.500.2350 | 23.5 | MK 3 | 276 | 155 | 183,15 |
| 12.500.2400 | 24 | MK 3 | 281 | 160 | 161,00 |
| 12.500.2450 | 24.5 | MK 3 | 281 | 160 | 177,00 |
| 12.500.2500 | 25 | MK 3 | 281 | 160 | 167,25 |
| 12.500.2550 | 25.5 | MK 3 | 286 | 165 | 202,35 |
| 12.500.2600 | 26 | MK 3 | 286 | 165 | 183,80 |
| 12.500.2650 | 26.5 | MK 3 | 286 | 165 | 188,40 |
| 12.500.2700 | 27 | MK 3 | 291 | 170 | 192,65 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 12.500.2750 | 27.5 | MK 3 | 291 | 170 | 224,80 |
| 12.500.2800 | 28 | MK 3 | 291 | 170 | 224,35 |
| 12.500.2850 | 28.5 | MK 3 | 296 | 175 | 217,05 |
| 12.500.2900 | 29 | MK 3 | 296 | 175 | 206,85 |
| 12.500.2950 | 29.5 | MK 3 | 296 | 175 | 223,35 |
| 12.500.3000 | 30 | MK 3 | 296 | 175 | 195,55 |
| 12.500.3100 | 31 | MK 3 | 301 | 180 | 271,00 |
| 12.500.3200 | 32 | MK 4 | 334 | 185 | 264,00 |
| 12.500.3300 | 33 | MK 4 | 334 | 185 | 275,00 |
| 12.500.3400 | 34 | MK 4 | 339 | 190 | 315,00 |
| 12.500.3500 | 35 | MK 4 | 339 | 190 | 333,00 |
| 12.500.3600 | 36 | MK 4 | 344 | 195 | 363,00 |
| 12.500.3700 | 37 | MK 4 | 344 | 195 | 366,00 |
| 12.500.3800 | 38 | MK 4 | 349 | 200 | 396,00 |
| 12.500.3900 | 39 | MK 4 | 349 | 200 | 444,00 |
| 12.500.4000 | 40 | MK 4 | 349 | 200 | 430,00 |

## › 15.100 Phantom




**NL** HSS Centerboor 60°
**FR** Foret à centrer HSS 60°
**ES** Broca escalonada HSS 60°
**DE** HSS Zentrierbohrer 60°
**EN** HSS Centre Drill 60°

60° | DIN 333-A | HSS | NFE 66051-A | h7

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC

20-25 E | 15-25 E | 16-22 F | 25-30 E | 20-25 D | 50-60 E | 60-70 E | 45-50 E | 25-40 E | 18-28 E

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.100.0531 | 0.5 | 3.15 | 25 | 0,6-0,9 | 8,58 |
| 15.100.0735 | 0.75 | 3.5 | 35 | 1,0-1,3 | 11,46 |
| 15.100.0831 | 0.8 | 3.15 | 25 | 1,0-1,3 | 8,58 |
| 15.100.1031 | 1 | 3.15 | 31 | 1,3-1,7 | 8,58 |
| 15.100.1040 | 1 | 4 | 35 | 1,3-1,7 | 10,16 |
| 15.100.1231 | 1.25 | 3.15 | 31 | 1,6-2,0 | 8,58 |
| 15.100.1240 | 1.25 | 4 | 35 | 1,6-2,0 | 10,38 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.100.1550 | 1.5 | 5 | 40 | 2,0-2,6 | 10,78 |
| 15.100.1640 | 1.6 | 4 | 35 | 2,0-2,6 | 8,58 |
| 15.100.1650 | 1.6 | 5 | 40 | 2,0-2,6 | 11,46 |
| 15.100.2050 | 2 | 5 | 40 | 2,5-3,1 | 10,04 |
| 15.100.2060 | 2 | 6 | 45 | 2,5-3,1 | 11,96 |
| 15.100.2063 | 2 | 6.3 | 45 | 2,5-3,1 | 12,52 |
| 15.100.2563 | 2.5 | 6.3 | 45 | 3,1-3,8 | 11,96 |

## › 15.100 Phantom

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.100.2580 | 2.5 | 8 | 50 | 3,1-3,8 | 13,48 |
| 15.100.3090 | 3 | 10 | 55 | 3,9-4,6 | 16,97 |
| 15.100.3180 | 3.15 | 8 | 50 | 3,9-4,6 | 13,48 |
| 15.100.3190 | 3.15 | 10 | 55 | 3,9-4,6 | 17,44 |
| 15.100.3590 | 3.5 | 10 | 55 | 4,0-4,5 | 35,30 |
| 15.100.4010 | 4 | 10 | 55 | 5,0-5,9 | 15,69 |
| 15.100.4012 | 4 | 12 | 63 | 5,0-5,9 | 28,85 |
| 15.100.4013 | 4 | 12.5 | 63 | 5,0-5,9 | 29,60 |
| 15.100.5013 | 5 | 12.5 | 63 | 6,3-7,2 | 24,99 |

| Ref. | d1 | d2 | l1 | l2 | € |
|---|---|---|---|---|---|
| 15.100.5014 | 5 | 14 | 69 | 6,3-7,2 | 36,30 |
| 15.100.5016 | 5 | 16 | 71 | 6,3-7,2 | 42,25 |
| 15.100.6018 | 6 | 18 | 77 | 8,0-8,9 | 57,60 |
| 15.100.6316 | 6.3 | 16 | 71 | 8,0-8,9 | 40,70 |
| 15.100.6320 | 6.3 | 20 | 80 | 8,0-8,9 | 82,40 |
| 15.100.8020 | 8 | 20 | 80 | 10,1-11,1 | 72,85 |
| 15.100.9025 | 10 | 25 | 100 | 12,8-13,8 | 135,75 |
| 15.100.9531 | 12.5 | 31.5 | 125 | 16,5-17,5 | 314,00 |

## › 19.145 Phantom



**NL HSS Set Spiraalboren**
**FR Coffret de Forets HSS**
**ES Estuche de brocas HSS**
**DE HSS Satz Spiralbohrer**
**EN HSS Drill set**

118° | DIN 338 | HSS | OX. | N | ≥1

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

25-27 F | 22-30 F | 15-20 E | 8-12 D | 15-20 E | 25-30 E | 45-50 G | 25-40 D | 22-28 D

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.145.0310 | 11.450 | 3-10 mm x 1 mm | 47,00 |
| 19.145.1000 | 11.450 | 1-10 mm x 0,5 mm | 93,00 |
| 19.145.1010 | 11.450 | 1-10 mm x 0,1 mm (91x) | 500,00 |
| 19.145.1150 | 11.450 | 1-10,5 mm x 0,5 mm + 3,3-4,2-6,8-10,2 mm | 133,00 |
| 19.145.1300 | 11.450 | 1-13 mm x 0,5 mm | 178,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.145.1590 | 11.450 | 1-5,9 mm x 0,1 mm | 150,00 |
| 19.145.1600 | 11.450 | 6-10 mm x 0,1 mm | 330,00 |
| 19.145.6000 | 11.450 | 1-10 mm x 0,5 mm (170x) | 661,00 |
| 19.145.6100 | 11.450 | 1-13 mm x 0,5 mm + 3,3 - 4,2 mm (220x) | 1.113,00 |

## › 19.146 Phantom



**NL HSS Set Spiraalboren TiN-tip**
**FR Coffret de Forets HSS avec revêtement TiN sur la partie utile**
**ES Estuche de brocas HSS con punta TiN**
**DE HSS Satz Spiralbohrer TiN-Tip**
**EN HSS Drill set TiN coated tip**

118° | DIN 338 | HSS | TiN | N | ≥1,6

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

25-27 F | 22-30 F | 15-20 E | 8-12 D | 15-20 E | 25-30 E | 48-60 E | 45-50 G | 25-40 D | 22-28 D

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.146.1000 | 11.451 | 1-10 mm x 0,5 mm | 120,00 |
| 19.146.1150 | 11.451 | 1-10,5 mm x 0,5 mm + 3,3-4,2-6,8-10,2 mm | 165,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.146.1300 | 11.451 | 1-13 mm x 0,5 mm | 231,00 |

## › 19.147 Phantom



NL **HSS Set Spiraalboren TiN-tip, (handgebruik)**
FR **Coffret de Forets HSS avec revêtement TiN sur la partie utile, (usage à la main)**
ES **Estuche de brocas HSS con punta TiN, (uso manual)**
DE **HSS Satz Spiralbohrer TiN-Tip, (handgebrauch)**
EN **HSS Drill set TiN coated tip, (handuse)**

118° | DIN 338 | HSS | >N | TiN | ≥1,6

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

25-27 F | 22-30 F | 15-20 E | 8-12 D | 15-20 E | 25-30 E | 48-60 E | 45-50 G | 25-40 D | 22-28 D

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.147.0310 | 11.461 | 3-10 mm x 1 mm | 60,00 |
| 19.147.1000 | 11.461 | 1-10 mm x 0,5 mm | 120,00 |
| 19.147.1010 | 11.461 | 1-10 mm x 0,1 mm (91x) | 588,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.147.1150 | 11.461 | 1-10,5 mm x 0,5 mm + 3,3-4,2-6,8-10,2 mm | 166,00 |
| 19.147.1300 | 11.461 | 1-13 mm x 0,5 mm | 232,00 |

## › 19.150 Phantom



NL **HSS-E Set Spiraalboren**
FR **Coffret de Forets HSS-E**
ES **Estuche de brocas HSS-E**
DE **HSS-E Satz Spiralbohrer**
EN **HSS-E Drill set**

135° | DIN 338 | HSS-E | N | ≥2

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 51 Cu | N 52 CuAlFe

28-35 E | 30-36 E | 20-27 E | 12-20 D | 14-18 D | 10-15 C | 30-35 F | 24-30 F | 30-40 E | 8-15 C

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.150.0310 | 11.500 | 3-10 mm x 1 mm | 69,00 |
| 19.150.1000 | 11.500 | 1-10 mm x 0,5 mm | 139,00 |
| 19.150.1010 | 11.500 | 1-10 mm x 0,1 mm (91x) | 920,00 |
| 19.150.1150 | 11.500 | 1-10,5 mm x 0,5 mm + 3,3-4,2-6,8-10,2 mm | 200,00 |
| 19.150.1300 | 11.500 | 1-13 mm x 0,5 mm | 277,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.150.1590 | 11.500 | 1-5,9 mm x 0,1 mm | 242,00 |
| 19.150.1600 | 11.500 | 6-10 mm x 0,1 mm | 658,00 |
| 19.150.6000 | 11.500 | 1-10 mm x 0,5 mm (170x) | 1.008,00 |
| 19.150.6100 | 11.500 | 1-13 mm x 0,5 mm + 3,3 - 4,2 mm (220x) | 1.757,00 |

## › 19.176 Phantom



NL **HSS-E Set Spiraalboren roestvaststaal**
FR **Coffret de Forets HSS-E Inox**
ES **Estuche de brocas HSS-E acero inoxidable**
DE **HSS-E Satz Spiralbohrer rostfreien Stahl**
EN **HSS-E Drill set stainless steel**

130° | DIN 338 | HSS-E | INOX | >N

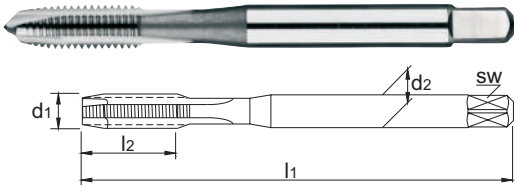
P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 71 Ni/Co | S 72 Ti

12-16 E | 14-18 D | 12-16 C | 6-8 A | 6-10 B

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.176.0310 | 11.760 | 3-10 mm x 1 mm | 81,00 |
| 19.176.1000 | 11.760 | 1-10 mm x 0,5 mm | 166,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 19.176.1150 | 11.760 | 1-10,5 mm x 0,5 mm + 3,3-4,2-6,8-10,2 mm | 231,00 |
| 19.176.1300 | 11.760 | 1-13 mm x 0,5 mm | 349,00 |

## › 22.200 Phantom




**NL** UNI HSS-E Machinetap Metrisch
**FR** Taraud machine HSS-E UNI Métrique
**ES** Macho máquina HSS-E UNI Métrica
**DE** UNI HSS-E Maschinengewindebohrer Metrisch
**EN** UNI HSS-E Machine Tap Metric Coarse

3xD | 60° | DIN 371 | HSS-E | ISO 2 6H | M | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.200.0100 | M1 | 0.25 | 40 | 5.5 | 2.5 | 2.1 | 43,35 |
| 22.200.0110 | M1,1 | 0.25 | 40 | 5.5 | 2.5 | 2.1 | 39,00 |
| 22.200.0120 | M1,2 | 0.25 | 40 | 5.5 | 2.5 | 2.1 | 35,40 |
| 22.200.0140 | M1,4 | 0.3 | 40 | 7 | 2.5 | 2.1 | 33,00 |
| 22.200.0160 | M1,6 | 0.35 | 40 | 8 | 2.5 | 2.1 | 29,60 |
| 22.200.0170 | M1,7 | 0.35 | 40 | 8 | 2.5 | 2.1 | 27,10 |
| 22.200.0180 | M1,8 | 0.35 | 40 | 8 | 2.5 | 2.1 | 25,45 |
| 22.200.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 27,60 |
| 22.200.0220 | M2,2 | 0.45 | 45 | 9 | 2.8 | 2.1 | 28,15 |
| 22.200.0230 | M2,3 | 0.4 | 45 | 9 | 2.8 | 2.1 | 28,75 |
| 22.200.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 25,70 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.200.0260 | M2,6 | 0.45 | 50 | 9 | 2.8 | 2.1 | 25,90 |
| 22.200.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 21,08 |
| 22.200.0350 | M3,5 | 0.6 | 56 | 12 | 4 | 3 | 23,26 |
| 22.200.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 21,10 |
| 22.200.0450 | M4,5 | 0.75 | 70 | 16 | 6 | 4.9 | 21,99 |
| 22.200.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 21,99 |
| 22.200.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 21,99 |
| 22.200.0700 | M7 | 1 | 80 | 19 | 7 | 5.5 | 26,10 |
| 22.200.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 25,75 |
| 22.200.0900 | M9 | 1.25 | 90 | 22 | 9 | 7 | 30,30 |
| 22.200.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 30,30 |

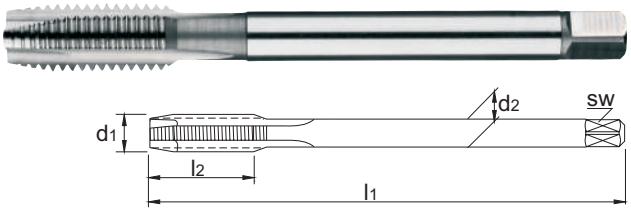


**NL** 80% kiest voor Phantom UNI machinetap!
**FR** 80% de notre clientèle choisissent un taraud machine Phantom UNI !
**ES** ¡El 80% elige el macho máquina Phantom UNI!
**DE** 80% entscheiden sich für den UNI-Maschinengewindebohrer von Phantom!
**EN** 80% opt for the Phantom UNI machine tap!

Watch me

www.phantom.eu

## › 22.201 Phantom



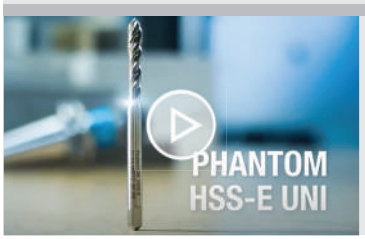

**NL** UNI HSS-E Machinetap Metrisch
**FR** Taraud machine HSS-E UNI Métrique
**ES** Macho máquina HSS-E UNI Métrica
**DE** UNI HSS-E Maschinengewindebohrer Metrisch
**EN** UNI HSS-E Machine Tap Metric Coarse

3xD | 60° | DIN 376 | HSS-E | ISO 2 6H | M | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.201.0200 | M2 | 0.4 | 45 | 4 | 1.4 | | 30,30 |
| 22.201.0250 | M2,5 | 0.45 | 50 | 5 | 1.8 | | 25,45 |
| 22.201.0300 | M3 | 0.5 | 56 | 11 | 2.2 | | 24,43 |
| 22.201.0400 | M4 | 0.7 | 63 | 13 | 2.8 | 2.1 | 24,72 |
| 22.201.0500 | M5 | 0.8 | 70 | 16 | 3.5 | 2.7 | 24,72 |
| 22.201.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 24,72 |
| 22.201.0700 | M7 | 1 | 80 | 19 | 5.5 | 4.3 | 26,10 |
| 22.201.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 28,80 |
| 22.201.0900 | M9 | 1.25 | 90 | 22 | 7 | 5.5 | 41,45 |
| 22.201.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 33,60 |
| 22.201.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 39,15 |
| 22.201.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 49,85 |
| 22.201.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 57,90 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.201.1800 | M18 | 2.5 | 125 | 34 | 14 | 11 | 77,35 |
| 22.201.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 85,75 |
| 22.201.2200 | M22 | 2.5 | 140 | 34 | 18 | 14.5 | 107,25 |
| 22.201.2400 | M24 | 3 | 160 | 38 | 18 | 14.5 | 114,70 |
| 22.201.2700 | M27 | 3 | 160 | 38 | 20 | 16 | 162,10 |
| 22.201.3000 | M30 | 3.5 | 180 | 45 | 22 | 18 | 198,15 |
| 22.201.3300 | M33 | 3.5 | 180 | 50 | 25 | 20 | 237,90 |
| 22.201.3600 | M36 | 4 | 200 | 56 | 28 | 22 | 306,00 |
| 22.201.3900 | M39 | 4 | 200 | 60 | 32 | 24 | 448,00 |
| 22.201.4200 | M42 | 4.5 | 200 | 60 | 32 | 24 | 469,00 |
| 22.201.4500 | M45 | 4.5 | 220 | 65 | 36 | 29 | 542,00 |
| 22.201.4800 | M48 | 5 | 250 | 70 | 36 | 29 | 637,00 |
| 22.201.5200 | M52 | 5 | 250 | 70 | 40 | 32 | 822,00 |




**NL** Test Phantom HSS-E UNI Machinetappen
**FR** Test de tarauds machine UNI HSS-E
**ES** Test Phantom HSS-E UNI Machos de roscado de máquina
**DE** Test Phantom HSS-E UNI Maschinengewindebohrer
**EN** Test Phantom HSS-E UNI Machine Taps

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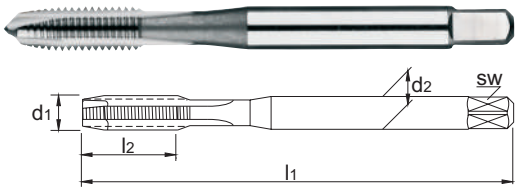
## › 22.210 Phantom




NL **UNI HSS-E Machinetap Metrisch, Overmaats**
FR **Taraud machine HSS-E UNI Métrique, surcoté**
ES **Macho máquina HSS-E UNI Métrica, sobremedida**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, Übermaß**
EN **UNI HSS-E Machine Tap Metric Coarse, Oversized**

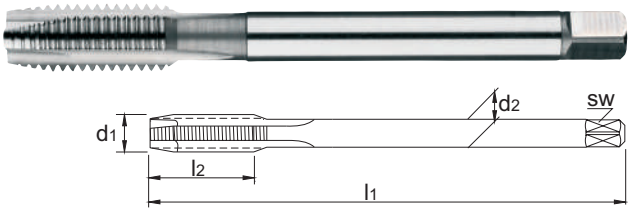
3xD | 60° | DIN 371 | HSS-E | ISO 2 6H | M | UNI | +0,1 +0,2 | FormB 3,5-5

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.210.0510 | M5+0,1 | 0.8 | 70 | 16 | 6 | 4.9 | 23,16 |
| 22.210.0610 | M6+0,1 | 1 | 80 | 19 | 6 | 4.9 | 23,16 |
| 22.210.0620 | M6+0,2 | 1 | 80 | 19 | 6 | 4.9 | 23,16 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.210.0820 | M8+0,2 | 1.25 | 90 | 22 | 8 | 6.2 | 30,95 |
| 22.210.1020 | M10+0,2 | 1.5 | 100 | 24 | 10 | 8 | 36,65 |

## › 22.211 Phantom




NL **UNI HSS-E Machinetap Metrisch, Overmaats**
FR **Taraud machine HSS-E UNI Métrique, surcoté**
ES **Macho máquina HSS-E UNI Métrica, sobremedida**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, Übermaß**
EN **UNI HSS-E Machine Tap Metric Coarse, Oversized**

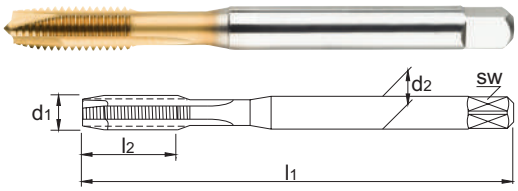
3xD | 60° | DIN 376 | HSS-E | ISO 2 6H | M | UNI | +0,1 +0,2 | FormB 3,5-5

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.211.1220 | M12+0,2 | 1.75 | 110 | 28 | 9 | 7 | 49,35 |
| 22.211.1420 | M14+0,2 | 2 | 110 | 30 | 11 | 9 | 59,10 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.211.1610 | M16+0,1 | 2 | 110 | 32 | 12 | 9 | 73,25 |
| 22.211.1620 | M16+0,2 | 2 | 110 | 32 | 12 | 9 | 73,25 |

## › 22.230 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiN**
FR **Taraud machine HSS-E UNI Métrique, TiN**
ES **Macho máquina HSS-E UNI Métrica, TiN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiN**

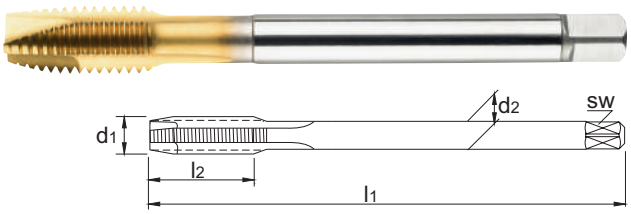
3xD | 60° | DIN 371 | HSS-E | ISO 2 6H | M | TiN | UNI | FormB 3,5-5

| P 11 | P 12 | P 13 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.230.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 31,30 |
| 22.230.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 29,55 |
| 22.230.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 25,40 |
| 22.230.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 26,35 |
| 22.230.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 26,80 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.230.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 27,50 |
| 22.230.0700 | M7 | 1 | 80 | 19 | 7 | 5.5 | 33,65 |
| 22.230.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 32,30 |
| 22.230.0900 | M9 | 1.25 | 90 | 22 | 9 | 7 | 38,05 |
| 22.230.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 38,05 |

## › 22.231 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiN**
FR **Taraud machine HSS-E UNI Métrique, TiN**
ES **Macho máquina HSS-E UNI Métrica, TiN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiN**

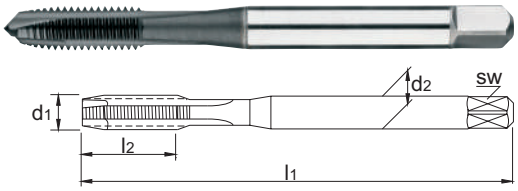
3xD | 60° | DIN 376 | HSS-E | ISO 2 6H | M | TiN | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.231.0300 | M3 | 0.5 | 56 | 11 | 2.2 | | 29,60 |
| 22.231.0400 | M4 | 0.7 | 63 | 13 | 2.8 | 2.1 | 30,00 |
| 22.231.0500 | M5 | 0.8 | 70 | 16 | 3.5 | 2.7 | 30,30 |
| 22.231.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 30,95 |
| 22.231.0700 | M7 | 1 | 80 | 19 | 5.5 | 4.3 | 33,10 |
| 22.231.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 35,90 |
| 22.231.0900 | M9 | 1.25 | 90 | 22 | 7 | 5.5 | 51,55 |
| 22.231.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 41,55 |
| 22.231.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 50,70 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.231.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 64,80 |
| 22.231.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 71,85 |
| 22.231.1800 | M18 | 2.5 | 125 | 34 | 14 | 11 | 97,95 |
| 22.231.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 109,85 |
| 22.231.2200 | M22 | 2.5 | 140 | 34 | 18 | 14.5 | 135,25 |
| 22.231.2400 | M24 | 3 | 160 | 38 | 18 | 14.5 | 146,50 |
| 22.231.2700 | M27 | 3 | 160 | 38 | 20 | 16 | 196,25 |
| 22.231.3000 | M30 | 3.5 | 180 | 45 | 22 | 18 | 242,35 |

## › 22.240 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiCN**
FR **Taraud machine HSS-E UNI Métrique, TiCN**
ES **Macho máquina HSS-E UNI Métrica, TiCN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiCN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiCN**

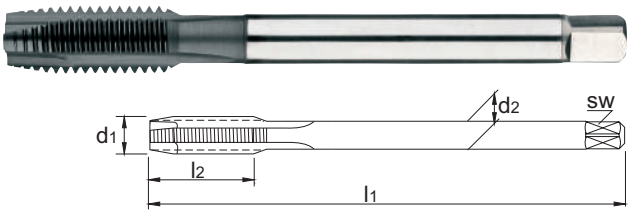
3xD | 60° | DIN 371 | HSS-E | ISO 2 6H | M | TiCN | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.240.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 38,50 |
| 22.240.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 36,35 |
| 22.240.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 31,60 |
| 22.240.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 31,60 |
| 22.240.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 31,60 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.240.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 31,60 |
| 22.240.0700 | M7 | 1 | 80 | 19 | 7 | 5.5 | 37,65 |
| 22.240.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 41,45 |
| 22.240.0900 | M9 | 1.25 | 90 | 22 | 9 | 7 | 48,10 |
| 22.240.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 49,10 |

## › 22.241 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiCN**
FR **Taraud machine HSS-E UNI Métrique, TiCN**
ES **Macho máquina HSS-E UNI Métrica, TiCN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiCN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiCN**

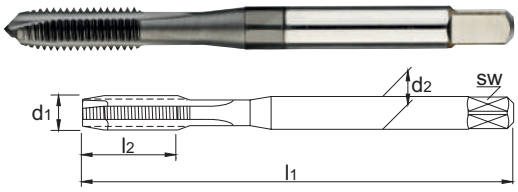
3xD | 60° | DIN 376 | HSS-E | ISO 2 6H | M | TiCN | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.241.0300 | M3 | 0.5 | 56 | 11 | 2.2 | | 35,75 |
| 22.241.0400 | M4 | 0.7 | 63 | 13 | 2.8 | 2.1 | 36,10 |
| 22.241.0500 | M5 | 0.8 | 70 | 16 | 3.5 | 2.7 | 36,35 |
| 22.241.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 36,70 |
| 22.241.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 42,80 |
| 22.241.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 51,55 |
| 22.241.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 60,35 |
| 22.241.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 76,05 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.241.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 85,35 |
| 22.241.1800 | M18 | 2.5 | 125 | 34 | 14 | 11 | 115,35 |
| 22.241.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 141,20 |
| 22.241.2200 | M22 | 2.5 | 140 | 34 | 18 | 14.5 | 162,75 |
| 22.241.2400 | M24 | 3 | 160 | 38 | 18 | 14.5 | 173,05 |
| 22.241.2700 | M27 | 3 | 160 | 38 | 20 | 16 | 216,75 |
| 22.241.3000 | M30 | 3.5 | 180 | 45 | 22 | 18 | 267,00 |

## › 22.268 Phantom




NL **HP2 UNI HSS-E PM Machinetap Metrisch, HARDLUBE**
FR **Taraud machine HSS-E PM HP2 UNI Métrique, HARDLUBE**
ES **Macho máquina HSS-E PM HP2 UNI Métrica, HARDLUBE**
DE **HP2 UNI HSS-E PM Maschinengewindebohrer Metrisch, HARDLUBE**
EN **HP2 UNI HSS-E PM Machine Tap Metric Coarse, HARDLUBE**

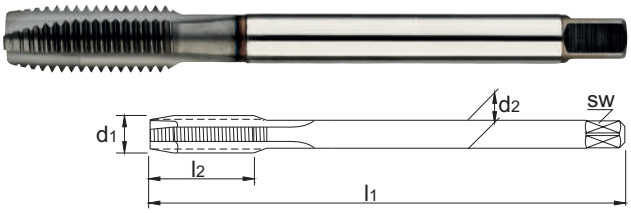
| 3xD | 60° | DIN 371 | | HARD LUBE | ISO 2 6H | M | HSS-E PM | HP2 UNI | FormB 3,5-5 |
|---|---|---|---|---|---|---|---|---|---|

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 15-20 | 8-15 | 8-15 | 8-15 | 8-15 | 20-25 | 20-25 | 20-25 | 20-25 | 5-12 | 5-12 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.268.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 34,40 |
| 22.268.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 35,10 |
| 22.268.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 36,45 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.268.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 43,20 |
| 22.268.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 48,65 |
| 22.268.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 68,85 |

## › 22.269 Phantom



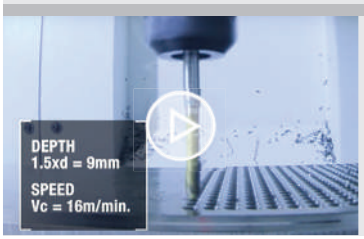

NL **HP2 UNI HSS-E PM Machinetap Metrisch, HARDLUBE**
FR **Taraud machine HSS-E PM HP2 UNI Métrique, HARDLUBE**
ES **Macho máquina HSS-E PM HP2 UNI Métrica, HARDLUBE**
DE **HP2 UNI HSS-E PM Maschinengewindebohrer Metrisch, HARDLUBE**
EN **HP2 UNI HSS-E PM Machine Tap Metric Coarse, HARDLUBE**

| 3xD | 60° | DIN 376 | | HARD LUBE | ISO 2 6H | M | HSS-E PM | HP2 UNI | FormB 3,5-5 |
|---|---|---|---|---|---|---|---|---|---|

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 15-20 | 8-15 | 8-15 | 8-15 | 8-15 | 20-25 | 20-25 | 20-25 | 20-25 | 5-12 | 5-12 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.269.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 78,30 |
| 22.269.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 113,45 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.269.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 100,55 |
| 22.269.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 164,95 |




NL Hardlube gecoate HP2 Machinetappen in actie
FR Les tarauds machine HP2 revêtus de HARDLUBE en action
ES Los machos de roscar a máquina con recubrimiento Hardlube HP2 en acción
DE Hardlube-beschichtete HP2-Maschinengewindebohrer
EN Hardlube-coated HP2 Machine Taps in Action

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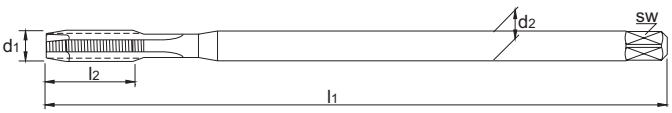
## › 22.350 Phantom



NL **UNI HSS-E Machinetap Metrisch, lang**
FR **Taraud machine HSS-E UNI Métrique, version longue**
ES **Macho máquina HSS-E UNI Métrica, larga**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, lang**
EN **UNI HSS-E Machine Tap Metric Coarse, long**




| 3xD | 60° | | HSS-E | ISO 2 6H | M | NORM | UNI | FormB 3,5-5 |
|---|---|---|---|---|---|---|---|---|

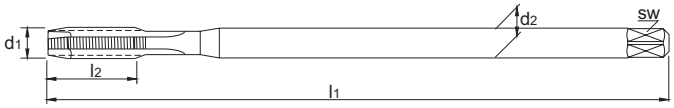
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.350.0300 | M3 | 0.5 | 100 | 11 | 3.5 | 2.7 | 50,65 |
| 22.350.0400 | M4 | 0.7 | 126 | 13 | 4.5 | 3.4 | 50,65 |
| 22.350.0500 | M5 | 0.8 | 140 | 15 | 6 | 4.9 | 54,80 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.350.0600 | M6 | 1 | 160 | 17 | 6 | 4.9 | 56,55 |
| 22.350.0800 | M8 | 1.25 | 180 | 20 | 8 | 6.2 | 64,05 |

## › 22.351 Phantom






NL **UNI HSS-E Machinetap Metrisch, lang**
FR **Taraud machine HSS-E UNI Métrique, version longue**
ES **Macho máquina HSS-E UNI Métrica, larga**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, lang**
EN **UNI HSS-E Machine Tap Metric Coarse, long**

3xD | 60° | HSS-E | ISO 2 6H | M | NORM | UNI | FormB 3,5-5

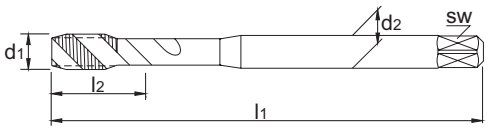
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 8-15 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.351.0800 | M8 | 1.25 | 180 | 20 | 6 | 4.9 | 62,00 |
| 22.351.1000 | M10 | 1.5 | 200 | 22 | 7 | 5.5 | 75,30 |
| 22.351.1200 | M12 | 1.75 | 220 | 24 | 9 | 7 | 86,85 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 22.351.1600 | M16 | 2 | 220 | 32 | 12 | 9 | 128,05 |
| 22.351.2000 | M20 | 2.5 | 280 | 32 | 16 | 12 | 180,30 |
| 22.351.2400 | M24 | 3 | 320 | 34 | 18 | 14.5 | 238,50 |

## › 23.300 Phantom






NL **UNI HSS-E Machinetap Metrisch**
FR **Taraud machine HSS-E UNI Métrique**
ES **Macho máquina HSS-E UNI Métrica**
DE **UNI HSS-E Maschinengewindebohrer Metrisch**
EN **UNI HSS-E Machine Tap Metric Coarse**

60° | 40° | DIN 371 | HSS-E | ISO 2 6H | M | UNI | 2,5xD | FormC 2-3

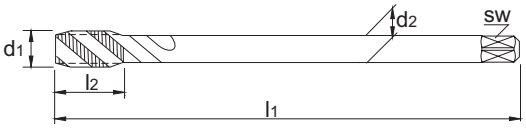
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.300.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 27,65 |
| 23.300.0220 | M2,2 | 0.45 | 45 | 9 | 2.8 | 2.1 | 35,00 |
| 23.300.0230 | M2,3 | 0.4 | 45 | 9 | 2.8 | 2.1 | 35,95 |
| 23.300.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 26,35 |
| 23.300.0260 | M2,6 | 0.45 | 50 | 9 | 2.8 | 2.1 | 31,05 |
| 23.300.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 22,28 |
| 23.300.0350 | M3,5 | 0.6 | 56 | 12 | 4 | 3 | 25,35 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.300.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 22,28 |
| 23.300.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 22,74 |
| 23.300.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 23,60 |
| 23.300.0700 | M7 | 1 | 80 | 19 | 7 | 5.5 | 29,85 |
| 23.300.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 28,10 |
| 23.300.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 34,50 |

## › 23.301 Phantom






NL **UNI HSS-E Machinetap Metrisch**
FR **Taraud machine HSS-E UNI Métrique**
ES **Macho máquina HSS-E UNI Métrica**
DE **UNI HSS-E Maschinengewindebohrer Metrisch**
EN **UNI HSS-E Machine Tap Metric Coarse**

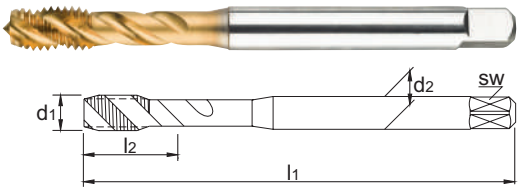
60° | 40° | DIN 376 | HSS-E | ISO 2 6H | M | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.301.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 25,70 |
| 23.301.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 29,40 |
| 23.301.0900 | M9 | 1.25 | 90 | 22 | 7 | 5.5 | 51,80 |
| 23.301.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 35,90 |
| 23.301.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 44,50 |
| 23.301.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 56,65 |
| 23.301.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 65,90 |
| 23.301.1800 | M18 | 2.5 | 125 | 34 | 14 | 11 | 87,95 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.301.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 98,05 |
| 23.301.2200 | M22 | 2.5 | 140 | 34 | 18 | 14.5 | 112,20 |
| 23.301.2400 | M24 | 3 | 160 | 38 | 18 | 14.5 | 127,50 |
| 23.301.2700 | M27 | 3 | 160 | 38 | 20 | 16 | 170,60 |
| 23.301.3000 | M30 | 3.5 | 180 | 45 | 22 | 18 | 217,30 |
| 23.301.3300 | M33 | 3.5 | 180 | 50 | 25 | 20 | 273,00 |
| 23.301.3600 | M36 | 4 | 200 | 56 | 28 | 22 | 368,00 |

## › 23.320 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiN**
FR **Taraud machine HSS-E UNI Métrique, TiN**
ES **Macho máquina HSS-E UNI Métrica, TiN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiN**

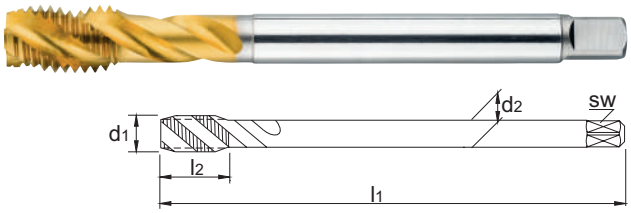
60° | 40° | DIN 371 | HSS-E | ISO 2 6H | M | TiN | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.320.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 31,35 |
| 23.320.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 30,20 |
| 23.320.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 26,80 |
| 23.320.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 27,10 |
| 23.320.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 28,50 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.320.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 28,55 |
| 23.320.0700 | M7 | 1 | 80 | 19 | 7 | 5.5 | 36,35 |
| 23.320.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 35,00 |
| 23.320.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 41,85 |

## › 23.321 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiN**
FR **Taraud machine HSS-E UNI Métrique, TiN**
ES **Macho máquina HSS-E UNI Métrica, TiN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiN**

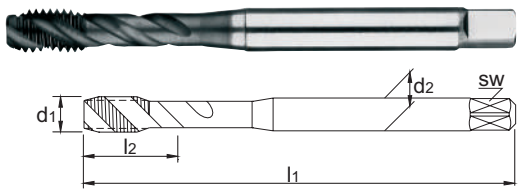
60° | 40° | DIN 376 | HSS-E | ISO 2 6H | M | TiN | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.321.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 30,40 |
| 23.321.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 37,10 |
| 23.321.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 45,30 |
| 23.321.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 54,90 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.321.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 71,45 |
| 23.321.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 78,95 |
| 23.321.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 124,30 |
| 23.321.2400 | M24 | 3 | 160 | 38 | 18 | 14.5 | 159,20 |

## › 23.324 Phantom




NL **UNI HSS-E Machinetap Metrisch, TiCN**
FR **Taraud machine HSS-E UNI Métrique, TiCN**
ES **Macho máquina HSS-E UNI Métrica, TiCN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiCN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiCN**

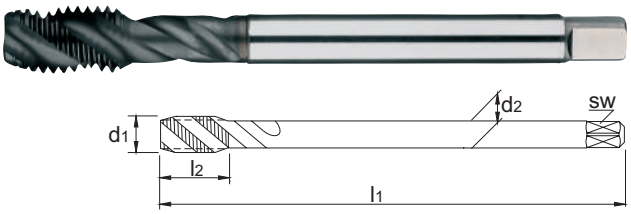
60° | 40° | DIN 371 | HSS-E | ISO 2 6H | M | TiCN | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.324.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 32,10 |
| 23.324.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 32,10 |
| 23.324.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 32,10 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.324.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 32,10 |
| 23.324.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 41,80 |
| 23.324.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 49,85 |

## › 23.325 Phantom






NL **UNI HSS-E Machinetap Metrisch, TiCN**
FR **Taraud machine HSS-E UNI Métrique, TiCN**
ES **Macho máquina HSS-E UNI Métrica, TiCN**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, TiCN**
EN **UNI HSS-E Machine Tap Metric Coarse, TiCN**

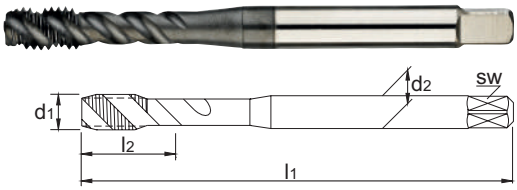
60° | 40° | DIN 376 | HSS-E | ISO 2 6H | M | TiCN | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.325.0600 | M6 | 1 | 80 | 19 | 4.5 | 3.4 | 35,80 |
| 23.325.0800 | M8 | 1.25 | 90 | 22 | 6 | 4.9 | 41,65 |
| 23.325.1000 | M10 | 1.5 | 100 | 24 | 7 | 5.5 | 50,55 |
| 23.325.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 61,75 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.325.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 76,05 |
| 23.325.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 90,45 |
| 23.325.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 149,40 |

## › 23.368 Phantom






NL **HP2 UNI HSS-E PM Machinetap Metrisch, HARDLUBE**
FR **Taraud machine HSS-E PM HP2 UNI Métrique, HARDLUBE**
ES **Macho máquina HSS-E PM HP2 UNI Métrica, HARDLUBE**
DE **HP2 UNI HSS-E PM Maschinengewindebohrer Metrisch, HARDLUBE**
EN **HP2 UNI HSS-E PM Machine Tap Metric Coarse, HARDLUBE**

60° | 50° | DIN 371 | HARD LUBE | 6HX | M | HSS-E PM | HP2 UNI | 2,5xD | FormC 2-3

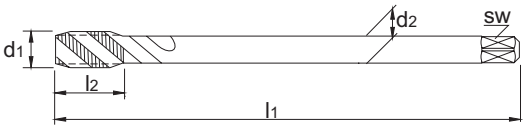
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 15-20 | 8-15 | 8-15 | 8-15 | 8-15 | 20-25 | 20-25 | 20-25 | 20-25 | 5-12 | 5-12 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.368.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 38,60 |
| 23.368.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 39,20 |
| 23.368.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 41,25 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.368.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 48,20 |
| 23.368.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 54,65 |
| 23.368.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 66,30 |

## › 23.369 Phantom






NL **HP2 UNI HSS-E PM Machinetap Metrisch, HARDLUBE**
FR **Taraud machine HSS-E PM HP2 UNI Métrique, HARDLUBE**
ES **Macho máquina HSS-E PM HP2 UNI Métrica, HARDLUBE**
DE **HP2 UNI HSS-E PM Maschinengewindebohrer Metrisch, HARDLUBE**
EN **HP2 UNI HSS-E PM Machine Tap Metric Coarse, HARDLUBE**

60° | 50° | DIN 376 | HARD LUBE | 6HX | M | HSS-E PM | HP2 UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 15-20 | 8-15 | 8-15 | 8-15 | 8-15 | 20-25 | 20-25 | 20-25 | 20-25 | 5-12 | 5-12 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.369.1200 | M12 | 1.75 | 110 | 28 | 9 | 7 | 80,60 |
| 23.369.1400 | M14 | 2 | 110 | 30 | 11 | 9 | 118,50 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.369.1600 | M16 | 2 | 110 | 32 | 12 | 9 | 115,80 |
| 23.369.2000 | M20 | 2.5 | 140 | 34 | 16 | 12 | 149,80 |




NL Hardlube gecoate HP2 Machinetappen in actie
FR Les tarauds machine HP2 revêtus de HARDLUBE en action
ES Los machos de roscar a máquina con recubrimiento Hardlube HP2 en acción
DE Hardlube-beschichtete HP2-Maschinengewindebohrer
EN Hardlube-coated HP2 Machine Taps in Action

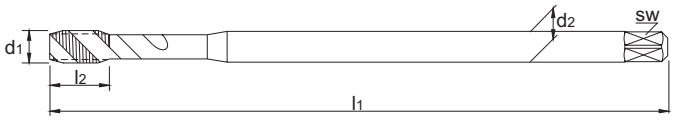
Watch me

www.phantom.eu

## › 23.370 Phantom



NL **UNI HSS-E Machinetap Metrisch, lang**
FR **Taraud machine HSS-E UNI Métrique, version longue**
ES **Macho máquina HSS-E UNI Métrica, larga**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, lang**
EN **UNI HSS-E Machine Tap Metric Coarse, long**




60° | 40° | HSS-E | ISO 2 6H | M | NORM | UNI | 2,5xD | FormC 2-3

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

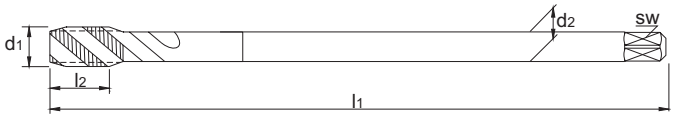
| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.370.0400 | M4 | 0.7 | 126 | 7 | 4.5 | 3.4 | 49,75 |
| 23.370.0500 | M5 | 0.8 | 140 | 8 | 6 | 4.9 | 56,60 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.370.0600 | M6 | 1 | 160 | 10 | 6 | 4.9 | 59,05 |
| 23.370.0800 | M8 | 1.25 | 180 | 12.5 | 8 | 6.2 | 67,65 |

## › 23.371 Phantom



NL **UNI HSS-E Machinetap Metrisch, lang**
FR **Taraud machine HSS-E UNI Métrique, version longue**
ES **Macho máquina HSS-E UNI Métrica, larga**
DE **UNI HSS-E Maschinengewindebohrer Metrisch, lang**
EN **UNI HSS-E Machine Tap Metric Coarse, long**




60° | 40° | HSS-E | ISO 2 6H | M | NORM | UNI | 2,5xD | FormC 2-3

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

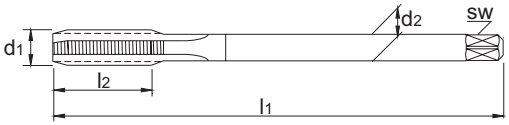
| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.371.0800 | M8 | 1.25 | 180 | 12 | 6 | 4.9 | 67,65 |
| 23.371.1000 | M10 | 1.5 | 200 | 15 | 7 | 5.5 | 78,00 |
| 23.371.1200 | M12 | 1.75 | 220 | 17.5 | 9 | 7 | 95,50 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.371.1600 | M16 | 2 | 220 | 20 | 12 | 9 | 136,60 |
| 23.371.2000 | M20 | 2.5 | 280 | 25 | 16 | 12 | 190,95 |

## › 23.620 Phantom



NL **UNI HSS-E Machinetap Metrisch Fijn**
FR **Taraud machine HSS-E UNI Métrique Fin**
ES **Macho máquina HSS-E UNI Métrica Fina**
DE **UNI HSS-E Maschinengewindebohrer Metrisch Fein**
EN **UNI HSS-E Machine Tap Metric Fine**




3xD | 60° | DIN 374 | HSS-E | ISO 2 6H | MF | UNI | FormB 3,5-5

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.620.0303 | MF3 | 0.35 | 56 | 8 | 2.2 | | 33,60 |
| 23.620.0405 | MF4 | 0.5 | 63 | 10 | 2.8 | 2.1 | 30,90 |
| 23.620.0505 | MF5 | 0.5 | 70 | 11 | 3.5 | 2.7 | 31,95 |
| 23.620.0605 | MF6 | 0.5 | 80 | 13 | 4.5 | 3.4 | 32,70 |
| 23.620.0607 | MF6 | 0.75 | 80 | 13 | 4.5 | 3.4 | 31,95 |
| 23.620.0705 | MF7 | 0.5 | 80 | 13 | 5.5 | 4.3 | 47,90 |
| 23.620.0707 | MF7 | 0.75 | 80 | 13 | 5.5 | 4.3 | 45,05 |
| 23.620.0805 | MF8 | 0.5 | 80 | 13 | 6 | 4.9 | 39,40 |
| 23.620.0807 | MF8 | 0.75 | 80 | 13 | 6 | 4.9 | 37,65 |
| 23.620.0810 | MF8 | 1 | 90 | 20 | 6 | 4.9 | 33,65 |
| 23.620.0907 | MF9 | 0.75 | 90 | 20 | 7 | 5.5 | 45,80 |
| 23.620.0910 | MF9 | 1 | 90 | 20 | 7 | 5.5 | 44,60 |
| 23.620.1005 | MF10 | 0.5 | 90 | 16 | 7 | 5.5 | 48,55 |
| 23.620.1007 | MF10 | 0.75 | 90 | 16 | 7 | 5.5 | 47,35 |
| 23.620.1010 | MF10 | 1 | 90 | 16 | 7 | 5.5 | 37,35 |
| 23.620.1012 | MF10 | 1.25 | 100 | 22 | 7 | 5.5 | 38,80 |
| 23.620.1110 | MF11 | 1 | 90 | 20 | 8 | 6.2 | 55,70 |
| 23.620.1112 | MF11 | 1.25 | 90 | 20 | 8 | 6.2 | 36,65 |
| 23.620.1205 | MF12 | 0.5 | 100 | 22 | 9 | 7 | 49,35 |
| 23.620.1207 | MF12 | 0.75 | 100 | 22 | 9 | 7 | 47,05 |
| 23.620.1210 | MF12 | 1 | 100 | 22 | 9 | 7 | 40,15 |
| 23.620.1212 | MF12 | 1.25 | 100 | 22 | 9 | 7 | 47,05 |
| 23.620.1215 | MF12 | 1.5 | 100 | 22 | 9 | 7 | 41,50 |

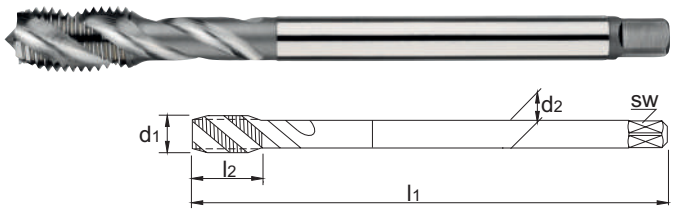
| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.620.1310 | MF13 | 1 | 100 | 22 | 11 | 9 | 76,40 |
| 23.620.1410 | MF14 | 1 | 100 | 22 | 11 | 9 | 57,55 |
| 23.620.1412 | MF14 | 1.25 | 100 | 22 | 11 | 9 | 55,05 |
| 23.620.1415 | MF14 | 1.5 | 100 | 22 | 11 | 9 | 55,05 |
| 23.620.1510 | MF15 | 1 | 100 | 22 | 12 | 9 | 70,30 |
| 23.620.1515 | MF15 | 1.5 | 100 | 22 | 12 | 9 | 72,20 |
| 23.620.1610 | MF16 | 1 | 100 | 22 | 12 | 9 | 62,15 |
| 23.620.1612 | MF16 | 1.25 | 100 | 22 | 12 | 9 | 58,55 |
| 23.620.1615 | MF16 | 1.5 | 100 | 22 | 12 | 9 | 58,55 |
| 23.620.1810 | MF18 | 1 | 110 | 25 | 14 | 11 | 84,15 |
| 23.620.1815 | MF18 | 1.5 | 110 | 25 | 14 | 11 | 76,35 |
| 23.620.1820 | MF18 | 2 | 125 | 30 | 14 | 11 | 90,65 |
| 23.620.2010 | MF20 | 1 | 125 | 25 | 16 | 12 | 89,30 |
| 23.620.2015 | MF20 | 1.5 | 125 | 25 | 16 | 12 | 82,90 |
| 23.620.2020 | MF20 | 2 | 140 | 32 | 16 | 12 | 108,70 |
| 23.620.2210 | MF22 | 1 | 125 | 25 | 18 | 14.5 | 123,75 |
| 23.620.2212 | MF22 | 1.25 | 125 | 25 | 18 | 14.5 | 109,85 |
| 23.620.2215 | MF22 | 1.5 | 125 | 25 | 18 | 14.5 | 94,95 |
| 23.620.2220 | MF22 | 2 | 140 | 32 | 18 | 14.5 | 124,25 |
| 23.620.2410 | MF24 | 1 | 140 | 28 | 18 | 14.5 | 131,95 |
| 23.620.2415 | MF24 | 1.5 | 140 | 28 | 18 | 14.5 | 110,80 |
| 23.620.2420 | MF24 | 2 | 140 | 28 | 18 | 14.5 | 141,20 |
| 23.620.2510 | MF25 | 1 | 140 | 28 | 18 | 14.5 | 208,15 |

## › 23.620 Phantom

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.620.2515 | MF25 | 1.5 | 140 | 28 | 18 | 14.5 | 189,15 |
| 23.620.2520 | MF25 | 2 | 140 | 28 | 18 | 14.5 | 194,40 |
| 23.620.2615 | MF26 | 1.5 | 140 | 28 | 18 | 14.5 | 154,55 |
| 23.620.2715 | MF27 | 1.5 | 140 | 28 | 20 | 16 | 157,65 |
| 23.620.2720 | MF27 | 2 | 140 | 28 | 20 | 16 | 173,45 |
| 23.620.2815 | MF28 | 1.5 | 140 | 28 | 20 | 16 | 160,55 |
| 23.620.3010 | MF30 | 1 | 150 | 28 | 22 | 18 | 192,05 |
| 23.620.3015 | MF30 | 1.5 | 150 | 28 | 22 | 18 | 178,90 |
| 23.620.3020 | MF30 | 2 | 150 | 28 | 22 | 18 | 184,40 |
| 23.620.3215 | MF32 | 1.5 | 150 | 28 | 22 | 18 | 215,80 |
| 23.620.3315 | MF33 | 1.5 | 160 | 30 | 25 | 20 | 292,00 |
| 23.620.3320 | MF33 | 2 | 160 | 30 | 25 | 20 | 292,00 |
| 23.620.3415 | MF34 | 1.5 | 170 | 30 | 28 | 22 | 298,00 |
| 23.620.3515 | MF35 | 1.5 | 170 | 30 | 28 | 22 | 298,00 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.620.3615 | MF36 | 1.5 | 170 | 30 | 28 | 22 | 286,00 |
| 23.620.3620 | MF36 | 2 | 170 | 30 | 28 | 22 | 302,00 |
| 23.620.3630 | MF36 | 3 | 200 | 50 | 28 | 22 | 321,00 |
| 23.620.3815 | MF38 | 1.5 | 170 | 30 | 28 | 22 | 337,00 |
| 23.620.4015 | MF40 | 1.5 | 170 | 30 | 32 | 24 | 323,00 |
| 23.620.4215 | MF42 | 1.5 | 170 | 30 | 32 | 24 | 405,00 |
| 23.620.4220 | MF42 | 2 | 170 | 30 | 32 | 24 | 433,00 |
| 23.620.4230 | MF42 | 3 | 200 | 45 | 32 | 24 | 454,00 |
| 23.620.4515 | MF45 | 1.5 | 180 | 32 | 36 | 29 | 464,00 |
| 23.620.4520 | MF45 | 2 | 180 | 32 | 36 | 29 | 479,00 |
| 23.620.4815 | MF48 | 1.5 | 190 | 32 | 36 | 29 | 563,00 |
| 23.620.5015 | MF50 | 1.5 | 190 | 32 | 36 | 29 | 675,00 |
| 23.620.5215 | MF52 | 1.5 | 190 | 32 | 40 | 32 | 697,00 |

## › 23.840 Phantom




**NL UNI HSS-E Machinetap Metrisch Fijn**
**FR Taraud machine HSS-E UNI Métrique Fin**
**ES Macho máquina HSS-E UNI Métrica Fina**
**DE UNI HSS-E Maschinengewindebohrer Metrisch Fein**
**EN UNI HSS-E Machine Tap Metric Fine**

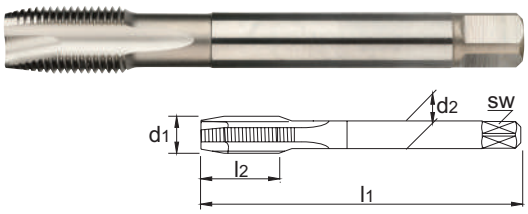
60° | 40° | DIN 374 | HSS-E | ISO 2 6H | MF | UNI | 2,5xD | FormC 2-3

| P 11 | P 12 | P 13 | M 21 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-20 | 10-20 | 6-10 | 7-10 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.840.0405 | MF4 | 0.5 | 63 | 10 | 2.8 | 2.1 | 31,00 |
| 23.840.0505 | MF5 | 0.5 | 70 | 11 | 3.5 | 2.7 | 31,70 |
| 23.840.0605 | MF6 | 0.5 | 80 | 13 | 4.5 | 3.4 | 31,70 |
| 23.840.0607 | MF6 | 0.75 | 80 | 13 | 4.5 | 3.4 | 32,30 |
| 23.840.0807 | MF8 | 0.75 | 80 | 14 | 6 | 4.9 | 38,40 |
| 23.840.0810 | MF8 | 1 | 90 | 17 | 6 | 4.9 | 37,55 |
| 23.840.0910 | MF9 | 1 | 90 | 18 | 7 | 5.5 | 45,35 |
| 23.840.1007 | MF10 | 0.75 | 90 | 18 | 7 | 5.5 | 45,50 |
| 23.840.1010 | MF10 | 1 | 90 | 18 | 7 | 5.5 | 40,35 |
| 23.840.1012 | MF10 | 1.25 | 100 | 22 | 7 | 5.5 | 40,35 |
| 23.840.1110 | MF11 | 1 | 90 | 18 | 8 | 6.2 | 50,70 |
| 23.840.1210 | MF12 | 1 | 100 | 18 | 9 | 7 | 53,55 |
| 23.840.1212 | MF12 | 1.25 | 100 | 22 | 9 | 7 | 53,80 |
| 23.840.1215 | MF12 | 1.5 | 100 | 22 | 9 | 7 | 46,40 |
| 23.840.1310 | MF13 | 1 | 100 | 22 | 11 | 9 | 55,60 |
| 23.840.1410 | MF14 | 1 | 100 | 22 | 11 | 9 | 66,85 |
| 23.840.1412 | MF14 | 1.25 | 100 | 22 | 11 | 9 | 66,85 |
| 23.840.1415 | MF14 | 1.5 | 100 | 22 | 11 | 9 | 60,75 |
| 23.840.1510 | MF15 | 1 | 100 | 22 | 12 | 9 | 73,95 |
| 23.840.1515 | MF15 | 1.5 | 100 | 22 | 12 | 9 | 73,95 |
| 23.840.1610 | MF16 | 1 | 100 | 18 | 12 | 9 | 73,95 |
| 23.840.1615 | MF16 | 1.5 | 100 | 22 | 12 | 9 | 73,75 |
| 23.840.1810 | MF18 | 1 | 110 | 20 | 14 | 11 | 97,20 |
| 23.840.1815 | MF18 | 1.5 | 110 | 25 | 14 | 11 | 94,95 |
| 23.840.1820 | MF18 | 2 | 125 | 27 | 14 | 11 | 91,25 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 23.840.2010 | MF20 | 1 | 125 | 20 | 16 | 12 | 104,20 |
| 23.840.2015 | MF20 | 1.5 | 125 | 25 | 16 | 12 | 102,20 |
| 23.840.2020 | MF20 | 2 | 140 | 27 | 16 | 12 | 104,20 |
| 23.840.2210 | MF22 | 1 | 125 | 20 | 18 | 14.5 | 130,55 |
| 23.840.2215 | MF22 | 1.5 | 125 | 25 | 18 | 14.5 | 115,40 |
| 23.840.2220 | MF22 | 2 | 140 | 27 | 18 | 14.5 | 118,30 |
| 23.840.2410 | MF24 | 1 | 140 | 20 | 18 | 14.5 | 138,00 |
| 23.840.2415 | MF24 | 1.5 | 140 | 27 | 18 | 14.5 | 136,55 |
| 23.840.2420 | MF24 | 2 | 140 | 27 | 18 | 14.5 | 138,00 |
| 23.840.2515 | MF25 | 1.5 | 140 | 28 | 18 | 14.5 | 219,80 |
| 23.840.2615 | MF26 | 1.5 | 140 | 28 | 18 | 14.5 | 175,65 |
| 23.840.2715 | MF27 | 1.5 | 140 | 28 | 20 | 16 | 196,00 |
| 23.840.2720 | MF27 | 2 | 140 | 28 | 20 | 16 | 197,55 |
| 23.840.2815 | MF28 | 1.5 | 140 | 28 | 20 | 16 | 199,05 |
| 23.840.3010 | MF30 | 1 | 150 | 28 | 22 | 18 | 232,40 |
| 23.840.3015 | MF30 | 1.5 | 150 | 30 | 22 | 18 | 223,95 |
| 23.840.3020 | MF30 | 2 | 150 | 30 | 22 | 18 | 231,75 |
| 23.840.3215 | MF32 | 1.5 | 150 | 30 | 22 | 18 | 259,00 |
| 23.840.3315 | MF33 | 1.5 | 160 | 30 | 25 | 20 | 305,00 |
| 23.840.3320 | MF33 | 2 | 160 | 33 | 25 | 20 | 307,00 |
| 23.840.3515 | MF35 | 1.5 | 170 | 32 | 28 | 22 | 356,00 |
| 23.840.3615 | MF36 | 1.5 | 170 | 33 | 28 | 22 | 320,00 |
| 23.840.3620 | MF36 | 2 | 170 | 33 | 28 | 22 | 330,00 |
| 23.840.3630 | MF36 | 3 | 200 | 45 | 28 | 22 | 340,00 |
| 23.840.4015 | MF40 | 1.5 | 170 | 33 | 32 | 24 | 382,00 |

## › 25.097 Phantom




NL **UNI HSS-E Machinetap G (BSP)**
FR **Taraud machine HSS-E UNI G (BSP)**
ES **Macho máquina HSS-E UNI G (BSP)**
DE **UNI HSS-E Maschinengewindebohrer G (BSP)**
EN **UNI HSS-E Machine Tap G (BSP)**

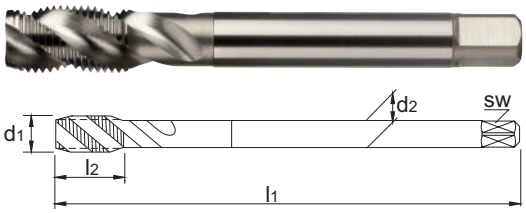
3xD | 55° | BSP G | DIN 5156 | HSS-E | UNI | FormB 3,5-5

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | TPI | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 25.097.0973 | G 1/8 | 28 | 90 | 20 | 7 | 5.5 | 36,10 |
| 25.097.1316 | G 1/4 | 19 | 100 | 22 | 11 | 9 | 48,80 |
| 25.097.1666 | G 3/8 | 19 | 100 | 22 | 12 | 9 | 57,60 |
| 25.097.2096 | G 1/2 | 14 | 125 | 25 | 16 | 12 | 82,80 |
| 25.097.2291 | G 5/8 | 14 | 125 | 25 | 18 | 14.5 | 113,55 |
| 25.097.2644 | G 3/4 | 14 | 140 | 28 | 20 | 16 | 146,85 |

| Ref. | d1 | TPI | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 25.097.3020 | G 7/8 | 14 | 150 | 28 | 22 | 18 | 179,25 |
| 25.097.3325 | G 1 | 11 | 160 | 30 | 25 | 20 | 211,00 |
| 25.097.3790 | G 1.1/8 | 11 | 170 | 30 | 28 | 22 | 288,00 |
| 25.097.4191 | G 1.1/4 | 11 | 170 | 30 | 32 | 24 | 330,00 |
| 25.097.4780 | G 1.1/2 | 11 | 190 | 32 | 36 | 29 | 470,00 |

## › 25.297 Phantom




NL **UNI HSS-E Machinetap G (BSP)**
FR **Taraud machine HSS-E UNI G (BSP)**
ES **Macho máquina HSS-E UNI G (BSP)**
DE **UNI HSS-E Maschinengewindebohrer G (BSP)**
EN **UNI HSS-E Machine Tap G (BSP)**

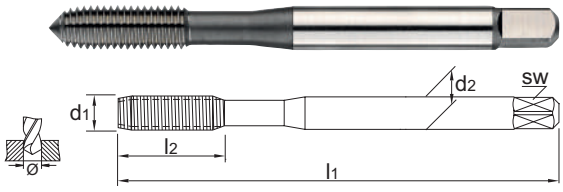
55° | 7 40° | BSP G | DIN 5156 | HSS-E | UNI | 2,5xD | FormC 2-3

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-20 | 10-20 | 6-10 | 7-10 | 4-8 | 10-15 | 10-15 | 25-35 | 10-20 | 15-35 | 2-8 | 2-8 |

| Ref. | d1 | TPI | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 25.297.0973 | G 1/8 | 28 | 90 | 20 | 7 | 5.5 | 52,05 |
| 25.297.1316 | G 1/4 | 19 | 100 | 22 | 11 | 9 | 71,75 |
| 25.297.1666 | G 3/8 | 19 | 100 | 22 | 12 | 9 | 87,95 |
| 25.297.2096 | G 1/2 | 14 | 125 | 25 | 16 | 12 | 116,15 |
| 25.297.2291 | G 5/8 | 14 | 125 | 25 | 18 | 14.5 | 144,55 |
| 25.297.2644 | G 3/4 | 14 | 140 | 28 | 20 | 16 | 196,80 |

| Ref. | d1 | TPI | l1 | l2 | d2 | sw | € |
|---|---|---|---|---|---|---|---|
| 25.297.3020 | G 7/8 | 14 | 150 | 28 | 22 | 18 | 247,70 |
| 25.297.3325 | G 1 | 11 | 160 | 30 | 25 | 20 | 295,00 |
| 25.297.3790 | G 1.1/8 | 11 | 170 | 30 | 28 | 22 | 391,00 |
| 25.297.4191 | G 1.1/4 | 11 | 170 | 30 | 32 | 24 | 470,00 |
| 25.297.4780 | G 1.1/2 | 11 | 190 | 32 | 36 | 29 | 690,00 |

## › 26.100 Phantom




NL **HSS-E Roltap Metrisch, genitreerd**
FR **Taraud à refouler HSS-E Métrique, nitruré**
ES **Macho de laminación HSS-E Métrica, nitrurado**
DE **HSS-E Gewindeformer Metrisch, nitriert**
EN **HSS-E Fluteless Tap Metric Coarse, nitrided**

3xD | 60° | DIN 371 | HSS-E | 6HX | M | NIT. | DIN 2174 | FormC 2-3

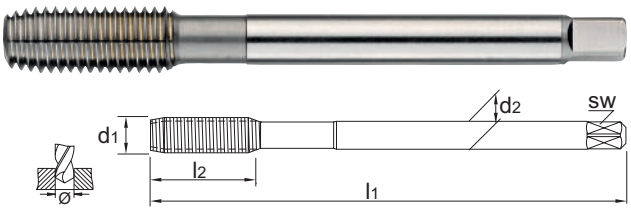
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | N 41 Alu | N 42 Alu Si>10% | N 51 Cu |
|---|---|---|---|---|
| 15-25 | 10-20 | 10-35 | 10-20 | 15-35 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.100.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 1.8 | 46,80 |
| 26.100.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 2.3 | 45,10 |
| 26.100.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 2.8 | 39,40 |
| 26.100.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 3.7 | 39,70 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.100.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 4.65 | 41,40 |
| 26.100.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 5.55 | 41,40 |
| 26.100.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 7.4 | 49,45 |
| 26.100.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 9.3 | 64,45 |

## › 26.101 Phantom

NL **HSS-E Roltap Metrisch, genitreerd**
FR **Taraud à refouler HSS-E Métrique, nitruré**
ES **Macho de laminación HSS-E Métrica, nitrurado**
DE **HSS-E Gewindeformer Metrisch, nitriert**
EN **HSS-E Fluteless Tap Metric Coarse, nitrided**




3xD | 60° | DIN 376 | HSS-E | 6HX | M | NIT. | DIN 2174 | FormC 2-3

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | N 41 Alu | N 42 Alu Si>10% | N 51 Cu

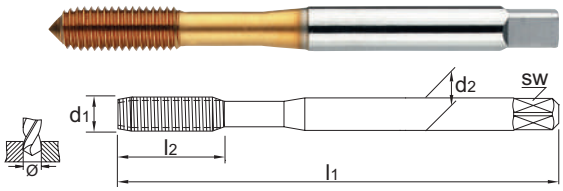
15-25 | 10-20 | 10-35 | 10-20 | 15-35

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.101.1200 | M12 | 1.75 | 110 | 29 | 9 | 7 | 11.2 | 80,65 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|

## › 26.110 Phantom

NL **HSS-E Roltap Metrisch, TiN**
FR **Taraud à refouler HSS-E Métrique, TiN**
ES **Macho de laminación HSS-E Métrica, TiN**
DE **HSS-E Gewindeformer Metrisch, TiN**
EN **HSS-E Fluteless Tap Metric Coarse, TiN**




3xD | 60° | DIN 371 | HSS-E | 6HX | M | TiN | DIN 2174 | FormC 2-3

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | M 21 INOX ≤850N/mm² | N 41 Alu | N 42 Alu Si>10% | N 51 Cu

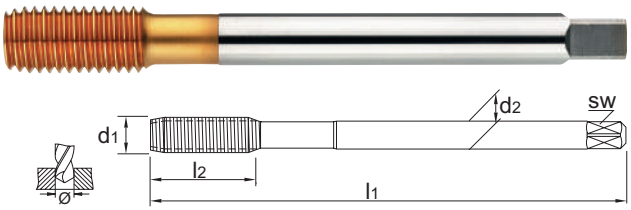
15-25 | 10-20 | 7-10 | 10-35 | 10-20 | 15-35

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.110.0200 | M2 | 0.4 | 45 | 8 | 2.8 | 2.1 | 1.8 | 55,50 |
| 26.110.0250 | M2,5 | 0.45 | 50 | 9 | 2.8 | 2.1 | 2.3 | 51,85 |
| 26.110.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 2.8 | 46,20 |
| 26.110.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 3.7 | 47,15 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.110.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 4.65 | 48,85 |
| 26.110.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 5.55 | 50,20 |
| 26.110.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 7.4 | 63,25 |
| 26.110.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 9.3 | 78,95 |

## › 26.111 Phantom

NL **HSS-E Roltap Metrisch, TiN**
FR **Taraud à refouler HSS-E Métrique, TiN**
ES **Macho de laminación HSS-E Métrica, TiN**
DE **HSS-E Gewindeformer Metrisch, TiN**
EN **HSS-E Fluteless Tap Metric Coarse, TiN**




3xD | 60° | DIN 376 | HSS-E | 6HX | M | TiN | DIN 2174 | FormC 2-3

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | M 21 INOX ≤850N/mm² | N 41 Alu | N 42 Alu Si>10% | N 51 Cu

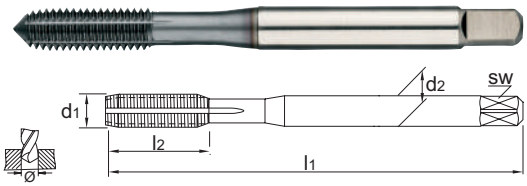
15-25 | 10-20 | 7-10 | 10-35 | 10-20 | 15-35

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.111.1200 | M12 | 1.75 | 110 | 29 | 9 | 7 | 11.2 | 96,40 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|

## › 26.160 Phantom

NL **HSS-E Roltap met smeergroef, Metrisch, TiCN**
FR **Taraud à refouler HSS-E rainures de lubrification, Métrique, TiCN**
ES **Macho de laminación HSS-E con ranura de refrigeración, Métrica, TiCN**
DE **HSS-E Gewindeformer mit Schmiernut, Metrisch, TiCN**
EN **HSS-E Fluteless Tap with lubrification grooves, Metric Coarse, TiCN**




3xD | 60° | DIN 371 | HSS-E | 6HX | M | TiCN | DIN 2174 | FormC 2-3

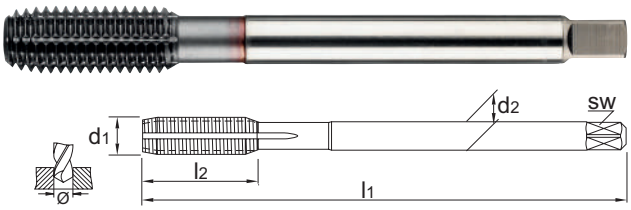
| P 11 | P 12 | M 21 | M 22 | N 41 | N 42 | N 51 |
|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | Alu | Alu Si>10% | Cu |
| 15-25 | 10-20 | 7-10 | 4-8 | 10-35 | 10-20 | 15-35 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.160.0300 | M3 | 0.5 | 56 | 11 | 3.5 | 2.7 | 2.8 | 54,10 |
| 26.160.0400 | M4 | 0.7 | 63 | 13 | 4.5 | 3.4 | 3.7 | 56,15 |
| 26.160.0500 | M5 | 0.8 | 70 | 16 | 6 | 4.9 | 4.65 | 56,60 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.160.0600 | M6 | 1 | 80 | 19 | 6 | 4.9 | 5.55 | 58,10 |
| 26.160.0800 | M8 | 1.25 | 90 | 22 | 8 | 6.2 | 7.4 | 72,90 |
| 26.160.1000 | M10 | 1.5 | 100 | 24 | 10 | 8 | 9.3 | 91,05 |

## › 26.161 Phantom

NL **HSS-E Roltap met smeergroef, Metrisch, TiCN**
FR **Taraud à refouler HSS-E rainures de lubrification, Métrique, TiCN**
ES **Macho de laminación HSS-E con ranura de refrigeración, Métrica, TiCN**
DE **HSS-E Gewindeformer mit Schmiernut, Metrisch, TiCN**
EN **HSS-E Fluteless Tap with lubrification grooves, Metric Coarse, TiCN**

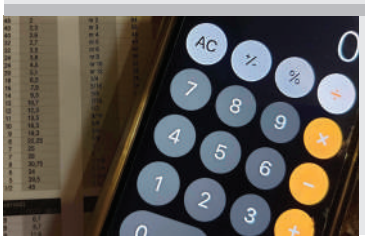



3xD | 60° | DIN 376 | HSS-E | 6HX | M | TiCN | DIN 2174 | FormC 2-3

| P 11 | P 12 | M 21 | M 22 | N 41 | N 42 | N 51 |
|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | Alu | Alu Si>10% | Cu |
| 15-25 | 10-20 | 7-10 | 4-8 | 10-35 | 10-20 | 15-35 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.161.1200 | M12 | 1.75 | 110 | 29 | 9 | 7 | 11.2 | 111,25 |
| 26.161.1400 | M14 | 2 | 110 | 26 | 11 | 9 | 13.1 | 126,70 |
| 26.161.1600 | M16 | 2 | 110 | 26 | 12 | 9 | 15.1 | 152,05 |

| Ref. | d1 | P | l1 | l2 | d2 | sw | Ø | € |
|---|---|---|---|---|---|---|---|---|
| 26.161.1800 | M18 | 2.5 | 125 | 30 | 14 | 11 | 16.9 | 196,30 |
| 26.161.2000 | M20 | 2.5 | 140 | 32 | 16 | 12 | 18.9 | 240,60 |



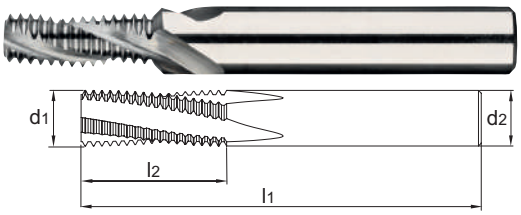
NL Roltappen voorboren?
FR Avant-trou pour tarauds à refouler ?
ES ¿Taladrado previo para machos laminadores?
DE Vorbohren für Gewindeformer?
EN Pre-drilling for roll taps?

Read me

www.phantom.eu

## › 26.310 Phantom

NL **Volhardmetaal Draadfrees 2xD**
FR **Fraise à fileter Carbure monobloc 2xD**
ES **Fresa de roscado Metal duro 2xD**
DE **Vollhartmetall Gewindefräser 2xD**
EN **Solid carbide Thread milling cutter 2xD**




60° | DIN 6535-HA | M | MG HM | 2xD | EG

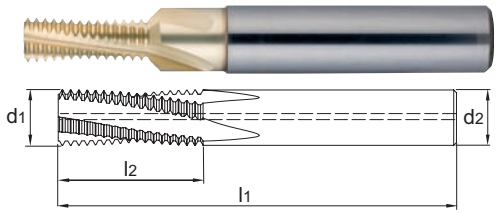
| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 52 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | CuAlFe | Ni/Co | Ti |
| 70-100 K | 70-90 K | 60-80 K | 50-70 K | 30-40 J | 40-50 J | 30-50 J | 90-130 N | 80-100 N | 200-240 K | 180-220 K | 120-140 J | 110-130 J | 25-35 I | 20-30 I |

| Ref. | M | P | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|---|
| 26.310.0600 | M6 | 1 | 4.8 | 54 | 13.5 | 6 | 3 | 184,90 |
| 26.310.0800 | M8 | 1.25 | 6.4 | 62 | 18.1 | 8 | 3 | 200,80 |
| 26.310.1000 | M10 | 1.5 | 7.95 | 74 | 21.8 | 10 | 3 | 236,55 |
| 26.310.1200 | M12 | 1.75 | 9.95 | 74 | 25.4 | 10 | 4 | 308,00 |

| Ref. | M | P | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|---|
| 26.310.1400 | M14 | 2 | 11.2 | 90 | 31 | 12 | 4 | 330,00 |
| 26.310.1600 | M16 | 2 | 12.8 | 90 | 35 | 14 | 4 | 417,00 |
| 26.310.2000 | M20 | 2.5 | 14.95 | 102 | 41.3 | 16 | 4 | 480,00 |

## › 26.316 Phantom

NL **Volhardmetaal Draadfrees 2xD met koelkanaal, ZrN-X**
FR **Fraise à fileter Carbure monobloc 2xD à trou d´huile, ZrN-X**
ES **Fresa de roscado Metal duro 2xD con canal de refrigeración, ZrN-X**
DE **Vollhartmetall Gewindefräser 2xD mit Innenkühlung, ZrN-X**
EN **Solid carbide Thread milling cutter 2xD with coolant holes, ZrN-X**




60° | DIN 6535-HA | M | MG HM | 2xD | EG | ZrN-X

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 52 CuAlFe | S 71 Ni/Co | S 72 Ti

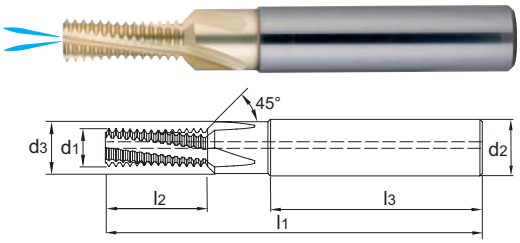
80-110 K | 80-100 K | 70-90 K | 60-80 K | 40-50 J | 50-60 J | 40-50 J | 100-140 N | 90-110 N | 220-260 K | 220-240 K | 130-150 J | 120-140 J | 35-45 I | 25-35 I

| Ref. | M | P | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|---|
| 26.316.0600 | M6 | 1 | 4.8 | 54 | 13.5 | 6 | 3 | 308,00 |
| 26.316.0800 | M8 | 1.25 | 6.4 | 62 | 18.1 | 8 | 3 | 340,00 |
| 26.316.1000 | M10 | 1.5 | 7.95 | 74 | 21.8 | 10 | 3 | 377,00 |
| 26.316.1200 | M12 | 1.75 | 9.95 | 74 | 25.4 | 10 | 4 | 459,00 |

| Ref. | M | P | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|---|
| 26.316.1400 | M14 | 2 | 11.2 | 90 | 31 | 12 | 4 | 522,00 |
| 26.316.1600 | M16 | 2 | 12.8 | 90 | 35 | 14 | 4 | 589,00 |
| 26.316.2000 | M20 | 2.5 | 14.95 | 102 | 41.3 | 16 | 4 | 674,00 |

## › 26.384 Phantom

NL **Volhardmetaal Draadfrees 2xD met koelkanaal, met fase, ZrN-X**
FR **Fraise à fileter Carbure monobloc 2xD à trou d´huile, avec chanfrein, ZrN-X**
ES **Fresa de roscado Metal duro 2xD con canal de refrigeración, con escalonado de avellanar, ZrN-X**
DE **Vollhartmetall Gewindefräser 2xD mit Innenkühlung, mit Fase, ZrN-X**
EN **Solid carbide Thread milling cutter 2xD with coolant holes, with countersink profile , ZrN-X**




60° | DIN 6535-HA | 90° | M | MG HM | 2xD | EG | ZrN-X

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 52 CuAlFe | S 71 Ni/Co | S 72 Ti

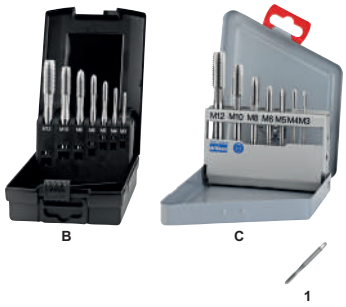
80-110 K | 80-100 K | 70-90 K | 60-80 K | 40-50 J | 50-60 J | 40-50 J | 100-140 N | 90-110 N | 220-260 K | 220-240 K | 130-150 J | 120-140 J | 35-45 I | 25-35 I

| Ref. | M | P | d1 | l1 | l2 | l3 | d2 | d3 | z | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.384.0300 | M3 | 0.5 | 2.3 | 48 | 6.8 | 36 | 6 | 3.4 | 3 | 315,00 |
| 26.384.0400 | M4 | 0.7 | 3 | 48 | 8.8 | 36 | 6 | 4.5 | 3 | 299,00 |
| 26.384.0500 | M5 | 0.8 | 4 | 54 | 10.8 | 36 | 6 | 5.5 | 3 | 299,00 |
| 26.384.0600 | M6 | 1 | 4.8 | 62 | 13.5 | 36 | 8 | 6.6 | 3 | 331,00 |

| Ref. | M | P | d1 | l1 | l2 | l3 | d2 | d3 | z | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.384.0800 | M8 | 1.25 | 6.4 | 74 | 18.1 | 40 | 10 | 6.8 | 3 | 397,00 |
| 26.384.1000 | M10 | 1.5 | 7.95 | 80 | 21.8 | 45 | 12 | 8.5 | 4 | 461,00 |
| 26.384.1200 | M12 | 1.75 | 9.95 | 90 | 25.4 | 45 | 14 | 10.2 | 4 | 656,00 |
| 26.384.1600 | M16 | 2 | 12.8 | 102 | 35 | 48 | 18 | 14 | 4 | 941,00 |

## › 29.250 Phantom

NL **Set machinetappen**
FR **Coffret de tarauds machine**
ES **Juego de machos máquina**
DE **Satz Maschinengewindebohren**
EN **Machine tap Set**

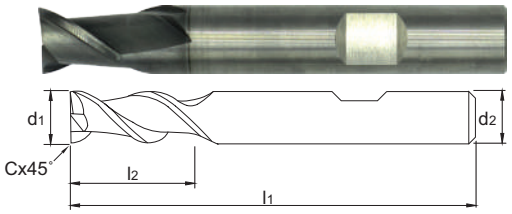



60° | ISO 2 6H | M

| Ref. | 1 | A, B, C | € |
|---|---|---|---|
| 29.250.2000 | 22.200/22.201 (M3-4-5-6-8-10-12) | B | 193,00 |
| 29.250.2100 | 22.201 (M3-4-5-6-8-10-12) | C | 259,00 |
| 29.250.2105 | 22.201 (M3-4-5-6-8-10-12) | B | 229,00 |
| 29.250.2120 | 22.230/22.231 (M3-4-5-6-8-10-12) | B | 239,00 |
| 29.250.2155 | 22.205 (M3-4-5-6-8-10-12) | B | 158,00 |
| 29.250.2500 | 22.268/22.269 (M3-4-5-6-8-10-12) | B | 356,00 |
| 29.250.2600 | 22.600/22.601 (M3-4-5-6-8-10-12) | B | 242,00 |
| 29.250.3300 | 23.300/23.301 (M3-4-5-6-8-10-12) | B | 210,00 |
| 29.250.3450 | 23.450/23.451 (M3-4-5-6-8-10-12) | B | 251,00 |

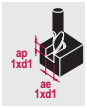
## › 32.242 International Tools

NL **ECO PRO Volhardmetaal Schachtfrees, 2-snijder kort, AlTiN-X**
FR **Fraise à rainurer 2 dents Carbure monobloc ECO PRO version courte, AlTiN-X**
ES **Fresa de ranurar de 2 labios Metal duro ECO PRO corta, AlTiN-X**
DE **ECO PRO Vollhartmetall Langlochfräser (2-Schneider) kurz, AlTiN-X**
EN **ECO PRO Solid carbide 2 Flute End Mill short, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |

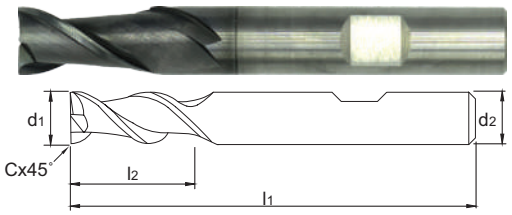



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 32.242.0200 | 2 | 6 | 50 | 3 | 0,1 | 2 | 14,93 |
| 32.242.0300 | 3 | 6 | 50 | 4 | 0,1 | 2 | 13,56 |
| 32.242.0400 | 4 | 6 | 54 | 5 | 0,15 | 2 | 13,56 |
| 32.242.0500 | 5 | 6 | 54 | 6 | 0,15 | 2 | 18,72 |
| 32.242.0600 | 6 | 6 | 54 | 7 | 0,2 | 2 | 18,72 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 32.242.0800 | 8 | 8 | 58 | 9 | 0,2 | 2 | 29,55 |
| 32.242.1000 | 10 | 10 | 66 | 11 | 0,3 | 2 | 48,70 |
| 32.242.1200 | 12 | 12 | 73 | 12 | 0,35 | 2 | 59,05 |
| 32.242.1600 | 16 | 16 | 82 | 16 | 0,4 | 2 | 111,10 |
| 32.242.2000 | 20 | 20 | 92 | 20 | 0,5 | 2 | 167,50 |

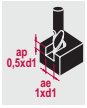
## › 32.252 International Tools

NL **ECO PRO Volhardmetaal Schachtfrees, 2-snijder lang, AlTiN-X**
FR **Fraise à rainurer 2 dents Carbure monobloc ECO PRO version longue, AlTiN-X**
ES **Fresa de ranurar de 2 labios Metal duro ECO PRO larga, AlTiN-X**
DE **ECO PRO Vollhartmetall Langlochfräser (2-Schneider) lang, AlTiN-X**
EN **ECO PRO Solid carbide 2 Flute End Mill long, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |

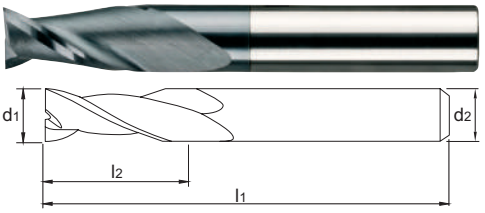



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 32.252.0300 | 3 | 6 | 57 | 7 | 0,1 | 2 | 13,95 |
| 32.252.0400 | 4 | 6 | 57 | 8 | 0,15 | 2 | 13,95 |
| 32.252.0500 | 5 | 6 | 57 | 10 | 0,15 | 2 | 19,35 |
| 32.252.0600 | 6 | 6 | 57 | 10 | 0,2 | 2 | 19,35 |
| 32.252.0800 | 8 | 8 | 63 | 16 | 0,2 | 2 | 30,35 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 32.252.1000 | 10 | 10 | 72 | 19 | 0,3 | 2 | 50,25 |
| 32.252.1200 | 12 | 12 | 83 | 22 | 0,35 | 2 | 60,75 |
| 32.252.1600 | 16 | 16 | 92 | 26 | 0,4 | 2 | 120,60 |
| 32.252.2000 | 20 | 20 | 104 | 32 | 0,5 | 2 | 181,70 |

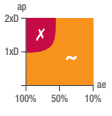
## › 32.256 Phantom

NL **UNI Volhardmetaal Schachtfrees, 2-snijder lang, AlTiN-X**
FR **Fraise à rainurer 2 dents Carbure monobloc UNI version longue, AlTiN-X**
ES **Fresa de ranurar de 2 labios Metal duro UNI larga, AlTiN-X**
DE **UNI Vollhartmetall Langlochfräser (2-Schneider) lang, AlTiN-X**
EN **UNI Solid carbide 2 Flute End Mill long, AlTiN-X**




DIN 6535-HA | MG HM | NORM | 30° | UNI | AlTiN X | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |



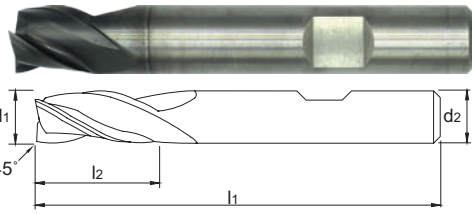

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.256.0100 | 1 | 3 | 39 | 3 | 2 | 22,71 |
| 32.256.0150 | 1.5 | 3 | 39 | 5 | 2 | 22,71 |
| 32.256.0200 | 2 | 3 | 39 | 7 | 2 | 21,87 |
| 32.256.0250 | 2.5 | 3 | 39 | 7 | 2 | 21,87 |
| 32.256.0300 | 3 | 3 | 39 | 9 | 2 | 21,87 |
| 32.256.0350 | 3.5 | 4 | 50 | 12 | 2 | 25,85 |
| 32.256.0400 | 4 | 4 | 51 | 14 | 2 | 24,98 |
| 32.256.0450 | 4.5 | 5 | 51 | 14 | 2 | 25,85 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.256.0500 | 5 | 5 | 51 | 16 | 2 | 27,45 |
| 32.256.0600 | 6 | 6 | 64 | 19 | 2 | 35,75 |
| 32.256.0700 | 7 | 8 | 64 | 19 | 2 | 49,00 |
| 32.256.0800 | 8 | 8 | 64 | 19 | 2 | 44,00 |
| 32.256.0900 | 9 | 10 | 70 | 22 | 2 | 69,20 |
| 32.256.1000 | 10 | 10 | 70 | 22 | 2 | 67,80 |
| 32.256.1100 | 11 | 11 | 76 | 25 | 2 | 102,10 |
| 32.256.1200 | 12 | 12 | 76 | 25 | 2 | 100,05 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.256.1400 | 14 | 14 | 89 | 30 | 2 | 166,95 |
| 32.256.1600 | 16 | 16 | 89 | 32 | 2 | 166,95 |
| 32.256.1800 | 18 | 18 | 100 | 36 | 2 | 271,00 |
| 32.256.2000 | 20 | 20 | 102 | 38 | 2 | 274,00 |
| 32.256.2200 | 22 | 25 | 102 | 38 | 2 | 323,00 |
| 32.256.2500 | 25 | 25 | 102 | 38 | 2 | 384,00 |

## › 33.242 International Tools

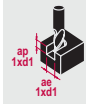
NL **ECO PRO Volhardmetaal Schachtfrees, 3-snijder kort, AlTiN-X**
FR **Fraise universelle 3 dents Carbure monobloc ECO PRO version courte, AlTiN-X**
ES **Fresa frontal de 3 labios Metal duro ECO PRO corta, AlTiN-X**
DE **ECO PRO Vollhartmetall Universalfräser (3-Schneider) kurz, AlTiN-X**
EN **ECO PRO Solid carbide 3 Flute End Mill short, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G

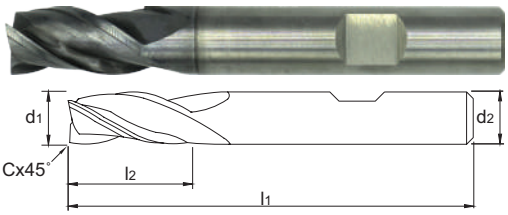



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 33.242.0200 | 2 | 6 | 50 | 3 | 0,1 | 3 | 14,93 |
| 33.242.0300 | 3 | 6 | 50 | 4 | 0,1 | 3 | 13,56 |
| 33.242.0350 | 3.5 | 6 | 50 | 4 | 0,15 | 3 | 14,93 |
| 33.242.0400 | 4 | 6 | 54 | 5 | 0,15 | 3 | 13,56 |
| 33.242.0500 | 5 | 6 | 54 | 6 | 0,15 | 3 | 18,72 |
| 33.242.0600 | 6 | 6 | 54 | 7 | 0,2 | 3 | 18,72 |
| 33.242.0700 | 7 | 8 | 58 | 8 | 0,2 | 3 | 29,55 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 33.242.0800 | 8 | 8 | 58 | 9 | 0,2 | 3 | 29,55 |
| 33.242.0900 | 9 | 10 | 66 | 10 | 0,25 | 3 | 52,75 |
| 33.242.1000 | 10 | 10 | 66 | 11 | 0,3 | 3 | 48,70 |
| 33.242.1200 | 12 | 12 | 73 | 12 | 0,35 | 3 | 59,05 |
| 33.242.1400 | 14 | 14 | 75 | 14 | 0,4 | 3 | 111,10 |
| 33.242.1600 | 16 | 16 | 82 | 16 | 0,4 | 3 | 111,10 |
| 33.242.2000 | 20 | 20 | 92 | 20 | 0,5 | 3 | 167,50 |

## › 33.252 International Tools

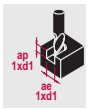
NL **ECO PRO Volhardmetaal Schachtfrees, 3-snijder lang, AlTiN-X**
FR **Fraise universelle 3 dents Carbure monobloc ECO PRO version longue, AlTiN-X**
ES **Fresa frontal de 3 labios Metal duro ECO PRO larga, AlTiN-X**
DE **ECO PRO Vollhartmetall Universalfräser (3-Schneider) lang, AlTiN-X**
EN **ECO PRO Solid carbide 3 Flute End Mill long, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G

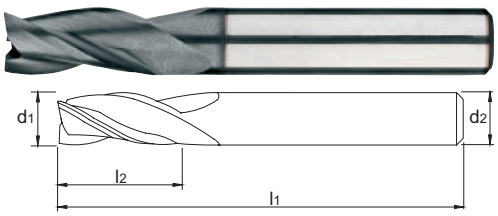



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 33.252.0300 | 3 | 6 | 57 | 7 | 0,1 | 3 | 13,95 |
| 33.252.0400 | 4 | 6 | 57 | 8 | 0,15 | 3 | 13,95 |
| 33.252.0500 | 5 | 6 | 57 | 10 | 0,15 | 3 | 19,35 |
| 33.252.0600 | 6 | 6 | 57 | 10 | 0,2 | 3 | 19,35 |
| 33.252.0800 | 8 | 8 | 63 | 16 | 0,2 | 3 | 30,35 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 33.252.1000 | 10 | 10 | 72 | 19 | 0,3 | 3 | 50,25 |
| 33.252.1200 | 12 | 12 | 83 | 22 | 0,35 | 3 | 60,75 |
| 33.252.1600 | 16 | 16 | 92 | 26 | 0,4 | 3 | 108,50 |
| 33.252.2000 | 20 | 20 | 104 | 32 | 0,5 | 3 | 163,50 |

## › 33.256 Phantom

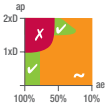
NL **UNI Volhardmetaal Schachtfrees, 3-snijder lang, AlTiN-X**
FR **Fraise universelle 3 dents Carbure monobloc UNI version longue, AlTiN-X**
ES **Fresa frontal de 3 labios Metal duro UNI larga, AlTiN-X**
DE **UNI Vollhartmetall Universalfräser (3-Schneider) lang, AlTiN-X**
EN **UNI Solid carbide 3 Flute End Mill long, AlTiN-X**




d1 ±0,00 -0,03 | DIN 6535-HA | MG HM | 30° | UNI | AlTiN X | h5 | DIN 6528

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 100-110 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G



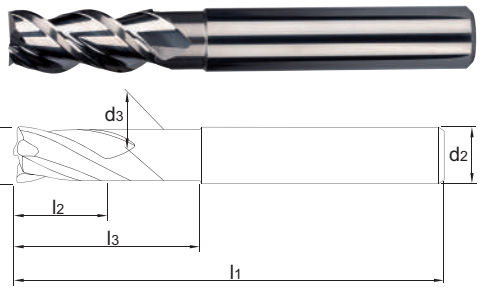

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.256.0100 | 1 | 3 | 38 | 3 | 3 | 22,71 |
| 33.256.0150 | 1.5 | 3 | 38 | 4 | 3 | 22,71 |
| 33.256.0200 | 2 | 3 | 38 | 6 | 3 | 21,87 |
| 33.256.0250 | 2.5 | 3 | 38 | 7 | 3 | 21,87 |
| 33.256.0300 | 3 | 3 | 38 | 7 | 3 | 21,87 |
| 33.256.0350 | 3.5 | 3.5 | 50 | 7 | 3 | 25,35 |
| 33.256.0400 | 4 | 4 | 50 | 8 | 3 | 24,69 |
| 33.256.0450 | 4.5 | 4.5 | 50 | 8 | 3 | 25,35 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.256.0500 | 5 | 5 | 50 | 10 | 3 | 26,95 |
| 33.256.0600 | 6 | 6 | 57 | 10 | 3 | 37,25 |
| 33.256.0700 | 7 | 7 | 60 | 13 | 3 | 49,15 |
| 33.256.0800 | 8 | 8 | 63 | 16 | 3 | 47,65 |
| 33.256.0900 | 9 | 9 | 67 | 16 | 3 | 69,20 |
| 33.256.1000 | 10 | 10 | 72 | 19 | 3 | 69,20 |
| 33.256.1100 | 11 | 11 | 83 | 22 | 3 | 102,10 |
| 33.256.1200 | 12 | 12 | 83 | 22 | 3 | 102,10 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.256.1400 | 14 | 14 | 83 | 22 | 3 | 171,95 |
| 33.256.1600 | 16 | 16 | 92 | 26 | 3 | 172,75 |
| 33.256.1800 | 18 | 18 | 92 | 26 | 3 | 283,00 |
| 33.256.2000 | 20 | 20 | 104 | 32 | 3 | 283,00 |
| 33.256.2200 | 22 | 25 | 104 | 38 | 3 | 340,00 |
| 33.256.2500 | 25 | 25 | 104 | 38 | 3 | 392,00 |

## › 33.610 Phantom

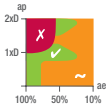
NL **Volhardmetaal Schachtfrees, 3-snijder lang, Aluminium**
FR **Fraise universelle 3 dents Carbure monobloc version longue, Aluminium**
ES **Fresa frontal de 3 labios Metal duro larga, Aluminio**
DE **Vollhartmetall Universalfräser (3-Schneider) lang, Aluminium**
EN **Solid carbide 3 Flute End Mill long, Aluminium**




DIN 6535-HA | MG HM | NORM | 45° | ALU | h5

N 41 Alu | N 51 Cu | N 61 PVC

280-350 P | 300-400 P | 400-600 P



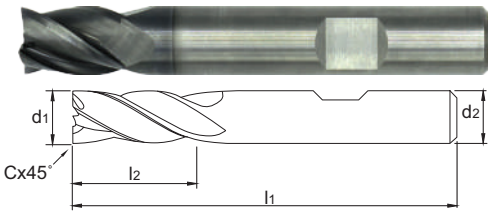

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | z | € |
|---|---|---|---|---|---|---|---|---|
| 33.610.0300 | 3 | 6 | 2.7 | 57 | 8 | 12 | 3 | 29,20 |
| 33.610.0400 | 4 | 6 | 3.7 | 57 | 11 | 18 | 3 | 39,95 |
| 33.610.0500 | 5 | 6 | 4.7 | 57 | 13 | 18 | 3 | 39,95 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | z | € |
|---|---|---|---|---|---|---|---|---|
| 33.610.0600 | 6 | 6 | 5.7 | 57 | 13 | 18 | 3 | 39,95 |
| 33.610.0800 | 8 | 8 | 7.4 | 63 | 21 | 25 | 3 | 60,20 |
| 33.610.1000 | 10 | 10 | 9.2 | 72 | 22 | 30 | 3 | 89,00 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | z | € |
|---|---|---|---|---|---|---|---|---|
| 33.610.1200 | 12 | 12 | 11 | 83 | 26 | 36 | 3 | 132,15 |
| 33.610.1600 | 16 | 16 | 15 | 92 | 36 | 42 | 3 | 209,80 |
| 33.610.2000 | 20 | 20 | 19 | 104 | 41 | 52 | 3 | 353,00 |

## › 34.242 International Tools

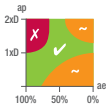
NL **ECO PRO Volhardmetaal Schachtfrees, 4-snijder kort, AlTiN-X**
FR **Fraise standard 4 dents Carbure monobloc ECO PRO version courte, AlTiN-X**
ES **Fresa frontal de 4 labios Metal duro ECO PRO corta, AlTiN-X**
DE **ECO PRO Vollhartmetall 4 Schneiden-Schaftfräser kurz, AlTiN-X**
EN **ECO PRO Solid carbide 4 Flute End Mill short, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G

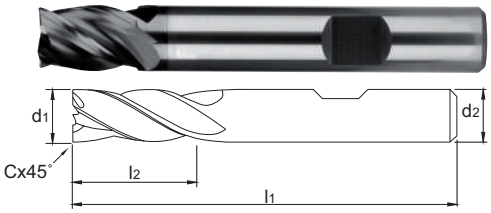



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.242.0200 | 2 | 6 | 50 | 4 | 0,1 | 4 | 14,93 |
| 34.242.0300 | 3 | 6 | 50 | 5 | 0,1 | 4 | 13,56 |
| 34.242.0400 | 4 | 6 | 54 | 8 | 0,15 | 4 | 13,56 |
| 34.242.0500 | 5 | 6 | 54 | 9 | 0,15 | 4 | 18,72 |
| 34.242.0600 | 6 | 6 | 54 | 10 | 0,2 | 4 | 18,72 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.242.0800 | 8 | 8 | 58 | 12 | 0,2 | 4 | 29,55 |
| 34.242.1000 | 10 | 10 | 66 | 14 | 0,3 | 4 | 48,70 |
| 34.242.1200 | 12 | 12 | 73 | 16 | 0,35 | 4 | 53,10 |
| 34.242.1600 | 16 | 16 | 82 | 22 | 0,4 | 4 | 100,00 |
| 34.242.2000 | 20 | 20 | 92 | 26 | 0,5 | 4 | 150,70 |

## › 34.246 Phantom

NL **UNI Volhardmetaal Vari-frees, 4-snijder kort, AlTiN-X**
FR **Fraise Vari Carbure monobloc UNI version courte, AlTiN-X**
ES **Fresa Vari Metal duro UNI corta, AlTiN-X**
DE **UNI Vollhartmetall Fräser mit ungleicher Drallsteigung kurz, AlTiN-X**
EN **UNI Solid carbide Vari Flute End Mill short, AlTiN-X**




DIN 6535-HB | DIN 6527 | MG HM | VARI | UNI | AlTiN X | d1 h10 | Cx45

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

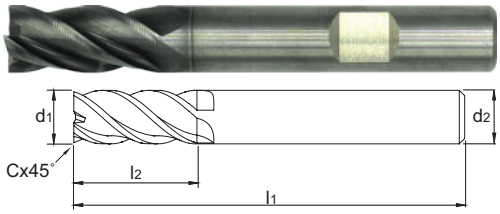
100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G




| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.246.0300 | 3 | 6 | 50 | 5 | 0,1 | 4 | 33,90 |
| 34.246.0400 | 4 | 6 | 54 | 8 | 0,15 | 4 | 33,90 |
| 34.246.0500 | 5 | 6 | 54 | 9 | 0,15 | 4 | 33,90 |
| 34.246.0600 | 6 | 6 | 54 | 10 | 0,2 | 4 | 33,70 |
| 34.246.0800 | 8 | 8 | 58 | 12 | 0,2 | 4 | 46,35 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.246.1000 | 10 | 10 | 66 | 14 | 0,3 | 4 | 68,80 |
| 34.246.1200 | 12 | 12 | 73 | 16 | 0,35 | 4 | 90,55 |
| 34.246.1600 | 16 | 16 | 82 | 22 | 0,4 | 4 | 171,95 |
| 34.246.2000 | 20 | 20 | 92 | 26 | 0,5 | 4 | 253,00 |

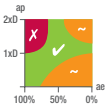
## › 34.252 International Tools




NL **ECO PRO Volhardmetaal Schachtfrees, 4-snijder lang, AlTiN-X**
FR **Fraise standard 4 dents Carbure monobloc ECO PRO version longue, AlTiN-X**
ES **Fresa frontal de 4 labios Metal duro ECO PRO larga, AlTiN-X**
DE **ECO PRO Vollhartmetall 4 Schneiden-Schaftfräser lang, AlTiN-X**
EN **ECO PRO Solid carbide 4 Flute End Mill long, AlTiN-X**

DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | d1 h10

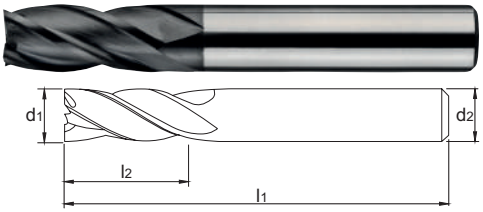
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |




| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.252.0300 | 3 | 6 | 57 | 8 | 0,1 | 4 | 13,95 |
| 34.252.0400 | 4 | 6 | 57 | 11 | 0,15 | 4 | 13,95 |
| 34.252.0500 | 5 | 6 | 57 | 13 | 0,15 | 4 | 19,35 |
| 34.252.0600 | 6 | 6 | 57 | 13 | 0,2 | 4 | 19,35 |
| 34.252.0800 | 8 | 8 | 63 | 19 | 0,2 | 4 | 30,35 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.252.1000 | 10 | 10 | 72 | 22 | 0,3 | 4 | 50,25 |
| 34.252.1200 | 12 | 12 | 83 | 26 | 0,35 | 4 | 60,75 |
| 34.252.1600 | 16 | 16 | 92 | 32 | 0,4 | 4 | 108,50 |
| 34.252.2000 | 20 | 20 | 104 | 38 | 0,5 | 4 | 163,50 |

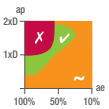
## › 34.256 Phantom




NL **UNI Volhardmetaal Schachtfrees, 4-snijder lang, AlTiN-X**
FR **Fraise standard 4 dents Carbure monobloc UNI version longue, AlTiN-X**
ES **Fresa frontal de 4 labios Metal duro UNI larga, AlTiN-X**
DE **UNI Vollhartmetall 4 Schneiden-Schaftfräser lang, AlTiN-X**
EN **UNI Solid carbide 4 Flute End Mill long, AlTiN-X**

DIN 6535-HA | MG HM | NORM | 30° | UNI | AlTiN X | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |

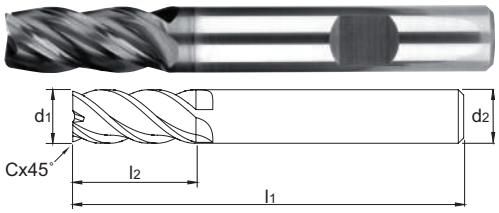



| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.256.0100 | 1 | 4 | 40 | 3 | 4 | 28,60 |
| 34.256.0150 | 1.5 | 4 | 40 | 4.5 | 4 | 28,60 |
| 34.256.0200 | 2 | 2 | 32 | 8 | 4 | 23,54 |
| 34.256.0250 | 2.5 | 2.5 | 32 | 8 | 4 | 23,54 |
| 34.256.0300 | 3 | 3 | 32 | 12 | 4 | 23,54 |
| 34.256.0350 | 3.5 | 3.5 | 32 | 12 | 4 | 28,95 |
| 34.256.0400 | 4 | 4 | 40 | 12 | 4 | 28,95 |
| 34.256.0450 | 4.5 | 4.5 | 50 | 14 | 4 | 28,95 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.256.0500 | 5 | 5 | 50 | 14 | 4 | 28,95 |
| 34.256.0600 | 6 | 6 | 50 | 16 | 4 | 30,80 |
| 34.256.0700 | 7 | 7 | 60 | 20 | 4 | 42,60 |
| 34.256.0800 | 8 | 8 | 60 | 20 | 4 | 42,60 |
| 34.256.0900 | 9 | 9 | 60 | 20 | 4 | 64,20 |
| 34.256.1000 | 10 | 10 | 70 | 22 | 4 | 67,80 |
| 34.256.1100 | 11 | 11 | 70 | 22 | 4 | 94,55 |
| 34.256.1200 | 12 | 12 | 70 | 22 | 4 | 91,65 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.256.1400 | 14 | 14 | 75 | 25 | 4 | 119,80 |
| 34.256.1600 | 16 | 16 | 75 | 25 | 4 | 159,15 |
| 34.256.1800 | 18 | 18 | 75 | 25 | 4 | 186,10 |
| 34.256.2000 | 20 | 20 | 100 | 32 | 4 | 267,00 |
| 34.256.2200 | 22 | 25 | 100 | 32 | 4 | 337,00 |
| 34.256.2500 | 25 | 25 | 150 | 45 | 4 | 390,00 |

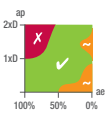
## › 34.260 Phantom




NL **UNI Volhardmetaal Vari-frees, 4-snijder lang, AlTiN-X**
FR **Fraise Vari Carbure monobloc UNI version longue, AlTiN-X**
ES **Fresa Vari Metal duro UNI larga, AlTiN-X**
DE **UNI Vollhartmetall Fräser mit ungleicher Drallsteigung lang, AlTiN-X**
EN **UNI Solid carbide Vari Flute End Mill long, AlTiN-X**

DIN 6535-HB | DIN 6527 | MG HM | VARI | UNI | AlTiN X | d1 h10 | Cx45

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 43 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Mg | Cu | PVC | Ni/Co | Ti |
| 100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G |

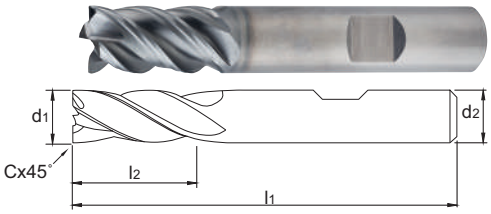



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.260.0300 | 3 | 6 | 57 | 8 | 0,1 | 4 | 38,90 |
| 34.260.0400 | 4 | 6 | 57 | 11 | 0,15 | 4 | 39,25 |
| 34.260.0500 | 5 | 6 | 57 | 13 | 0,15 | 4 | 39,25 |
| 34.260.0600 | 6 | 6 | 57 | 13 | 0,2 | 4 | 39,45 |
| 34.260.0800 | 8 | 8 | 63 | 19 | 0,2 | 4 | 52,75 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.260.1000 | 10 | 10 | 72 | 22 | 0,3 | 4 | 78,45 |
| 34.260.1200 | 12 | 12 | 83 | 26 | 0,35 | 4 | 105,30 |
| 34.260.1400 | 14 | 14 | 83 | 26 | 0,35 | 4 | 138,30 |
| 34.260.1600 | 16 | 16 | 92 | 32 | 0,4 | 4 | 192,65 |
| 34.260.2000 | 20 | 20 | 104 | 38 | 0,5 | 4 | 295,00 |

## › 34.302 Phantom

NL **HP2 UNI Volhardmetaal Vari-frees, 4-snijder 1,5xD AlCrN**
FR **Fraise Vari 4 dents Carbure monobloc 1,5xD HP2 UNI AlCrN**
ES **Fresa Vari Metal duro 1,5xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Fräser mit ungleicher Teilung 1,5xD AlCrN**
EN **HP2 UNI Solid carbide Vari Flute End Mill 1,5xD AlCrN**




DIN 6535-HB | MG HM | VARI | NORM | AlCrN | HP2 UNI | 1,5xD | d1 h10 | Cx45

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |




| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.302.0300 | 3 | 6 | 50 | 5 | 0,05 | 4 | 44,15 |
| 34.302.0400 | 4 | 6 | 54 | 8 | 0,05 | 4 | 44,25 |
| 34.302.0500 | 5 | 6 | 54 | 9 | 0,1 | 4 | 44,55 |
| 34.302.0600 | 6 | 6 | 54 | 10 | 0,1 | 4 | 45,65 |
| 34.302.0800 | 8 | 8 | 58 | 12 | 0,2 | 4 | 56,90 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 34.302.1000 | 10 | 10 | 66 | 17 | 0,25 | 4 | 78,25 |
| 34.302.1200 | 12 | 12 | 73 | 20 | 0,3 | 4 | 104,75 |
| 34.302.1600 | 16 | 16 | 82 | 26 | 0,4 | 4 | 188,10 |
| 34.302.2000 | 20 | 20 | 92 | 32 | 0,5 | 4 | 284,00 |



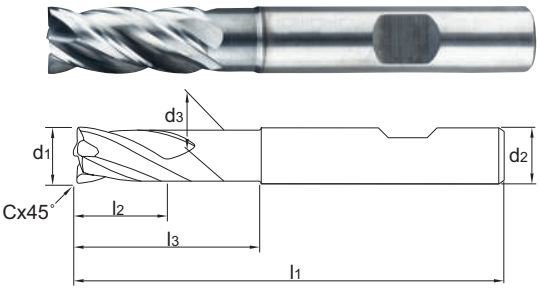

NL HP2 vari-frees met werkgebiedicoon in werking
FR Fraises carbure HP2 universelles. 4 dents, denture décalée et hélice variable, revêtement AlCrN
ES ¡La fresa Vari HP2 Phantom con icono de área de trabajo en funcionamiento!
DE Phantom-Fräser HP2 mit ungleicher Teilung im Betrieb mit Arbeitsbereichsdiagramm!
EN Phantom HP2 vari flute end mill in operation with work area icon!

Watch me

www.phantom.eu

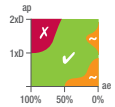
## › 34.314 Phantom

NL **HP2 UNI Volhardmetaal Vari-frees, 4-snijder 2xD/3xD AlCrN**
FR **Fraise Vari 4 dents Carbure monobloc 2xD/3xD HP2 UNI AlCrN**
ES **Fresa Vari Metal duro 2xD/3xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Fräser mit ungleicher Teilung 2xD/3xD AlCrN**
EN **HP2 UNI Solid carbide Vari Flute End Mill 2xD/3xD AlCrN**




DIN 6535-HB | MG HM | VARI | NORM | AlCrN | HP2 UNI | d1 h10 | 2xD 3xD | Cx45

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |




| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | C | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.314.0300 | 3 | 6 | 2.9 | 57 | 6 | 9 | 0,03 | 4 | 45,45 |
| 34.314.0400 | 4 | 6 | 3.8 | 57 | 8 | 12 | 0,04 | 4 | 45,45 |
| 34.314.0500 | 5 | 6 | 4.8 | 57 | 10 | 15 | 0,05 | 4 | 45,45 |
| 34.314.0600 | 6 | 6 | 5.6 | 57 | 12 | 18 | 0,06 | 4 | 45,60 |
| 34.314.0800 | 8 | 8 | 7.6 | 63 | 16 | 24 | 0,08 | 4 | 63,65 |
| 34.314.1000 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0,1 | 4 | 99,35 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | C | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.314.1200 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0,12 | 4 | 122,25 |
| 34.314.1400 | 14 | 14 | 13.5 | 93 | 28 | 42 | 0,15 | 4 | 202,50 |
| 34.314.1600 | 16 | 16 | 15.3 | 108 | 32 | 48 | 0,16 | 4 | 224,15 |
| 34.314.1800 | 18 | 18 | 17.5 | 108 | 36 | 54 | 0,2 | 4 | 299,00 |
| 34.314.2000 | 20 | 20 | 19.3 | 126 | 40 | 60 | 0,2 | 4 | 369,00 |



NL Universele VHM frees én werkgebiedicoon
FR Phantom simplifie le fraisage CNC grâce à sa fraise universelle VHM et son icône de zone de travail
ES Fresa de metal duro universal e icono del área de trabajo
DE Universeller VHM-Fräser und Arbeitsbereichsdiagramm
EN Universal SC cutter plus work area icon

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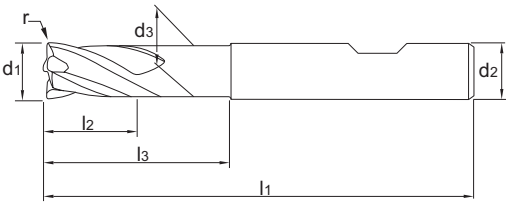
## › 34.316 Phantom






NL **HP2 UNI Volhardmetaal Vari-frees, 4-snijder 2xD/3xD AlCrN, kantradius**
FR **Fraise Vari 4 dents Carbure monobloc 2xD/3xD HP2 UNI AlCrN, à rayon**
ES **Fresa Vari Metal duro 2xD/3xD HP2 UNI AlCrN, radio de corte**
DE **HP2 UNI Vollhartmetall Fräser mit ungleicher Teilung 2xD/3xD AlCrN, Eckradius**
EN **HP2 UNI Solid carbide Vari Flute End Mill 2xD/3xD AlCrN, corner radius**

DIN 6535-HB | MG HM | VARI | NORM | r | AlCrN | HP2 UNI | d1 h10 | 2xD 3xD

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |

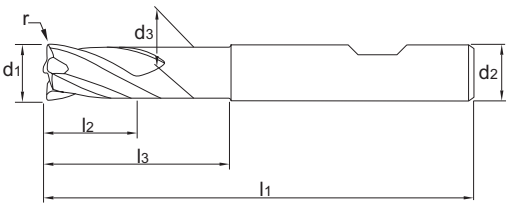



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.316.0303 | 3 | 6 | 2.9 | 57 | 6 | 9 | 0.25 | 4 | 47,95 |
| 34.316.0305 | 3 | 6 | 2.9 | 57 | 6 | 9 | 0.5 | 4 | 47,95 |
| 34.316.0310 | 3 | 6 | 2.9 | 57 | 6 | 9 | 1 | 4 | 47,95 |
| 34.316.0403 | 4 | 6 | 3.8 | 57 | 8 | 12 | 0.25 | 4 | 49,20 |
| 34.316.0405 | 4 | 6 | 3.8 | 57 | 8 | 12 | 0.5 | 4 | 49,20 |
| 34.316.0410 | 4 | 6 | 3.8 | 57 | 8 | 12 | 1 | 4 | 49,20 |
| 34.316.0415 | 4 | 6 | 3.8 | 57 | 8 | 12 | 1.5 | 4 | 49,20 |
| 34.316.0503 | 5 | 6 | 4.8 | 57 | 10 | 15 | 0.25 | 4 | 49,35 |
| 34.316.0505 | 5 | 6 | 4.8 | 57 | 10 | 15 | 0.5 | 4 | 49,35 |
| 34.316.0510 | 5 | 6 | 4.8 | 57 | 10 | 15 | 1 | 4 | 49,35 |
| 34.316.0603 | 6 | 6 | 5.6 | 57 | 12 | 18 | 0.25 | 4 | 49,65 |
| 34.316.0605 | 6 | 6 | 5.6 | 57 | 12 | 18 | 0.5 | 4 | 49,65 |
| 34.316.0608 | 6 | 6 | 5.6 | 57 | 12 | 18 | 0.8 | 4 | 49,65 |
| 34.316.0610 | 6 | 6 | 5.6 | 57 | 12 | 18 | 1 | 4 | 49,65 |
| 34.316.0615 | 6 | 6 | 5.6 | 57 | 12 | 18 | 1.5 | 4 | 49,65 |
| 34.316.0620 | 6 | 6 | 5.6 | 57 | 12 | 18 | 2 | 4 | 54,70 |
| 34.316.0803 | 8 | 8 | 7.6 | 63 | 16 | 24 | 0.25 | 4 | 70,40 |
| 34.316.0805 | 8 | 8 | 7.6 | 63 | 16 | 24 | 0.5 | 4 | 70,40 |
| 34.316.0808 | 8 | 8 | 7.6 | 63 | 16 | 24 | 0.8 | 4 | 70,40 |
| 34.316.0810 | 8 | 8 | 7.6 | 63 | 16 | 24 | 1 | 4 | 70,40 |
| 34.316.0815 | 8 | 8 | 7.6 | 63 | 16 | 24 | 1.5 | 4 | 70,40 |
| 34.316.0820 | 8 | 8 | 7.6 | 63 | 16 | 24 | 2 | 4 | 73,00 |
| 34.316.0830 | 8 | 8 | 7.6 | 63 | 16 | 24 | 3 | 4 | 76,90 |
| 34.316.1003 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0.25 | 4 | 103,15 |
| 34.316.1005 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0.5 | 4 | 103,15 |
| 34.316.1008 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0.8 | 4 | 103,15 |
| 34.316.1010 | 10 | 10 | 9.5 | 72 | 20 | 30 | 1 | 4 | 103,15 |
| 34.316.1013 | 10 | 10 | 9.5 | 72 | 20 | 30 | 1.25 | 4 | 103,15 |
| 34.316.1015 | 10 | 10 | 9.5 | 72 | 20 | 30 | 1.5 | 4 | 103,15 |
| 34.316.1020 | 10 | 10 | 9.5 | 72 | 20 | 30 | 2 | 4 | 109,50 |
| 34.316.1025 | 10 | 10 | 9.5 | 72 | 20 | 30 | 2.5 | 4 | 109,50 |
| 34.316.1030 | 10 | 10 | 9.5 | 72 | 20 | 30 | 3 | 4 | 112,10 |
| 34.316.1203 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0.25 | 4 | 127,35 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.316.1205 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0.5 | 4 | 127,35 |
| 34.316.1208 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0.8 | 4 | 127,35 |
| 34.316.1210 | 12 | 12 | 11.5 | 83 | 24 | 36 | 1 | 4 | 127,35 |
| 34.316.1213 | 12 | 12 | 11.5 | 83 | 24 | 36 | 1.25 | 4 | 127,35 |
| 34.316.1215 | 12 | 12 | 11.5 | 83 | 24 | 36 | 1.5 | 4 | 127,35 |
| 34.316.1220 | 12 | 12 | 11.5 | 83 | 24 | 36 | 2 | 4 | 132,40 |
| 34.316.1225 | 12 | 12 | 11.5 | 83 | 24 | 36 | 2.5 | 4 | 132,40 |
| 34.316.1230 | 12 | 12 | 11.5 | 83 | 24 | 36 | 3 | 4 | 137,50 |
| 34.316.1235 | 12 | 12 | 11.5 | 83 | 24 | 36 | 3.5 | 4 | 137,50 |
| 34.316.1240 | 12 | 12 | 11.5 | 83 | 24 | 36 | 4 | 4 | 144,60 |
| 34.316.1250 | 12 | 12 | 11.5 | 83 | 24 | 36 | 5 | 4 | 148,55 |
| 34.316.1605 | 16 | 16 | 15.3 | 108 | 32 | 48 | 0.5 | 4 | 229,20 |
| 34.316.1608 | 16 | 16 | 15.3 | 108 | 32 | 48 | 0.8 | 4 | 229,20 |
| 34.316.1610 | 16 | 16 | 15.3 | 108 | 32 | 48 | 1 | 4 | 229,20 |
| 34.316.1615 | 16 | 16 | 15.3 | 108 | 32 | 48 | 1.5 | 4 | 229,20 |
| 34.316.1620 | 16 | 16 | 15.3 | 108 | 32 | 48 | 2 | 4 | 235,60 |
| 34.316.1625 | 16 | 16 | 15.3 | 108 | 32 | 48 | 2.5 | 4 | 235,60 |
| 34.316.1630 | 16 | 16 | 15.3 | 108 | 32 | 48 | 3 | 4 | 241,90 |
| 34.316.1635 | 16 | 16 | 15.3 | 108 | 32 | 48 | 3.5 | 4 | 241,90 |
| 34.316.1640 | 16 | 16 | 15.3 | 108 | 32 | 48 | 4 | 4 | 248,30 |
| 34.316.1645 | 16 | 16 | 15.3 | 108 | 32 | 48 | 4.5 | 4 | 248,30 |
| 34.316.1650 | 16 | 16 | 15.3 | 108 | 32 | 48 | 5 | 4 | 255,00 |
| 34.316.2005 | 20 | 20 | 19.3 | 126 | 40 | 60 | 0.5 | 4 | 372,00 |
| 34.316.2008 | 20 | 20 | 19.3 | 126 | 40 | 60 | 0.8 | 4 | 372,00 |
| 34.316.2010 | 20 | 20 | 19.3 | 126 | 40 | 60 | 1 | 4 | 372,00 |
| 34.316.2015 | 20 | 20 | 19.3 | 126 | 40 | 60 | 1.5 | 4 | 372,00 |
| 34.316.2020 | 20 | 20 | 19.3 | 126 | 40 | 60 | 2 | 4 | 380,00 |
| 34.316.2025 | 20 | 20 | 19.3 | 126 | 40 | 60 | 2.5 | 4 | 380,00 |
| 34.316.2030 | 20 | 20 | 19.3 | 126 | 40 | 60 | 3 | 4 | 384,00 |
| 34.316.2035 | 20 | 20 | 19.3 | 126 | 40 | 60 | 3.5 | 4 | 384,00 |
| 34.316.2040 | 20 | 20 | 19.3 | 126 | 40 | 60 | 4 | 4 | 392,00 |
| 34.316.2045 | 20 | 20 | 19.3 | 126 | 40 | 60 | 4.5 | 4 | 392,00 |
| 34.316.2050 | 20 | 20 | 19.3 | 126 | 40 | 60 | 5 | 4 | 398,00 |

## › 34.318 Phantom






NL **HP2 UNI Volhardmetaal Vari-frees, 4-snijder 1,5xD/5xD AlCrN**
FR **Fraise Vari 4 dents Carbure monobloc 1,5xD/5xD HP2 UNI AlCrN**
ES **Fresa Vari Metal duro 1,5xD/5xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Fräser mit ungleicher Teilung 1, 5xD/5xD AlCrN**
EN **HP2 UNI Solid carbide Vari Flute End Mill 1,5xD/5xD AlCrN**

DIN 6535-HB | MG HM | VARI | NORM | r | AlCrN | HP2 UNI | d1 h10 | 1,5xD 5xD

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |

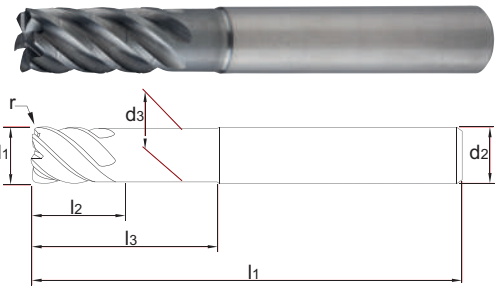



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.318.0300 | 3 | 6 | 2.8 | 57 | 5 | 15 | 0.1 | 4 | 56,90 |
| 34.318.0400 | 4 | 6 | 3.8 | 62 | 8 | 20 | 0.1 | 4 | 61,90 |
| 34.318.0500 | 5 | 6 | 4.8 | 70 | 9 | 25 | 0.1 | 4 | 65,60 |
| 34.318.0600 | 6 | 6 | 5.7 | 70 | 10 | 30 | 0.1 | 4 | 68,10 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.318.0800 | 8 | 8 | 7.6 | 80 | 12 | 40 | 0.2 | 4 | 89,55 |
| 34.318.1000 | 10 | 10 | 9.5 | 90 | 17 | 50 | 0.2 | 4 | 125,00 |
| 34.318.1200 | 12 | 12 | 11.5 | 110 | 20 | 60 | 0.25 | 4 | 180,45 |
| 34.318.1600 | 16 | 16 | 15.5 | 130 | 26 | 80 | 0.5 | 4 | 293,00 |

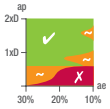
## › 34.330 Phantom

NL **HP2 UNI Volhardmetaal Trochoïdaal-frees 2xD AlCrN**
FR **Fraise-trochoïdale Carbure monobloc 2xD HP2 UNI AlCrN**
ES **Fresa trocoidal Metal duro 2xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Trochoidaler-Schaftfräser 2xD AlCrN**
EN **HP2 UNI Solid carbide Trochoidal-end mill 2xD AlCrN**




DIN 6535-HA | MG HM | VARI | NORM | r | AlCrN | HP2 UNI | 2xD | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |

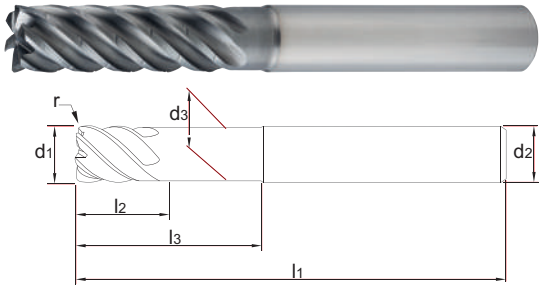



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.330.0301 | 3 | 6 | 2.8 | 57 | 6 | 14 | | 6 | 75,75 |
| 34.330.0401 | 4 | 6 | 3.8 | 57 | 8 | 16 | | 6 | 75,75 |
| 34.330.0501 | 5 | 6 | 4.8 | 57 | 10 | 18 | | 6 | 75,75 |
| 34.330.0601 | 6 | 6 | 5.7 | 57 | 12 | 19 | 0.1 | 6 | 75,75 |
| 34.330.0802 | 8 | 8 | 7.6 | 63 | 16 | 25 | 0.2 | 6 | 101,00 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.330.1002 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0.2 | 6 | 132,50 |
| 34.330.1203 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0.25 | 6 | 170,40 |
| 34.330.1605 | 16 | 16 | 15.5 | 92 | 32 | 42 | 0.5 | 6 | 309,00 |
| 34.330.2005 | 20 | 20 | 19.5 | 104 | 40 | 54 | 0.5 | 6 | 425,00 |

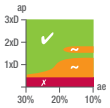
## › 34.331 Phantom

NL **HP2 UNI Volhardmetaal Trochoïdaal-frees 3xD AlCrN**
FR **Fraise-trochoïdale Carbure monobloc 3xD HP2 UNI AlCrN**
ES **Fresa trocoidal Metal duro 3xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Trochoidaler-Schaftfräser 3xD AlCrN**
EN **HP2 UNI Solid carbide Trochoidal-end mill 3xD AlCrN**




3xD | DIN 6535-HA | MG HM | VARI | NORM | r | AlCrN | HP2 UNI | d1 h10

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |

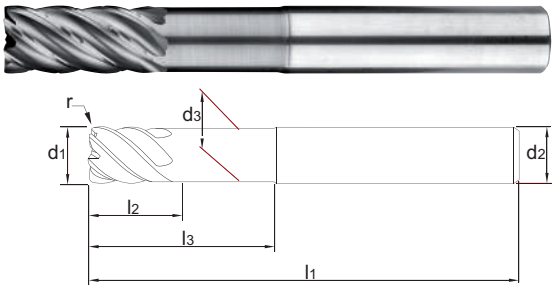



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.331.0301 | 3 | 6 | 2.8 | 62 | 9 | 14 | | 6 | 80,75 |
| 34.331.0401 | 4 | 6 | 3.8 | 62 | 12 | 18 | | 6 | 80,75 |
| 34.331.0501 | 5 | 6 | 4.8 | 62 | 15 | 21 | | 6 | 80,75 |
| 34.331.0601 | 6 | 6 | 5.7 | 62 | 18 | 24 | 0.1 | 6 | 80,75 |
| 34.331.0802 | 8 | 8 | 7.6 | 68 | 24 | 30 | 0.2 | 6 | 107,30 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.331.1002 | 10 | 10 | 9.5 | 80 | 30 | 38 | 0.2 | 6 | 148,90 |
| 34.331.1203 | 12 | 12 | 11.5 | 93 | 36 | 46 | 0.25 | 6 | 186,85 |
| 34.331.1605 | 16 | 16 | 15.5 | 108 | 48 | 58 | 0.5 | 6 | 359,00 |
| 34.331.2005 | 20 | 20 | 19.5 | 126 | 60 | 74 | 0.5 | 6 | 554,00 |

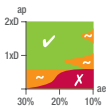
## › 34.332 Phantom

NL **HP2 UNI Volhardmetaal Trochoïdaal-frees 2xD/4xD AlCrN**
FR **Fraise-trochoïdale Carbure monobloc 2xD/4xD HP2 UNI AlCrN**
ES **Fresa trocoidal Metal duro 2xD/4xD HP2 UNI AlCrN**
DE **HP2 UNI Vollhartmetall Trochoidaler-Schaftfräser 2xD/4xD AlCrN**
EN **HP2 UNI Solid carbide Trochoidal-end mill 2xD/4xD AlCrN**




DIN 6535-HA | MG HM | VARI | NORM | r | AlCrN | HP2 UNI | d1 h10 | 2xD 4xD

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Ni/Co | Ti |
| 180-240 L | 160-220 L | 150-200 K | 100-140 K | 80-140 I | 60-120 H | 120-180 J | 80-130 J | 40-60 J | 60-80 I |

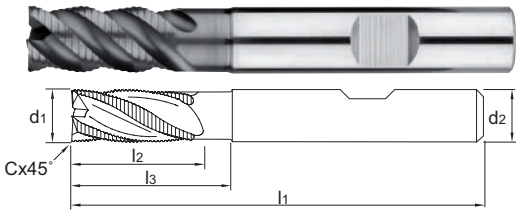



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.332.0301 | 3 | 6 | 2.8 | 62 | 6 | 12 | | 6 | 78,25 |
| 34.332.0401 | 4 | 6 | 3.8 | 62 | 8 | 16 | | 6 | 78,25 |
| 34.332.0501 | 5 | 6 | 4.8 | 62 | 10 | 20 | | 6 | 78,25 |
| 34.332.0601 | 6 | 6 | 5.7 | 62 | 12 | 24 | 0.1 | 6 | 78,25 |
| 34.332.0802 | 8 | 8 | 7.6 | 70 | 16 | 32 | 0.2 | 6 | 104,15 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | r | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 34.332.1002 | 10 | 10 | 9.5 | 80 | 20 | 40 | 0.2 | 6 | 140,75 |
| 34.332.1203 | 12 | 12 | 11.5 | 95 | 24 | 48 | 0.25 | 6 | 179,15 |
| 34.332.1605 | 16 | 16 | 15.5 | 115 | 32 | 64 | 0.5 | 6 | 334,00 |
| 34.332.2005 | 20 | 20 | 19.5 | 132 | 40 | 80 | 0.5 | 6 | 490,00 |

## › 35.254 Phantom

NL **HP2 UNI Volhardmetaal Ruwfrees 2xD/3xD AlCrN, fijn**
FR **Fraise d'ébauche Carbure monobloc 2xD/3xD HP2 UNI AlCrN, pas fin**
ES **Fresa de desbaste Metal duro 2xD/3xD HP2 UNI AlCrN, paso fino**
DE **HP2 UNI Vollhartmetall Schruppfräser 2xD/3xD AlCrN, fein**
EN **HP2 UNI Solid carbide Roughing Cutter 2xD/3xD AlCrN, fine pitch**




DIN 6535-HB | HR | MG HM | 45° | AlCrN | HP2 UNI | d1 h10 | 2xD 3xD | Cx45

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | S 71 Ni/Co | S 72 Ti

160-200 I | 130-180 H | 110-160 I | 80-120 H | 70-120 J | 50-100 I | 100-160 I | 80-140 I | 40-50 I | 50-65 I

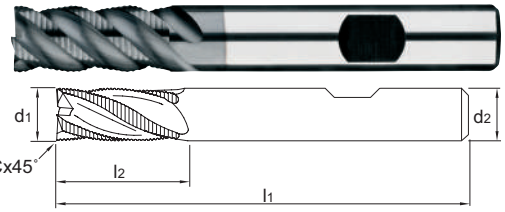



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | C | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 35.254.0400 | 4 | 6 | 3.8 | 57 | 8 | 12 | 0,04 | 3 | 53,40 |
| 35.254.0500 | 5 | 6 | 4.8 | 57 | 10 | 15 | 0,05 | 4 | 53,40 |
| 35.254.0600 | 6 | 6 | 5.6 | 57 | 12 | 18 | 0,06 | 4 | 53,40 |
| 35.254.0800 | 8 | 8 | 7.6 | 63 | 16 | 24 | 0,08 | 4 | 76,65 |
| 35.254.1000 | 10 | 10 | 9.5 | 72 | 20 | 30 | 0,1 | 4 | 104,75 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | C | z | € |
|---|---|---|---|---|---|---|---|---|---|
| 35.254.1200 | 12 | 12 | 11.5 | 83 | 24 | 36 | 0,12 | 4 | 146,00 |
| 35.254.1400 | 14 | 14 | 13.5 | 93 | 28 | 42 | 0,15 | 4 | 208,15 |
| 35.254.1600 | 16 | 16 | 15.3 | 108 | 32 | 48 | 0,16 | 5 | 265,00 |
| 35.254.2000 | 20 | 20 | 19.3 | 126 | 40 | 60 | 0,2 | 6 | 403,00 |

## › 35.484 Phantom

NL **Volhardmetaal Ruwfrees lang, TiAlN, fijn, roestvaststaal**
FR **Fraise d'ébauche Carbure monobloc version longue, TiAlN, pas fin, Inox**
ES **Fresa de desbaste Metal duro larga, TiAlN, paso fino, acero inoxidable**
DE **Vollhartmetall Schruppfräser lang, TiAlN, fein, rostfreien Stahl**
EN **Solid carbide Roughing Cutter long, TiAlN, fine pitch, stainless steel**




DIN 6535-HB | HR | INOX | MG HM | NORM | 45° | TiAlN | d1 h10 | Cx45

P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 71 Ni/Co | S 72 Ti

70-80 H | 80-100 I | 70-100 H | 50-80 J | 40-60 I | 35-40 I | 50-65 I

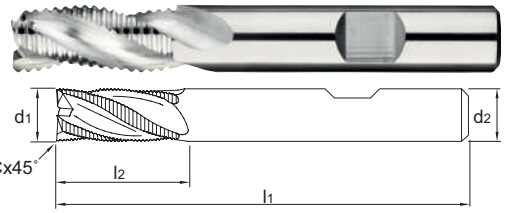



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.484.0400 | 4 | 6 | 57 | 11 | 0,1 | 3 | 79,60 |
| 35.484.0500 | 5 | 6 | 57 | 13 | 0,15 | 4 | 79,60 |
| 35.484.0600 | 6 | 6 | 57 | 16 | 0,15 | 4 | 79,60 |
| 35.484.0800 | 8 | 8 | 63 | 16 | 0,2 | 4 | 89,80 |
| 35.484.1000 | 10 | 10 | 72 | 22 | 0,2 | 4 | 127,50 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.484.1200 | 12 | 12 | 83 | 26 | 0,2 | 4 | 151,30 |
| 35.484.1400 | 14 | 14 | 83 | 26 | 0,2 | 5 | 208,55 |
| 35.484.1600 | 16 | 16 | 92 | 32 | 0,2 | 5 | 250,00 |
| 35.484.2000 | 20 | 20 | 104 | 38 | 0,2 | 6 | 411,00 |

## › 35.540 Phantom

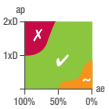
NL **Volhardmetaal Ruwfrees lang, rond, Aluminium**
FR **Fraise d'ébauche Carbure monobloc version longue, rond, Aluminium**
ES **Fresa de desbaste Metal duro larga, redondo, Aluminio**
DE **Vollhartmetall Schruppfräser lang, rund, Aluminium**
EN **Solid carbide Roughing Cutter long, round profile, Aluminium**




DIN 6535-HB | MG HM | NORM | 30° | WR | ALU | d1 h10 | Cx45

N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC

250-270 N | 160-180 M | 115-130 J | 115-130 L | 250-270 N

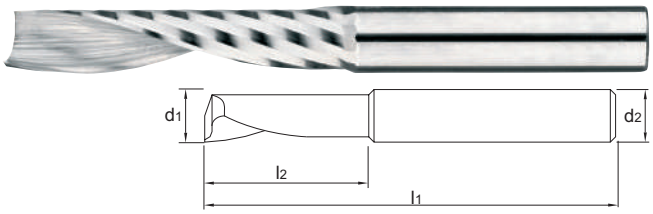



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.540.0600 | 6 | 6 | 57 | 13 | 0,6 | 3 | 56,40 |
| 35.540.0800 | 8 | 8 | 63 | 16 | 0,6 | 3 | 60,65 |
| 35.540.1000 | 10 | 10 | 72 | 22 | 0,6 | 3 | 97,15 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.540.1200 | 12 | 12 | 83 | 26 | 0,6 | 3 | 127,80 |
| 35.540.1600 | 16 | 16 | 92 | 32 | 0,9 | 3 | 215,15 |
| 35.540.2000 | 20 | 20 | 104 | 38 | 0,9 | 3 | 340,00 |

## › 36.130 Phantom

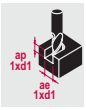
NL **Volhardmetaal Eensnijderfrees Aluminium, 21°**
FR **Fraise à 1 dent Carbure monobloc Aluminium, 21°**
ES **Fresa frontal de 1 labio Metal duro Aluminio, 21°**
DE **Vollhartmetall Einzahnfräser Aluminium, 21°**
EN **Solid carbide 1 Flute End Mill Aluminium, 21°**




DIN 6535-HA | MG HM | NORM | 21° | ALU

N 41 Alu | N 61 PVC

300-450 H | 300-450 H

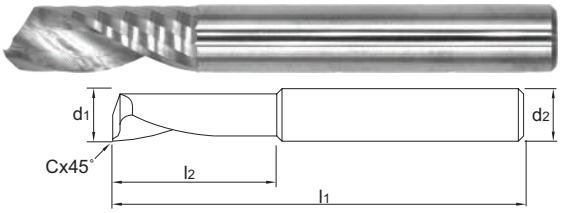



| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 36.130.0201 | 2 | 2 | 50 | 8 | 1 | 27,95 |
| 36.130.0202 | 2 | 6 | 64 | 8 | 1 | 34,75 |
| 36.130.0251 | 2.5 | 2.5 | 50 | 8 | 1 | 29,05 |
| 36.130.0252 | 2.5 | 6 | 64 | 8 | 1 | 34,75 |
| 36.130.0301 | 3 | 3 | 50 | 8 | 1 | 29,05 |
| 36.130.0302 | 3 | 6 | 64 | 8 | 1 | 34,75 |
| 36.130.0303 | 3 | 3 | 64 | 12 | 1 | 29,05 |
| 36.130.0304 | 3 | 6 | 64 | 12 | 1 | 34,75 |
| 36.130.0401 | 4 | 4 | 64 | 8 | 1 | 30,45 |
| 36.130.0402 | 4 | 4 | 64 | 12 | 1 | 31,30 |
| 36.130.0403 | 4 | 4 | 64 | 20 | 1 | 32,85 |
| 36.130.0404 | 4 | 6 | 64 | 20 | 1 | 34,80 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 36.130.0405 | 4 | 4 | 64 | 30 | 1 | 34,80 |
| 36.130.0501 | 5 | 5 | 64 | 16 | 1 | 33,45 |
| 36.130.0502 | 5 | 6 | 64 | 16 | 1 | 34,80 |
| 36.130.0503 | 5 | 5 | 64 | 30 | 1 | 42,90 |
| 36.130.0602 | 6 | 6 | 64 | 12 | 1 | 39,05 |
| 36.130.0603 | 6 | 6 | 64 | 20 | 1 | 39,75 |
| 36.130.0604 | 6 | 6 | 76 | 30 | 1 | 41,35 |
| 36.130.0605 | 6 | 6 | 76 | 38 | 1 | 44,40 |
| 36.130.0801 | 8 | 8 | 64 | 25 | 1 | 60,30 |
| 36.130.0802 | 8 | 8 | 76 | 38 | 1 | 64,20 |
| 36.130.1001 | 10 | 10 | 76 | 30 | 1 | 101,80 |

## › 36.140 Phantom

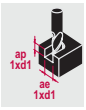
NL **Volhardmetaal Eensnijderfrees Aluminium, 30°**
FR **Fraise à 1 dent Carbure monobloc Aluminium, 30°**
ES **Fresa frontal de 1 labio Metal duro Aluminio, 30°**
DE **Vollhartmetall Einzahnfräser Aluminium, 30°**
EN **Solid carbide 1 Flute End Mill Aluminium, 30°**




DIN 6535-HA | MG HM | NORM | 30° | ALU | h5 | Cx45

N 41 Alu | N 42 Alu Si>10% | N 61 PVC

300-450 H | 145-220 I | 300-450 H

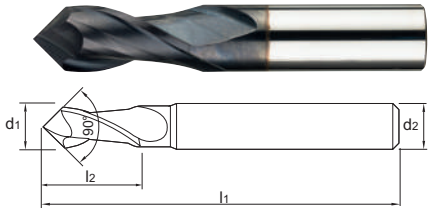



| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 36.140.0200 | 2 | 3 | 50 | 8 | 0,05 | 1 | 25,35 |
| 36.140.0250 | 2.5 | 3 | 40 | 12 | 0,05 | 1 | 27,60 |
| 36.140.0300 | 3 | 3 | 50 | 12 | 0,05 | 1 | 23,10 |
| 36.140.0400 | 4 | 4 | 60 | 15 | 0,1 | 1 | 29,15 |
| 36.140.0500 | 5 | 5 | 60 | 17 | 0,1 | 1 | 33,40 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 36.140.0600 | 6 | 6 | 65 | 20 | 0,1 | 1 | 35,45 |
| 36.140.0800 | 8 | 8 | 65 | 22 | 0,15 | 1 | 57,00 |
| 36.140.1000 | 10 | 10 | 75 | 25 | 0,15 | 1 | 92,90 |
| 36.140.1200 | 12 | 12 | 80 | 30 | 0,15 | 1 | 125,20 |

## › 36.166 Phantom

NL **Volhardmetaal Multi-PLUS frees AlTiN-X, 90°**
FR **Fraise Multi PLUS Carbure monobloc AlTiN-X, 90°**
ES **Fresa Multi PLUS Metal duro AlTiN-X, 90°**
DE **Vollhartmetall Multi-PLUS Fräser AlTiN-X, 90°**
EN **Solid carbide Multi-PLUS 2 Flute End Mill AlTiN-X, 90°**




DIN 6535-HA | MG HM | NORM | 30° | AlTiN X

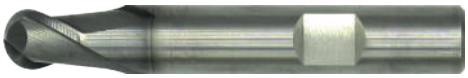
P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

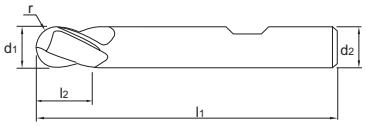
70-75 S | 40-60 S | 35-40 S | 30-35 Q | 30-35 Q | 25-30 P | 150-180 S | 120-150 S | 50-120 S | 150-180 S | 20-25 P | 30-35 P

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 36.166.0050 | 0.5 | 3 | 39 | 1 | 2 | 71,90 |
| 36.166.0100 | 1 | 3 | 39 | 2 | 2 | 69,10 |
| 36.166.0150 | 1.5 | 3 | 39 | 3 | 2 | 92,50 |
| 36.166.0200 | 2 | 3 | 39 | 4 | 2 | 71,90 |
| 36.166.0250 | 2.5 | 3 | 39 | 5 | 2 | 76,15 |
| 36.166.0300 | 3 | 4 | 50 | 6 | 2 | 84,60 |
| 36.166.0400 | 4 | 5 | 50 | 8 | 2 | 90,25 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 36.166.0500 | 5 | 6 | 50 | 10 | 2 | 97,30 |
| 36.166.0600 | 6 | 8 | 60 | 12 | 2 | 107,20 |
| 36.166.0800 | 8 | 10 | 70 | 16 | 2 | 145,35 |
| 36.166.1000 | 10 | 12 | 70 | 18 | 2 | 190,50 |
| 36.166.1200 | 12 | 12 | 70 | 20 | 2 | 205,95 |
| 36.166.1600 | 16 | 16 | 80 | 26 | 2 | 286,00 |
| 36.166.2000 | 20 | 20 | 100 | 32 | 2 | 444,00 |

## › 36.242 International Tools



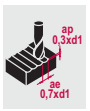



NL **ECO PRO Volhardmetaal Radiusfrees, 2-snijder kort, AlTiN-X**
FR **Fraise à rayon 2 dents Carbure monobloc ECO PRO version courte, AlTiN-X**
ES **Fresa de punta esférica Metal duro ECO PRO corta, AlTiN-X**
DE **ECO PRO Vollhartmetall 2 Schneiden Radiusfräser kurz, AlTiN-X**
EN **ECO PRO Solid carbide 2 Flute Ball Nose End Mill short, AlTiN-X**

DIN 6535-HB | DIN 6527 | MG HM | 35° | AlTiN X | ECO PRO | r ±0,02 | d1 h10

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G



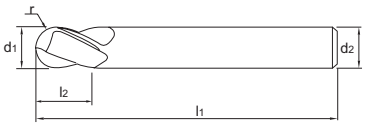

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.242.0300 | 3 | 6 | 50 | 4 | 1.5 | 2 | 19,89 |
| 36.242.0400 | 4 | 6 | 54 | 5 | 2 | 2 | 19,89 |
| 36.242.0500 | 5 | 6 | 54 | 6 | 2.5 | 2 | 24,85 |

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.242.0600 | 6 | 6 | 54 | 7 | 3 | 2 | 24,85 |
| 36.242.0800 | 8 | 8 | 58 | 9 | 4 | 2 | 38,20 |
| 36.242.1000 | 10 | 10 | 66 | 11 | 5 | 2 | 68,75 |

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.242.1200 | 12 | 12 | 73 | 12 | 6 | 2 | 77,35 |
| 36.242.1600 | 16 | 16 | 82 | 16 | 8 | 2 | 126,95 |
| 36.242.2000 | 20 | 20 | 92 | 20 | 10 | 2 | 193,75 |

## › 36.256 Phantom



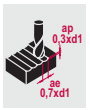



NL **UNI Volhardmetaal Radiusfrees, 2-snijder lang, TiAlN**
FR **Fraise à rayon 2 dents Carbure monobloc UNI version longue, TiAlN**
ES **Fresa de punta esférica Metal duro UNI larga, TiAlN**
DE **UNI Vollhartmetall 2 Schneiden Radiusfräser lang, TiAlN**
EN **UNI Solid carbide 2 Flute Ball Nose End Mill long, TiAlN**

d1 ±0,00 -0,03 | DIN 6535-HA | MG HM | NORM | 30° | TiAlN | UNI | r ±0,02

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 61 PVC | S 71 Ni/Co | S 72 Ti

100-115 K | 95-110 J | 80-100 I | 55-80 I | 50-65 I | 35-44 H | 100-120 J | 130-140 J | 240-300 K | 120-150 I | 160-180 K | 50-90 I | 80-90 G | 25-35 H | 30-40 G

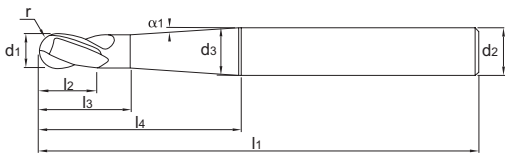



| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.256.0100 | 1 | 3 | 39 | 3 | 0.5 | 2 | 27,90 |
| 36.256.0150 | 1.5 | 3 | 39 | 5 | 0.75 | 2 | 27,90 |
| 36.256.0200 | 2 | 3 | 39 | 7 | 1 | 2 | 27,65 |
| 36.256.0250 | 2.5 | 3 | 39 | 8 | 1.25 | 2 | 27,65 |
| 36.256.0300 | 3 | 3 | 39 | 9 | 1.5 | 2 | 27,65 |
| 36.256.0350 | 3.5 | 4 | 51 | 12 | 1.75 | 2 | 31,60 |
| 36.256.0400 | 4 | 4 | 51 | 14 | 2 | 2 | 30,85 |
| 36.256.0450 | 4.5 | 5 | 51 | 14 | 2.25 | 2 | 31,60 |
| 36.256.0500 | 5 | 5 | 51 | 16 | 2.5 | 2 | 31,45 |
| 36.256.0600 | 6 | 6 | 64 | 19 | 3 | 2 | 43,35 |
| 36.256.0700 | 7 | 7 | 64 | 19 | 3.5 | 2 | 69,85 |

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.256.0800 | 8 | 8 | 64 | 21 | 4 | 2 | 69,85 |
| 36.256.0900 | 9 | 10 | 70 | 22 | 4.5 | 2 | 113,15 |
| 36.256.1000 | 10 | 10 | 70 | 22 | 5 | 2 | 113,15 |
| 36.256.1100 | 11 | 11 | 70 | 25 | 5.5 | 2 | 145,55 |
| 36.256.1200 | 12 | 12 | 76 | 25 | 6 | 2 | 145,55 |
| 36.256.1400 | 14 | 14 | 89 | 30 | 7 | 2 | 232,45 |
| 36.256.1600 | 16 | 16 | 89 | 32 | 8 | 2 | 232,45 |
| 36.256.1800 | 18 | 18 | 102 | 32 | 9 | 2 | 358,00 |
| 36.256.2000 | 20 | 20 | 102 | 38 | 10 | 2 | 358,00 |
| 36.256.2200 | 22 | 22 | 102 | 38 | 11 | 2 | 427,00 |
| 36.256.2500 | 25 | 25 | 102 | 38 | 12.5 | 2 | 493,00 |

## › 36.285 Phantom



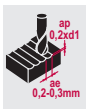



NL **Volhardmetaal Precisie Radiusfrees, 2-snijder AlTiN-X, HRC 30-65**
FR **Fraise à rayon de précision 2 dents Carbure monobloc AlTiN-X, HRC 30-65**
ES **Fresa de punta esférical de precisión Metal duro AlTiN-X, HRC 30-65**
DE **Vollhartmetall Präzisions-Radiusfräser (2-Schneider) AlTiN-X, HRC 30-65**
EN **Solid carbide Precision Radius Cutter AlTiN-X, HRC 30-65**

d1 ±0,00 -0,03 | DIN 6535-HA | HRC | MG HM | NORM | 30° | AlTiN X | r ±0,02

P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC

75-200 X | 60-110 W | 80-135 V

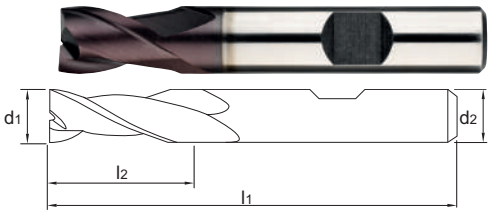



| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | l4 | r | z | α1 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36.285.0111 | 1 | 6 | 2 | 60 | 2 | 4 | 23 | 0.5 | 2 | 1°30' | 71,70 |
| 36.285.0112 | 1 | 6 | 4.3 | 60 | 2 | 4 | 23 | 0.5 | 2 | 5° | 71,70 |
| 36.285.0113 | 1 | 6 | 5 | 80 | 2 | 4 | 42 | 0.5 | 2 | 3° | 75,40 |
| 36.285.0221 | 2 | 6 | 2.9 | 60 | 4 | 6 | 23 | 1 | 2 | 1°30' | 64,30 |
| 36.285.0222 | 2 | 6 | 5 | 60 | 4 | 6 | 23 | 1 | 2 | 5° | 64,30 |
| 36.285.0223 | 2 | 6 | 5.7 | 80 | 4 | 6 | 41 | 1 | 2 | 3° | 70,05 |
| 36.285.0331 | 3 | 6 | 5.3 | 90 | 6 | 8 | 52 | 1.5 | 2 | 1°30' | 72,00 |
| 36.285.0333 | 3 | 6 | 5.6 | 70 | 6 | 8 | 32 | 1.5 | 2 | 3° | 64,85 |
| 36.285.0441 | 4 | 6 | 6 | 90 | 8 | 10 | 49 | 2 | 2 | 1°30' | 72,50 |
| 36.285.0443 | 4 | 6 | 6 | 70 | 8 | 10 | 28 | 2 | 2 | 3° | 65,30 |

| Ref. | d1 | d2 | d3 | l1 | l2 | l3 | l4 | r | z | α1 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36.285.0551 | 5 | 8 | 7 | 110 | 10 | 12 | 61 | 2.5 | 2 | 1°30' | 121,45 |
| 36.285.0553 | 5 | 8 | 8 | 90 | 10 | 12 | 41 | 2.5 | 2 | 3° | 104,20 |
| 36.285.0661 | 6 | 8 | 8 | 110 | 12 | 15 | 53 | 3 | 2 | 1°30' | 121,45 |
| 36.285.0663 | 6 | 8 | 8 | 90 | 12 | 15 | 34 | 3 | 2 | 3° | 104,20 |
| 36.285.0871 | 8 | 10 | 10 | 120 | 14 | 17 | 55 | 4 | 2 | 1°30' | 206,55 |
| 36.285.0873 | 8 | 10 | 10 | 100 | 14 | 17 | 36 | 4 | 2 | 3° | 184,10 |
| 36.285.1081 | 10 | 12 | 12 | 130 | 18 | 21 | 59 | 5 | 2 | 1°30' | 238,80 |
| 36.285.1083 | 10 | 12 | 12 | 110 | 18 | 21 | 40 | 5 | 2 | 3° | 230,85 |
| 36.285.1291 | 12 | 16 | 15 | 160 | 22 | 25 | 83 | 6 | 2 | 1°30' | 196,00 |
| 36.285.1293 | 12 | 16 | 16 | 140 | 22 | 25 | 63 | 6 | 2 | 3° | 190,45 |

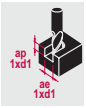
## › 32.228 Phantom

NL **HSS-E PM Schachtfrees, 2-snijder kort, type N, TiAlN**
FR **Fraise à rainurer 2 dents HSS-E PM version courte, type N, TiAlN**
ES **Fresa de ranurar de 2 labios HSS-E PM corta, tipo N, TiAlN**
DE **HSS-E PM Langlochfräser (2-Schneider) kurz, Typ N, TiAlN**
EN **HSS-E PM 2 Flute End Mill short, type N, TiAlN**




DIN 1835-B | DIN 327-B | HSS-E PM | 30° | TiAlN | N

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | N 52 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | CuAlFe |
| 45-70 J | 35-50 J | 30-40 J | 20-30 J | 20-25 I | 15-20 I | 35-45 J | 35-45 J | 50-70 J | 15-30 H |



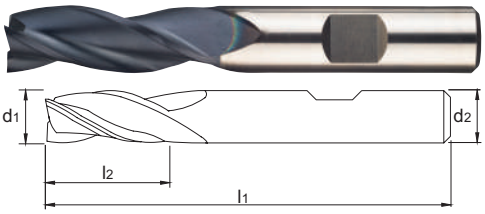

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.228.0200 | 2 | 6 | 48 | 4 | 2 | 29,40 |
| 32.228.0300 | 3 | 6 | 49 | 5 | 2 | 29,40 |
| 32.228.0400 | 4 | 6 | 51 | 7 | 2 | 29,40 |
| 32.228.0500 | 5 | 6 | 52 | 8 | 2 | 29,40 |
| 32.228.0600 | 6 | 6 | 52 | 8 | 2 | 29,40 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.228.0800 | 8 | 10 | 61 | 11 | 2 | 46,40 |
| 32.228.1000 | 10 | 10 | 63 | 13 | 2 | 48,00 |
| 32.228.1200 | 12 | 12 | 73 | 16 | 2 | 61,10 |
| 32.228.1400 | 14 | 12 | 73 | 16 | 2 | 66,15 |
| 32.228.1600 | 16 | 16 | 79 | 19 | 2 | 79,95 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 32.228.1800 | 18 | 16 | 79 | 19 | 2 | 102,35 |
| 32.228.2000 | 20 | 20 | 82 | 22 | 2 | 131,15 |
| 32.228.2200 | 22 | 20 | 88 | 22 | 2 | 149,80 |
| 32.228.2500 | 25 | 25 | 102 | 26 | 2 | 193,75 |

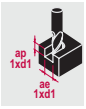
## › 33.228 Phantom

NL **HSS-E PM Schachtfrees, 3-snijder kort, type N, AlTiN-X**
FR **Fraise universelle 3 dents HSS-E PM version courte, type N, AlTiN-X**
ES **Fresa frontal de 3 labios HSS-E PM corta, tipo N, AlTiN-X**
DE **HSS-E PM Universalfräser (3-Schneider) kurz, Typ N, AlTiN-X**
EN **HSS-E PM 3 Flute End Mill short, type N, AlTiN-X**




DIN 1835-B | DIN 844-B | HSS-E PM | 30° | N | AlTiN X

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | N 52 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | CuAlFe |
| 45-70 J | 35-50 J | 30-40 J | 20-30 J | 20-25 I | 15-20 I | 35-45 J | 35-45 J | 50-70 J | 15-30 H |



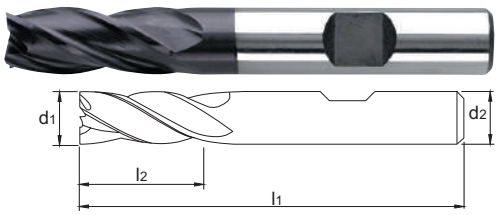

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.228.0200 | 2 | 6 | 51 | 7 | 3 | 26,65 |
| 33.228.0300 | 3 | 6 | 52 | 8 | 3 | 26,65 |
| 33.228.0400 | 4 | 6 | 55 | 11 | 3 | 26,65 |
| 33.228.0500 | 5 | 6 | 57 | 13 | 3 | 26,65 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.228.0600 | 6 | 6 | 57 | 13 | 3 | 26,65 |
| 33.228.0800 | 8 | 10 | 69 | 19 | 3 | 41,10 |
| 33.228.1000 | 10 | 10 | 72 | 22 | 3 | 45,35 |
| 33.228.1200 | 12 | 12 | 83 | 26 | 3 | 61,45 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 33.228.1400 | 14 | 12 | 83 | 26 | 3 | 72,70 |
| 33.228.1600 | 16 | 16 | 92 | 32 | 3 | 89,40 |
| 33.228.1800 | 18 | 16 | 92 | 32 | 3 | 114,50 |
| 33.228.2000 | 20 | 20 | 104 | 38 | 3 | 134,10 |

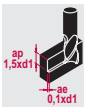
## › 34.228 Phantom

NL **HSS-E PM Schachtfrees, meersnijder kort, type N, AlTiN-X**
FR **Fraise standard HSS-E PM version courte, type N, AlTiN-X**
ES **Fresa frontal de varios labios HSS-E PM corta, tipo N, AlTiN-X**
DE **HSS-E PM Mehrschneiden-Schaftfräser kurz, Typ N, AlTiN-X**
EN **HSS-E PM Multi Flute End Mill short, type N, AlTiN-X**




DIN 1835-B | DIN 844-B | HSS-E PM | 30° | N | AlTiN X

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 51 | N 52 |
|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Cu | CuAlFe |
| 45-70 J | 35-50 J | 30-40 J | 20-30 J | 20-25 I | 15-20 I | 35-45 J | 35-45 J | 50-70 J | 15-30 H |



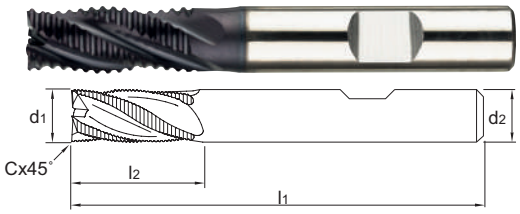

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.228.0300 | 3 | 6 | 52 | 8 | 4 | 26,65 |
| 34.228.0400 | 4 | 6 | 55 | 11 | 4 | 26,65 |
| 34.228.0500 | 5 | 6 | 57 | 13 | 4 | 26,65 |
| 34.228.0600 | 6 | 6 | 57 | 13 | 4 | 26,65 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.228.0800 | 8 | 10 | 69 | 19 | 4 | 41,10 |
| 34.228.1000 | 10 | 10 | 72 | 22 | 4 | 45,35 |
| 34.228.1200 | 12 | 12 | 83 | 26 | 4 | 61,45 |
| 34.228.1400 | 14 | 12 | 83 | 26 | 4 | 72,70 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 34.228.1600 | 16 | 16 | 92 | 32 | 4 | 89,40 |
| 34.228.1800 | 18 | 16 | 92 | 32 | 4 | 114,50 |
| 34.228.2000 | 20 | 20 | 104 | 38 | 4 | 134,10 |

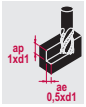
## › 35.126 Phantom

NL **HSS-E PM Ruwfrees kort, type NR, AlTiN-X**
FR **Fraise d'ébauche HSS-E PM version courte, type NR, AlTiN-X**
ES **Fresa de desbaste HSS-E PM corta, tipo NR, AlTiN-X**
DE **HSS-E PM Schruppfräser kurz, Typ NR, AlTiN-X**
EN **HSS-E PM Roughing Cutter short, type NR, AlTiN-X**




DIN 1835-B | DIN 844-B | HSS-E PM | 30° | AlTiN X | NR | Cx45

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu |
| 55-60 L | 40-50 K | 30-35 L | 25-30 J | 30-35 I | 25-30 G | 40-45 I | 40-50 I | 105-120 L |



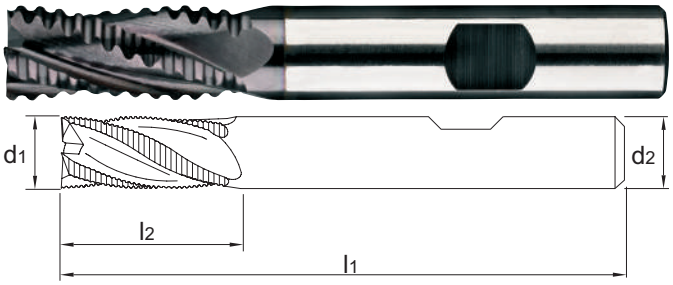

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.126.0600 | 6 | 6 | 57 | 13 | 0,25 | 4 | 51,40 |
| 35.126.0800 | 8 | 10 | 69 | 19 | 0,25 | 4 | 57,40 |
| 35.126.1000 | 10 | 10 | 72 | 22 | 0,35 | 4 | 66,35 |
| 35.126.1200 | 12 | 12 | 83 | 26 | 0,5 | 4 | 76,50 |
| 35.126.1400 | 14 | 12 | 83 | 26 | 0,55 | 4 | 91,85 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.126.1600 | 16 | 16 | 92 | 32 | 0,55 | 4 | 109,70 |
| 35.126.1800 | 18 | 16 | 92 | 32 | 0,55 | 4 | 127,55 |
| 35.126.2000 | 20 | 20 | 104 | 38 | 0,55 | 4 | 158,15 |
| 35.126.2200 | 22 | 20 | 104 | 38 | 0,55 | 5 | 188,80 |
| 35.126.2500 | 25 | 25 | 121 | 45 | 0,55 | 5 | 227,00 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.126.2800 | 28 | 25 | 121 | 45 | 0,7 | 5 | 275,00 |
| 35.126.3000 | 30 | 25 | 121 | 45 | 0,7 | 5 | 317,00 |
| 35.126.3200 | 32 | 32 | 133 | 53 | 0,7 | 6 | 352,00 |

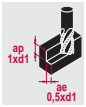
## › 35.128 Phantom

NL **HSS-E PM Ruwfrees kort, type NR, TiAlN**
FR **Fraise d'ébauche HSS-E PM version courte, type NR, TiAlN**
ES **Fresa de desbaste HSS-E PM corta, tipo NR, TiAlN**
DE **HSS-E PM Schruppfräser kurz, Typ NR, TiAlN**
EN **HSS-E PM Roughing Cutter short, type NR, TiAlN**




DIN 1835-B | DIN 844-B | HSS-E PM | 30° | TiAlN | NR

| P 11 | P 12 | P 13 | P 14 |
|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² |
| 45-50 L | 35-40 K | 25-30 L | 15-20 J |



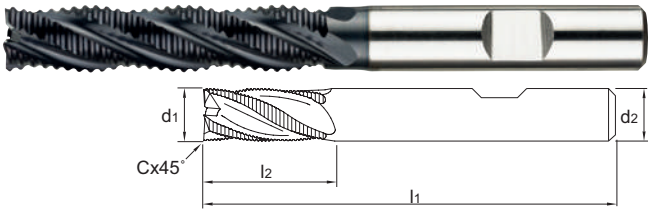

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 35.128.2200 | 22 | 20 | 104 | 38 | 4 | 106,70 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|
| 35.128.2400 | 24 | 25 | 121 | 45 | 4 | 127,15 |

| Ref. | d1 | d2 | l1 | l2 | z | € |
|---|---|---|---|---|---|---|

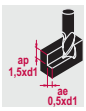
## › 35.726 Phantom

NL **HSS-E PM Ruwfrees lang, type NR, AlTiN-X**
FR **Fraise d'ébauche HSS-E PM version longue, type NR, AlTiN-X**
ES **Fresa de desbaste HSS-E PM larga, tipo NR, AlTiN-X**
DE **HSS-E PM Schruppfräser lang, Typ NR, AlTiN-X**
EN **HSS-E PM Roughing Cutter long, type NR, AlTiN-X**




DIN 1835-B | DIN 844-B | HSS-E PM | 30° | AlTiN X | NR | Cx45

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu |
| 55-60 G | 40-50 F | 30-35 G | 25-30 G | 30-35 G | 25-30 F | 40-45 G | 40-50 G | 105-120 I |



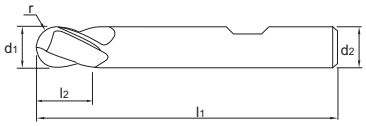

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.726.0600 | 6 | 6 | 68 | 24 | 0,25 | 4 | 63,75 |
| 35.726.0800 | 8 | 10 | 88 | 38 | 0,25 | 4 | 71,50 |
| 35.726.1000 | 10 | 10 | 95 | 45 | 0,35 | 4 | 79,05 |
| 35.726.1200 | 12 | 12 | 110 | 53 | 0,5 | 4 | 94,35 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.726.1400 | 14 | 12 | 110 | 53 | 0,55 | 4 | 113,45 |
| 35.726.1600 | 16 | 16 | 123 | 63 | 0,55 | 4 | 133,95 |
| 35.726.1800 | 18 | 16 | 123 | 63 | 0,55 | 4 | 155,65 |
| 35.726.2000 | 20 | 20 | 141 | 75 | 0,55 | 4 | 191,30 |

| Ref. | d1 | d2 | l1 | l2 | C | z | € |
|---|---|---|---|---|---|---|---|
| 35.726.2500 | 25 | 25 | 166 | 90 | 0,55 | 5 | 275,00 |
| 35.726.3200 | 32 | 32 | 186 | 106 | 0,7 | 6 | 426,00 |

# › 36.228 Phantom

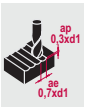





**NL** HSS-E PM Radiusfrees, 2-snijder kort, type N, TiAlN
**FR** Fraise à rayon 2 dents HSS-E PM version courte, type N, TiAlN
**ES** Fresa de punta esférica HSS-E PM corta, tipo N, TiAlN
**DE** HSS-E PM 2 Schneiden Radiusfräser kurz, Typ N, TiAlN
**EN** HSS-E PM 2 Flute Ball Nose End Mill short, type N, TiAlN

| DIN 1835-B | DIN 327-B | HSS-E PM | 30° | TiAlN | N | | r ±0,02 |
|---|---|---|---|---|---|---|---|

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW |
|---|---|---|---|---|---|---|---|
| 70-85 M | 55-70 L | 35-40 K | 20-25 K | 25-30 K | 20-25 K | 55-60 L | 65-70 L |



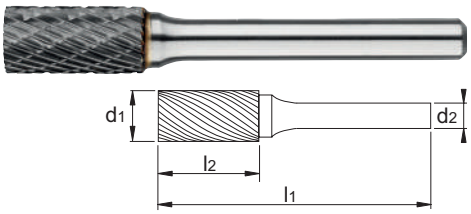

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.228.0300 | 3 | 6 | 49 | 5 | 1.5 | 2 | 39,20 |
| 36.228.0400 | 4 | 6 | 51 | 7 | 2 | 2 | 39,20 |
| 36.228.0500 | 5 | 6 | 52 | 8 | 2.5 | 2 | 39,20 |

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.228.0600 | 6 | 6 | 52 | 8 | 3 | 2 | 39,20 |
| 36.228.0800 | 8 | 10 | 61 | 11 | 4 | 2 | 55,95 |
| 36.228.1000 | 10 | 10 | 63 | 13 | 5 | 2 | 57,70 |

| Ref. | d1 | d2 | l1 | l2 | r | z | € |
|---|---|---|---|---|---|---|---|
| 36.228.1200 | 12 | 12 | 73 | 16 | 6 | 2 | 73,40 |
| 36.228.1600 | 16 | 16 | 79 | 19 | 8 | 2 | 95,05 |
| 36.228.2000 | 20 | 20 | 82 | 22 | 10 | 2 | 149,85 |

## › 41.510 Phantom

NL **Hardmetaal Stiftfrees model A, cilindrisch, schacht 6 mm**
FR **Fraise lime Carbure Forme A, forme cylindrique, queue 6 mm**
ES **Fresa rotativa Metal Duro forma A, cilíndrico, mango 6 mm**
DE **Hartmetall Frässtift Form A, Zylinderform, Schaft 6 mm**
EN **Carbide Burr model A, cylindrical, shank 6 mm**



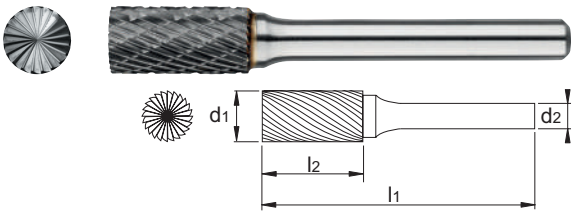

HM | Ø6 | A

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.510.0601 | 6 | 6 | 50 | 18 | 6 | 1-ALU | 28,35 |
| 41.510.0603 | 6 | 6 | 50 | 18 | 6 | 3-FINE | 21,98 |
| 41.510.0604 | 6 | 6 | 50 | 18 | 6 | 4-DIAMOND | 23,33 |
| 41.510.0606 | 6 | 6 | 50 | 18 | 6 | 6-UNI | 22,20 |
| 41.510.0608 | 6 | 6 | 50 | 18 | 6 | 8-STEEL | 24,48 |
| 41.510.0609 | 6 | 6 | 50 | 18 | 6 | 9-INOX | 26,80 |
| 41.510.0801 | 8 | 8 | 64 | 19 | 6 | 1-ALU | 35,90 |
| 41.510.0803 | 8 | 8 | 64 | 19 | 6 | 3-FINE | 29,55 |
| 41.510.0804 | 8 | 8 | 64 | 19 | 6 | 4-DIAMOND | 31,40 |
| 41.510.0806 | 8 | 8 | 64 | 19 | 6 | 6-UNI | 29,80 |
| 41.510.0808 | 8 | 8 | 64 | 19 | 6 | 8-STEEL | 32,90 |
| 41.510.0809 | 8 | 8 | 64 | 19 | 6 | 9-INOX | 35,90 |
| 41.510.1001 | 10 | 9.5 | 64 | 19 | 6 | 1-ALU | 38,95 |
| 41.510.1003 | 10 | 9.5 | 64 | 19 | 6 | 3-FINE | 31,80 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.510.1004 | 10 | 9.5 | 64 | 19 | 6 | 4-DIAMOND | 33,65 |
| 41.510.1006 | 10 | 9.5 | 64 | 19 | 6 | 6-UNI | 32,05 |
| 41.510.1008 | 10 | 9.5 | 64 | 19 | 6 | 8-STEEL | 35,25 |
| 41.510.1009 | 10 | 9.5 | 64 | 19 | 6 | 9-INOX | 38,25 |
| 41.510.1201 | 12 | 12.7 | 70 | 25 | 6 | 1-ALU | 60,40 |
| 41.510.1203 | 12 | 12.7 | 70 | 25 | 6 | 3-FINE | 49,95 |
| 41.510.1204 | 12 | 12.7 | 70 | 25 | 6 | 4-DIAMOND | 52,70 |
| 41.510.1206 | 12 | 12.7 | 70 | 25 | 6 | 6-UNI | 50,45 |
| 41.510.1208 | 12 | 12.7 | 70 | 25 | 6 | 8-STEEL | 55,10 |
| 41.510.1209 | 12 | 12.7 | 70 | 25 | 6 | 9-INOX | 60,40 |
| 41.510.1601 | 16 | 16 | 70 | 25 | 6 | 1-ALU | 75,95 |
| 41.510.1604 | 16 | 16 | 70 | 25 | 6 | 4-DIAMOND | 66,55 |
| 41.510.1606 | 16 | 16 | 70 | 25 | 6 | 6-UNI | 63,45 |
| 41.510.2006 | 20 | 19 | 70 | 25 | 6 | 6-UNI | 95,65 |

## › 41.520 Phantom

NL **Hardmetaal Stiftfrees model B, cilindrisch met kopvertanding, schacht 6 mm**
FR **Fraise lime Carbure Forme B, Forme cylindrique avec denture en bout, queue 6 mm**
ES **Fresa rotativa Metal Duro forma B, cilíndrico con corte al centro, mango 6 mm**
DE **Hartmetall Frässtift Form B, Zylinderform mit Stirnverzahnung, Schaft 6 mm**
EN **Carbide Burr model B, cylindrical with End Cut, shank 6 mm**



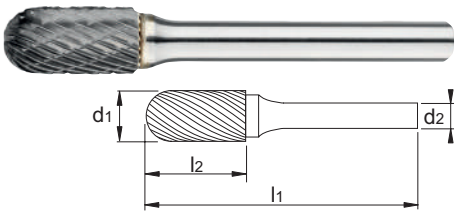

HM | Ø6 | B

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.520.0601 | 6 | 6 | 50 | 18 | 6 | 1-ALU | 30,55 |
| 41.520.0603 | 6 | 6 | 50 | 18 | 6 | 3-FINE | 23,63 |
| 41.520.0604 | 6 | 6 | 50 | 18 | 6 | 4-DIAMOND | 25,25 |
| 41.520.0606 | 6 | 6 | 50 | 18 | 6 | 6-UNI | 23,85 |
| 41.520.0608 | 6 | 6 | 50 | 18 | 6 | 8-STEEL | 26,80 |
| 41.520.0801 | 8 | 8 | 64 | 19 | 6 | 1-ALU | 39,45 |
| 41.520.0803 | 8 | 8 | 64 | 19 | 6 | 3-FINE | 32,55 |
| 41.520.0804 | 8 | 8 | 64 | 19 | 6 | 4-DIAMOND | 34,40 |
| 41.520.0806 | 8 | 8 | 64 | 19 | 6 | 6-UNI | 32,90 |
| 41.520.0808 | 8 | 8 | 64 | 19 | 6 | 8-STEEL | 35,90 |
| 41.520.1001 | 10 | 9.5 | 64 | 19 | 6 | 1-ALU | 42,05 |
| 41.520.1003 | 10 | 9.5 | 64 | 19 | 6 | 3-FINE | 34,75 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.520.1004 | 10 | 9.5 | 64 | 19 | 6 | 4-DIAMOND | 36,70 |
| 41.520.1006 | 10 | 9.5 | 64 | 19 | 6 | 6-UNI | 35,25 |
| 41.520.1008 | 10 | 9.5 | 64 | 19 | 6 | 8-STEEL | 41,60 |
| 41.520.1201 | 12 | 12.7 | 70 | 25 | 6 | 1-ALU | 66,55 |
| 41.520.1203 | 12 | 12.7 | 70 | 25 | 6 | 3-FINE | 55,85 |
| 41.520.1204 | 12 | 12.7 | 70 | 25 | 6 | 4-DIAMOND | 58,90 |
| 41.520.1206 | 12 | 12.7 | 70 | 25 | 6 | 6-UNI | 55,85 |
| 41.520.1208 | 12 | 12.7 | 70 | 25 | 6 | 8-STEEL | 61,20 |
| 41.520.1603 | 16 | 16 | 70 | 25 | 6 | 3-FINE | 69,50 |
| 41.520.1604 | 16 | 16 | 70 | 25 | 6 | 4-DIAMOND | 73,40 |
| 41.520.1606 | 16 | 16 | 70 | 25 | 6 | 6-UNI | 69,50 |
| 41.520.2006 | 20 | 19 | 70 | 25 | 6 | 6-UNI | 99,40 |

## › 41.530 Phantom

NL **Hardmetaal Stiftfrees model C, cilindrisch, ronde kop, schacht 6 mm**
FR **Fraise lime Carbure Forme C, Forme cylindrique à bout arrondi, queue 6 mm**
ES **Fresa rotativa Metal Duro forma C, cilíndrico, forma semiesférica, mango 6 mm**
DE **Hartmetall Frässtift Form C, Walzenrundform, Schaft 6 mm**
EN **Carbide Burr model C, Cylindrical, ball nose, shank 6 mm**




HM | Ø6 | C

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.530.0306 | 3 | 3 | 60 | 15 | 6 | 6-UNI | 32,90 |
| 41.530.0406 | 4 | 4 | 60 | 15 | 6 | 6-UNI | 32,90 |
| 41.530.0601 | 6 | 6 | 50 | 18 | 6 | 1-ALU | 32,90 |
| 41.530.0603 | 6 | 6 | 50 | 18 | 6 | 3-FINE | 24,98 |
| 41.530.0604 | 6 | 6 | 50 | 18 | 6 | 4-DIAMOND | 26,80 |
| 41.530.0606 | 6 | 6 | 50 | 18 | 6 | 6-UNI | 25,25 |
| 41.530.0608 | 6 | 6 | 50 | 18 | 6 | 8-STEEL | 27,55 |
| 41.530.0609 | 6 | 6 | 50 | 18 | 6 | 9-INOX | 29,80 |
| 41.530.0616 | 6 | 6 | 60 | 18 | 6 | 6-UNI | 33,95 |
| 41.530.0636 | 6 | 6 | 100 | 18 | 6 | 6-UNI | 73,45 |

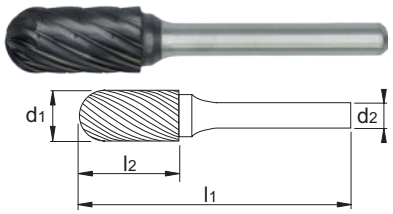
| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.530.0801 | 8 | 8 | 64 | 19 | 6 | 1-ALU | 37,15 |
| 41.530.0803 | 8 | 8 | 64 | 19 | 6 | 3-FINE | 30,40 |
| 41.530.0804 | 8 | 8 | 64 | 19 | 6 | 4-DIAMOND | 33,20 |
| 41.530.0806 | 8 | 8 | 64 | 19 | 6 | 6-UNI | 32,65 |
| 41.530.0808 | 8 | 8 | 64 | 19 | 6 | 8-STEEL | 35,85 |
| 41.530.0809 | 8 | 8 | 64 | 19 | 6 | 9-INOX | 38,50 |
| 41.530.1001 | 10 | 9.5 | 64 | 19 | 6 | 1-ALU | 43,70 |
| 41.530.1003 | 10 | 9.5 | 64 | 19 | 6 | 3-FINE | 36,30 |
| 41.530.1004 | 10 | 9.5 | 64 | 19 | 6 | 4-DIAMOND | 38,95 |
| 41.530.1006 | 10 | 9.5 | 64 | 19 | 6 | 6-UNI | 36,70 |

## 41.530 Phantom

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.530.1008 | 10 | 9.5 | 64 | 19 | 6 | 8-STEEL | 40,55 |
| 41.530.1009 | 10 | 9.5 | 64 | 19 | 6 | 9-INOX | 43,70 |
| 41.530.1201 | 12 | 12.7 | 70 | 25 | 6 | 1-ALU | 67,30 |
| 41.530.1203 | 12 | 12.7 | 70 | 25 | 6 | 3-FINE | 53,00 |
| 41.530.1204 | 12 | 12.7 | 70 | 25 | 6 | 4-DIAMOND | 57,40 |
| 41.530.1206 | 12 | 12.7 | 70 | 25 | 6 | 6-UNI | 54,25 |
| 41.530.1208 | 12 | 12.7 | 70 | 25 | 6 | 8-STEEL | 59,65 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.530.1209 | 12 | 12.7 | 70 | 25 | 6 | 9-INOX | 64,95 |
| 41.530.1601 | 16 | 16 | 70 | 25 | 6 | 1-ALU | 85,70 |
| 41.530.1603 | 16 | 16 | 70 | 25 | 6 | 3-FINE | 67,40 |
| 41.530.1604 | 16 | 16 | 70 | 25 | 6 | 4-DIAMOND | 72,15 |
| 41.530.1606 | 16 | 16 | 70 | 25 | 6 | 6-UNI | 69,15 |
| 41.530.2006 | 20 | 19 | 70 | 25 | 6 | 6-UNI | 104,75 |

## › 41.534 Phantom




**NL** HP2 UNI Hardmetaal Stiftfrees model C, cilindrisch, ronde kop, AlTiN-X
**FR** Fraise lime Carbure HP2 UNI Forme C, Forme cylindrique à bout arrondi, AlTiN-X
**ES** Fresa rotativa CMetal Duro HP2 UNI forma C, cilíndrico, forma semiesférica, AlTiN-X
**DE** HP2 UNI Hartmetall Frässtift Form C, Walzenrundform, AlTiN-X
**EN** HP2 UNI Carbide Burr model C, Cylindrical, ball nose, AlTiN-X

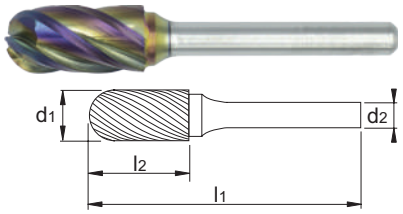
HM | AlTiN X | HP2 UNI | Ø6 | C

NIEUW NOUVEAU NUEVO NEU

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.534.1000 | 10 | 9.5 | 64 | 19 | 6 | HP2-UNI | 43,15 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.534.1200 | 12 | 12.7 | 70 | 25 | 6 | HP2-UNI | 65,60 |

## › 41.536 Phantom




**NL** HP2 ALU Hardmetaal Stiftfrees model C, cilindrisch, ronde kop, ta-C
**FR** Fraise lime Carbure HP2 ALU Forme C, Forme cylindrique à bout arrondi, ta-C
**ES** Fresa rotativa Metal Duro HP2 ALU forma C, cilíndrico, forma semiesférica, ta-C
**DE** HP2 ALU Hartmetall Frässtift Form C, Walzenrundform, ta-C
**EN** HP2 ALU Carbide Burr model C, Cylindrical, ball nose, ta-C

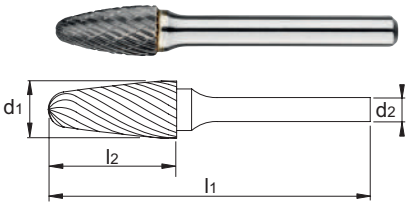
HM | Ø6 | C | HP2 ALU | ta-C

NIEUW NOUVEAU NUEVO NEU

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.536.1000 | 10 | 9.5 | 64 | 19 | 6 | HP2-ALU | 55,30 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.536.1200 | 12 | 12.7 | 70 | 25 | 6 | HP2-ALU | 86,85 |

## › 41.560 Phantom



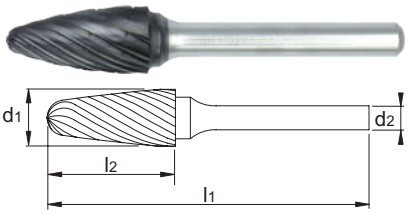

**NL** Hardmetaal Stiftfrees model F, boomvorm met ronde kop, schacht 6 mm
**FR** Fraise lime Carbure Forme F, Forme ogive à bout arrondi, queue 6 mm
**ES** Fresa rotativa Metal Duro forma F, forma ojival en semiesférica, mango 6 mm
**DE** Hartmetall Frässtift Form F, Rundbogenform, Schaft 6 mm
**EN** Carbide Burr model F, Ball nose tree, shank 6 mm

HM | Ø6 | F

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.560.0601 | 6 | 6 | 50 | 18 | 6 | 1-ALU | 35,60 |
| 41.560.0603 | 6 | 6 | 50 | 18 | 6 | 3-FINE | 26,50 |
| 41.560.0604 | 6 | 6 | 50 | 18 | 6 | 4-DIAMOND | 29,10 |
| 41.560.0606 | 6 | 6 | 50 | 18 | 6 | 6-UNI | 28,00 |
| 41.560.0608 | 6 | 6 | 50 | 18 | 6 | 8-STEEL | 29,80 |
| 41.560.0609 | 6 | 6 | 50 | 18 | 6 | 9-INOX | 32,50 |
| 41.560.0806 | 8 | 8 | 65 | 20 | 6 | 6-UNI | 37,45 |
| 41.560.0808 | 8 | 8 | 65 | 20 | 6 | 8-STEEL | 36,70 |
| 41.560.0809 | 8 | 8 | 65 | 20 | 6 | 9-INOX | 40,55 |
| 41.560.1001 | 10 | 9.5 | 64 | 19 | 6 | 1-ALU | 45,45 |
| 41.560.1003 | 10 | 9.5 | 64 | 19 | 6 | 3-FINE | 35,60 |
| 41.560.1004 | 10 | 9.5 | 64 | 19 | 6 | 4-DIAMOND | 39,40 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.560.1006 | 10 | 9.5 | 64 | 19 | 6 | 6-UNI | 37,10 |
| 41.560.1008 | 10 | 9.5 | 64 | 19 | 6 | 8-STEEL | 40,55 |
| 41.560.1009 | 10 | 9.5 | 64 | 19 | 6 | 9-INOX | 43,70 |
| 41.560.1201 | 12 | 12.7 | 70 | 25 | 6 | 1-ALU | 63,55 |
| 41.560.1203 | 12 | 12.7 | 70 | 25 | 6 | 3-FINE | 52,30 |
| 41.560.1204 | 12 | 12.7 | 70 | 25 | 6 | 4-DIAMOND | 57,55 |
| 41.560.1206 | 12 | 12.7 | 70 | 25 | 6 | 6-UNI | 54,60 |
| 41.560.1208 | 12 | 12.7 | 70 | 25 | 6 | 8-STEEL | 58,50 |
| 41.560.1209 | 12 | 12.7 | 70 | 25 | 6 | 9-INOX | 64,20 |
| 41.560.1601 | 16 | 16 | 70 | 25 | 6 | 1-ALU | 90,75 |
| 41.560.1604 | 16 | 16 | 70 | 25 | 6 | 4-DIAMOND | 81,80 |
| 41.560.1606 | 16 | 16 | 70 | 25 | 6 | 6-UNI | 78,75 |

## › 41.564 Phantom




NL **HP2 UNI Hardmetaal Stiftfrees model F, boomvorm met ronde kop, AlTiN-X**
FR **Fraise lime Carbure HP2 UNI Forme F, Forme ogive à bout arrondi, AlTiN-X**
ES **Fresa rotativa Metal Duro HP2 UNI forma F, forma ojival en semiesférica, AlTiN-X**
DE **HP2 UNI Hartmetall Frässtift Form F, Rundbogenform, AlTiN-X**
EN **HP2 UNI Carbide Burr model F, Ball nose tree, AlTiN-X**

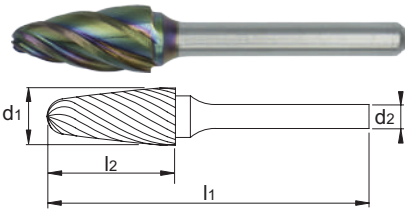
HM | AlTiN X | HP2 UNI | Ø6 | F

NIEUW NOUVEAU NUEVO NEU

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.564.1000 | 10 | 9.5 | 64 | 19 | 6 | HP2-UNI | 42,20 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.564.1200 | 12 | 12.7 | 70 | 25 | 6 | HP2-UNI | 62,25 |

## › 41.566 Phantom




NL **HP2 ALU Hardmetaal Stiftfrees model F, boomvorm met ronde kop, ta-C**
FR **Fraise lime Carbure HP2 ALU Forme F, Forme ogive à bout arrondi, ta-C**
ES **Fresa rotativa Metal Duro HP2 ALU forma F, forma ojival en semiesférica, ta-C**
DE **HP2 ALU Hartmetall Frässtift Form F, Rundbogenform, ta-C**
EN **HP2 ALU Carbide Burr model F, Ball nose tree, ta-C**

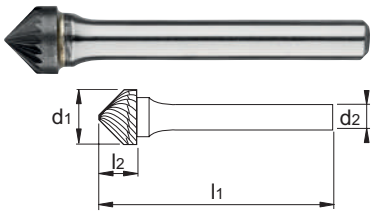
HM | Ø6 | F | HP2 ALU | ta-C

NIEUW NOUVEAU NUEVO NEU

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.566.1000 | 10 | 9.5 | 64 | 19 | 6 | HP2-ALU | 54,00 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.566.1200 | 12 | 12.7 | 70 | 25 | 6 | HP2-ALU | 79,95 |

## › 41.610 Phantom



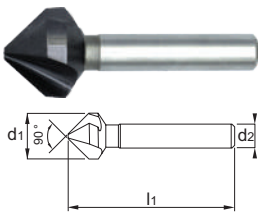

NL **Hardmetaal Stiftfrees model K, kegelvorm 90°, schacht 6 mm**
FR **Fraise lime Carbure Forme K, Forme conique pointue 90°, queue 6 mm**
ES **Fresa rotativa Metal Duro forma K, forma cónica 90°, mango 6 mm**
DE **Hartmetall Frässtift Form K, Kegelsenkform 90°, Schaft 6 mm**
EN **Carbide Burr model K, countersink 90°, shank 6 mm**

HM | Ø6 | K

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.610.0603 | 6 | 6 | 50 | 6 | 6 | 3-FINE | 24,23 |
| 41.610.0604 | 6 | 6 | 50 | 3 | 6 | 4-DIAMOND | 10,53 |
| 41.610.1003 | 10 | 9.5 | 52 | 4.7 | 6 | 3-FINE | 29,90 |

| Ref. | Ø | d1 | l1 | l2 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 41.610.1203 | 12 | 12.7 | 54 | 6.3 | 6 | 3-FINE | 40,55 |
| 41.610.1603 | 16 | 16 | 57 | 8 | 6 | 3-FINE | 52,70 |
| 41.610.2003 | 20 | 20 | 61 | 20 | 6 | 3-FINE | 23,87 |

## › 42.548 Phantom




NL **HP2 UNI HSS-E Vari Verzinkboor 90°, 3 snijkanten, AlTiN-X**
FR **Fraise à chanfreiner Vari HSS-E HP2 UNI 90°, 3 taillants, AlTiN-X**
ES **Avellanador Vari HSS-E HP2 UNI 90°, 3 labios, AlTiN-X**
DE **HP2 UNI HSS-E Kegelsenker ungleichteilung 90°, 3 Schneiden, AlTiN-X**
EN **HP2 UNI HSS-E Vari Countersink 90°, 3 flute, AlTiN-X**

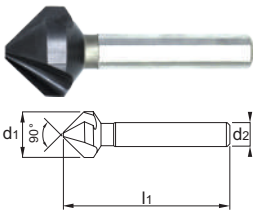
DIN 335-C | HSS-E | 3 | 3 | AlTiN X | HP2 UNI | 90° | VARI

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 52 CuAlFe | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-40 H | 25-35 F | 20-30 F | 10-16 A | 13-21 B | 12-20 A | 25-35 H | 30-40 H | 60-80 I | 30-50 I | 40-60 G | 30-40 G | 7-11 A | 7-11 B |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.548.0430 | 4.3 | 1,3-4,3 | M2 | 40 | 4 | 26,80 |
| 42.548.0600 | 6 | 1,5-6 | | 45 | 5 | 28,05 |
| 42.548.0630 | 6.3 | 1,5-6,3 | M3 | 45 | 5 | 28,05 |
| 42.548.0800 | 8 | 2-8 | | 50 | 6 | 31,90 |
| 42.548.0830 | 8.3 | 2-8,3 | M4 | 50 | 6 | 31,90 |
| 42.548.1000 | 10 | 2,5-10 | | 50 | 6 | 33,20 |
| 42.548.1040 | 10.4 | 2,5-10,4 | M5 | 50 | 6 | 33,20 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.548.1150 | 11.5 | 2,8-11,5 | M5,5 | 50 | 8 | 41,10 |
| 42.548.1240 | 12.4 | 2,8-12,4 | M6 | 56 | 8 | 41,10 |
| 42.548.1500 | 15 | 3,2-15 | | 60 | 10 | 46,45 |
| 42.548.1650 | 16.5 | 3,2-16,5 | M8 | 60 | 10 | 46,45 |
| 42.548.2050 | 20.5 | 3,5-20,5 | M10 | 63 | 10 | 60,25 |
| 42.548.2500 | 25 | 3,8-25 | M12 | 67 | 10 | 73,75 |
| 42.548.3100 | 31 | 4-31 | M16 | 71 | 12 | 116,80 |

## › 42.558 Phantom




NL **HP2 UNI HSS-E Vari Verzinkboor 90°, 3 snijkanten, AlTiN-X, met drievlaks schacht**
FR **Fraise à chanfreiner Vari HSS-E HP2 UNI 90°, 3 taillants, AlTiN-X, queue à trois méplats**
ES **Avellanador Vari HSS-E HP2 UNI 90°, 3 labios, AlTiN-X, con 3 chaflanes**
DE **HP2 UNI HSS-E Kegelsenker ungleichteilung 90°, 3 Schneiden, AlTiN-X, 3-Flächen-Schaft**
EN **HP2 UNI HSS-E Vari Countersink 90°, 3 flute, AlTiN-X, with 3 flat surfaces**

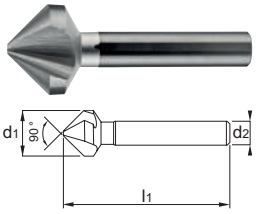
DIN 335-C | HSS-E | AlTiN X | HP2 UNI | 90° | VARI

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 52 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | CuAlFe | Ni/Co | Ti |
| 30-40 H | 25-35 F | 20-30 F | 10-16 A | 13-21 B | 12-20 A | 25-35 H | 30-40 H | 60-80 I | 30-50 I | 40-60 G | 30-40 G | 7-11 A | 7-11 B |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.558.0630 | 6.3 | 1,5-6,3 | M3 | 45 | 5 | 31,90 |
| 42.558.0830 | 8.3 | 2-8,3 | M4 | 50 | 6 | 35,75 |
| 42.558.1040 | 10.4 | 2,5-10,4 | M5 | 50 | 6 | 37,15 |
| 42.558.1240 | 12.4 | 2,8-12,4 | M6 | 56 | 8 | 43,40 |
| 42.558.1500 | 15 | 3,2-15 | | 60 | 10 | 50,45 |
| 42.558.1650 | 16.5 | 3,2-16,5 | M8 | 60 | 10 | 50,95 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.558.2050 | 20.5 | 3,5-20,5 | M10 | 63 | 10 | 64,30 |
| 42.558.2500 | 25 | 3,8-25 | M12 | 67 | 10 | 78,45 |
| 42.558.3100 | 31 | 4-31 | M16 | 71 | 12 | 123,05 |
| 42.558.4000 | 40 | 8-40 | | 112 | 12 | 273,00 |
| 42.558.5000 | 50 | 10-50 | | 125 | 16 | 382,00 |

## › 42.560 Phantom




NL **Volhardmetaal Verzinkboor 90°, 3 snijkanten**
FR **Fraise à chanfreiner Carbure monobloc 90°, 3 taillants**
ES **Avellanador para desbarbar Metal duro 90°, 3 labios**
DE **Vollhartmetall Kegelsenker 90°, 3 Schneiden**
EN **Solid carbide Countersink 90°, 3 flute**

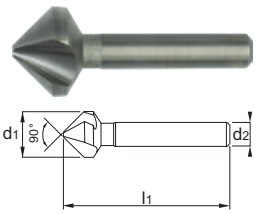
DIN 335-C | MG HM | 90°

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 40-80 C | 30-60 C | 20-40 B | 20-40 B | 8-10 A | 20-40 C | 15-20 B | 40-60 B | 50-80 C | 40-100 D | 40-80 C | 50-80 C | 10-12 A | 10-12 A |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.560.2050 | 20.5 | 4-20,5 | M10 | 60 | 10 | 285,00 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|

## › 42.562 Phantom




NL **Volhardmetaal Vari Verzinkboor 90°, 3 snijkanten met drievlaks schacht**
FR **Fraise à chanfreiner Vari Carbure monobloc 90°, 3 taillants, queue à 3 méplats**
ES **Avellanador Vari Metal duro 90°, 3 labios con 3 chaflanes**
DE **Vollhartmetall Kegelsenker ungleichteilung 90°, 3 Schneiden 3-Flächen-Schaft**
EN **Solid carbide Vari Countersink 90°, 3 flute with 3 flat surfaces**

DIN 335-C | VHM SC | 90° | VARI | ≥12,4

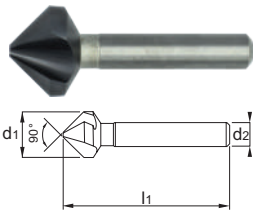
NIEUW | NOUVEAU | NUEVO | NEU

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 40-80 C | 30-60 C | 20-40 B | 20-40 B | 8-10 A | 20-40 C | 15-20 B | 40-60 B | 50-80 C | 40-100 D | 40-80 C | 50-80 C | 10-12 A | 10-12 A |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.562.0630 | 6.3 | 2-6,3 | M3 | 50 | 6 | 127,65 |
| 42.562.0830 | 8.3 | 2,5-8,3 | M4 | 50 | 6 | 138,20 |
| 42.562.1040 | 10.4 | 3-10,4 | M5 | 50 | 8 | 144,55 |
| 42.562.1240 | 12.4 | 3-12,4 | M6 | 56 | 8 | 152,95 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.562.1650 | 16.5 | 4-16,5 | M8 | 60 | 10 | 187,80 |
| 42.562.2050 | 20.5 | 4-20,5 | M10 | 60 | 10 | 213,10 |
| 42.562.2500 | 25 | 4-25 | M12 | 67 | 10 | 250,00 |
| 42.562.3100 | 31 | 5-31 | M16 | 71 | 12 | 292,00 |

## › 42.564 Phantom




NL **Volhardmetaal Vari Verzinkboor 90°, 3 snijkanten, AlCrN-X met drievlaks schacht**
FR **Fraise à chanfreiner Vari Carbure monobloc 90°, 3 taillants, AlCrN-X, queue à 3 méplats**
ES **Avellanador Vari Metal duro 90°, 3 labios, AlCrN-X con 3 chaflanes**
DE **Vollhartmetall Kegelsenker ungleichteilung 90°, 3 Schneiden, AlCrN-X 3-Flächen-Schaft**
EN **Solid carbide Vari Countersink 90°, 3 flute, AlCrN-X with 3 flat surfaces**

NIEUW NOUVEAU NUEVO NEU

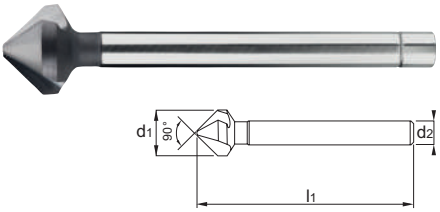
DIN 335-C | 3 | 3 | VHM SC | AlCrN-X | 90° | VARI | ≥12,4

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40-80 C | 30-60 C | 20-40 B | 20-40 B | 8-10 A | 20-40 C | 15-20 B | 40-60 B | 50-80 C | 40-100 D | 40-80 C | 50-80 C | 10-12 A | 10-12 A |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.564.0630 | 6.3 | 2-6,3 | M3 | 50 | 6 | 144,00 |
| 42.564.0830 | 8.3 | 2,5-8,3 | M4 | 50 | 6 | 154,55 |
| 42.564.1040 | 10.4 | 3-10,4 | M5 | 50 | 8 | 160,90 |
| 42.564.1240 | 12.4 | 3-12,4 | M6 | 56 | 8 | 169,35 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.564.1650 | 16.5 | 4-16,5 | M8 | 60 | 10 | 206,80 |
| 42.564.2050 | 20.5 | 4-20,5 | M10 | 60 | 10 | 238,45 |
| 42.564.2500 | 25 | 4-25 | M12 | 67 | 10 | 275,00 |
| 42.564.3100 | 31 | 5-31 | M16 | 71 | 12 | 325,00 |

## › 42.567 Phantom




NL **HSS-E Vari Verzinkboor 90°, 3 snijkanten, TiAlN, lang**
FR **Fraise à chanfreiner Vari HSS-E 90°, 3 taillants, TiAlN, version longue**
ES **Avellanador Vari HSS-E 90°, 3 labios, TiAlN, larga**
DE **HSS-E Kegelsenker ungleichteilung 90°, 3 Schneiden, TiAlN, lang**
EN **HSS-E Vari Countersink 90°, 3 flute, TiAlN, long**

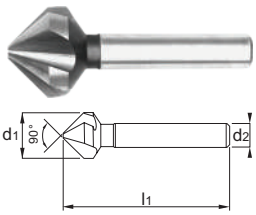
HSS-E | NORM | TiAlN | 3 | 3 | 90° | VARI

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 52 CuAlFe | N 61 PVC | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35-45 C | 20-30 C | 16-20 B | 8-15 A | 12-15 B | 8-12 A | 20-30 C | 30-40 C | 50-60 D | 35-40 C | 20-30 D | 30-40 C | 35-70 I | 4-8 A |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.567.0630 | 6.3 | 1,5-6,3 | M3 | 104 | 5 | 44,50 |
| 42.567.0830 | 8.3 | 2-8,3 | M4 | 105 | 6 | 50,65 |
| 42.567.1040 | 10.4 | 2,5-10,4 | M5 | 107 | 6 | 55,60 |
| 42.567.1240 | 12.4 | 2,8-12,4 | M6 | 108 | 8 | 63,40 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | € |
|---|---|---|---|---|---|---|
| 42.567.1650 | 16.5 | 3,2-16,5 | M8 | 111 | 10 | 79,35 |
| 42.567.2050 | 20.5 | 3,5-20,5 | M10 | 114 | 10 | 106,10 |
| 42.567.2500 | 25 | 3,8-25 | M12 | 118 | 10 | 135,40 |
| 42.567.3100 | 31 | 6-31 | M16 | 140 | 12 | 206,70 |

## › 42.582 Phantom




NL **HRC50 HSS-E 8% Vari Verzinkboor 90°, meersnijder met drievlaks schacht**
FR **Fraise à chanfreiner Vari HSS-E 8% HRC50 90°, multi-dents, queue à 3 méplats**
ES **Avellanador Vari HSS-E 8% HRC50 90°, multi labios con 3 chaflanes**
DE **HRC50 HSS-E 8% Kegelsenker ungleichteilung 90°, Mehrschneiden 3-Flächen-Schaft**
EN **HRC50 HSS-E 8% Vari Countersink 90°, Multi Flute with 3 flat surfaces**

HSS-E 8% | DIN 335-C | 90° | >3 | VARI | ≥12,4 | HRc 50

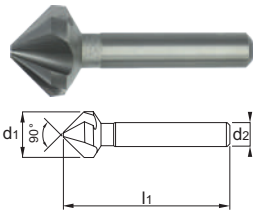
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | H 15 HRC | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 52 CuAlFe | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-40 I | 25-35 I | 20-30 I | 10-16 I | 9-14 I | 13-21 I | 12-20 I | 25-35 I | 30-40 I | 60-80 I | 30-50 I | 40-60 I | 30-40 I | 7-11 B | 7-11 H |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 42.582.0630 | 6.3 | 1,5-6,3 | M3 | 45 | 5 | 4 | 32,90 |
| 42.582.0830 | 8.3 | 2-8,3 | M4 | 50 | 6 | 4 | 34,50 |
| 42.582.1040 | 10.4 | 2,5-10,4 | M5 | 50 | 6 | 4 | 41,25 |
| 42.582.1240 | 12.4 | 2,8-12,4 | M6 | 56 | 8 | 5 | 45,05 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 42.582.1650 | 16.5 | 3,2-16,5 | M8 | 60 | 10 | 5 | 54,25 |
| 42.582.2050 | 20.5 | 3,5-20,5 | M10 | 63 | 10 | 5 | 76,95 |
| 42.582.2500 | 25 | 3,8-25 | M12 | 67 | 10 | 5 | 100,25 |
| 42.582.3100 | 31 | 4-31 | M16 | 71 | 12 | 5 | 169,30 |

## › 42.585 Phantom

**NL HRC50 Volhardmetaal Vari Verzinkboor 90°, meersnijder met drievlaks schacht**
**FR Fraise à chanfreiner Vari Carbure monobloc HRC50 90°, multi-dents, queue à 3 méplats**
**ES Avellanador Vari Metal duro HRC50 90°, multi labios con 3 chaflanes**
**DE HRC50 Vollhartmetall Kegelsenker ungleichteilung 90°, Mehrschneiden 3-Flächen-Schaft**
**EN HRC50 Solid carbide Vari Countersink 90°, Multi Flute with 3 flat surfaces**




DIN 335-C | VHM SC | 90° | >3 | VARI | ≥12,4 | HRc 50

NIEUW / NOUVEAU / NUEVO / NEU

| P 11 | P 12 | P 13 | P 14 | H 15 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 52 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | HRC | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | CuAlFe | Ni/Co | Ti |
| 40-60 I | 30-50 I | 25-35 I | 20-30 I | 20-30 I | 20-30 I | 20-25 I | 40-50 I | 35-45 I | 60-80 I | 30-50 I | 50-70 I | 35-45 I | 7-13 B | 7-13 H |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 42.585.0630 | 6.3 | 1,5-6,3 | M3 | 45 | 5 | 4 | 159,30 |
| 42.585.0830 | 8.3 | 2-8,3 | M4 | 50 | 6 | 4 | 164,60 |
| 42.585.1040 | 10.4 | 2,5-10,4 | M5 | 50 | 6 | 4 | 168,80 |
| 42.585.1240 | 12.4 | 2,8-12,4 | M6 | 56 | 8 | 5 | 174,05 |

| Ref. | d1 | Min-Max Ø | M | l1 | d2 | z | € |
|---|---|---|---|---|---|---|---|
| 42.585.1650 | 16.5 | 3,2-16,5 | M8 | 60 | 10 | 5 | 209,95 |
| 42.585.2050 | 20.5 | 3,5-20,5 | M10 | 63 | 10 | 5 | 235,25 |
| 42.585.2500 | 25 | 3,8-25 | M12 | 67 | 10 | 5 | 269,00 |
| 42.585.3100 | 31 | 4-31 | M16 | 71 | 12 | 5 | 311,00 |

## › 49.150 Phantom

**NL Hardmetaal Set Stiftfrezen**
**FR Coffret de Fraises limes Carbure**
**ES Juego de fresa rotativa Metal Duro**
**DE Hartmetall Satz Fräsfräsen**
**EN Carbide Set Burr**






VHM SC | Ø6

| Ref. | Ø | z | Contents | € |
|---|---|---|---|---|
| 49.150.0101 | 10 | 1-ALU | Form B, C, D, F, G | 225,00 |
| 49.150.0103 | 10 | 3-FINE | Form B, C, D, F, G | 179,00 |
| 49.150.0104 | 10 | 4-DIAMOND | Form B, C, D, F, G | 193,00 |
| 49.150.0106 | 10 | 6-UNI | Form B, C, D, F, G | 184,00 |

| Ref. | Ø | z | Contents | € |
|---|---|---|---|---|
| 49.150.0108 | 10 | 8-STEEL | Form B, C, D, F, G | 204,00 |
| 49.150.0109 | 10 | 9-INOX | Form A, C, D, F, G | 213,00 |
| 49.150.0126 | 12 | 6-UNI | Form B, C, D, F, G | 267,00 |

## › 49.164 Phantom

**NL HP2 UNI Hardmetaal Set Stiftfrezen AlTiN-X**
**FR Coffret de Fraises limes Carbure HP2 UNI AlTiN-X**
**ES Juego de fresa rotativa Metal Duro HP2 UNI AlTiN-X**
**DE HP2 UNI Hartmetall Satz Fräsfräsen AlTiN-X**
**EN HP2 UNI Carbide Set Burr AlTiN-X**



VHM SC | AlTiN X | HP2 UNI | Ø6

NIEUW / NOUVEAU / NUEVO / NEU

| Ref. | Ø | z | Contents | € |
|---|---|---|---|---|
| 49.164.0100 | 10 | HP2-UNI | Form B, C, D, F, G | 219,00 |

| Ref. | Ø | z | Contents | € |
|---|---|---|---|---|
| 49.164.0120 | 12 | HP2-UNI | Form B, C, D, F, G | 314,00 |

## › 49.264 Phantom



NL **HP2 UNI HSS-E Set Vari Verzinkboren 42.548, 90°, 3 snijkanten, AlTiN-X**
FR **Coffret de fraises à chanfreiner Vari HSS-E HP2 UNI 42.548, 90°, 3 taillants, AlTiN-X**
ES **Juego de avellanadores Vari HSS-E HP2 UNI 42.548, 90°, 3 labios, AlTiN-X**
DE **HP2 UNI HSS-E Satz Kegelsenker ungleichteilung 42.548, 90°, 3 Schneiden, AlTiN-X**
EN **HP2 UNI HSS-E Vari Countersink set 42.548, 90°, 3 flute, AlTiN-X**

DIN 335-C | HSS-E | 3 | 3 | AlTiN X | HP2 UNI | 90° | VARI

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 52 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | CuAlFe | Ni/Co | Ti |
| 30-40 H | 25-35 F | 20-30 F | 10-16 A | 13-21 B | 12-20 A | 25-35 H | 30-40 H | 60-80 I | 30-50 I | 40-60 G | 30-40 G | 7-11 A | 7-11 B |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 49.264.0620 | 42.548 | 6,3-8,3-10,4-12,4-16,5-20,5 mm | 250,00 |
| 49.264.0625 | 42.548 | 6,3-8,3-10,4-12,4-16,5-20,5-25 mm | 324,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 49.264.1020 | 42.548 | 10,4-12,4-16,5-20,5 mm | 190,00 |
| 49.264.1025 | 42.548 | 10,4-12,4-16,5-20,5-25 mm | 264,00 |

## › 49.266 Phantom



NL **HP2 UNI HSS-E Set Vari Verzinkboren 42.558, 90°, 3 snijkanten, AlTiN-X, met drievlaks schacht**
FR **Coffret de fraises à chanfreiner Vari HSS-E HP2 UNI 42.558, 90°, 3 taillants, AlTiN-X, queue à trois méplats**
ES **Juego de avellanadores Vari HSS-E HP2 UNI 42.558, 90°, 3 labios, AlTiN-X, con 3 chaflanes**
DE **HP2 UNI HSS-E Satz Kegelsenker ungleichteilung 42.558, 90°, 3 Schneiden, AlTiN-X, 3-Flächen-Schaft**
EN **HP2 UNI HSS-E Vari Countersink set 42.558, 90°, 3 flute, AlTiN-X, with 3 flat surfaces**

DIN 335-C | HSS-E | 3 | 3 | AlTiN X | HP2 UNI | 90° | VARI

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 52 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | CuAlFe | Ni/Co | Ti |
| 30-40 H | 25-35 F | 20-30 F | 10-16 A | 13-21 B | 12-20 A | 25-35 H | 30-40 H | 60-80 I | 30-50 I | 40-60 G | 30-40 G | 7-11 A | 7-11 B |

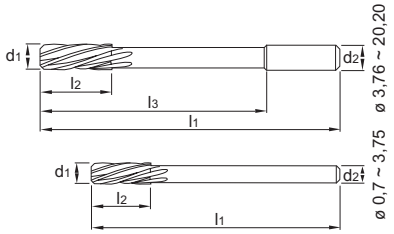
| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 49.266.0620 | 42.558 | 6,3-8,3-10,4-12,4-16,5-20,5 mm | 273,00 |
| 49.266.0625 | 42.558 | 6,3-8,3-10,4-12,4-16,5-20,5-25 mm | 351,00 |

| Ref. | Type | Ø mm | € |
|---|---|---|---|
| 49.266.1020 | 42.558 | 10,4-12,4-16,5-20,5 mm | 205,00 |
| 49.266.1025 | 42.558 | 10,4-12,4-16,5-20,5-25 mm | 284,00 |

## › 51.320 Phantom



NL **HSS-E Machineruimer vorm B/D H7**
FR **Alésoir machine HSS-E forme B/D H7**
ES **Escariador máquina HSS-E forma B/D H7**
DE **HSS-E Maschinenreibahlen form B/D H7**
EN **HSS-E Machine Chucking Reamer form B/D H7**




H7 | HSS-E | h8 | DIN 212 B/D

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-22 E | 12-17 D | 7-10 C | 5-7 B | 4-6 A | 3-5 A | 4-5 C | 6-15 D | 25-35 G | 20-30 G | 12-17 D | 2-3 A | 2-3 A |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.320.0100 | 1 | 38 | 5 | | 1 | 36,50 |
| 51.320.0150 | 1.5 | 40 | 8 | | 1.5 | 34,95 |
| 51.320.0200 | 2 | 49 | 11 | | 2 | 32,60 |
| 51.320.0250 | 2.5 | 57 | 14 | | 2.5 | 32,75 |
| 51.320.0300 | 3 | 61 | 15 | | 3 | 32,75 |
| 51.320.0350 | 3.5 | 70 | 18 | | 3.5 | 32,75 |
| 51.320.0400 | 4 | 75 | 19 | 47 | 4 | 36,45 |
| 51.320.0450 | 4.5 | 80 | 21 | 52 | 4.5 | 36,45 |
| 51.320.0500 | 5 | 86 | 23 | 58 | 5 | 37,80 |
| 51.320.0550 | 5.5 | 93 | 26 | 58 | 5.6 | 39,15 |

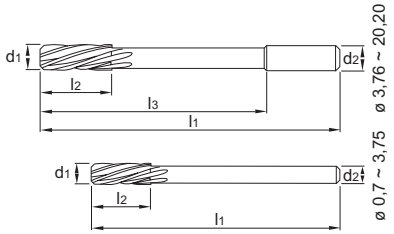
| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.320.0600 | 6 | 93 | 26 | 58 | 5.6 | 39,15 |
| 51.320.0650 | 6.5 | 101 | 28 | 65 | 6.3 | 42,15 |
| 51.320.0700 | 7 | 109 | 31 | 73 | 7.1 | 42,15 |
| 51.320.0750 | 7.5 | 109 | 31 | 73 | 7.1 | 42,15 |
| 51.320.0800 | 8 | 117 | 33 | 81 | 8 | 42,15 |
| 51.320.0850 | 8.5 | 117 | 33 | 81 | 8 | 49,35 |
| 51.320.0900 | 9 | 125 | 36 | 85 | 9 | 49,35 |
| 51.320.0950 | 9.5 | 125 | 36 | 85 | 9 | 49,35 |
| 51.320.1000 | 10 | 133 | 38 | 93 | 10 | 49,35 |
| 51.320.1050 | 10.5 | 133 | 38 | 93 | 10 | 63,60 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.320.1100 | 11 | 142 | 41 | 102 | 10 | 63,60 |
| 51.320.1150 | 11.5 | 142 | 41 | 102 | 10 | 70,55 |
| 51.320.1200 | 12 | 151 | 44 | 111 | 10 | 70,55 |
| 51.320.1250 | 12.5 | 151 | 44 | 111 | 10 | 83,80 |
| 51.320.1300 | 13 | 151 | 44 | 111 | 10 | 83,80 |
| 51.320.1350 | 13.5 | 160 | 47 | 115 | 12.5 | 95,25 |
| 51.320.1400 | 14 | 160 | 47 | 117 | 12.5 | 95,25 |
| 51.320.1450 | 14.5 | 162 | 50 | 117 | 12.5 | 114,95 |
| 51.320.1500 | 15 | 162 | 50 | 117 | 12.5 | 114,95 |
| 51.320.1600 | 16 | 170 | 52 | 125 | 12.5 | 117,80 |

## › 51.324 Phantom



NL **HSS-E Machineruimer AlCrN-X vorm B/D H7**
FR **Alésoir machine HSS-E AlCrN-X forme B/D H7**
ES **Escariador máquina HSS-E AlCrN-X forma B/D H7**
DE **HSS-E Maschinenreibahlen AlCrN-X form B/D H7**
EN **HSS-E Machine Chucking Reamer AlCrN-X form B/D H7**




H7 | HSS-E | AlCrN-X | h8 | DIN 212 B/D

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 15-22 E | 12-17 D | 7-10 C | 5-7 B | 4-6 A | 3-5 A | 4-5 C | 6-15 D | 25-35 G | 20-30 G | 12-17 D | 2-3 A | 2-3 A |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.324.0100 | 1 | 38 | 5 | | 1 | 50,45 |
| 51.324.0150 | 1.5 | 40 | 8 | | 1.5 | 49,00 |
| 51.324.0200 | 2 | 49 | 11 | | 2 | 45,50 |
| 51.324.0250 | 2.5 | 57 | 14 | | 2.5 | 45,50 |
| 51.324.0300 | 3 | 61 | 15 | | 3 | 45,50 |

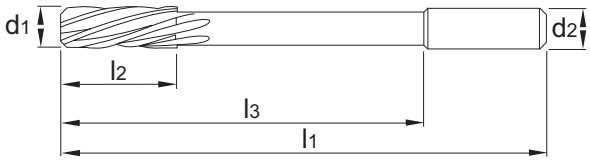
| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.324.0400 | 4 | 75 | 19 | 47 | 4 | 50,45 |
| 51.324.0500 | 5 | 86 | 23 | 58 | 5 | 51,35 |
| 51.324.0600 | 6 | 93 | 26 | 58 | 5.6 | 54,75 |
| 51.324.0700 | 7 | 109 | 31 | 73 | 7.1 | 59,05 |
| 51.324.0800 | 8 | 117 | 33 | 81 | 8 | 60,45 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.324.0900 | 9 | 125 | 36 | 85 | 9 | 68,30 |
| 51.324.1000 | 10 | 133 | 38 | 93 | 10 | 68,30 |
| 51.324.1200 | 12 | 151 | 44 | 111 | 10 | 93,65 |

## › 51.330 Phantom



NL **Volhardmetaal Machineruimer vorm B/D H7**
FR **Alésoir machine Carbure monobloc forme B/D H7**
ES **Escariador máquina Metal duro forma B/D H7**
DE **Vollhartmetall Maschinenreibahlen form B/D H7**
EN **Solid carbide Machine Chucking Reamer form B/D H7**




H7 | MG HM | DIN 212 B/D | h7

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | Ni/Co | Ti |
| 25-40 E | 20-25 D | 12-18 C | 10-15 B | 8-14 A | 7-12 A | 8-15 C | 15-20 D | 50-60 G | 40-60 G | 20-30 D | 6-10 A | 6-10 A |

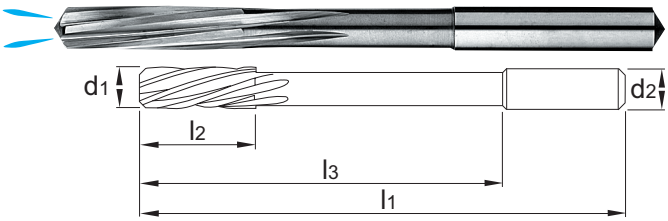
| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.330.0100 | 1 | 40 | 8 | 22 | 1 | 76,05 |
| 51.330.0150 | 1.5 | 40 | 8 | 24 | 1.5 | 76,05 |
| 51.330.0200 | 2 | 49 | 11 | 31 | 2 | 75,15 |
| 51.330.0250 | 2.5 | 57 | 14 | 38 | 2.5 | 79,20 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.330.0300 | 3 | 61 | 15 | 38 | 3 | 79,20 |
| 51.330.0400 | 4 | 75 | 19 | 51 | 4 | 98,60 |
| 51.330.0500 | 5 | 86 | 23 | 60 | 5 | 119,90 |
| 51.330.0600 | 6 | 93 | 26 | 73 | 6 | 126,80 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.330.0800 | 8 | 117 | 33 | 86 | 8 | 192,05 |
| 51.330.1000 | 10 | 133 | 38 | 99 | 10 | 247,55 |
| 51.330.1200 | 12 | 151 | 44 | 106 | 12 | 315,00 |
| 51.330.1400 | 14 | 160 | 47 | 110 | 14 | 650,00 |

## › 51.334 Phantom

NL **Volhardmetaal Machineruimer met koelkanaal vorm D H7**
FR **Alésoir machine Carbure monobloc à trou d´huile forme D H7**
ES **Escariador máquina Metal duro con canal de refrigeración forma D H7**
DE **Vollhartmetall Maschinenreibahlen mit Innenkühlung form D H7**
EN **Solid carbide Machine Chucking Reamer with coolant holes form D H7**




h6 | DIN 212-D | H7 | MG HM

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti

25-40 E | 20-25 D | 12-18 C | 10-15 B | 8-14 A | 7-12 A | 8-15 C | 15-20 D | 50-60 G | 40-60 G | 20-30 D | 6-10 A | 6-10 A

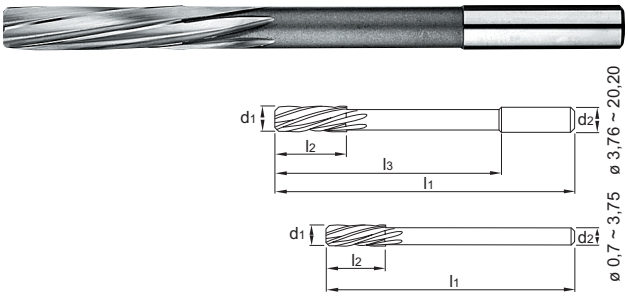
| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.334.0400 | 4 | 75 | 19 | 51 | 4 | 222,00 |
| 51.334.0500 | 5 | 86 | 23 | 60 | 5 | 240,90 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.334.0600 | 6 | 93 | 26 | 73 | 6 | 267,00 |
| 51.334.0800 | 8 | 117 | 33 | 86 | 8 | 322,00 |

| Ref. | d1 | l1 | l2 | l3 | d2 | € |
|---|---|---|---|---|---|---|
| 51.334.1000 | 10 | 133 | 38 | 99 | 10 | 411,00 |
| 51.334.1200 | 12 | 151 | 44 | 106 | 12 | 538,00 |

## › 51.350 Phantom

NL **HSS-E Precisie Machineruimer vorm B/D x 0,01 mm**
FR **Alésoir machine de précision HSS-E forme B/D x 0,01 mm**
ES **Escariador máquina de precisión HSS-E forma B/D x 0,01 mm**
DE **HSS-E Präzisions Maschinenreibahlen form B/D x 0,01 mm**
EN **HSS-E Precision Machine Reamer form B/D x 0,01 mm**




>ø6 −0,000 +0,005 | ≤ø3 - 0,000 +0,003 | ≤ø6 −0,000 +0,004 | HSS-E | x0,01 | h8 | DIN 212 B/D

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti

15-22 E | 12-17 D | 7-10 C | 5-7 B | 4-6 A | 3-5 A | 4-5 C | 6-15 D | 25-35 G | 20-30 G | 12-17 D | 2-3 A | 2-3 A

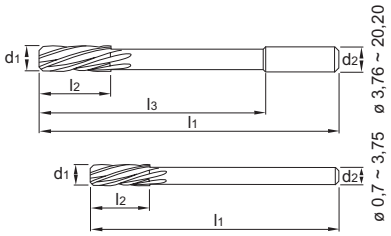
| Ref. | d1 | l1 | l2 | l3 | z | d2 | € |
|---|---|---|---|---|---|---|---|
| 51.350.0070-51.350.0079 | 0.7-0.79 | 33 | 5 | | 4 | 0.7-0.79 | 63,60 |
| 51.350.0080-51.350.0089 | 0.8-0.89 | 38 | 5 | | 4 | 0.8-0.89 | 57,25 |
| 51.350.0090-51.350.0096 | 0.9-0.96 | 38 | 5 | | 4 | 0.9-0.96 | 41,40 |
| 51.350.0097-51.350.0105 | 0.97-1.05 | 38 | 5 | | 4 | 0.97-1.05 | 39,50 |
| 51.350.0106-51.350.0132 | 1.06-1.32 | 40 | 5 | | 6 | 1.06-1.32 | 36,25 |
| 51.350.0133-51.350.0150 | 1.33-1.5 | 40 | 8 | | 6 | 1.33-1.5 | 36,25 |
| 51.350.0151-51.350.0170 | 1.51-1.7 | 43 | 9 | | 6 | 1.51-1.7 | 36,25 |
| 51.350.0171-51.350.0179 | 1.71-1.79 | 46 | 10 | | 6 | 1.71-1.79 | 36,25 |
| 51.350.0180-51.350.0190 | 1.80-1.9 | 46 | 10 | | 6 | 1.80-1.9 | 33,65 |
| 51.350.0191-51.350.0212 | 1.91-2.12 | 49 | 11 | | 6 | 1.91-2.12 | 33,65 |
| 51.350.0213-51.350.0236 | 2.13-2.36 | 53 | 12 | | 6 | 2.13-2.36 | 33,65 |
| 51.350.0237-51.350.0265 | 2.37-2.65 | 57 | 14 | | 6 | 2.37-2.65 | 33,40 |
| 51.350.0266-51.350.0300 | 2.66-3 | 61 | 15 | | 6 | 2.66-3 | 33,40 |
| 51.350.0301-51.350.0329 | 3.01-3.29 | 65 | 16 | | 6 | 3.01-3.29 | 33,40 |
| 51.350.0330-51.350.0335 | 3.30-3.35 | 65 | 16 | | 6 | 3.30-3.35 | 34,00 |
| 51.350.0336-51.350.0375 | 3.36-3.75 | 70 | 18 | | 6 | 3.36-3.75 | 34,00 |
| 51.350.0376-51.350.0425 | 3.76-4.25 | 75 | 19 | 47 | 6 | 4 | 35,45 |
| 51.350.0426-51.350.0475 | 4.26-4.75 | 80 | 21 | 52 | 6 | 4.5 | 35,45 |
| 51.350.0476-51.350.0530 | 4.76-5.3 | 86 | 23 | 58 | 6 | 5 | 36,75 |
| 51.350.0531-51.350.0600 | 5.31-6 | 93 | 26 | 58 | 6 | 5.6 | 38,25 |
| 51.350.0601-51.350.0668 | 6.01-6.68 | 101 | 28 | 65 | 6 | 6.3 | 38,25 |
| 51.350.0670 | 6.70 | 101 | 28 | 65 | 6 | 6.3 | 41,40 |
| 51.350.0671-51.350.0750 | 6.71-7.5 | 109 | 31 | 73 | 6 | 7.1 | 41,40 |

| Ref. | d1 | l1 | l2 | l3 | z | d2 | € |
|---|---|---|---|---|---|---|---|
| 51.350.0751-51.350.0850 | 7.51-8.5 | 117 | 33 | 81 | 6 | 8 | 41,40 |
| 51.350.0851-51.350.0855 | 8.51-8.55 | 125 | 36 | 85 | 6 | 9 | 41,40 |
| 51.350.0856-51.350.0950 | 8.56-9.5 | 125 | 36 | 85 | 6 | 9 | 47,85 |
| 51.350.0951-51.350.0955 | 9.51-9.55 | 133 | 38 | 93 | 6 | 10 | 47,85 |
| 51.350.0956-51.350.1005 | 9.56-10.05 | 133 | 38 | 93 | 6 | 10 | 49,85 |
| 51.350.1006-51.350.1060 | 10.06-10.6 | 133 | 38 | 93 | 6 | 10 | 51,85 |
| 51.350.1061-51.350.1131 | 10.61-11.31 | 142 | 41 | 102 | 6 | 10 | 51,85 |
| 51.350.1132-51.350.1180 | 11.32-11.8 | 142 | 41 | 102 | 6 | 10 | 67,90 |
| 51.350.1182-51.350.1250 | 11.82-12.5 | 151 | 44 | 111 | 6 | 10 | 67,90 |
| 51.350.1251-51.350.1320 | 12.51-13.2 | 151 | 44 | 111 | 8 | 10 | 73,15 |
| 51.350.1325-51.350.1375 | 13.25-13.75 | 160 | 47 | 115 | 8 | 12.5 | 147,00 |
| 51.350.1397-51.350.1400 | 13.97-14 | 160 | 47 | 117 | 8 | 12.5 | 131,60 |
| 51.350.1401-51.350.1405 | 14.01-14.05 | 162 | 50 | 117 | 8 | 12.5 | 131,60 |
| 51.350.1410-51.350.1500 | 14.1-15 | 162 | 50 | 117 | 8 | 12.5 | 156,70 |
| 51.350.1501-51.350.1510 | 15.01-15.1 | 170 | 52 | 125 | 8 | 12.5 | 156,70 |
| 51.350.1515-51.350.1590 | 15.15-15.9 | 170 | 52 | 125 | 8 | 12.5 | 205,95 |
| 51.350.1597-51.350.1600 | 15.97-16.00 | 170 | 52 | 125 | 8 | 12.5 | 156,70 |
| 51.350.1601-51.350.1605 | 16.01-16.05 | 175 | 54 | 130 | 8 | 14 | 156,70 |
| 51.350.1610-51.350.1699 | 16.1-16.99 | 175 | 54 | 130 | 8 | 14 | 192,40 |
| 51.350.1701-51.350.1800 | 17.01-18 | 182 | 56 | 137 | 8 | 14 | 192,40 |
| 51.350.1801-51.350.1900 | 18.01-19 | 189 | 58 | 141 | 8 | 16 | 192,40 |
| 51.350.1901-51.350.2005 | 19.01-20.05 | 195 | 60 | 147 | 8 | 16 | 192,40 |
| 51.350.2010-51.350.2020 | 20.1-20.2 | 195 | 60 | 147 | 8 | 16 | 232,75 |

# › 51.360 Phantom



NL **Volhardmetaal Precisie Machineruimer vorm B/D x 0,01 mm**
FR **Alésoir machine de précision Carbure monobloc forme B/D x 0,01 mm**
ES **Escariador máquina de precisión Metal duro forma B/D x 0,01 mm**
DE **Vollhartmetall Präzisions Maschinenreibahlen form B/D x 0,01 mm**
EN **Solid carbide Precision Machine Reamer form B/D x 0,01 mm**




| >ø6 −0,000 +0,005 | ≤ø3 - 0,000 +0,003 | ≤ø6 −0,000 +0,004 | h6 | MG HM | NORM | x0,01 |
|---|---|---|---|---|---|---|

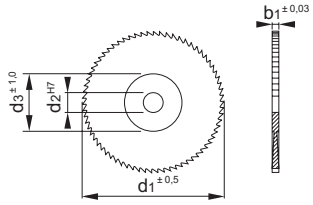
| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25-40 E | 20-25 D | 12-18 C | 10-15 B | 8-14 A | 7-12 A | 8-15 C | 15-20 D | 50-60 G | 40-60 G | 20-30 D | 6-10 A | 6-10 A |

| Ref. | d1 | l1 | l2 | l3 | z | d2 | € |
|---|---|---|---|---|---|---|---|
| 51.360.0070-51.360.0079 | 0.7-0.79 | 33 | 7 | | 4 | 0.7-0.79 | 79,70 |
| 51.360.0080-51.360.0105 | 0.8-1.05 | 38 | 7 | | 4 | 0.8-1.05 | 74,05 |
| 51.360.0106-51.360.0109 | 1.06-1.09 | 40 | 10 | | 4 | 1.06-1.09 | 74,05 |
| 51.360.0110-51.360.0155 | 1.1-1.55 | 40 | 10 | | 4 | 1.1-1.55 | 75,00 |
| 51.360.0156-51.360.0159 | 1.56-1.59 | 43 | 11 | | 4 | 1.56-1.59 | 75,00 |
| 51.360.0160-51.360.0179 | 1.60-1.79 | 43 | 11 | | 4 | 1.60-1.79 | 73,45 |
| 51.360.0180-51.360.0235 | 1.8-2.35 | 49 | 12 | | 4 | 1.8-2.35 | 73,45 |
| 513.600.236 | 2.36 | 49 | 12 | | 4 | 2.36 | 79,70 |
| 51.360.0237-51.360.0307 | 2.37-3.07 | 57 | 18 | | 6 | 2.37-3.07 | 79,70 |
| 51.360.0308-51.360.0370 | 3.08-3.70 | 57 | 18 | | 6 | 3.08-3.70 | 82,55 |
| 51.360.0371-51.360.0375 | 3.71-3.75 | 57 | 18 | | 6 | 3.71-3.75 | 103,20 |
| 51.360.0376-51.360.0396 | 3.76-3.96 | 75 | 19 | 51 | 6 | 4 | 103,20 |
| 51.360.0397-51.360.0420 | 3.97-4.20 | 75 | 19 | 51 | 6 | 4 | 104,70 |
| 51.360.0421-51.360.0425 | 4.21-4.25 | 75 | 19 | 51 | 6 | 4 | 112,15 |
| 51.360.0426-51.360.0475 | 4.26-4.75 | 80 | 21 | 55 | 6 | 4.5 | 112,15 |
| 51.360.0476-51.360.0505 | 4.76-5.05 | 86 | 23 | 60 | 6 | 5 | 112,15 |
| 51.360.0506-51.360.0530 | 5.06-5.3 | 86 | 23 | 60 | 6 | 5 | 126,55 |
| 513.600.535 | 5.35 | 93 | 26 | 66 | 6 | 5.5 | 126,55 |
| 51.360.0540-51.360.0580 | 5.40-5.8 | 93 | 26 | 66 | 6 | 5.5 | 128,50 |
| 51.360.0581-51.360.0596 | 5.81-5.96 | 101 | 28 | 73 | 6 | 6 | 128,50 |
| 51.360.0597-51.360.0670 | 5.97-6.7 | 101 | 28 | 73 | 6 | 6 | 135,20 |

| Ref. | d1 | l1 | l2 | l3 | z | d2 | € |
|---|---|---|---|---|---|---|---|
| 51.360.0675-51.360.0705 | 6.75-7.05 | 109 | 31 | 80 | 6 | 7 | 164,90 |
| 51.360.0706-51.360.0755 | 7.06-7.55 | 109 | 31 | 80 | 6 | 7 | 182,20 |
| 51.360.0760-51.360.0796 | 7.6-7.96 | 117 | 33 | 86 | 6 | 8 | 180,85 |
| 51.360.0797-51.360.0855 | 7.97-8.55 | 117 | 33 | 86 | 6 | 8 | 190,30 |
| 51.360.0860-51.360.0905 | 8.6-9.05 | 125 | 36 | 91 | 6 | 9 | 197,85 |
| 51.360.0907-51.360.0955 | 9.07-9.55 | 125 | 36 | 91 | 6 | 9 | 223,90 |
| 51.360.0959-51.360.1003 | 9.59-10.03 | 133 | 38 | 99 | 6 | 10 | 238,10 |
| 51.360.1004-51.360.1104 | 10.04-11.04 | 133 | 38 | 99 | 6 | 10 | 240,50 |
| 51.360.1105-51.360.1130 | 11.05-11.3 | 133 | 38 | 99 | 6 | 10 | 264,00 |
| 51.360.1131-51.360.1199 | 11.31-11.99 | 151 | 44 | 106 | 6 | 12 | 264,00 |
| 51.360.1200-51.360.1203 | 12-12.03 | 151 | 44 | 106 | 6 | 12 | 279,00 |
| 51.360.1204-51.360.1220 | 12.04-12.20 | 151 | 44 | 106 | 6 | 12 | 364,00 |
| 51.360.1225-51.360.1305 | 12.25-13.05 | 151 | 44 | 106 | 6 | 12 | 367,00 |
| 51.360.1398-51.360.1405 | 13.98-14.05 | 160 | 47 | 110 | 8 | 14 | 582,00 |
| 51.360.1497-51.360.1505 | 14.97-15.05 | 162 | 50 | 112 | 8 | 14 | 646,00 |
| 51.360.1597-51.360.1605 | 15.97-16.05 | 170 | 52 | 117 | 8 | 16 | 711,00 |
| 51.360.1697-51.360.1705 | 16.97-17.05 | 175 | 54 | 122 | 8 | 16 | 818,00 |
| 51.360.1797-51.360.1805 | 17.97-18.05 | 182 | 56 | 129 | 8 | 16 | 818,00 |
| 51.360.1897-51.360.1905 | 18.97-19.05 | 189 | 58 | 136 | 8 | 16 | 981,00 |
| 51.360.1997-51.360.2005 | 19.97-20.05 | 195 | 60 | 142 | 8 | 16 | 981,00 |

# › 63.200 Phantom

NL **HSS Metaalcirkelzaag fijn**
FR **Fraise-scie HSS pas fin**
ES **Fresa sierra circular HSS paso fino**
DE **HSS Metallkreissägeblätter fein**
EN **HSS Circular Saw Blade fine pitch**






DIN 1837-A | HSS | A

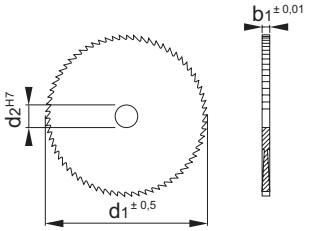
| P 11 | P 12 | P 13 | P 14 | M 21 | K 31 | K 32 |
|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | GG | GGG GTS-GTW |
| 30-40 | 25-35 | 15-25 | 15-20 | 10-15 | 25-30 | 20-25 |

| Ref. | d1 | b1 | d2 | d3 | z | t | € |
|---|---|---|---|---|---|---|---|
| 63.200.0303 | 32 | 0.3 | 8 | 14 | 80 | 1,25 | 26,00 |
| 63.200.0304 | 32 | 0.4 | 8 | 14 | 80 | 1,25 | 26,00 |
| 63.200.0305 | 32 | 0.5 | 8 | 14 | 80 | 1,25 | 26,00 |
| 63.200.0306 | 32 | 0.6 | 8 | 14 | 64 | 1,5 | 26,00 |
| 63.200.0308 | 32 | 0.8 | 8 | 14 | 64 | 1,5 | 26,00 |
| 63.200.0310 | 32 | 1 | 8 | 14 | 64 | 1,5 | 26,00 |
| 63.200.0312 | 32 | 1.2 | 8 | 14 | 48 | 2 | 28,00 |
| 63.200.0315 | 32 | 1.5 | 8 | 14 | 48 | 2 | 63,00 |
| 63.200.0316 | 32 | 1.6 | 8 | 14 | 48 | 2 | 30,00 |
| 63.200.0320 | 32 | 2 | 8 | 14 | 48 | 2 | 32,00 |
| 63.200.0358 | 35 | 0.8 | 13 | | 80 | 1,25 | 17,16 |
| 63.200.0403 | 40 | 0.3 | 10 | 18 | 100 | 1,25 | 30,00 |
| 63.200.0404 | 40 | 0.4 | 10 | 18 | 100 | 1,25 | 30,00 |
| 63.200.0405 | 40 | 0.5 | 10 | 18 | 80 | 1,5 | 29,00 |
| 63.200.0406 | 40 | 0.6 | 10 | 18 | 80 | 1,5 | 28,00 |
| 63.200.0408 | 40 | 0.8 | 10 | 18 | 80 | 1,5 | 28,00 |
| 63.200.0410 | 40 | 1 | 10 | 18 | 64 | 2 | 28,00 |
| 63.200.0412 | 40 | 1.2 | 10 | 18 | 64 | 2 | 28,00 |
| 63.200.0415 | 40 | 1.5 | 10 | 18 | 64 | 2 | 31,00 |
| 63.200.0416 | 40 | 1.6 | 10 | 18 | 64 | 2 | 31,00 |
| 63.200.0420 | 40 | 2 | 10 | 18 | 48 | 2,5 | 32,00 |
| 63.200.0425 | 40 | 2.5 | 10 | 18 | 48 | 2,5 | 37,00 |
| 63.200.0430 | 40 | 3 | 10 | 18 | 48 | 2,5 | 44,00 |
| 63.200.0503 | 50 | 0.3 | 13 | 25 | 128 | 1,25 | 33,00 |
| 63.200.0504 | 50 | 0.4 | 13 | 25 | 100 | 1,5 | 33,00 |
| 63.200.0505 | 50 | 0.5 | 13 | 25 | 100 | 1,5 | 30,00 |
| 63.200.0506 | 50 | 0.6 | 13 | 25 | 100 | 1,5 | 30,00 |
| 63.200.0508 | 50 | 0.8 | 13 | 25 | 80 | 2 | 30,00 |
| 63.200.0510 | 50 | 1 | 13 | 25 | 80 | 2 | 30,00 |
| 63.200.0512 | 50 | 1.2 | 13 | 25 | 80 | 2 | 30,00 |
| 63.200.0515 | 50 | 1.5 | 13 | 25 | 64 | 2,5 | 70,00 |
| 63.200.0516 | 50 | 1.6 | 13 | 25 | 64 | 2,5 | 34,00 |
| 63.200.0520 | 50 | 2 | 13 | 25 | 64 | 2,5 | 37,00 |
| 63.200.0525 | 50 | 2.5 | 13 | 25 | 64 | 2,5 | 39,80 |
| 63.200.0530 | 50 | 3 | 13 | 25 | 48 | 3,25 | 46,00 |
| 63.200.0540 | 50 | 4 | 13 | 25 | 48 | 3,25 | 54,00 |
| 63.200.0603 | 63 | 0.3 | 16 | 32 | 128 | 1,5 | 38,00 |
| 63.200.0604 | 63 | 0.4 | 16 | 32 | 128 | 1,5 | 37,00 |
| 63.200.0605 | 63 | 0.5 | 16 | 32 | 128 | 1,5 | 34,00 |
| 63.200.0606 | 63 | 0.6 | 16 | 32 | 100 | 2 | 34,00 |
| 63.200.0608 | 63 | 0.8 | 16 | 32 | 100 | 2 | 34,00 |
| 63.200.0610 | 63 | 1 | 16 | 32 | 100 | 2 | 34,00 |
| 63.200.0612 | 63 | 1.2 | 16 | 32 | 80 | 2,5 | 35,00 |
| 63.200.0615 | 63 | 1.5 | 16 | 32 | 80 | 2,5 | 39,00 |
| 63.200.0616 | 63 | 1.6 | 16 | 32 | 80 | 2,5 | 39,00 |
| 63.200.0620 | 63 | 2 | 16 | 32 | 80 | 2,5 | 42,00 |
| 63.200.0625 | 63 | 2.5 | 16 | 32 | 64 | 3 | 44,00 |
| 63.200.0630 | 63 | 3 | 16 | 32 | 64 | 3 | 48,00 |
| 63.200.0640 | 63 | 4 | 16 | 32 | 64 | 3 | 62,00 |
| 63.200.0650 | 63 | 5 | 16 | 32 | 48 | 4 | 76,00 |
| 63.200.0660 | 63 | 6 | 16 | 32 | 48 | 4 | 85,00 |
| 63.200.0803 | 80 | 0.3 | 22 | 36 | 160 | 1,5 | 43,00 |
| 63.200.0804 | 80 | 0.4 | 22 | 36 | 160 | 1,5 | 43,00 |
| 63.200.0805 | 80 | 0.5 | 22 | 36 | 128 | 2 | 40,00 |
| 63.200.0806 | 80 | 0.6 | 22 | 36 | 128 | 2 | 40,00 |
| 63.200.0808 | 80 | 0.8 | 22 | 36 | 128 | 2 | 40,00 |
| 63.200.0810 | 80 | 1 | 22 | 36 | 100 | 2,5 | 40,00 |
| 63.200.0812 | 80 | 1.2 | 22 | 36 | 100 | 2,5 | 41,00 |
| 63.200.0815 | 80 | 1.5 | 22 | 36 | 100 | 2,5 | 44,00 |
| 63.200.0816 | 80 | 1.6 | 22 | 36 | 100 | 2,5 | 44,00 |

| Ref. | d1 | b1 | d2 | d3 | z | t | € |
|---|---|---|---|---|---|---|---|
| 63.200.0820 | 80 | 2 | 22 | 36 | 80 | 3,25 | 48,00 |
| 63.200.0825 | 80 | 2.5 | 22 | 36 | 80 | 3,25 | 57,00 |
| 63.200.0830 | 80 | 3 | 22 | 36 | 80 | 3,25 | 62,00 |
| 63.200.0840 | 80 | 4 | 22 | 36 | 64 | 4 | 75,00 |
| 63.200.0850 | 80 | 5 | 22 | 36 | 64 | 4 | 93,00 |
| 63.200.0860 | 80 | 6 | 22 | 36 | 64 | 4 | 103,00 |
| 63.200.1005 | 100 | 0.5 | 22 | 40 | 160 | 2 | 46,00 |
| 63.200.1006 | 100 | 0.6 | 22 | 40 | 160 | 2 | 46,00 |
| 63.200.1008 | 100 | 0.8 | 22 | 40 | 128 | 2,5 | 46,00 |
| 63.200.1010 | 100 | 1 | 22 | 40 | 128 | 2,5 | 46,00 |
| 63.200.1012 | 100 | 1.2 | 22 | 40 | 128 | 2,5 | 46,00 |
| 63.200.1015 | 100 | 1.5 | 22 | 40 | 100 | 3,25 | 56,00 |
| 63.200.1016 | 100 | 1.6 | 22 | 40 | 100 | 3,25 | 56,00 |
| 63.200.1020 | 100 | 2 | 22 | 40 | 100 | 3,25 | 63,00 |
| 63.200.1025 | 100 | 2.5 | 22 | 40 | 100 | 3,25 | 71,00 |
| 63.200.1030 | 100 | 3 | 22 | 40 | 80 | 4 | 76,00 |
| 63.200.1040 | 100 | 4 | 22 | 40 | 80 | 4 | 104,00 |
| 63.200.1050 | 100 | 5 | 22 | 40 | 80 | 4 | 115,00 |
| 63.200.1060 | 100 | 6 | 22 | 40 | 64 | 5 | 135,00 |
| 63.200.1210 | 125 | 1 | 22 | 40 | 160 | 2,5 | 69,00 |
| 63.200.1212 | 125 | 1.2 | 22 | 40 | 128 | 3 | 69,00 |
| 63.200.1215 | 125 | 1.5 | 22 | 40 | 128 | 3 | 72,00 |
| 63.200.1216 | 125 | 1.6 | 22 | 40 | 128 | 3 | 72,00 |
| 63.200.1220 | 125 | 2 | 22 | 40 | 128 | 3 | 76,00 |
| 63.200.1225 | 125 | 2.5 | 22 | 40 | 100 | 4 | 80,00 |
| 63.200.1230 | 125 | 3 | 22 | 40 | 100 | 4 | 89,00 |
| 63.200.1240 | 125 | 4 | 22 | 40 | 100 | 4 | 133,00 |
| 63.200.1250 | 125 | 5 | 22 | 40 | 80 | 5 | 156,00 |
| 63.200.1260 | 125 | 6 | 22 | 40 | 80 | 5 | 173,00 |
| 63.200.1610 | 160 | 1 | 32 | 63 | 160 | 3,25 | 117,00 |
| 63.200.1612 | 160 | 1.2 | 32 | 63 | 160 | 3,25 | 117,00 |
| 63.200.1615 | 160 | 1.5 | 32 | 63 | 160 | 3,25 | 121,00 |
| 63.200.1616 | 160 | 1.6 | 32 | 63 | 160 | 3,25 | 121,00 |
| 63.200.1620 | 160 | 2 | 32 | 63 | 128 | 4 | 121,00 |
| 63.200.1625 | 160 | 2.5 | 32 | 63 | 128 | 4 | 127,00 |
| 63.200.1630 | 160 | 3 | 32 | 63 | 128 | 4 | 142,00 |
| 63.200.1640 | 160 | 4 | 32 | 63 | 100 | 5 | 196,00 |
| 63.200.1650 | 160 | 5 | 32 | 63 | 100 | 5 | 232,00 |
| 63.200.1660 | 160 | 6 | 32 | 63 | 100 | 5 | 267,00 |
| 63.200.2010 | 200 | 1 | 32 | 63 | 200 | 3,25 | 147,00 |
| 63.200.2012 | 200 | 1.2 | 32 | 63 | 200 | 3,25 | 147,00 |
| 63.200.2015 | 200 | 1.5 | 32 | 63 | 160 | 4 | 151,30 |
| 63.200.2016 | 200 | 1.6 | 32 | 63 | 160 | 4 | 154,00 |
| 63.200.2020 | 200 | 2 | 32 | 63 | 160 | 4 | 164,00 |
| 63.200.2025 | 200 | 2.5 | 32 | 63 | 160 | 4 | 178,35 |
| 63.200.2030 | 200 | 3 | 32 | 63 | 128 | 5 | 197,75 |
| 63.200.2040 | 200 | 4 | 32 | 63 | 128 | 5 | 281,00 |
| 63.200.2050 | 200 | 5 | 32 | 63 | 128 | 5 | 343,00 |
| 63.200.2060 | 200 | 6 | 32 | 63 | 100 | 6,25 | 391,00 |
| 63.200.2520 | 250 | 2 | 32 | 63 | 200 | 4 | 211,30 |
| 63.200.2525 | 250 | 2.5 | 32 | 63 | 160 | 5 | 244,50 |
| 63.200.2530 | 250 | 3 | 32 | 63 | 160 | 5 | 268,00 |
| 63.200.2540 | 250 | 4 | 32 | 63 | 160 | 5 | 391,00 |
| 63.200.2550 | 250 | 5 | 32 | 63 | 128 | 6,25 | 464,00 |
| 63.200.2560 | 250 | 6 | 32 | 63 | 128 | 6,25 | 556,00 |
| 63.200.3125 | 315 | 2.5 | 40 | 80 | 200 | 5 | 378,00 |
| 63.200.3130 | 315 | 3 | 40 | 80 | 200 | 5 | 429,00 |
| 63.200.3140 | 315 | 4 | 40 | 80 | 160 | 6,25 | 552,00 |
| 63.200.3150 | 315 | 5 | 40 | 80 | 160 | 6,25 | 677,00 |
| 63.200.3160 | 315 | 6 | 40 | 80 | 160 | 6,25 | 806,00 |

# › 63.220 Phantom

**NL Volhardmetaal Metaalcirkelzaag fijn**
**FR Fraise-scie Carbure monobloc pas fin**
**ES Fresa sierra circular Metal duro paso fino**
**DE Vollhartmetall Metallkreissägeblätter fein**
**EN Solid carbide Circular Saw Blade fine pitch**






DIN 1837-A | A | VHM SC

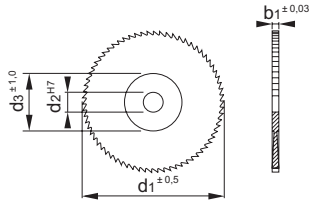
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC | Ni/Co | Ti |
| 100-200 | 80-160 | 60-120 | 40-80 | 50-100 | 25-60 | 60-120 | 60-120 | 150-600 | 80-300 | 80-300 | 150-600 | 25-60 | 30-60 |

| Ref. | d1 | b1 | d2 | z | t | € |
|---|---|---|---|---|---|---|
| 63.220.0102 | 15 | 0.2 | 5 | 64 | 0,75 | 33,75 |
| 63.220.0103 | 15 | 0.3 | 5 | 64 | 0,75 | 33,75 |
| 63.220.0104 | 15 | 0.4 | 5 | 64 | 0,75 | 33,75 |
| 63.220.0105 | 15 | 0.5 | 5 | 48 | 1 | 33,75 |
| 63.220.0106 | 15 | 0.6 | 5 | 48 | 1 | 33,75 |
| 63.220.0107 | 15 | 0.7 | 5 | 48 | 1 | 40,35 |
| 63.220.0108 | 15 | 0.8 | 5 | 40 | 1,25 | 40,35 |
| 63.220.0109 | 15 | 0.9 | 5 | 40 | 1,25 | 41,60 |
| 63.220.0110 | 15 | 1 | 5 | 40 | 1,25 | 42,20 |
| 63.220.0112 | 15 | 1.2 | 5 | 40 | 1,25 | 43,35 |
| 63.220.0115 | 15 | 1.5 | 5 | 40 | 1,25 | 49,75 |
| 63.220.0116 | 15 | 1.6 | 5 | 40 | 1,25 | 50,65 |
| 63.220.0118 | 15 | 1.8 | 5 | 40 | 1,25 | 52,00 |
| 63.220.0120 | 15 | 2 | 5 | 40 | 1,25 | 54,00 |
| 63.220.0202 | 20 | 0.2 | 5 | 64 | 1 | 36,90 |
| 63.220.0203 | 20 | 0.3 | 5 | 64 | 1 | 36,90 |
| 63.220.0204 | 20 | 0.4 | 5 | 64 | 1 | 36,90 |
| 63.220.0205 | 20 | 0.5 | 5 | 48 | 1,25 | 36,90 |
| 63.220.0206 | 20 | 0.6 | 5 | 48 | 1,25 | 36,90 |
| 63.220.0207 | 20 | 0.7 | 5 | 48 | 1,25 | 43,00 |
| 63.220.0208 | 20 | 0.8 | 5 | 48 | 1,25 | 43,00 |
| 63.220.0209 | 20 | 0.9 | 5 | 40 | 1,5 | 44,90 |
| 63.220.0210 | 20 | 1 | 5 | 40 | 1,5 | 47,85 |
| 63.220.0212 | 20 | 1.2 | 5 | 40 | 1,5 | 49,00 |
| 63.220.0215 | 20 | 1.5 | 5 | 40 | 1,5 | 57,00 |
| 63.220.0216 | 20 | 1.6 | 5 | 40 | 1,5 | 57,00 |
| 63.220.0218 | 20 | 1.8 | 5 | 32 | 2 | 61,50 |
| 63.220.0220 | 20 | 2 | 5 | 32 | 2 | 64,65 |
| 63.220.0225 | 20 | 2.5 | 5 | 32 | 2 | 81,50 |
| 63.220.0230 | 20 | 3 | 5 | 32 | 2 | 93,00 |
| 63.220.0302 | 30 | 0.2 | 8 | 100 | 1 | 48,55 |
| 63.220.0303 | 30 | 0.3 | 8 | 80 | 1,25 | 48,55 |
| 63.220.0304 | 30 | 0.4 | 8 | 80 | 1,25 | 48,55 |
| 63.220.0305 | 30 | 0.5 | 8 | 80 | 1,25 | 51,35 |
| 63.220.0306 | 30 | 0.6 | 8 | 64 | 1,5 | 51,35 |
| 63.220.0307 | 30 | 0.7 | 8 | 64 | 1,5 | 60,25 |
| 63.220.0308 | 30 | 0.8 | 8 | 64 | 1,5 | 64,85 |
| 63.220.0309 | 30 | 0.9 | 8 | 64 | 1,5 | 68,50 |
| 63.220.0310 | 30 | 1 | 8 | 64 | 1,5 | 68,50 |
| 63.220.0312 | 30 | 1.2 | 8 | 48 | 2 | 76,00 |
| 63.220.0315 | 30 | 1.5 | 8 | 48 | 2 | 85,50 |
| 63.220.0316 | 30 | 1.6 | 8 | 48 | 2 | 91,00 |
| 63.220.0318 | 30 | 1.8 | 8 | 48 | 2 | 95,00 |
| 63.220.0320 | 30 | 2 | 8 | 48 | 2 | 101,00 |
| 63.220.0325 | 30 | 2.5 | 8 | 40 | 2,25 | 118,00 |
| 63.220.0330 | 30 | 3 | 8 | 40 | 2,25 | 141,00 |
| 63.220.0402 | 40 | 0.2 | 10 | 128 | 1 | 59,00 |
| 63.220.0403 | 40 | 0.3 | 10 | 100 | 1,25 | 59,00 |
| 63.220.0404 | 40 | 0.4 | 10 | 100 | 1,25 | 59,00 |
| 63.220.0405 | 40 | 0.5 | 10 | 80 | 1,5 | 64,00 |
| 63.220.0406 | 40 | 0.6 | 10 | 80 | 1,5 | 64,00 |
| 63.220.0407 | 40 | 0.7 | 10 | 80 | 1,5 | 74,00 |
| 63.220.0408 | 40 | 0.8 | 10 | 80 | 1,5 | 77,00 |
| 63.220.0409 | 40 | 0.9 | 10 | 64 | 2 | 77,00 |
| 63.220.0410 | 40 | 1 | 10 | 64 | 2 | 77,00 |
| 63.220.0412 | 40 | 1.2 | 10 | 64 | 2 | 82,00 |
| 63.220.0415 | 40 | 1.5 | 10 | 64 | 2 | 91,50 |
| 63.220.0416 | 40 | 1.6 | 10 | 64 | 2 | 94,00 |
| 63.220.0418 | 40 | 1.8 | 10 | 48 | 2,5 | 101,75 |
| 63.220.0420 | 40 | 2 | 10 | 48 | 2,5 | 105,00 |
| 63.220.0425 | 40 | 2.5 | 10 | 48 | 2,5 | 137,00 |
| 63.220.0430 | 40 | 3 | 10 | 48 | 2,5 | 159,00 |
| 63.220.0502 | 50 | 0.2 | 13 | 128 | 1,25 | 96,75 |
| 63.220.0503 | 50 | 0.3 | 13 | 128 | 1,25 | 79,70 |

| Ref. | d1 | b1 | d2 | z | t | € |
|---|---|---|---|---|---|---|
| 63.220.0504 | 50 | 0.4 | 13 | 100 | 1,5 | 79,70 |
| 63.220.0505 | 50 | 0.5 | 13 | 100 | 1,5 | 82,25 |
| 63.220.0506 | 50 | 0.6 | 13 | 100 | 1,5 | 82,25 |
| 63.220.0507 | 50 | 0.7 | 13 | 80 | 2 | 82,25 |
| 63.220.0508 | 50 | 0.8 | 13 | 80 | 2 | 89,25 |
| 63.220.0509 | 50 | 0.9 | 13 | 80 | 2 | 92,00 |
| 63.220.0510 | 50 | 1 | 13 | 80 | 2 | 95,00 |
| 63.220.0512 | 50 | 1.2 | 13 | 80 | 2 | 99,00 |
| 63.220.0515 | 50 | 1.5 | 13 | 64 | 2,5 | 122,50 |
| 63.220.0516 | 50 | 1.6 | 13 | 64 | 2,5 | 124,00 |
| 63.220.0518 | 50 | 1.8 | 13 | 64 | 2,5 | 128,00 |
| 63.220.0520 | 50 | 2 | 13 | 64 | 2,5 | 134,00 |
| 63.220.0525 | 50 | 2.5 | 13 | 64 | 2,5 | 163,00 |
| 63.220.0530 | 50 | 3 | 13 | 48 | 3,25 | 190,00 |
| 63.220.0603 | 63 | 0.3 | 16 | 128 | 1,5 | 120,00 |
| 63.220.0604 | 63 | 0.4 | 16 | 128 | 1,5 | 103,00 |
| 63.220.0605 | 63 | 0.5 | 16 | 128 | 1,5 | 101,00 |
| 63.220.0606 | 63 | 0.6 | 16 | 100 | 2 | 103,00 |
| 63.220.0607 | 63 | 0.7 | 16 | 100 | 2 | 116,00 |
| 63.220.0608 | 63 | 0.8 | 16 | 100 | 2 | 130,00 |
| 63.220.0609 | 63 | 0.9 | 16 | 100 | 2 | 132,00 |
| 63.220.0610 | 63 | 1 | 16 | 100 | 2 | 134,45 |
| 63.220.0612 | 63 | 1.2 | 16 | 80 | 2,5 | 145,00 |
| 63.220.0615 | 63 | 1.5 | 16 | 80 | 2,5 | 151,65 |
| 63.220.0616 | 63 | 1.6 | 16 | 80 | 2,5 | 159,00 |
| 63.220.0618 | 63 | 1.8 | 16 | 80 | 2,5 | 169,00 |
| 63.220.0620 | 63 | 2 | 16 | 80 | 2,5 | 183,40 |
| 63.220.0625 | 63 | 2.5 | 16 | 64 | 3 | 225,00 |
| 63.220.0630 | 63 | 3 | 16 | 64 | 3 | 254,00 |
| 63.220.0805 | 80 | 0.5 | 22 | 128 | 2 | 169,00 |
| 63.220.0806 | 80 | 0.6 | 22 | 128 | 2 | 164,00 |
| 63.220.0808 | 80 | 0.8 | 22 | 128 | 2 | 177,00 |
| 63.220.0810 | 80 | 1 | 22 | 100 | 2,5 | 182,00 |
| 63.220.0812 | 80 | 1.2 | 22 | 100 | 2,5 | 195,00 |
| 63.220.0815 | 80 | 1.5 | 22 | 100 | 2,5 | 216,00 |
| 63.220.0816 | 80 | 1.6 | 22 | 100 | 2,5 | 222,00 |
| 63.220.0818 | 80 | 1.8 | 22 | 80 | 3,25 | 242,00 |
| 63.220.0820 | 80 | 2 | 22 | 80 | 3,25 | 255,00 |
| 63.220.0825 | 80 | 2.5 | 22 | 80 | 3,25 | 312,00 |
| 63.220.0830 | 80 | 3 | 22 | 80 | 3,25 | 374,00 |
| 63.220.1005 | 100 | 0.5 | 22 | 160 | 2 | 315,00 |
| 63.220.1006 | 100 | 0.6 | 22 | 160 | 2 | 299,00 |
| 63.220.1008 | 100 | 0.8 | 22 | 128 | 2,5 | 264,00 |
| 63.220.1010 | 100 | 1 | 22 | 128 | 2,5 | 249,00 |
| 63.220.1012 | 100 | 1.2 | 22 | 128 | 2,5 | 275,00 |
| 63.220.1015 | 100 | 1.5 | 22 | 100 | 3,25 | 313,00 |
| 63.220.1016 | 100 | 1.6 | 22 | 100 | 3,25 | 330,00 |
| 63.220.1018 | 100 | 1.8 | 22 | 100 | 3,25 | 348,00 |
| 63.220.1020 | 100 | 2 | 22 | 100 | 3,25 | 388,00 |
| 63.220.1025 | 100 | 2.5 | 22 | 100 | 3,25 | 461,00 |
| 63.220.1030 | 100 | 3 | 22 | 80 | 4 | 509,00 |
| 63.220.1208 | 125 | 0.8 | 22 | 160 | 2,5 | 452,00 |
| 63.220.1210 | 125 | 1 | 22 | 160 | 2,5 | 412,00 |
| 63.220.1212 | 125 | 1.2 | 22 | 128 | 3 | 453,00 |
| 63.220.1215 | 125 | 1.5 | 22 | 128 | 3 | 482,00 |
| 63.220.1216 | 125 | 1.6 | 22 | 128 | 3 | 499,00 |
| 63.220.1218 | 125 | 1.8 | 22 | 128 | 3 | 540,00 |
| 63.220.1220 | 125 | 2 | 22 | 128 | 3 | 593,00 |
| 63.220.1610 | 160 | 1 | 32 | 160 | 3,25 | 819,00 |
| 63.220.1612 | 160 | 1.2 | 32 | 160 | 3,25 | 804,00 |
| 63.220.1615 | 160 | 1.5 | 32 | 160 | 3,25 | 838,00 |
| 63.220.1616 | 160 | 1.6 | 32 | 160 | 3,25 | 855,00 |
| 63.220.1620 | 160 | 2 | 32 | 128 | 4 | 1.105,00 |

# › 63.250 Phantom

NL **HSS Metaalcirkelzaag grof**
FR **Fraise-scie HSS pas grossier**
ES **Fresa sierra circular HSS grueso**
DE **HSS Metallkreissägeblätter grob**
EN **HSS Circular Saw Blade coarse pitch**






DIN 1838-B | HSS | B

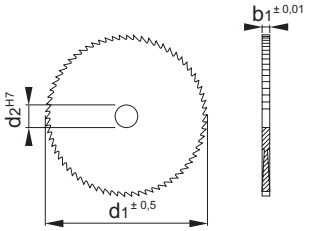
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC |
| 30-40 | 25-35 | 15-25 | 15-20 | 10-15 | 6-8 | 25-30 | 20-25 | 500-700 | 500-700 | 200-400 | 200-600 |

| Ref. | d1 | b1 | d2 | d3 | z | t | € |
|---|---|---|---|---|---|---|---|
| 63.250.0505 | 50 | 0.5 | 13 | 25 | 48 | 3,25 | 31,00 |
| 63.250.0506 | 50 | 0.6 | 13 | 25 | 48 | 3,25 | 31,00 |
| 63.250.0508 | 50 | 0.8 | 13 | 25 | 40 | 4 | 31,00 |
| 63.250.0510 | 50 | 1 | 13 | 25 | 40 | 4 | 31,00 |
| 63.250.0512 | 50 | 1.2 | 13 | 25 | 40 | 4 | 31,00 |
| 63.250.0516 | 50 | 1.6 | 13 | 25 | 32 | 5 | 35,00 |
| 63.250.0520 | 50 | 2 | 13 | 25 | 32 | 5 | 37,00 |
| 63.250.0525 | 50 | 2.5 | 13 | 25 | 32 | 5 | 40,00 |
| 63.250.0530 | 50 | 3 | 13 | 25 | 24 | 6,5 | 47,00 |
| 63.250.0540 | 50 | 4 | 13 | 25 | 24 | 6,5 | 54,70 |
| 63.250.0550 | 50 | 5 | 13 | 25 | 24 | 6,5 | 71,55 |
| 63.250.0560 | 50 | 6 | 13 | 25 | 20 | 7,75 | 81,15 |
| 63.250.0605 | 63 | 0.5 | 16 | 32 | 64 | 3 | 35,00 |
| 63.250.0606 | 63 | 0.6 | 16 | 32 | 48 | 4 | 35,00 |
| 63.250.0608 | 63 | 0.8 | 16 | 32 | 48 | 4 | 35,00 |
| 63.250.0610 | 63 | 1 | 16 | 32 | 48 | 4 | 35,00 |
| 63.250.0612 | 63 | 1.2 | 16 | 32 | 40 | 5 | 35,00 |
| 63.250.0615 | 63 | 1.5 | 16 | 32 | 40 | 5 | 39,00 |
| 63.250.0616 | 63 | 1.6 | 16 | 32 | 40 | 5 | 39,00 |
| 63.250.0620 | 63 | 2 | 16 | 32 | 40 | 5 | 43,00 |
| 63.250.0625 | 63 | 2.5 | 16 | 32 | 32 | 6,25 | 45,00 |
| 63.250.0630 | 63 | 3 | 16 | 32 | 40 | 5 | 86,00 |
| 63.250.0640 | 63 | 4 | 16 | 32 | 32 | 6,25 | 62,50 |
| 63.250.0650 | 63 | 5 | 16 | 32 | 24 | 8,25 | 78,00 |
| 63.250.0660 | 63 | 6 | 16 | 32 | 24 | 8,25 | 87,00 |
| 63.250.0805 | 80 | 0.5 | 22 | 36 | 64 | 4 | 41,00 |
| 63.250.0806 | 80 | 0.6 | 22 | 36 | 64 | 4 | 41,00 |
| 63.250.0808 | 80 | 0.8 | 22 | 36 | 64 | 4 | 41,00 |
| 63.250.0810 | 80 | 1 | 22 | 36 | 48 | 5,25 | 41,00 |
| 63.250.0812 | 80 | 1.2 | 22 | 36 | 48 | 5,25 | 41,00 |
| 63.250.0815 | 80 | 1.5 | 22 | 36 | 48 | 5,25 | 44,00 |
| 63.250.0816 | 80 | 1.6 | 22 | 36 | 48 | 5,25 | 44,00 |
| 63.250.0820 | 80 | 2 | 22 | 36 | 40 | 6,25 | 48,00 |
| 63.250.0825 | 80 | 2.5 | 22 | 36 | 40 | 6,25 | 58,00 |
| 63.250.0830 | 80 | 3 | 22 | 36 | 40 | 6,25 | 62,50 |
| 63.250.0840 | 80 | 4 | 22 | 36 | 32 | 7,75 | 77,00 |
| 63.250.0850 | 80 | 5 | 22 | 36 | 32 | 7,75 | 95,00 |
| 63.250.0860 | 80 | 6 | 22 | 36 | 32 | 7,75 | 104,00 |
| 63.250.1005 | 100 | 0.5 | 22 | 40 | 80 | 4 | 47,00 |
| 63.250.1006 | 100 | 0.6 | 22 | 40 | 80 | 4 | 46,50 |
| 63.250.1008 | 100 | 0.8 | 22 | 40 | 64 | 5 | 46,50 |
| 63.250.1010 | 100 | 1 | 22 | 40 | 64 | 5 | 46,50 |
| 63.250.1012 | 100 | 1.2 | 22 | 40 | 64 | 5 | 46,50 |
| 63.250.1015 | 100 | 1.5 | 22 | 40 | 64 | 5 | 57,00 |
| 63.250.1016 | 100 | 1.6 | 22 | 40 | 48 | 6,5 | 57,00 |

| Ref. | d1 | b1 | d2 | d3 | z | t | € |
|---|---|---|---|---|---|---|---|
| 63.250.1020 | 100 | 2 | 22 | 40 | 48 | 6,5 | 64,00 |
| 63.250.1025 | 100 | 2.5 | 22 | 40 | 48 | 6,5 | 72,00 |
| 63.250.1030 | 100 | 3 | 22 | 40 | 40 | 7,75 | 77,00 |
| 63.250.1040 | 100 | 4 | 22 | 40 | 40 | 7,75 | 106,00 |
| 63.250.1050 | 100 | 5 | 22 | 40 | 40 | 7,75 | 116,00 |
| 63.250.1060 | 100 | 6 | 22 | 40 | 32 | 9,75 | 137,00 |
| 63.250.1210 | 125 | 1 | 22 | 40 | 80 | 5 | 69,00 |
| 63.250.1212 | 125 | 1.2 | 22 | 40 | 64 | 6,25 | 69,00 |
| 63.250.1215 | 125 | 1.5 | 22 | 40 | 64 | 6,25 | 73,00 |
| 63.250.1216 | 125 | 1.6 | 22 | 40 | 64 | 6,25 | 73,00 |
| 63.250.1220 | 125 | 2 | 22 | 40 | 64 | 6,25 | 77,00 |
| 63.250.1225 | 125 | 2.5 | 22 | 40 | 48 | 8,25 | 82,00 |
| 63.250.1230 | 125 | 3 | 22 | 40 | 48 | 8,25 | 89,00 |
| 63.250.1240 | 125 | 4 | 22 | 40 | 48 | 8,25 | 135,00 |
| 63.250.1250 | 125 | 5 | 22 | 40 | 40 | 9,75 | 159,00 |
| 63.250.1260 | 125 | 6 | 22 | 40 | 40 | 9,75 | 175,00 |
| 63.250.1610 | 160 | 1 | 32 | 63 | 80 | 6,25 | 119,10 |
| 63.250.1612 | 160 | 1.2 | 32 | 63 | 80 | 6,25 | 120,20 |
| 63.250.1615 | 160 | 1.5 | 32 | 63 | 80 | 6,25 | 122,35 |
| 63.250.1616 | 160 | 1.6 | 32 | 63 | 80 | 6,25 | 122,35 |
| 63.250.1620 | 160 | 2 | 32 | 63 | 64 | 7,75 | 124,45 |
| 63.250.1625 | 160 | 2.5 | 32 | 63 | 64 | 7,75 | 128,70 |
| 63.250.1630 | 160 | 3 | 32 | 63 | 64 | 7,75 | 143,70 |
| 63.250.1640 | 160 | 4 | 32 | 63 | 48 | 10,5 | 199,70 |
| 63.250.1650 | 160 | 5 | 32 | 63 | 48 | 10,5 | 235,35 |
| 63.250.1660 | 160 | 6 | 32 | 63 | 48 | 10,5 | 271,00 |
| 63.250.2015 | 200 | 1.5 | 32 | 63 | 80 | 7,75 | 151,90 |
| 63.250.2016 | 200 | 1.6 | 32 | 63 | 80 | 7,75 | 156,05 |
| 63.250.2020 | 200 | 2 | 32 | 63 | 80 | 7,75 | 166,45 |
| 63.250.2025 | 200 | 2.5 | 32 | 63 | 80 | 7,75 | 181,05 |
| 63.250.2030 | 200 | 3 | 32 | 63 | 64 | 9,75 | 200,80 |
| 63.250.2040 | 200 | 4 | 32 | 63 | 64 | 9,75 | 286,00 |
| 63.250.2050 | 200 | 5 | 32 | 63 | 64 | 9,75 | 348,00 |
| 63.250.2060 | 200 | 6 | 32 | 63 | 48 | 13 | 396,00 |
| 63.250.2520 | 250 | 2 | 32 | 63 | 100 | 7,75 | 214,50 |
| 63.250.2525 | 250 | 2.5 | 32 | 63 | 80 | 9,75 | 248,15 |
| 63.250.2530 | 250 | 3 | 32 | 63 | 80 | 9,75 | 272,00 |
| 63.250.2540 | 250 | 4 | 32 | 63 | 80 | 9,75 | 397,00 |
| 63.250.2550 | 250 | 5 | 32 | 63 | 64 | 12,25 | 473,00 |
| 63.250.2560 | 250 | 6 | 32 | 63 | 64 | 12,25 | 566,00 |
| 63.250.3125 | 315 | 2.5 | 40 | 80 | 100 | 10 | 383,00 |
| 63.250.3130 | 315 | 3 | 40 | 80 | 100 | 10 | 435,00 |
| 63.250.3140 | 315 | 4 | 40 | 80 | 80 | 12,25 | 561,00 |
| 63.250.3150 | 315 | 5 | 40 | 80 | 80 | 12,25 | 686,00 |
| 63.250.3160 | 315 | 6 | 40 | 80 | 80 | 12,25 | 818,00 |

# › 63.270 Phantom

**NL Volhardmetaal Metaalcirkelzaag grof**
**FR Fraise-scie Carbure monobloc pas grossier**
**ES Fresa sierra circular Metal duro grueso**
**DE Vollhartmetall Metallkreissägeblätter grob**
**EN Solid carbide Circular Saw Blade coarse pitch**






DIN 1838-B | B | VHM SC

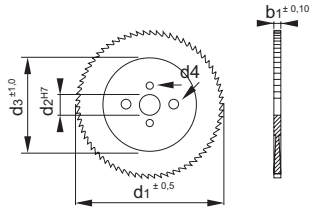
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC | Ni/Co | Ti |
| 100-200 | 80-160 | 60-120 | 40-80 | 50-100 | 25-60 | 60-120 | 60-120 | 150-600 | 80-300 | 80-300 | 150-600 | 25-60 | 30-60 |

| Ref. | d1 | b1 | d2 | z | t | € |
|---|---|---|---|---|---|---|
| 63.270.0103 | 15 | 0.3 | 5 | 20 | 2,25 | 33,75 |
| 63.270.0104 | 15 | 0.4 | 5 | 20 | 2,25 | 33,75 |
| 63.270.0105 | 15 | 0.5 | 5 | 20 | 2,25 | 33,75 |
| 63.270.0106 | 15 | 0.6 | 5 | 20 | 2,25 | 33,75 |
| 63.270.0108 | 15 | 0.8 | 5 | 20 | 2,25 | 40,35 |
| 63.270.0110 | 15 | 1 | 5 | 20 | 2,25 | 42,20 |
| 63.270.0112 | 15 | 1.2 | 5 | 20 | 2,25 | 43,35 |
| 63.270.0115 | 15 | 1.5 | 5 | 20 | 2,25 | 49,75 |
| 63.270.0120 | 15 | 2 | 5 | 20 | 2,25 | 55,00 |
| 63.270.0130 | 15 | 3 | 5 | 20 | 2,25 | 81,00 |
| 63.270.0203 | 20 | 0.3 | 5 | 20 | 3,25 | 36,90 |
| 63.270.0204 | 20 | 0.4 | 5 | 20 | 3,25 | 36,90 |
| 63.270.0205 | 20 | 0.5 | 5 | 20 | 3,25 | 36,90 |
| 63.270.0206 | 20 | 0.6 | 5 | 20 | 3,25 | 36,90 |
| 63.270.0208 | 20 | 0.8 | 5 | 20 | 3,25 | 43,00 |
| 63.270.0210 | 20 | 1 | 5 | 20 | 3,25 | 47,85 |
| 63.270.0212 | 20 | 1.2 | 5 | 20 | 3,25 | 49,00 |
| 63.270.0215 | 20 | 1.5 | 5 | 20 | 3,25 | 57,00 |
| 63.270.0220 | 20 | 2 | 5 | 20 | 3,25 | 65,00 |
| 63.270.0230 | 20 | 3 | 5 | 20 | 3,25 | 93,00 |
| 63.270.0303 | 30 | 0.3 | 8 | 30 | 3,25 | 48,55 |
| 63.270.0304 | 30 | 0.4 | 8 | 30 | 3,25 | 48,55 |
| 63.270.0305 | 30 | 0.5 | 8 | 30 | 3,25 | 51,35 |
| 63.270.0306 | 30 | 0.6 | 8 | 30 | 3,25 | 51,35 |
| 63.270.0308 | 30 | 0.8 | 8 | 24 | 4 | 64,85 |
| 63.270.0310 | 30 | 1 | 8 | 24 | 4 | 68,50 |
| 63.270.0312 | 30 | 1.2 | 8 | 24 | 4 | 76,00 |
| 63.270.0315 | 30 | 1.5 | 8 | 24 | 4 | 85,00 |
| 63.270.0320 | 30 | 2 | 8 | 24 | 4 | 101,00 |
| 63.270.0325 | 30 | 2.5 | 8 | 24 | 4 | 118,00 |
| 63.270.0330 | 30 | 3 | 8 | 24 | 4 | 139,00 |
| 63.270.0403 | 40 | 0.3 | 10 | 40 | 3,25 | 59,00 |
| 63.270.0404 | 40 | 0.4 | 10 | 40 | 3,25 | 59,00 |
| 63.270.0405 | 40 | 0.5 | 10 | 40 | 3,25 | 64,00 |
| 63.270.0406 | 40 | 0.6 | 10 | 40 | 3,25 | 64,00 |
| 63.270.0408 | 40 | 0.8 | 10 | 32 | 4 | 77,00 |
| 63.270.0410 | 40 | 1 | 10 | 32 | 4 | 77,00 |
| 63.270.0412 | 40 | 1.2 | 10 | 32 | 4 | 82,00 |
| 63.270.0415 | 40 | 1.5 | 10 | 32 | 4 | 91,00 |
| 63.270.0420 | 40 | 2 | 10 | 32 | 4 | 105,00 |
| 63.270.0425 | 40 | 2.5 | 10 | 32 | 4 | 137,00 |
| 63.270.0430 | 40 | 3 | 10 | 32 | 4 | 159,00 |
| 63.270.0504 | 50 | 0.4 | 13 | 48 | 3,25 | 79,00 |
| 63.270.0505 | 50 | 0.5 | 13 | 48 | 3,25 | 82,00 |
| 63.270.0506 | 50 | 0.6 | 13 | 48 | 3,25 | 82,00 |
| 63.270.0508 | 50 | 0.8 | 13 | 40 | 4 | 89,00 |

| Ref. | d1 | b1 | d2 | z | t | € |
|---|---|---|---|---|---|---|
| 63.270.0510 | 50 | 1 | 13 | 40 | 4 | 95,00 |
| 63.270.0512 | 50 | 1.2 | 13 | 40 | 4 | 99,00 |
| 63.270.0515 | 50 | 1.5 | 13 | 32 | 5 | 122,00 |
| 63.270.0516 | 50 | 1.6 | 13 | 32 | 5 | 125,00 |
| 63.270.0520 | 50 | 2 | 13 | 32 | 5 | 134,00 |
| 63.270.0525 | 50 | 2.5 | 13 | 32 | 5 | 164,00 |
| 63.270.0530 | 50 | 3 | 13 | 24 | 6,5 | 190,10 |
| 63.270.0604 | 63 | 0.4 | 16 | 64 | 3 | 103,00 |
| 63.270.0605 | 63 | 0.5 | 16 | 64 | 3 | 100,50 |
| 63.270.0606 | 63 | 0.6 | 16 | 48 | 4 | 103,00 |
| 63.270.0608 | 63 | 0.8 | 16 | 48 | 4 | 129,00 |
| 63.270.0610 | 63 | 1 | 16 | 48 | 4 | 135,00 |
| 63.270.0612 | 63 | 1.2 | 16 | 40 | 5 | 145,00 |
| 63.270.0615 | 63 | 1.5 | 16 | 40 | 5 | 152,00 |
| 63.270.0616 | 63 | 1.6 | 16 | 40 | 5 | 159,00 |
| 63.270.0620 | 63 | 2 | 16 | 40 | 5 | 184,00 |
| 63.270.0625 | 63 | 2.5 | 16 | 32 | 6,25 | 224,00 |
| 63.270.0630 | 63 | 3 | 16 | 32 | 6,25 | 254,00 |
| 63.270.0806 | 80 | 0.6 | 22 | 64 | 4 | 164,00 |
| 63.270.0808 | 80 | 0.8 | 22 | 64 | 4 | 178,00 |
| 63.270.0810 | 80 | 1 | 22 | 48 | 5,25 | 182,00 |
| 63.270.0812 | 80 | 1.2 | 22 | 48 | 5,25 | 195,00 |
| 63.270.0815 | 80 | 1.5 | 22 | 48 | 5,25 | 219,00 |
| 63.270.0816 | 80 | 1.6 | 22 | 48 | 5,25 | 221,00 |
| 63.270.0820 | 80 | 2 | 22 | 40 | 6,25 | 255,00 |
| 63.270.0825 | 80 | 2.5 | 22 | 40 | 6,25 | 312,00 |
| 63.270.0830 | 80 | 3 | 22 | 40 | 6,25 | 375,00 |
| 63.270.1008 | 100 | 0.8 | 22 | 64 | 5 | 265,00 |
| 63.270.1010 | 100 | 1 | 22 | 64 | 5 | 249,00 |
| 63.270.1012 | 100 | 1.2 | 22 | 64 | 5 | 275,00 |
| 63.270.1015 | 100 | 1.5 | 22 | 48 | 6,5 | 313,00 |
| 63.270.1016 | 100 | 1.6 | 22 | 48 | 6,5 | 330,00 |
| 63.270.1020 | 100 | 2 | 22 | 48 | 6,5 | 389,00 |
| 63.270.1025 | 100 | 2.5 | 22 | 48 | 6,5 | 461,00 |
| 63.270.1030 | 100 | 3 | 22 | 40 | 7,75 | 509,00 |
| 63.270.1208 | 125 | 0.8 | 22 | 80 | 5 | 452,00 |
| 63.270.1210 | 125 | 1 | 22 | 80 | 5 | 412,00 |
| 63.270.1212 | 125 | 1.2 | 22 | 64 | 6,25 | 453,00 |
| 63.270.1215 | 125 | 1.5 | 22 | 64 | 6,25 | 482,00 |
| 63.270.1216 | 125 | 1.6 | 22 | 64 | 6,25 | 499,00 |
| 63.270.1220 | 125 | 2 | 22 | 64 | 6,25 | 593,00 |
| 63.270.1225 | 125 | 2.5 | 22 | 48 | 8,25 | 720,00 |
| 63.270.1230 | 125 | 3 | 22 | 48 | 8,25 | 850,00 |
| 63.270.1615 | 160 | 1.5 | 32 | 80 | 6,25 | 330,00 |
| 63.270.1616 | 160 | 1.6 | 32 | 80 | 6,25 | 339,00 |

# › 63.400 Phantom

NL **HSS Afkortzaag stoomontlaten**
FR **Fraise-scie à tronçonner HSS vaporisé**
ES **Fresa sierra circular tronzadora HSS vaporizada**
DE **HSS Trennsägeblätter dampfangelassen**
EN **HSS Circular Saw Blade steam oxide**






T≥5 C | T≤4 BW | HSS | OX.

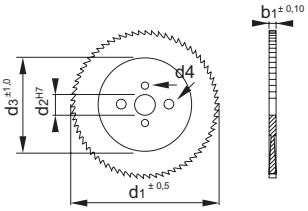
| P 11 | P 12 | P 13 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC |
| 30-40 | 25-35 | 15-25 | 25-30 | 20-25 | 500-700 | 500-700 | 200-400 | 200-600 |

| Ref. | d1 | b1 | d2 | d3 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|---|
| 63.400.2013 | 200 | 1.8 | 32 | 90 | 130 | 5 | 2/8-45+2/11-63 | 134,45 |
| 63.400.2016 | 200 | 1.8 | 32 | 90 | 160 | 4 | 2/8-45+2/11-63 | 134,45 |
| 63.400.2018 | 200 | 1.8 | 32 | 90 | 180 | 3,5 | 2/8-45+2/11-63 | 134,45 |
| 63.400.2126 | 225 | 1.2 | 32 | 100 | 264 | 2,5 | 2/8-45+2/11-63+2/9-50 | 186,00 |
| 63.400.2209 | 225 | 2 | 32 | 90 | 90 | 8 | 2/8-45+2/11-63+2/9-50 | 135,90 |
| 63.400.2212 | 225 | 2 | 32 | 90 | 120 | 6 | 2/8-45+2/11-63+2/9-50 | 135,90 |
| 63.400.2214 | 225 | 2 | 32 | 90 | 140 | 5 | 2/8-45+2/11-63+2/9-50 | 135,90 |
| 63.400.2218 | 225 | 2 | 32 | 90 | 180 | 4 | 2/8-45+2/11-63+2/9-50 | 135,90 |
| 63.400.2222 | 225 | 2 | 32 | 90 | 220 | 3 | 2/8-45+2/11-63+2/9-50 | 135,90 |
| 63.400.2312 | 225 | 2 | 40 | 90 | 120 | 6 | 2/8-55+4/11-63 | 135,90 |
| 63.400.2318 | 225 | 2 | 40 | 90 | 180 | 4 | 2/8-55+4/11-63 | 135,90 |
| 63.400.2326 | 225 | 2 | 40 | 90 | 220 | 3 | 2/8-55+4/11-63 | 135,90 |
| 63.400.2508 | 250 | 2 | 32 | 90 | 80 | 10 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2510 | 250 | 2 | 32 | 90 | 100 | 8 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2512 | 250 | 2 | 32 | 90 | 128 | 6 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2516 | 250 | 2 | 32 | 90 | 160 | 5 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2520 | 250 | 2 | 32 | 90 | 200 | 4 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2525 | 250 | 2 | 32 | 90 | 250 | 3 | 2/8-45+2/11-63+2/9-50 | 143,05 |
| 63.400.2566 | 250 | 2.5 | 32 | 100 | 160 | 5 | 2/8-45+2/11-63+2/9-50 | 167,65 |
| 63.400.2570 | 250 | 2.5 | 32 | 100 | 200 | 4 | 2/8-45+2/11-63+2/9-50 | 167,65 |
| 63.400.2575 | 250 | 2.5 | 32 | 100 | 250 | 3 | 2/8-45+2/11-63+2/9-50 | 167,65 |
| 63.400.2608 | 250 | 2.5 | 40 | 100 | 80 | 10 | 2/8-55+4/12-64 | 167,65 |
| 63.400.2610 | 250 | 2.5 | 40 | 100 | 100 | 8 | 2/8-55+4/12-64 | 167,65 |
| 63.400.2612 | 250 | 2.5 | 40 | 100 | 128 | 6 | 2/8-45+4/12-64 | 167,65 |
| 63.400.2616 | 250 | 2.5 | 40 | 100 | 160 | 5 | 2/8-55+4/12-64 | 167,65 |
| 63.400.2620 | 250 | 2.5 | 40 | 100 | 200 | 4 | 2/8-55+4/12-64 | 167,65 |
| 63.400.2625 | 250 | 2.5 | 40 | 100 | 250 | 3 | 2/8-55+4/12-64 | 167,65 |
| 63.400.2709 | 275 | 2.5 | 32 | 100 | 90 | 10 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2711 | 275 | 2.5 | 32 | 100 | 110 | 8 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2714 | 275 | 2.5 | 32 | 100 | 140 | 6 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2718 | 275 | 2.5 | 32 | 100 | 180 | 5 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2722 | 275 | 2.5 | 32 | 100 | 220 | 4 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2728 | 275 | 2.5 | 32 | 100 | 280 | 3 | 2/8-45+2/11-63+2/12-75 | 188,70 |
| 63.400.2809 | 275 | 2.5 | 40 | 100 | 90 | 10 | 2/8-55+4/12-64 | 188,70 |
| 63.400.2811 | 275 | 2.5 | 40 | 100 | 110 | 8 | 2/8-55+4/12-64 | 188,70 |
| 63.400.2814 | 275 | 2.5 | 40 | 100 | 140 | 6 | 2/8-55+4/12-64 | 188,70 |
| 63.400.2818 | 275 | 2.5 | 40 | 100 | 180 | 5 | 2/8-55+4/12-64 | 188,70 |
| 63.400.2822 | 275 | 2.5 | 40 | 100 | 220 | 4 | 2/8-55+4/12-64 | 188,70 |
| 63.400.2828 | 275 | 2.5 | 40 | 100 | 280 | 3 | 2/8-55+4/12-64 | 188,70 |
| 63.400.3009 | 300 | 2.5 | 32 | 100 | 90 | 10 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3012 | 300 | 2.5 | 32 | 100 | 120 | 8 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3016 | 300 | 2.5 | 32 | 100 | 160 | 6 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3018 | 300 | 2.5 | 32 | 100 | 180 | 5 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3020 | 300 | 2.5 | 32 | 100 | 200 | 4,5 | 2/8-45+4/11-63 | 233,05 |

| Ref. | d1 | b1 | d2 | d3 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|---|
| 63.400.3022 | 300 | 2.5 | 32 | 100 | 220 | 4 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3030 | 300 | 2.5 | 32 | 100 | 300 | 3 | 2/8-45+4/11-63 | 233,05 |
| 63.400.3059 | 300 | 3 | 40 | 100 | 90 | 10 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3062 | 300 | 3 | 40 | 100 | 120 | 8 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3066 | 300 | 3 | 40 | 100 | 160 | 6 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3068 | 300 | 3 | 40 | 100 | 180 | 5 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3072 | 300 | 3 | 40 | 100 | 220 | 4 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3080 | 300 | 3 | 40 | 100 | 300 | 3 | 2/8-55+4/12-64 | 297,00 |
| 63.400.3110 | 315 | 2.5 | 32 | 100 | 100 | 10 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3112 | 315 | 2.5 | 32 | 100 | 120 | 8 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3116 | 315 | 2.5 | 32 | 100 | 160 | 6 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3120 | 315 | 2.5 | 32 | 100 | 200 | 5 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3124 | 315 | 2.5 | 32 | 100 | 240 | 4 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3130 | 315 | 2.5 | 32 | 100 | 300 | 3 | 2/8-45+4/11-63 | 252,00 |
| 63.400.3160 | 315 | 2.5 | 40 | 100 | 100 | 10 | 2/8-55+2/12-64 | 252,00 |
| 63.400.3162 | 315 | 2.5 | 40 | 100 | 120 | 8 | 2/8-55+4/12-64 | 252,00 |
| 63.400.3166 | 315 | 2.5 | 40 | 100 | 160 | 6 | 2/8-55+4/12-64 | 252,00 |
| 63.400.3170 | 315 | 2.5 | 40 | 100 | 200 | 5 | 2/8-55+4/12-64 | 252,00 |
| 63.400.3174 | 315 | 2.5 | 40 | 100 | 240 | 4 | 2/8-55+4/12-64 | 252,00 |
| 63.400.3180 | 315 | 2.5 | 40 | 100 | 300 | 3 | 2/8-55+4/12-64 | 252,00 |
| 63.400.3512 | 350 | 3 | 32 | 120 | 120 | 9 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3514 | 350 | 3 | 32 | 120 | 140 | 8 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3518 | 350 | 3 | 32 | 120 | 180 | 6 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3522 | 350 | 3 | 32 | 120 | 220 | 5 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3528 | 350 | 3 | 32 | 120 | 280 | 4 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3535 | 350 | 3 | 32 | 120 | 350 | 3 | 2/8-45+4/11-63 | 363,00 |
| 63.400.3562 | 350 | 3 | 40 | 120 | 120 | 9 | 2/8-55+4/12-64 | 363,00 |
| 63.400.3564 | 350 | 3 | 40 | 120 | 140 | 8 | 2/8-55+4/12-64 | 363,00 |
| 63.400.3568 | 350 | 3 | 40 | 120 | 180 | 6 | 2/8-55+2/12-64 | 363,00 |
| 63.400.3572 | 350 | 3 | 40 | 120 | 220 | 5 | 2/8-55+2/12-64 | 363,00 |
| 63.400.3578 | 350 | 3 | 40 | 120 | 280 | 4 | 2/8-55+2/12-64 | 363,00 |
| 63.400.3585 | 350 | 3 | 40 | 120 | 350 | 3 | 2/8-55+4/12-64 | 363,00 |
| 63.400.3608 | 350 | 3 | 50 | 120 | 80 | 14 | 4/15-80+4/14-85 | 363,00 |
| 63.400.3612 | 350 | 3 | 50 | 120 | 120 | 9 | 4/15-80+4/14-85 | 363,00 |
| 63.400.3616 | 350 | 3 | 50 | 120 | 160 | 7 | 4/15-80+4/14-85 | 363,00 |
| 63.400.3622 | 350 | 3 | 50 | 120 | 220 | 5 | 4/15-80+4/14-85 | 363,00 |
| 63.400.3711 | 370 | 3 | 50 | 120 | 110 | 10 | 4/15-80+4/14-85 | 488,00 |
| 63.400.3716 | 370 | 3 | 50 | 120 | 160 | 7 | 4/15-80+4/14-85 | 488,00 |
| 63.400.3722 | 370 | 3 | 50 | 120 | 220 | 5 | 4/15-80+4/14-85 | 488,00 |
| 63.400.4008 | 400 | 3 | 50 | 120 | 80 | 16 | 4/15-80+4/14-85 | 501,00 |
| 63.400.4010 | 400 | 3 | 50 | 120 | 100 | 12 | 4/15-80+4/14-85 | 501,00 |
| 63.400.4012 | 400 | 3 | 50 | 120 | 120 | 10 | 4/15-80+4/14-85 | 501,00 |
| 63.400.4016 | 400 | 3 | 50 | 120 | 160 | 8 | 4/15-80+4/14-85 | 501,00 |
| 63.400.4020 | 400 | 3 | 50 | 120 | 200 | 6 | 4/15-80+4/14-85 | 501,00 |

## › 63.424 Phantom

NL **HSS-E Afkortzaag TiAlN**
FR **Fraise-scie à tronçonner HSS-E TiAlN**
ES **Fresa sierra circular tronzadora HSS-E TiAlN**
DE **HSS-E Trennsägeblätter TiAlN**
EN **HSS-E Circular Saw Blade TiAlN**






T≥5 C | T≤4 BW | HSS-E | INOX | TiAlN

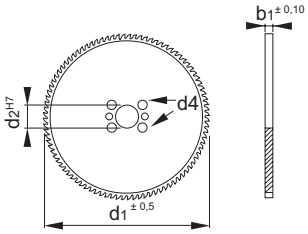
| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 42 | N 51 | N 61 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Alu Si>10% | Cu | PVC |
| 30-40 | 25-35 | 15-25 | 15-20 | 10-15 | 6-8 | 25-30 | 20-25 | 500-700 | 500-700 | 200-400 | 200-600 |

| Ref. | d1 | b1 | d2 | d3 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|---|
| 63.424.2822 | 275 | 2.5 | 40 | 100 | 220 | 4 | 2/8-55+4/12-64 | 316,00 |
| 63.424.3022 | 300 | 2.5 | 32 | 100 | 220 | 4 | 2/8-45+4/11-63 | 378,00 |
| 63.424.3030 | 300 | 2.5 | 32 | 100 | 300 | 3 | 2/8-45+4/11-63 | 378,00 |
| 63.424.3116 | 315 | 2.5 | 32 | 100 | 160 | 6 | 2/8-45+2/11-63 | 414,00 |
| 63.424.3120 | 315 | 2.5 | 32 | 100 | 200 | 5 | 2/8-45+4/11-63 | 414,00 |
| 63.424.3124 | 315 | 2.5 | 32 | 100 | 240 | 4 | 2/8-45+4/11-63 | 414,00 |

| Ref. | d1 | b1 | d2 | d3 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|---|
| 63.424.3166 | 315 | 2.5 | 40 | 100 | 160 | 6 | 2/8-55+4/12-64 | 414,00 |
| 63.424.3170 | 315 | 2.5 | 40 | 100 | 200 | 5 | 2/8-55+4/12-64 | 414,00 |
| 63.424.3174 | 315 | 2.5 | 40 | 100 | 240 | 4 | 2/8-55+4/12-64 | 414,00 |
| 63.424.3518 | 350 | 3 | 32 | 120 | 180 | 6 | 2/8-45+4/11-63 | 569,00 |
| 63.424.3522 | 350 | 3 | 32 | 120 | 220 | 5 | 2/8-45+4/11-63 | 569,00 |

## › 63.450 Phantom

NL **HM-tip Cirkelzaag positieve spaanhoek**
FR **Fraise-scie à plaquette carbure angle de coupe positif**
ES **Fresa sierra circular con punta MD ángulo de corte positivo**
DE **Hartmetallbestückt Kreissägeblätter mit positivem Spanwinkel**
EN **Carbide Tipped Circular Saw Blade slightly positive rake angle**






HM-TIP | ALU | α 5°

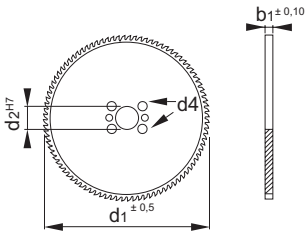
| N 41 | N 42 |
|---|---|
| Alu | Alu Si>10% |
| 2400-3600 | 1900-2800 |

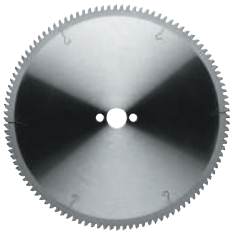
| Ref. | d1 | b1 | d2 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|
| 63.450.2032 | 200 | 3.2 | 32 | 64 | 10 | | 202,05 |
| 63.450.2532 | 250 | 3.4 | 32 | 60 | 13 | 2/11-63 | 217,05 |
| 63.450.2533 | 250 | 3.4 | 32 | 80 | 10 | 2/11-63 | 246,35 |
| 63.450.3029 | 300 | 3.4 | 32 | 72 | 13 | 2/11-63 | 261,00 |
| 63.450.3031 | 300 | 3.4 | 32 | 84 | 11 | 2/11-63 | 279,00 |
| 63.450.3032 | 300 | 3.4 | 32 | 96 | 10 | 2/11-63 | 299,00 |

| Ref. | d1 | b1 | d2 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|
| 63.450.3534 | 350 | 3.4 | 32 | 84 | 13 | 2/11-63 | 303,00 |
| 63.450.3535 | 350 | 3.4 | 32 | 96 | 11 | 2/11-63 | 331,00 |
| 63.450.3536 | 350 | 3.4 | 32 | 108 | 10 | 2/11-63 | 347,00 |
| 63.450.4030 | 400 | 4 | 32 | 96 | 13 | 2/11-63 | 372,00 |
| 63.450.4032 | 400 | 4 | 32 | 108 | 12 | 2/11-63 | 387,00 |

## › 63.460 Phantom

NL **HM-tip Cirkelzaag negatieve spaanhoek**
FR **Fraise-scie à plaquette carbure angle de coupe négatif**
ES **Fresa sierra circular con punta MD ángulo de corte negativo**
DE **Hartmetallbestückt Kreissägeblätter negativem Spanwinkel**
EN **Carbide Tipped Circular Saw Blade negative cutting edge**



HM-TIP | ALU | α-5°

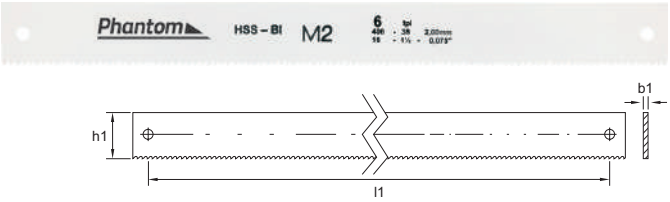
| N 41 | N 42 |
|---|---|
| Alu | Alu Si>10% |
| 2400-3600 | 1900-2800 |

| Ref. | d1 | b1 | d2 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|
| 63.460.2032 | 200 | 3.2 | 32 | 64 | 10 | 2/11-63 | 202,05 |
| 63.460.2532 | 250 | 3.4 | 32 | 60 | 13 | 2/11-63 | 217,05 |
| 63.460.2533 | 250 | 3.4 | 32 | 80 | 10 | 2/11-63 | 246,35 |
| 63.460.3029 | 300 | 3.4 | 32 | 72 | 13 | 2/11-63 | 261,00 |
| 63.460.3031 | 300 | 3.4 | 32 | 84 | 11 | 2/11-63 | 279,00 |
| 63.460.3032 | 300 | 3.4 | 32 | 96 | 10 | 2/11-63 | 299,00 |

| Ref. | d1 | b1 | d2 | z | t | d4 | € |
|---|---|---|---|---|---|---|---|
| 63.460.3529 | 350 | 3.4 | 32 | 84 | 13 | 2/11-63 | 303,00 |
| 63.460.3531 | 350 | 3.4 | 32 | 96 | 11 | 2/11-63 | 331,00 |
| 63.460.3533 | 350 | 3.4 | 32 | 108 | 10 | 2/11-63 | 347,00 |
| 63.460.4032 | 400 | 4 | 32 | 96 | 13 | 2/11/63 | 372,00 |
| 63.460.4034 | 400 | 4 | 32 | 108 | 12 | 2/11/63 | 387,00 |

## › 66.110 Phantom

NL **M2 Bi-Metaal Machinezaagblad**
FR **Lame de scie alternative Bi-métal M2**
ES **Hoja de sierra de máquina Bi-metal M2**
DE **M2 Bi-Metall Maschinensägeblätter**
EN **M2 Bi-Metal Power Hacksaw Blade**




BiM HSS | Const. | ∧ α0°

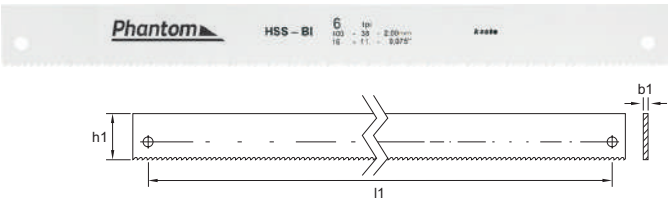
P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.110.3036 | 300 | 25 | 1.25 | 8.5 | 10 | 18,30 |
| 66.110.3037 | 300 | 25 | 1.25 | 8.5 | 14 | 18,30 |
| 66.110.3054 | 300 | 32 | 1.6 | 8.5 | 6 | 23,16 |
| 66.110.3055 | 300 | 32 | 1.6 | 8.5 | 8 | 23,16 |
| 66.110.3056 | 300 | 32 | 1.6 | 8.5 | 10 | 23,16 |
| 66.110.3514 | 350 | 25 | 1.25 | 8.5 | 6 | 20,33 |
| 66.110.3515 | 350 | 25 | 1.25 | 8.5 | 8 | 20,33 |
| 66.110.3516 | 350 | 25 | 1.25 | 8.5 | 10 | 20,33 |
| 66.110.3517 | 350 | 25 | 1.25 | 8.5 | 14 | 20,33 |
| 66.110.3534 | 350 | 32 | 1.6 | 8.5 | 6 | 26,65 |
| 66.110.3535 | 350 | 32 | 1.6 | 8.5 | 8 | 26,65 |
| 66.110.3536 | 350 | 32 | 1.6 | 8.5 | 10 | 26,65 |
| 66.110.3537 | 350 | 32 | 1.6 | 8.5 | 14 | 26,65 |
| 66.110.3553 | 350 | 38 | 2 | 10.5 | 4 | 38,25 |
| 66.110.3554 | 350 | 38 | 2 | 10.5 | 6 | 38,25 |
| 66.110.3555 | 350 | 38 | 2 | 10.5 | 8 | 38,25 |
| 66.110.3556 | 350 | 38 | 2 | 10.5 | 10 | 38,25 |
| 66.110.3557 | 350 | 38 | 2 | 10.5 | 14 | 38,25 |
| 66.110.4034 | 400 | 25 | 1.25 | 8.5 | 6 | 22,37 |
| 66.110.4035 | 400 | 25 | 1.25 | 8.5 | 8 | 22,37 |
| 66.110.4036 | 400 | 25 | 1.25 | 8.5 | 10 | 22,37 |
| 66.110.4037 | 400 | 25 | 1.25 | 8.5 | 14 | 22,37 |
| 66.110.4054 | 400 | 32 | 1.6 | 8.5 | 6 | 30,10 |
| 66.110.4055 | 400 | 32 | 1.6 | 8.5 | 8 | 30,10 |
| 66.110.4056 | 400 | 32 | 1.6 | 8.5 | 10 | 30,15 |
| 66.110.4057 | 400 | 32 | 1.6 | 8.5 | 14 | 30,15 |
| 66.110.4073 | 400 | 38 | 2 | 8.5 | 4 | 44,15 |
| 66.110.4074 | 400 | 38 | 2 | 8.5 | 6 | 44,15 |
| 66.110.4075 | 400 | 38 | 2 | 8.5 | 8 | 44,15 |
| 66.110.4076 | 400 | 38 | 2 | 8.5 | 10 | 44,15 |
| 66.110.4077 | 400 | 38 | 2 | 8.5 | 14 | 44,15 |
| 66.110.4094 | 400 | 38 | 2 | 10.5 | 6 | 44,15 |
| 66.110.4233 | 425 | 32 | 1.6 | 8.5 | 4 | 33,15 |
| 66.110.4234 | 425 | 32 | 1.6 | 8.5 | 6 | 33,15 |

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.110.4504 | 450 | 30 | 1.5 | 8.5 | 6 | 34,70 |
| 66.110.4506 | 450 | 30 | 1.5 | 8.5 | 10 | 33,05 |
| 66.110.4513 | 450 | 32 | 1.6 | 8.5 | 4 | 34,80 |
| 66.110.4514 | 450 | 32 | 1.6 | 10.5 | 6 | 34,70 |
| 66.110.4515 | 450 | 32 | 1.6 | 10.5 | 8 | 34,80 |
| 66.110.4516 | 450 | 32 | 1.6 | 10.5 | 10 | 34,80 |
| 66.110.4524 | 450 | 32 | 1.6 | 8.5 | 6 | 34,70 |
| 66.110.4525 | 450 | 32 | 1.6 | 8.5 | 8 | 34,70 |
| 66.110.4526 | 450 | 32 | 1.6 | 8.5 | 10 | 34,70 |
| 66.110.4553 | 450 | 38 | 2 | 10.5 | 4 | 47,75 |
| 66.110.4554 | 450 | 38 | 2 | 10.5 | 6 | 47,75 |
| 66.110.4555 | 450 | 38 | 2 | 10.5 | 8 | 47,75 |
| 66.110.4556 | 450 | 38 | 2 | 10.5 | 10 | 47,75 |
| 66.110.5005 | 500 | 32 | 1.6 | 8.5 | 8 | 43,60 |
| 66.110.5013 | 500 | 38 | 2 | 10.5 | 4 | 53,20 |
| 66.110.5014 | 500 | 38 | 2 | 10.5 | 6 | 53,20 |
| 66.110.5015 | 500 | 38 | 2 | 10.5 | 8 | 53,20 |
| 66.110.5016 | 500 | 38 | 2 | 10.5 | 10 | 53,20 |
| 66.110.5214 | 525 | 40 | 2 | 10.5 | 6 | 54,45 |
| 66.110.5513 | 550 | 45 | 2.25 | 10.5 | 4 | 76,75 |
| 66.110.5514 | 550 | 45 | 2.25 | 10.5 | 6 | 76,80 |
| 66.110.5515 | 550 | 45 | 2.25 | 13 | 8 | 76,75 |
| 66.110.5516 | 550 | 45 | 2.25 | 13 | 10 | 76,80 |
| 66.110.6003 | 600 | 50 | 2.5 | 10.5 | 4 | 99,10 |
| 66.110.6004 | 600 | 50 | 2.5 | 10.5 | 6 | 99,10 |
| 66.110.6013 | 600 | 50 | 2.5 | 13 | 4 | 99,20 |
| 66.110.6014 | 600 | 50 | 2.5 | 13 | 6 | 99,20 |
| 66.110.6015 | 600 | 50 | 2.5 | 13 | 8 | 99,15 |
| 66.110.6016 | 600 | 50 | 2.5 | 13 | 10 | 99,20 |
| 66.110.6513 | 650 | 50 | 2.5 | 13 | 4 | 106,80 |
| 66.110.6514 | 650 | 50 | 2.5 | 13 | 6 | 106,80 |
| 66.110.6515 | 650 | 50 | 2.5 | 13 | 8 | 106,80 |
| 66.110.6516 | 650 | 50 | 2.5 | 13 | 10 | 106,80 |
| 66.110.7014 | 700 | 50 | 2.5 | 13 | 6 | 114,20 |

## › 66.130 Phantom

NL **M2 Bi-Metaal Machinezaagblad type Kasto**
FR **Lame de scie alternative Bi-métal M2 type Kasto**
ES **Hoja de sierra de máquina Bi-metal M2 tipo Kasto**
DE **M2 Bi-Metall Maschinensägeblätter Typ Kasto**
EN **M2 Bi-Metal Power Hacksaw Blade type Kasto**




BiM HSS | Const. | KASTO | ∧ α0°

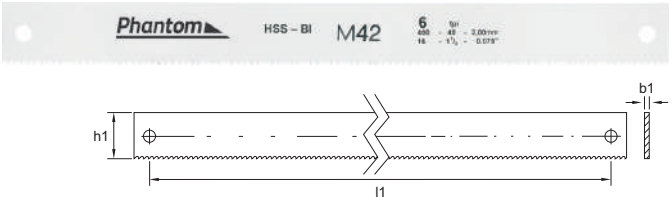
P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.130.4074 | 400 | 38 | 2 | 8.5 | 6 | 44,15 |
| 66.130.4075 | 400 | 38 | 2 | 8.5 | 8 | 44,15 |
| 66.130.4076 | 400 | 38 | 2 | 8.5 | 10 | 44,15 |
| 66.130.4553 | 450 | 38 | 2 | 8.5 | 4 | 47,75 |
| 66.130.4554 | 450 | 38 | 2 | 8.5 | 6 | 47,75 |
| 66.130.4555 | 450 | 38 | 2 | 8.5 | 8 | 47,75 |
| 66.130.4556 | 450 | 38 | 2 | 8.5 | 10 | 47,75 |
| 66.130.5513 | 550 | 45 | 2.25 | 10.5 | 4 | 76,80 |
| 66.130.5514 | 550 | 45 | 2.25 | 10.5 | 6 | 76,80 |
| 66.130.5515 | 550 | 45 | 2.25 | 10.5 | 8 | 76,80 |

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.130.5516 | 550 | 45 | 2.25 | 10.5 | 10 | 76,80 |
| 66.130.5713 | 575 | 50 | 2.5 | 10.5 | 4 | 95,25 |
| 66.130.5714 | 575 | 50 | 2.5 | 10.5 | 6 | 95,25 |
| 66.130.5715 | 575 | 50 | 2.5 | 10.5 | 8 | 95,25 |
| 66.130.6533 | 650 | 50 | 2.5 | 10.5 | 4 | 106,80 |
| 66.130.6534 | 650 | 50 | 2.5 | 10.5 | 6 | 106,80 |
| 66.130.6535 | 650 | 50 | 2.5 | 10.5 | 8 | 106,80 |
| 66.130.7023 | 700 | 50 | 2.5 | 10.5 | 4 | 114,20 |
| 66.130.7024 | 700 | 50 | 2.5 | 10.5 | 6 | 114,20 |

# › 66.160 Phantom

**NL** M42 Bi-Metaal Machinezaagblad
**FR** Lame de scie alternative Bi-métal M42
**ES** Hoja de sierra de máquina Bi-metal M42
**DE** M42 Bi-Metall Maschinensägeblätter
**EN** M42 Bi-Metal Power Hacksaw Blade




Const. | INOX | λ α0° | BiM 8% Co

P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 51 Cu | N 61 PVC

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.160.4094 | 400 | 40 | 2 | 10.5 | 6 | 55,30 |
| 66.160.4095 | 400 | 40 | 2 | 10.5 | 8 | 55,30 |
| 66.160.4096 | 400 | 40 | 2 | 10.5 | 10 | 55,30 |
| 66.160.4097 | 400 | 40 | 2 | 10.5 | 14 | 55,30 |
| 66.160.4554 | 450 | 40 | 2 | 10.5 | 6 | 59,65 |
| 66.160.4555 | 450 | 40 | 2 | 10.5 | 8 | 59,65 |
| 66.160.4556 | 450 | 40 | 2 | 10.5 | 10 | 59,65 |

| Ref. | l1 | h1 | b1 | d1 | TPI | € |
|---|---|---|---|---|---|---|
| 66.160.5014 | 500 | 40 | 2 | 10.5 | 6 | 66,50 |
| 66.160.5015 | 500 | 40 | 2 | 8.5 | 8 | 66,50 |
| 66.160.5713 | 575 | 50 | 2.5 | 10.5 | 4 | 119,10 |
| 66.160.5714 | 575 | 50 | 2.5 | 10.5 | 6 | 119,10 |
| 66.160.7013 | 700 | 50 | 2.5 | 13 | 4 | 142,85 |
| 66.160.7014 | 700 | 50 | 2.5 | 13 | 6 | 142,90 |

## › 66.450 Phantom

NL **M42 Bi-Metaal Bandzaag voor profielmateriaal**
FR **Scie à ruban Bi-métal M42 pour profilés**
ES **Sierra de cinta Bimetal M42 para materiales de perfiles**
DE **M42 Bi-Metall Sägebänder für Profilmaterial**
EN **M42 Bi-Metal Band saw for profile material**



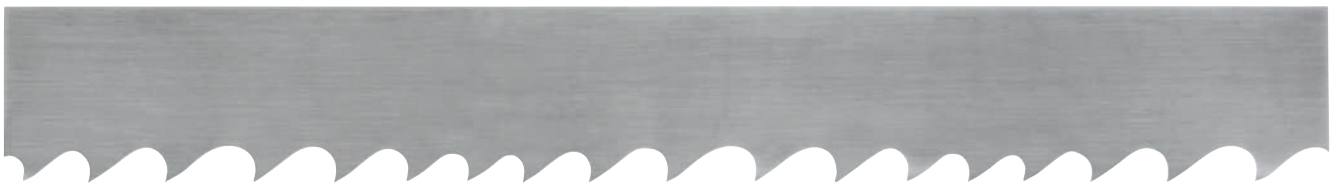
BiM HSS | HSS-E 8% | VARI | α0°

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | K 32 | N 41 | N 51 | S 71 | S 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | GGG GTS-GTW | Alu | Cu | Ni/Co | Ti |
| 50-120 | 35-50 | 30-45 | 30-40 | 30-40 | 10-30 | 30-60 | 30-60 | 80-800 | 50-400 | 10-25 | 10-20 |

| h1 x b1 (mm) | Price pr. Meter € | Welding costs € | z=5-8/" | z=6-10/" | z=8-12/" | z=10-14/" |
|---|---|---|---|---|---|---|
| 13 x 0,65 | 16,25 | 12,50 | | 66.450.07.... | 66.450.08.... | 66.450.09.... |
| 13 x 0,9 | 17,30 | 12,50 | | 66.450.17.... | 66.450.18.... | 66.450.19.... |
| 20 x 0,9 | 17,90 | 14,00 | 66.450.26.... | 66.450.27.... | 66.450.28.... | 66.450.29.... |
| 27 x 0,9 | 18,80 | 14,75 | 66.450.36.... | 66.450.37.... | 66.450.38.... | 66.450.39.... |
| 34 x 1,1 | 23,30 | 15,30 | 66.450.56.... | 66.450.57.... | 66.450.58.... | |

## › 66.460 Phantom

NL **M42 Bi-Metaal Bandzaag voor grotere afmetingen**
FR **Scie à ruban Bi-métal M42 pour matériaux de grandes dimensions**
ES **Sierra de cinta Bi-metal M42 para materiales con dimensiones grandes**
DE **M42 Bi-Metall Sägebänder größer Abmessung**
EN **M42 Bi-Metal Band saw for large sizes**



BiM HSS | HSS-E 8% | VARI | α10°

| P 11 | P 12 | P 13 | P 14 | M 21 | M 22 | K 31 | N 41 | N 42 |
|---|---|---|---|---|---|---|---|---|
| ≤600 N/mm² | ≤850 N/mm² | ≤1000 N/mm² | ≤1400 N/mm² | INOX ≤850N/mm² | INOX >850N/mm² | GG | Alu | Alu Si>10% |
| 50-120 | 35-50 | 30-45 | 30-40 | 30-40 | 10-30 | 30-60 | 80-800 | 80-800 |

| h1 x b1 (mm) | Price pr. Meter € | Welding costs € | z=2-3/" | z=3-4/" | z=4-6/" |
|---|---|---|---|---|---|
| 20 x 0,9 | 17,90 | 14,00 | | | 66.460.25.... |
| 27 x 0,9 | 18,80 | 14,75 | 66.460.33.... | 66.460.34.... | 66.460.35.... |
| 34 x 1,1 | 23,30 | 15,30 | 66.460.53.... | 66.460.54.... | 66.460.55.... |
| 41 x 1,3 | 33,65 | 21,65 | 66.460.63.... | 66.460.64.... | 66.460.65.... |
| 54 x 1,6 | 48,35 | 34,40 | 66.450.73.... | 66.460.74.... | |

## › 66.580 Phantom

NL **M51 Bi-Metal Bandzaag voor grotere afmetingen, extra slijtvast**
FR **Scie à ruban Bi-métal M51 pour matériaux de grandes dimensions, très résistante à l'usure**
ES **Sierra de cinta Bi-metal M51 para materiales con dimensiones grandes, extra resistente al degaste**
DE **M51 BiMetall Sägebänder größer Abmessung, besonders Verschleissfest**
EN **M51 Bi-Metal Band saw for large sizes, Extra wear-resistant**



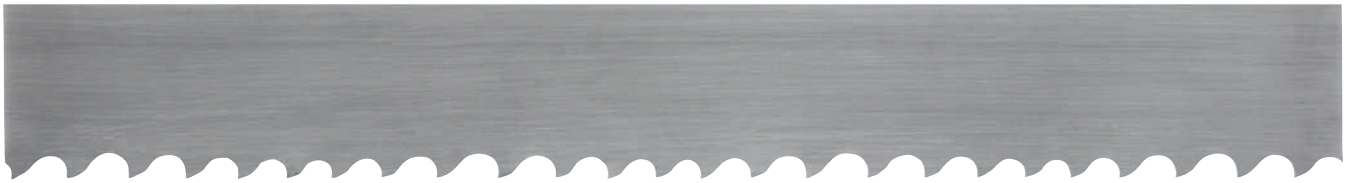
BiM HSS | 10% Co | VARI | ∧α10° | P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | S 71 Ni/Co | S 72 Ti

50-120 | 35-50 | 30-45 | 30-40 | 30-40 | 10-30 | 10-25 | 10-20

| h1 x b1 (mm) | Price pr. Meter € | Welding costs € | z=3-4/" | z=4-6/" | z=5-8/" |
|---|---|---|---|---|---|
| 27 x 0,9 | 26,30 | 14,75 | 66.580.44.... | 66.580.45.... | 66.580.46.... |
| 34 x 1,1 | 36,45 | 15,30 | 66.580.54.... | 66.580.55.... | |
| 41 x 1,3 | 43,30 | 21,65 | 66.580.64.... | 66.580.65.... | |

## › 66.700 Phantom

NL **HP2 UNI M42 Bi-Metaal Bandzaag universele multizaag**
FR **Scie à ruban Bi-métal M42 HP2 UNI scie multifonction**
ES **Sierra de cinta Bimetal M42 HP2 UNI sierra universal**
DE **HP2 UNI M42 Bi-Metall Sägebänder Universal-Sägeband**
EN **HP2 UNI M42 Bi-Metal Band saw universal multi-saw**



BiM HSS | HSS-E 8% | VARI | ∧α5° | HP2 UNI | P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 51 Cu | S 71 Ni/Co | S 72 Ti

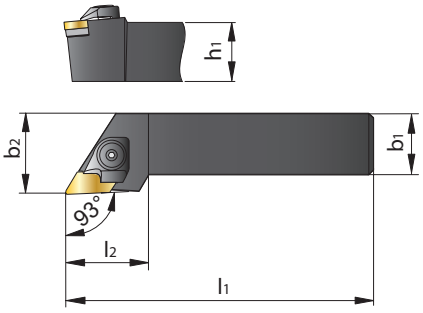
50-120 | 35-50 | 30-45 | 30-40 | 30-40 | 10-30 | 30-60 | 30-60 | 80-800 | 50-400 | 10-25 | 10-20

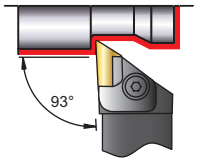
| h1 x b1 (mm) | Price pr. Meter € | Welding costs € | z=2-3/" | z=3-4/" | z=4-6/" | z=5-7/" | z=7-9/" | z=8-11/" |
|---|---|---|---|---|---|---|---|---|
| 27 x 0,9 | 21,55 | 14,75 | | 66.700.34.... | 66.700.35.... | 66.700.36.... | 66.700.37.... | 66.700.38.... |
| 34 x 1,1 | 25,30 | 15,30 | 66.700.53. | 66.700.54.... | 66.700.55.... | 66.700.56.... | | |
| 41 x 1,3 | 36,40 | 21,65 | 66.700.63. | 66.700.64.... | 66.700.65.... | 66.700.66.... | | |
| 54 x 1,6 | 52,45 | 34,40 | | 66.700.74.... | | | | |

## › 72.121 Phantom

NL **Wisselplaathouder CKJNR/L**
FR **Porte outil pour plaquette carbure CKJNR/L**
ES **Portaplaquita CKJNR/L**
DE **Klemmhalter, CKJNR/L**
EN **TCranked Knife Tool CKJNR/L**





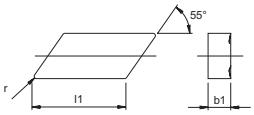




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 incl. | 6 incl. | 7 incl. | 8 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.121.1250 | CKJNR 2525-M16 | 25 | 25 | 32 | 150 | 35 | 73.998.0025 | 73.998.0065 | 73.998.0190 | 73.998.0335 | 73.998.0285 | 73.998.0345(B)<br>73.998.0343(S) | SW4 | KNUX 1604.. | 179,95 |
| 72.121.2250 | CKJNL 2525-M16 | 25 | 25 | 32 | 150 | 35 | 73.998.0026 | 73.998.0065 | 73.998.0190 | 73.998.0335 | 73.998.0286 | 73.998.0345(B)<br>73.998.0343(S) | SW4 | KNUX 1604.. | 179,95 |

# › 73.105 KNUX Phantom

NL **Hardmetaal Wisselplaat KNUX**
FR **Plaquette Carbure KNUX**
ES **Plaquita Carburo KNUX**
DE **Hartmetall Wendeplatte KNUX**
EN **Carbide Insert KNUX**




| KN.. | l1 (mm) | b1 (mm) |
|---|---|---|
| 16 | 16,0 | 4,76 |

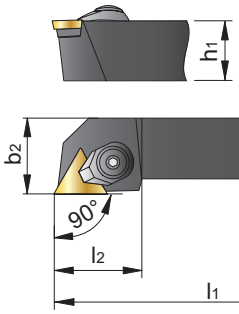
P K

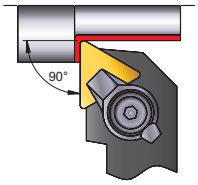
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.105.0155 | 1604 | 0,5 | ER 11 | PC20 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 16,18 |  |
| 73.105.0205 | 1604 | 0,5 | EL 11 | PC20 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 16,18 | |
| 73.105.0455 | 1604 | 1,0 | ER 12 | PC20 | 3-6 | 0,2-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 16,18 |  |
| 73.105.0465 | 1604 | 1,0 | EL 12 | PC20 | 3-6 | 0,2-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 18,18 | |

## › 72.156 Phantom

NL **Wisselplaathouder, 90° CTGPR**
FR **Porte outil pour plaquette carbure, 90° CTGPR**
ES **Portaplaquita, 90° CTGPR**
DE **Klemmhalter, 90° CTGPR**
EN **Cranked Knife Tool, 90° CTGPR**





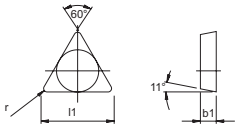




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 incl. | 6 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.156.1120 | CTGPR 1212-F11 | 12 | 12 | 16 | 80 | 16.5 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 93,80 |
| 72.156.1150 | CTGPR 1616-H11 | 16 | 16 | 20 | 100 | 20 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 96,85 |
| 72.156.1204 | CTGPR 2020-K16 | 20 | 20 | 25 | 125 | 28 | 73.998.0280(B)<br>73.998.0281(S) | 73.998.0017 | incl with 2(set) | 73.998.0345(B)<br>73.998.0343(S) | T20(B)<br>SW3(S) | TP.. 1603.. | 103,35 |
| 72.156.1254 | CTGPR 2525-M16 | 25 | 25 | 32 | 150 | 28 | 73.998.0280(B)<br>73.998.0281(S) | 73.998.0017 | incl with 2(set) | 73.998.0345(B)<br>73.998.0343(S) | T20(B)<br>SW3(S) | TP.. 1603.. | 113,20 |

## › 73.171 TPMR Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TP.. | l1 (mm) | b1 (mm) |
|---|---|---|
| 11 | 11,0 | 3,18 |
| 16 | 16,6 | 3,18 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.171.0150 | 1103 | 0,4 | EN | PC10 | 0,5-2 | 0,05-0,15 | | ✔ | | ✔ | ✔ | | 6,61 |  |
| 73.171.0200 | 1103 | 0,8 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,61 | |
| 73.171.0300 | 1603 | 0,4 | EN | PC10 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,86 | |
| 73.171.0350 | 1603 | 0,8 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,86 | |

## › 73.175 TPUN Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.175.0450 | 1603 | 0,4 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 10,54 |  |
| 73.175.0550 | 1603 | 0,8 | EN | PC20 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 10,54 | |
| 73.175.0650 | 1603 | 1,2 | EN | PC20 | 1,5-5 | 0,1-0,3 | | ✔ | ✔ | ✔ | ✔ | ✔ | 10,54 | |

## › 73.180 TPUX Phantom

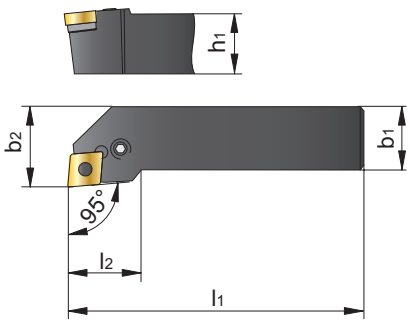
**P M K N**

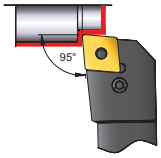
| Ref. | lxd | r (mm) | Geo | Kwaliteit | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.180.0100 | 1103 | 0,4 | FR | P25 | 0,5-2 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 16,66 |  |
| 73.180.0150 | 1103 | 0,4 | FL | P25 | 0,5-2 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 16,66 | |
| 73.180.0500 | 1603 | 0,4 | FR | P25 | 0,5-3 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 20,86 | |
| 73.180.0550 | 1603 | 0,4 | FL | P25 | 0,5-3 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 20,86 | |
| 73.180.0700 | 1603 | 0,8 | FR | P25 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 20,86 | |
| 73.180.0750 | 1603 | 0,8 | FL | P25 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 20,86 | |

## › 72.240 Phantom

**NL** Wisselplaathouder, 95° PCLNR/L
**FR** Porte outil pour plaquette carbure, 95° PCLNR/L
**ES** Portaplaquita, 95° PCLNR/L
**DE** Klemmhalter, 95° PCLNR/L
**EN** Cranked Knife Tool, 95° PCLNR/L







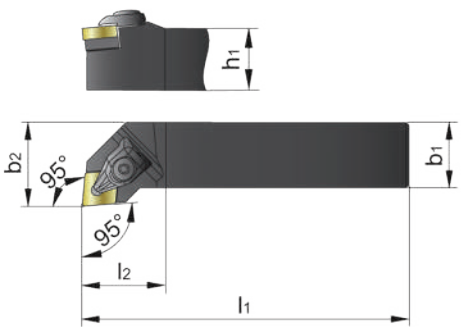


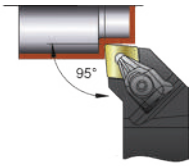
| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.240.1150 | PCLNR 1616-H12 | 16 | 16 | 20 | 100 | 26.1 | 73.998.0230 | 73.998.0100 | 73.998.0155 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 98,05 |
| 72.240.1200 | PCLNR 2020-K12 | 20 | 20 | 25 | 125 | 27.4 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 107,25 |
| 72.240.1250 | PCLNR 2525-M12 | 25 | 25 | 32 | 150 | 28 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 113,20 |
| 72.240.2200 | PCLNL 2020-K12 | 20 | 20 | 25 | 125 | 27.4 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 107,25 |
| 72.240.2250 | PCLNL 2525-M12 | 25 | 25 | 32 | 150 | 28 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 113,20 |
| 72.240.2320 | PCLNL 3225-P12 | 32 | 25 | 32 | 170 | 32.6 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 84,85 |

## › 72.245 Phantom

**NL** Wisselplaathouder, 95° DCLNR/L
**FR** Porte outil pour plaquette carbure, 95° DCLNR/L
**ES** Portaplaquita, 95° DCLNR/L
**DE** Klemmhalter, 95° DCLNR/L
**EN** Cranked Knife Tool, 95° DCLNR/L





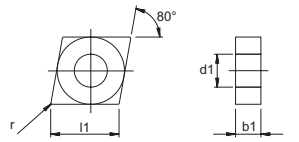




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.245.1200 | DCLNR 2020-K12 | 20 | 20 | 25 | 125 | 32 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0455(B)<br>73.998.0456(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | CN.. 1204.. | 110,20 |
| 72.245.1250 | DCLNR 2525-M12 | 25 | 25 | 32 | 150 | 32 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0455(B)<br>73.998.0456(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | CN.. 1204.. | 116,20 |
| 72.245.2200 | DCLNL 2020-K12 | 20 | 20 | 25 | 125 | 32 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0455(B)<br>73.998.0456(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | CN.. 1204.. | 110,20 |
| 72.245.2250 | DCLNL 2525-M12 | 25 | 25 | 32 | 150 | 32 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0455(B)<br>73.998.0456(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | CN.. 1204.. | 116,20 |
| 72.245.2320 | DCLNL 3225-P12 | 32 | 25 | 32 | 170 | 32 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0455 | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | CN.. 1204.. | 84,85 |

## › 73.200 CNMG Phantom

NL **WISSELPLAAT**
FR **PLAQUETTE**
ES **PLAQUITA**
DE **WENDEPLATTE**
EN **INSERT**




| CN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 12 | 12,7 | 5,15 | 4,76 |
| 19 | 19,5 | 7,92 | 6,35 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.200.1347 | 1204 | 0,4 | UF | UI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,60 |  |
| 73.200.4367 | 1204 | 0,8 | UM | UI20 | 0,2-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 12,60 |  |

## › 73.201 CNMG Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.201.1346 | 1204 | 0,4 | PF | PC20 | 0,2-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,06 |  |
| 73.201.1364 | 1204 | 0,8 | PF | PC10 | 0,25-1,5 | 0,1-0,4 | ✔ | | | ✔ | ✔ | | 12,06 | |
| 73.201.1366 | 1204 | 0,8 | PF | PC20 | 0,25-1,5 | 0,1-0,4 | ✔ | | | ✔ | ✔ | | 12,06 | |
| 73.201.4366 | 1204 | 0,8 | PM | PC20 | 0,5-5,5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 12,06 |  |
| 73.201.4368 | 1204 | 0,8 | PM | PC30 | 0,5-5,5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.4376 | 1204 | 1,2 | PM | PC20 | 0,8-5,5 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.4378 | 1204 | 1,2 | PM | PC30 | 0,8-5,5 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.7368 | 1204 | 0,8 | PR | PC30 | 1-7 | 0,2-0,55 | | | ✔ | ✔ | ✔ | ✔ | 12,06 |  |

## › 73.203 CNMG Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.203.1347 | 1204 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,60 |  |
| 73.203.1367 | 1204 | 0,8 | MF | MSI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 12,60 | |
| 73.203.4347 | 1204 | 0,4 | MM | MSI20 | 0,15-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,60 | |
| 73.203.4367 | 1204 | 0,8 | MM | MSI20 | 0,2-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 12,60 | |

## › 73.204 CNMA Phantom

**P K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.204.0364 | 1204 | 0,8 | EN | KC10 | 0,2-8 | 0,15-0,6 | | ✔ | ✔ | ✔ | ✔ | | 10,54 |  |

## › 73.206 CNMG Phantom

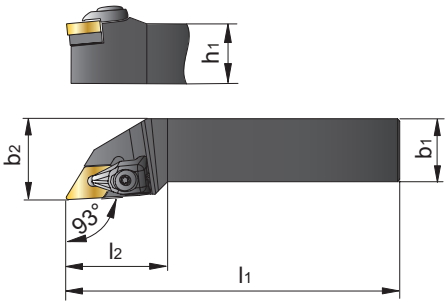
**P M S**

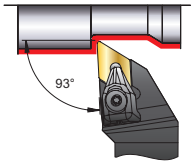
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.206.4347 | 1204 | 0,4 | SM | MSI20 | 0,2-3,6 | 0,1-0,2 | ✔ | ✔ | | ✔ | ✔ | | 12,60 |  |

## › 72.265 Phantom

NL **Wisselplaathouder, 93° DDJNR/L**
FR **Porte outil pour plaquette carbure, 93° DDJNR/L**
ES **Portaplaquita, 93° DDJNR/L**
DE **Klemmhalter, 93° DDJNR/L**
EN **Cranked Knife Tool, 93° DDJNR/L**







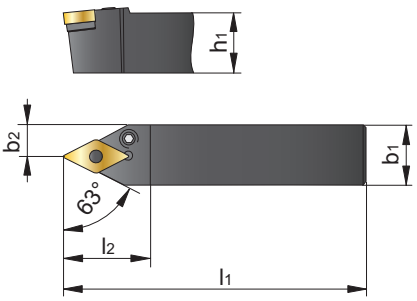


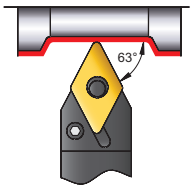
| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.265.1170 | DDJNR 2020-K11 | 20 | 20 | 25 | 125 | 40 | 73.998.0445(B)<br>73.998.0446(S) | 73.998.0460(B)<br>73.998.0461(S) | T9IP(B)<br>SW4(S) | 73.998.0496(B)<br>73.998.0030(S) | DN.. 1104.. | 110,20 |
| 72.265.1200 | DDJNR 2020-K15 | 20 | 20 | 25 | 125 | 40 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0465(B)<br>73.998.0466(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | DN.. 1506.. | 110,20 |
| 72.265.1250 | DDJNR 2525-M15 | 25 | 25 | 32 | 150 | 40 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0465(B)<br>73.998.0466(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | DN.. 1506.. | 116,20 |
| 72.265.2200 | DDJNL 2020-K15 | 20 | 20 | 25 | 125 | 40 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0465(B)<br>73.998.0466(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | DN.. 1506.. | 110,20 |
| 72.265.2250 | DDJNL 2525-M15 | 25 | 25 | 32 | 150 | 40 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0465(B)<br>73.998.0466(S) | T15IP(B)<br>SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | DN.. 1506.. | 116,20 |

## › 72.280 Phantom

NL **Wisselplaathouder, 63° PDNNR/L**
FR **Porte outil pour plaquette carbure, 63° PDNNR/L**
ES **Portaplaquita, 63° PDNNR/L**
DE **Klemmhalter, 63° PDNNR/L**
EN **Cranked Knife Tool, 63° PDNNR/L**





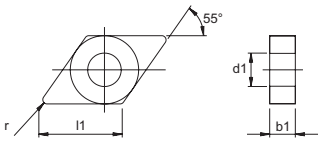




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.280.1250 | PDNNR 2525-M15 | 25 | 25 | 12.5 | 150 | 36.5 | 73.998.0265 | 73.998.0120 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | DN.. 1506.. | 113,20 |
| 72.280.2250 | PDNNL 2525-M15 | 25 | 25 | 12.5 | 150 | 36.5 | 73.998.0265 | 73.998.0120 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | DN.. 1506.. | 113,20 |

## › 73.211 DNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| DN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,6 | 3,81 | 4,76 |
| 15 | 15,5 | 5,16 | 6,35 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.211.1246 | 1104 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,15 | |
| 73.211.1446 | 1506 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 17,64 | |
| 73.211.4266 | 1104 | 0,8 | PM | PC20 | 0,4-5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,15 |  |
| 73.211.4466 | 1506 | 0,8 | PM | PC20 | 0,5-6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 17,64 | |
| 73.211.4468 | 1506 | 0,8 | PM | PC30 | 0,5-6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 17,64 | |
| 73.211.7568 | 1506 | 0,8 | PR | PC30 | 0,8-6 | 0,2-0,55 | | | ✔ | ✔ | ✔ | ✔ | 17,64 | |

## › 73.213 DNMG Phantom

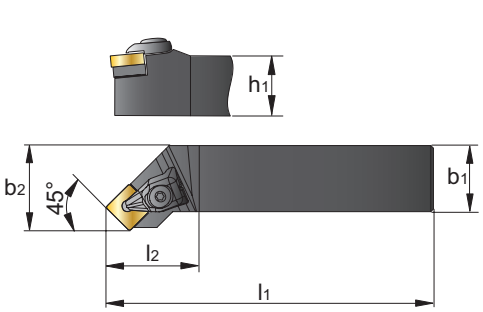
**P M S**

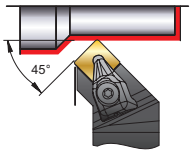
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.213.1247 | 1104 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,50 | |
| 73.213.1447 | 1506 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 18,77 |  |
| 73.213.4447 | 1506 | 0,4 | MM | MSI20 | 0,15-2 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 18,77 | |
| 73.213.4467 | 1506 | 0,8 | MM | MSI20 | 0,2-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 18,77 | |

## › 72.325 Phantom

NL **Wisselplaathouder, 45° DSSNR/L**
FR **Porte outil pour plaquette carbure, 45° DSSNR/L**
ES **Portaplaquita, 45° DSSNR/L**
DE **Klemmhalter, 45° DSSNR/L**
EN **Cranked Knife Tool, 45° DSSNR/L**





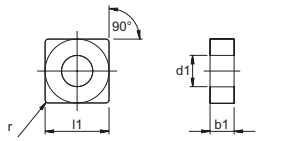




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.325.1200 | DSSNR 2020 K12 | 20 | 20 | 25 | 125 | 35 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0470(B)<br>73.998.0471(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | SN.. 1204.. | 110,20 |
| 72.325.1250 | DSSNR 2525 M12 | 25 | 25 | 32 | 150 | 35 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0470(B)<br>73.998.0471(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | SN.. 1204.. | 116,20 |
| 72.325.2200 | DSSNL 2020 K12 | 20 | 20 | 25 | 125 | 35 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0470(B)<br>73.998.0471(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | SN.. 1204.. | 110,20 |
| 72.325.2250 | DSSNL 2525 M12 | 25 | 25 | 32 | 150 | 35 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0470(B)<br>73.998.0471(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | SN.. 1204.. | 116,20 |

## › 73.241 SNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| SN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 12 | 12,7 | 5,15 | 4,76 |

P M K

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.241.1346 | 1204 | 0,4 | PF | PC20 | 0,15-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,06 |  |
| 73.241.4368 | 1204 | 0,8 | PM | PC30 | 0,5-6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.241.4376 | 1204 | 1,2 | PM | PC20 | 0,8-6 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.241.7366 | 1204 | 0,8 | PR | PC20 | 0,8-7 | 0,2-0,55 | | | ✔ | ✔ | ✔ | ✔ | 12,06 | |

## › 73.243 SNMG Phantom

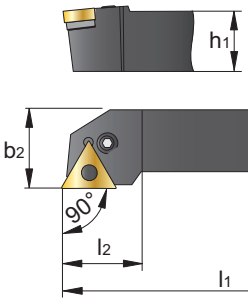
P M S

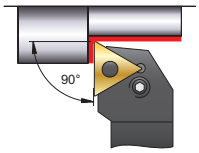
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.243.4367 | 1204 | 0,8 | MM | MSI20 | 0,2-3 | 0,15-0,4 | | ✔ | | ✔ | ✔ | ✔ | 12,50 |  |

## › 72.340 Phantom

NL **Wisselplaathouder, 90° PTGNR/L**
FR **Porte outil pour plaquette carbure, 90° PTGNR/L**
ES **Portaplaquita, 90° PTGNR/L**
DE **Klemmhalter, 90° PTGNR/L**
EN **Cranked Knife Tool, 90° PTGNR/L**





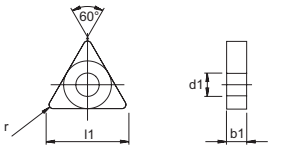




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.340.1150 | PTGNR 1616-H16 | 16 | 16 | 20 | 100 | 20 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 98,05 |
| 72.340.1200 | PTGNR 2020-K16 | 20 | 20 | 25 | 125 | 20 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 107,25 |
| 72.340.1250 | PTGNR 2525-M16 | 25 | 25 | 32 | 150 | 22.2 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 113,20 |
| 72.340.2200 | PTGNL 2020-K16 | 20 | 20 | 25 | 125 | 20 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 107,25 |
| 72.340.2250 | PTGNL 2525-M16 | 25 | 25 | 32 | 150 | 22.2 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 113,20 |

## › 73.250 TNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 16 | 16,5 | 3,81 | 4,76 |
| 22 | 22,0 | 5,16 | 4,76 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.250.4567 | 1604 | 0,8 | UF | UI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 12,65 |  |

## › 73.251 TNMG Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.251.1546 | 1604 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,15 |  |
| 73.251.4548 | 1604 | 0,4 | PM | PC30 | 0,4-5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 12,15 |  |
| 73.251.4566 | 1604 | 0,8 | PM | PC20 | 0,5-5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 12,15 | |
| 73.251.4766 | 2204 | 0,8 | PM | PC20 | 0,5-6,6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 18,09 | |
| 73.251.5546 | 1604 | 0,4 | ER | PC20 | 1-3,5 | 0,12-0,3 | | | | ✔ | ✔ | | 12,15 |  |
| 73.251.5566 | 1604 | 0,8 | ER | PC20 | 1,3-3,5 | 0,15-0,5 | | | | ✔ | ✔ | | 12,15 | |

## › 73.253 TNMG Phantom

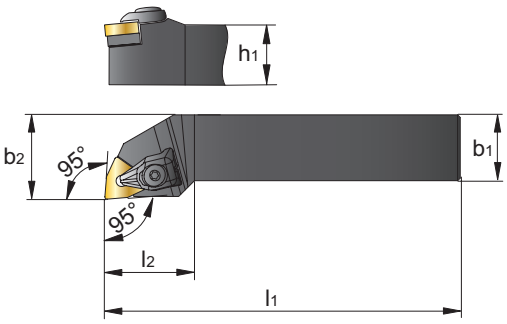
**P M S**

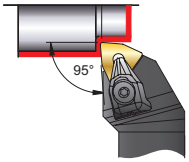
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.253.4547 | 1604 | 0,4 | MM | MSI20 | 0,15-3 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,50 |  |
| 73.253.4567 | 1604 | 0,8 | MM | MSI20 | 0,2-3 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 12,50 | |

## › 72.385 Phantom

**NL Wisselplaathouder, 95° DWLNR/L**
**FR Porte outil pour plaquette carbure, 95° DWLNR/L**
**ES Portaplaquita, 95° DWLNR/L**
**DE Klemmhalter, 95° DWLNR/L**
**EN Cranked Knife Tool, 95° DWLNR/L**





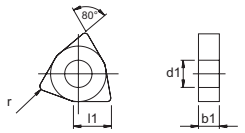




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.385.1170 | DWLNR 2020 K06 | 20 | 20 | 25 | 125 | 27 | 73.998.0445(B)<br>73.998.0446(S) | 73.998.0480(B)<br>73.998.0481(S) | T9IP(B)/SW4(S) | 73.998.0495(B)<br>73.998.0030(S) | WN.. 0604.. | 110,20 |
| 72.385.1200 | DWLNR 2020 K08 | 20 | 20 | 25 | 125 | 34 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0485(B)<br>73.998.0486(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | WN.. 0804.. | 110,20 |
| 72.385.1230 | DWLNR 2525 M06 | 25 | 25 | 32 | 150 | 27 | 73.998.0445(B)<br>73.998.0446(S) | 73.998.0480(B)<br>73.998.0481(S) | T9IP(B)/SW4(S) | 73.998.0495(B)<br>73.998.0030(S) | WN.. 0604.. | 116,20 |
| 72.385.1250 | DWLNR 2525 M08 | 25 | 25 | 32 | 150 | 34 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0485(B)<br>73.998.0486(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | WN.. 0804.. | 116,20 |
| 72.385.2170 | DWLNL 2020 K06 | 20 | 20 | 25 | 125 | 27 | 73.998.0445(B)<br>73.998.0446(S) | 73.998.0480(B)<br>73.998.0481(S) | T9IP(B)/SW4(S) | 73.998.0495(B)<br>73.998.0030(S) | WN.. 0604.. | 110,20 |
| 72.385.2250 | DWLNL 2525 M08 | 25 | 25 | 32 | 150 | 34 | 73.998.0450(B)<br>73.998.0451(S) | 73.998.0485(B)<br>73.998.0486(S) | T15IP(B)/SW4(S) | 73.998.0497(B)<br>73.998.0032(S) | WN.. 0804.. | 116,20 |

## › 73.291 WNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| WN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 06 | 6,6 | 3,81 | 4,76 |
| 08 | 8,7 | 5,16 | 4,76 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.291.1046 | 0604 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,3 | ✔ | | | ✔ | ✔ | | 11,27 |  |
| 73.291.1146 | 0804 | 0,4 | PF | PC20 | 0,1-2 | 0,05-0,3 | ✔ | | | ✔ | ✔ | | 13,92 | |
| 73.291.4066 | 0604 | 0,8 | PM | PC20 | 0,5-3 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 11,27 | |
| 73.291.4166 | 0804 | 0,8 | PM | PC20 | 0,5-4 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 13,92 | |
| 73.291.4168 | 0804 | 0,8 | PM | PC30 | 0,5-4 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 13,92 | |
| 73.291.4176 | 0804 | 1,2 | PM | PC20 | 0,8-4 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 13,92 | |

## › 73.293 WNMG Phantom

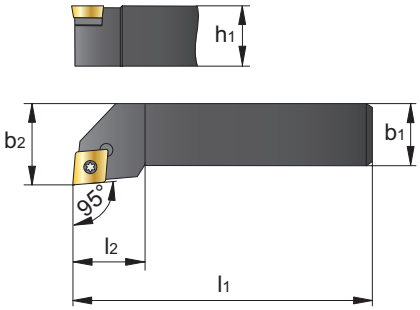
**P M S**

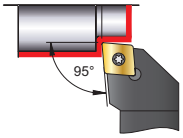
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.293.1047 | 0604 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 11,58 |  |
| 73.293.1147 | 0804 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 14,24 | |
| 73.293.1167 | 0804 | 0,8 | MF | MSI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 14,24 | |
| 73.293.4147 | 0804 | 0,4 | MM | MSI20 | 0,15-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 14,24 | |
| 73.293.4167 | 0804 | 0,8 | MM | MSI20 | 0,25-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 14,24 | |

# › 72.420 Phantom

NL **Wisselplaathouder, 95° SCLCR/L**
FR **Porte outil pour plaquette carbure, 95° SCLCR/L**
ES **Portaplaquita, 95° SCLCR/L**
DE **Klemmhalter, 95° SCLCR/L**
EN **Cranked Knife Tool, 95° SCLCR/L**





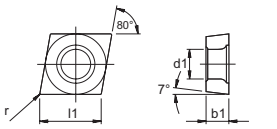




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.420.1080 | SCLCR 0808-D06 | 8 | 8 | 10 | 60 | 9 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | CC.. 0602. | 86,95 |
| 72.420.1100 | SCLCR 1010-E06 | 10 | 10 | 12 | 70 | 9 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | CC.. 0602. | 86,95 |
| 72.420.1120 | SCLCR 1212-F09 | 12 | 12 | 16 | 80 | 15 | - | - | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 93,80 |
| 72.420.1160 | SCLCR 1616-H09 | 16 | 16 | 20 | 100 | 17 | 73.998.0320 (B)/<br>- (S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 96,85 |
| 72.420.1200 | SCLCR 2020-K09 | 20 | 20 | 25 | 125 | 17 | 73.998.0320 (B)/<br>- (S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 103,35 |
| 72.420.1240 | SCLCR 2020-K12 | 20 | 20 | 25 | 125 | 20 | 73.998.0325(B)<br>73.998.0326(S) | 73.998.0356(B)<br>73.998.0357(S) | 73.998.0072(B)<br>73.998.0092(S) | T15 | CC.. 1204.. | 103,35 |
| 72.420.1300 | SCLCR 2525-M12 | 25 | 25 | 32 | 150 | 20 | 73.998.0325(B)<br>73.998.0326(S) | 73.998.0356(B)<br>73.998.0357(S) | 73.998.0072(B)<br>73.998.0092(S) | T15 | CC.. 1204.. | 113,20 |
| 72.420.2080 | SCLCL 0808-D06 | 8 | 8 | 10 | 60 | 9 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | CC.. 0602. | 86,95 |
| 72.420.2100 | SCLCL 1010-E06 | 10 | 10 | 12 | 70 | 9 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | CC.. 0602. | 86,95 |
| 72.420.2120 | SCLCL 1212-F09 | 12 | 12 | 16 | 80 | 15 | - | - | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 93,80 |
| 72.420.2160 | SCLCL 1616-H09 | 16 | 16 | 20 | 100 | 17 | 73.998.0320 (B)/<br>- (S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 96,85 |
| 72.420.2200 | SCLCL 2020-K09 | 20 | 20 | 25 | 125 | 17 | 73.998.0320 (B)/<br>- (S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | CC.. 09T3.. | 103,35 |

## › 73.500 CCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| CC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 06 | 6,4 | 2,80 | 2,38 |
| 09 | 9,7 | 4,40 | 3,97 |
| 12 | 12,4 | 5,50 | 4,76 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.500.4045 | 0602 | 0,4 | UM | UI10 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 | |
| 73.500.4047 | 0602 | 0,4 | UM | UI20 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 | |
| 73.500.4145 | 09T3 | 0,4 | UM | UI10 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 9,76 | |
| 73.500.4147 | 09T3 | 0,4 | UM | UI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 9,76 | |
| 73.500.4167 | 09T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 9,76 | |
| 73.500.4367 | 1204 | 0,8 | UM | UI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,61 | |



## › 73.501 CCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.501.1026 | 0602 | 0,2 | PF | PC20 | 0,06-1,7 | 0,03-0,11 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1046 | 0602 | 0,4 | PF | PC20 | 0,1-1,7 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1146 | 09T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1166 | 09T3 | 0,8 | PF | PC20 | 0,15-2 | 0,08-0,45 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.4046 | 0602 | 0,4 | PM | PC20 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4146 | 09T3 | 0,4 | PM | PC20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4166 | 09T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4346 | 1204 | 0,4 | PM | PC20 | 0,3-3,6 | 0,09-0,27 | | ✔ | | ✔ | ✔ | | 13,53 | |
| 73.501.4366 | 1204 | 0,8 | PM | PC20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | | 13,53 | |



## › 73.503 CCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.503.1047 | 0602 | 0,4 | MF | MSI20 | 0,1-1,7 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,14 | |
| 73.503.1147 | 09T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,14 | |
| 73.503.1167 | 09T3 | 0,8 | MF | MSI20 | 0,15-2 | 0,08-0,45 | ✔ | | | ✔ | ✔ | ✔ | 10,14 | |
| 73.503.4147 | 09T3 | 0,4 | MM | MSI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.503.4167 | 09T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,14 | |
| 73.503.4367 | 1204 | 0,8 | MM | MSI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,61 | |



## › 73.505 CCGT Phantom

**N**

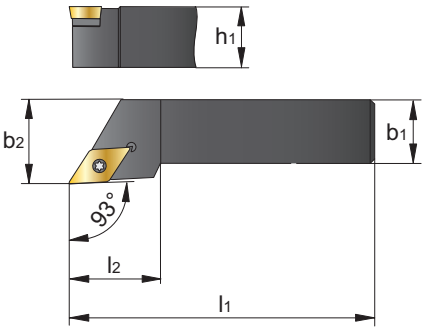
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.505.4020 | 0602 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 15,04 | |
| 73.505.4040 | 0602 | 0,4 | NM | K10 | 0,1-3 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 15,04 | |
| 73.505.4140 | 09T3 | 0,4 | NM | K10 | 0,1-5 | 0,1-0,22 | | ✔ | | ✔ | ✔ | | 16,32 | |
| 73.505.4160 | 09T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,45 | | ✔ | ✔ | ✔ | ✔ | ✔ | 16,32 | |

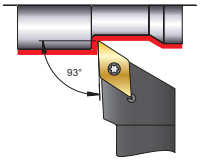


## › 72.450 Phantom

**NL Wisselplaathouder, 93° SDJCR/L**
**FR Porte outil pour plaquette carbure, 93° SDJCR/L**
**ES Portaplaquita, 93° SDJCR/L**
**DE Klemmhalter, 93° SDJCR/L**
**EN Cranked Knife Tool, 93° SDJCR/L**







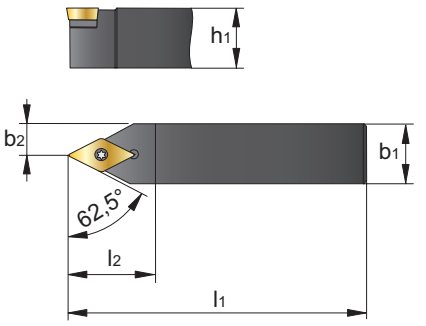


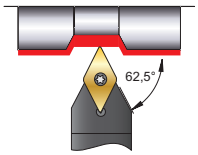
| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.450.1100 | SDJCR 1010-E07 | 10 | 10 | 12 | 70 | 16 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 86,95 |
| 72.450.1120 | SDJCR 1212-F07 | 12 | 12 | 16 | 80 | 18 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 93,80 |
| 72.450.1160 | SDJCR 1616-H11 | 16 | 16 | 20 | 100 | 22 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 96,85 |
| 72.450.1200 | SDJCR 2020-K11 | 20 | 20 | 25 | 125 | 22 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 103,35 |
| 72.450.1300 | SDJCR 2525-M11 | 25 | 25 | 32 | 150 | 22 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 113,20 |
| 72.450.2080 | SDJCL 0808-D07 | 8 | 8 | 10 | 60 | 13 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 54,75 |
| 72.450.2100 | SDJCL 1010-E07 | 10 | 10 | 12 | 70 | 16 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 86,95 |
| 72.450.2120 | SDJCL 1212-F07 | 12 | 12 | 16 | 80 | 18 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 93,80 |
| 72.450.2160 | SDJCL 1616-H11 | 16 | 16 | 20 | 100 | 22 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 96,85 |
| 72.450.2200 | SDJCL 2020-K11 | 20 | 20 | 25 | 125 | 22 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/3.998.0071(S) | T15 | DC.. 11T3.. | 103,35 |

## › 72.455 Phantom

**NL Wisselplaathouder, 63° SDNCN**
**FR Porte outil pour plaquette carbure, 63° SDNCN**
**ES Portaplaquita, 63° SDNCN**
**DE Klemmhalter, 63° SDNCN**
**EN Cranked Knife Tool, 63° SDNCN**





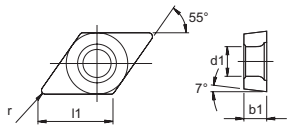




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.455.1080 | SDNCN 0808-D07 | 8 | 8 | 4 | 60 | 8 | - | - | 73.998.0080(B)73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 54,75 |
| 72.455.1100 | SDNCN 1010-E07 | 10 | 10 | 5 | 70 | 10 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 86,95 |
| 72.455.1120 | SDNCN 1212-F07 | 12 | 12 | 6 | 80 | 12 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 93,80 |
| 72.455.1160 | SDNCN 1616-H11 | 16 | 16 | 8 | 100 | 18 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 96,85 |
| 72.455.1200 | SDNCN 2020-K11 | 20 | 20 | 10 | 125 | 21 | 73.998.0290(B)/73.998.0291(S) | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | DC.. 11T3.. | 103,35 |

## › 73.510 DCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| DC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 07 | 7,7 | 2,80 | 2,38 |
| 11 | 11,6 | 4,40 | 3,97 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.510.4047 | 0702 | 0,4 | UM | UI20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 |  |
| 73.510.4247 | 11T3 | 0,4 | UM | UI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,34 | |
| 73.510.4267 | 11T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,89 | |

## › 73.511 DCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.511.1046 | 0702 | 0,4 | PF | PC20 | 0,08-1,5 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,89 |  |
| 73.511.1246 | 11T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.511.4046 | 0702 | 0,4 | PM | PC20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4066 | 0702 | 0,8 | PM | PC20 | 0,38-2,25 | 0,08-0,35 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4246 | 11T3 | 0,4 | PM | PC20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4266 | 11T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | | 10,89 | |

## › 73.513 DCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.513.1247 | 11T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,14 |  |
| 73.513.4047 | 0702 | 0,4 | MM | MSI20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.513.4247 | 11T3 | 0,4 | MM | MSI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.513.4267 | 11T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,14 | |

## › 73.515 DCGT Phantom

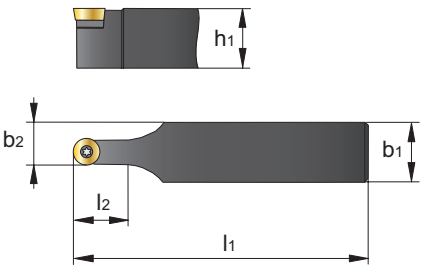
**N**

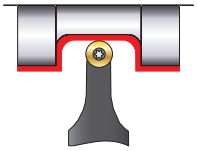
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.515.4020 | 0702 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 15,04 |  |
| 73.515.4240 | 11T3 | 0,4 | NM | K10 | 0,1-5 | 0,1-0,22 | | ✔ | | ✔ | ✔ | | 16,32 | |
| 73.515.4260 | 11T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 16,32 | |

# › 72.461 Phantom

NL **Wisselplaathouder, 45° SRDCN**
FR **Porte outil pour plaquette carbure, 45° SRDCN**
ES **Portaplaquita, 45° SRDCN**
DE **Klemmhalter, 45° SRDCN**
EN **Cranked Knife Tool, 45° SRDCN**





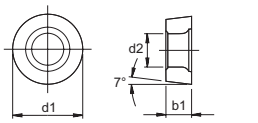



| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.461.1200 | SRDCN 2020-K08 | 20 | 20 | 15 | 125 | 20 | - | - | 73.998.0090 | T8 | RCMT 0803 | 103,35 |
| 72.461.1201 | SRDCN 2020-K10 | 20 | 20 | 15 | 125 | 22 | 73.998.0292 | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | RCMT 10T3 | 103,35 |
| 72.461.1250 | SRDCN 2525-M10 | 25 | 25 | 17.5 | 150 | 22 | 73.998.0292 | 73.998.0355 | 73.998.0070(B)/73.998.0071(S) | T15 | RCMT 10T3 | 113,20 |
| 72.461.1253 | SRDCN 2525-M12 | 25 | 25 | 185 | 150 | 28 | 73.998.0293 | 73.998.0355 | 73.998.0071 | T15 | RCMT 1204 | 113,20 |

# › 73.521 RCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**

P M K



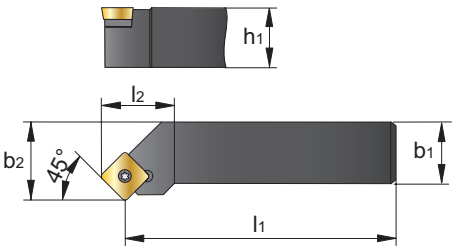

| RC.. | d1 (mm) | d2 (mm) | b1 (mm) |
|---|---|---|---|
| 0803 | 8,0 | 3,40 | 3,18 |
| 1003 | 10,0 | 3,40 | 3,18 |
| 10T3 | 10,0 | 4,40 | 3,97 |
| 1204 | 12,0 | 4,40 | 4,76 |

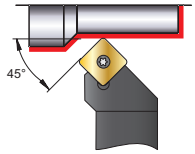
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.521.4106 | 0803 | 4 | PM | PC20 | 0,8-3,2 | 0,1-0,8 | | ✔ | | ✔ | ✔ | ✔ | 10,00 |  |
| 73.521.4206 | 1003 | 5 | PM | PC20 | 1-4 | 0,12-1 | | ✔ | | ✔ | ✔ | ✔ | 10,00 | |
| 73.521.4236 | 10T3 | 5 | PM | PC20 | 1-4 | 0,12-1 | | ✔ | | ✔ | ✔ | ✔ | 10,00 | |
| 73.521.4306 | 1204 | 6 | PM | PC20 | 1,2-4,8 | 0,2-1,8 | | ✔ | | ✔ | ✔ | ✔ | 11,27 | |

## › 72.485 Phantom

NL **Wisselplaathouder, 45° SSSCR**
FR **Porte outil pour plaquette carbure, 45° SSSCR**
ES **Portaplaquita, 45° SSSCR**
DE **Klemmhalter, 45° SSSCR**
EN **Cranked Knife Tool, 45° SSSCR**





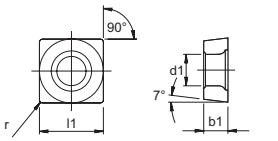




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.485.1120 | SSSCR 1212-F09 | 12 | 12 | 16 | 80 | 18 | - | - | 73.998.0070(B)<br>73.998.0096(S) | T15 | SC.T 09T3.. | 93,80 |
| 72.485.1160 | SSSCR 1616-H09 | 16 | 16 | 20 | 100 | 20 | 73.998.0295(B)/-(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | SC.T 09T3.. | 96,85 |
| 72.485.1240 | SSSCR 2020-K12 | 20 | 20 | 25 | 125 | 25 | 73.998.0296(B)<br>73.998.0297(S) | 73.998.0356(B)<br>73.998.0357(S) | 73.998.0072(B)<br>73.998.0092(S) | T15 | SC.T 1204.. | 103,35 |
| 72.485.1300 | SSSCR 2525-M12 | 25 | 25 | 32 | 150 | 25 | 73.998.0296(B)<br>73.998.0297(S) | 73.998.0356(B)<br>73.998.0357(S) | 73.998.0072(B)<br>73.998.0092(S) | T15 | SC.T 1204.. | 113,20 |

## › 73.530 SCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| SC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 09 | 9,5 | 4,40 | 3,97 |
| 12 | 12,7 | 5,60 | 4,76 |

**P M K S**

| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.530.4147 | 09T3 | 0,4 | UM | UI20 | 0,25-3 | 0,06-0,23 | | ✔ | | ✔ | ✔ | | 9,32 |  |
| 73.530.4167 | 09T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 9,32 | |
| 73.530.4367 | 1204 | 0,8 | UM | UI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,64 | |

## › 73.531 SCMT Phantom

**P M K**

| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.531.1146 | 09T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 11,27 |  |
| 73.531.4166 | 09T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 11,27 | |
| 73.531.4366 | 1204 | 0,8 | PM | PC20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 13,53 | |

## › 73.535 SCGT Phantom

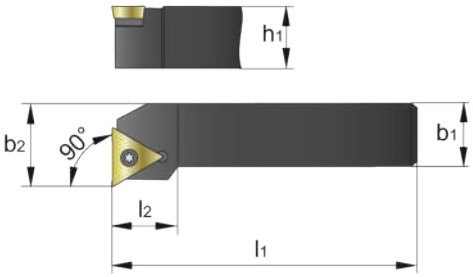
**N**

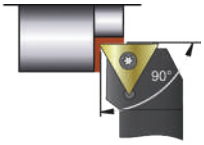
| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.535.4140 | 09T3 | 0,4 | NM | K10 | 0,1-4 | 0,1-0,26 | | ✔ | | ✔ | ✔ | | 15,43 |  |
| 73.535.4160 | 09T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,4 | | ✔ | ✔ | ✔ | ✔ | ✔ | 15,43 | |

## › 72.500 Phantom

**NL Wisselplaathouder, 90° STFCR**
**FR Porte outil pour plaquette carbure, 90° STFCR**
**ES Portaplaquita, 90° STFCR**
**DE Klemmhalter, 90° STFCR**
**EN Cranked Knife Tool, 90° STFCR**







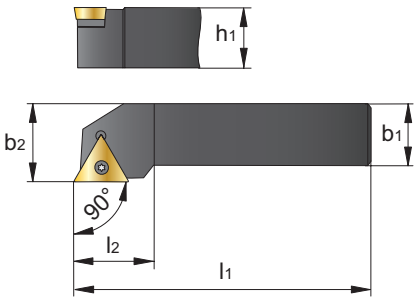


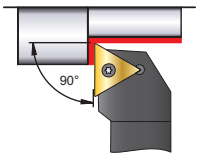
| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.500.1120 | STFCR 1212-F11 | 12 | 12 | 16 | 80 | 15 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 93,80 |
| 72.500.1160 | STFCR 1616-H16 | 16 | 16 | 20 | 100 | 20 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 96,85 |
| 72.500.1200 | STFCR 2020-K16 | 20 | 20 | 25 | 125 | 20 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 103,35 |

## › 72.505 Phantom

**NL Wisselplaathouder, 90° STGCR/L**
**FR Porte outil pour plaquette carbure, 90° STGCR/L**
**ES Portaplaquita, 90° STGCR/L**
**DE Klemmhalter, 90° STGCR/L**
**EN Cranked Knife Tool, 90° STGCR/L**





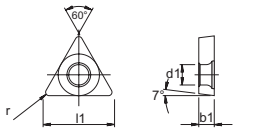




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.505.1120 | STGCR 1212-F11 | 12 | 12 | 16 | 80 | 15 | - | - | 73.998.0080(B)<br>73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 93,80 |
| 72.505.1160 | STGCR 1616-H16 | 16 | 16 | 20 | 100 | 22 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 96,85 |
| 72.505.1200 | STGCR 2020-K16 | 20 | 20 | 25 | 125 | 22 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 103,35 |
| 72.505.1240 | STGCR 2525-M16 | 25 | 25 | 32 | 150 | 22 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 113,20 |
| 72.505.2160 | STGCL 1616-H16 | 16 | 16 | 20 | 100 | 22 | 73.998.0300(B)<br>73.998.0301(S) | 73.998.0355 | 73.998.0070(B)<br>73.998.0096(S) | T15 | TC.. 16T3.. | 96,85 |

## › 73.540 TCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,6 | 2,80 | 2,38 |
| 16 | 16,0 | 4,40 | 3,97 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.540.4567 | 16T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | ✔ | 10,29 |  |

## › 73.541 TCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.541.1266 | 1102 | 0,8 | PF | PC20 | 0,13-1,7 | 0,07-0,26 | ✔ | | | ✔ | ✔ | | 10,89 |  |
| 73.541.1546 | 16T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 11,27 | |
| 73.541.4246 | 1102 | 0,4 | PM | PC20 | 0,21-2,5 | 0,06-0,19 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.541.4566 | 16T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | | 11,27 | |

## › 73.543 TCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.543.1247 | 1102 | 0,4 | MF | MSI20 | 0,1-1,7 | 0,05-0,19 | ✔ | | | ✔ | ✔ | | 10,14 |  |
| 73.543.1547 | 16T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,54 | |
| 73.543.4247 | 1102 | 0,4 | MM | MSI20 | 0,21-2,5 | 0,06-0,19 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.543.4567 | 16T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | ✔ | 10,54 | |

## › 73.545 TCGT Phantom

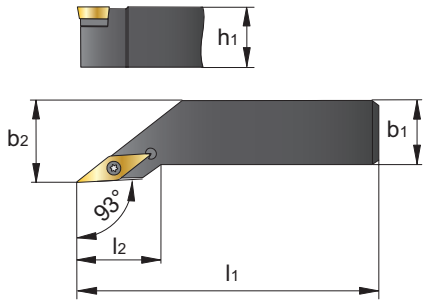
**N**

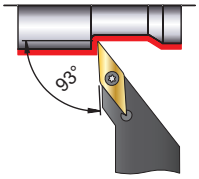
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.545.4240 | 1102 | 0,4 | NM | K10 | 0,1-4 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 15,43 |  |
| 73.545.4540 | 16T3 | 0,4 | NM | K10 | 0,1-5,5 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 18,73 | |
| 73.545.4560 | 16T3 | 0,8 | NM | K10 | 0,1-5,5 | 0,15-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 18,73 | |

## › 72.515 Phantom

**NL** Wisselplaathouder, 93° SVJCR/L
**FR** Porte outil pour plaquette carbure, 93° SVJCR/L
**ES** Portaplaquita, 93° SVJCR/L
**DE** Klemmhalter, 93° SVJCR/L
**EN** Cranked Knife Tool, 93° SVJCR/L







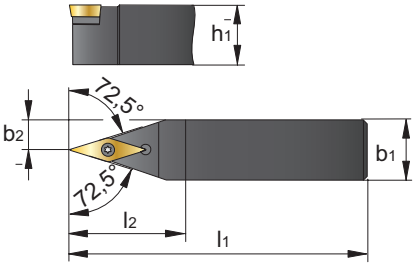


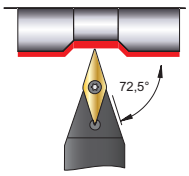
| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.515.1160 | SVJCR 1616-H11 | 16 | 16 | 20 | 100 | 21.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 107,80 |
| 72.515.1200 | SVJCR 2020-K11 | 20 | 20 | 25 | 125 | 23 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 120,95 |
| 72.515.1201 | SVJCR 2020-K16 | 20 | 20 | 25 | 125 | 29.5 | 73.998.0305 | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | VC.T 1604.. | 120,95 |
| 72.515.1250 | SVJCR 2525-M16 | 25 | 25 | 32 | 150 | 32.5 | 73.998.0305 | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | VC.T 1604.. | 129,55 |
| 72.515.2160 | SVJCL 1616-H11 | 16 | 16 | 20 | 100 | 21.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 107,80 |
| 72.515.2200 | SVJCL 2020-K11 | 20 | 20 | 25 | 125 | 23 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 120,95 |
| 72.515.2250 | SVJCL 2525-M16 | 25 | 25 | 32 | 150 | 32.5 | 73.998.0305 | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | VC.T 1604.. | 129,55 |

## › 72.520 Phantom

**NL** Wisselplaathouder, 72° 30' SVVCN
**FR** Porte outil pour plaquette carbure, 72° 30' SVVCN
**ES** Portaplaquita, 72° 30' SVVCN
**DE** Klemmhalter, 72° 30' SVVCN
**EN** Cranked Knife Tool, 72° 30' SVVCN





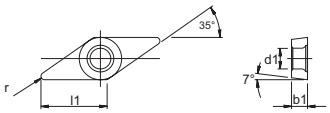




| Ref. | Type | h1 | b1 | b2 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.520.1160 | SVVCN 1616-H11 | 16 | 16 | 8 | 100 | 25 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 107,80 |
| 72.520.1200 | SVVCN 2020-K11 | 20 | 20 | 10 | 125 | 32 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.T 1103.. | 120,95 |
| 72.520.1250 | SVVCN 2525-M16 | 25 | 25 | 12.5 | 150 | 40 | 73.998.0305 | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | VC.T 1604.. | 129,55 |

## › 73.591 VCMT Phantom

NL **WISSELPLAAT**
FR **PLAQUETTE**
ES **PLAQUITA**
DE **WENDEPLATTE**
EN **INSERT**




| VC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,0 | 2,80 | 3,18 |
| 16 | 16,6 | 4,40 | 4,76 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.591.1226 | 1103 | 0,2 | PF | PC20 | 0,07-1,5 | 0,03-0,13 | ✔ | | | ✔ | ✔ | | 14,36 |  |
| 73.591.1246 | 1103 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,2 | ✔ | | | ✔ | ✔ | | 14,36 | |
| 73.591.1546 | 1604 | 0,4 | PF | PC20 | 0,1-1,8 | 0,05-0,2 | ✔ | | | ✔ | ✔ | | 18,38 | |
| 73.591.4546 | 1604 | 0,4 | PM | PC20 | 0,23-2,7 | 0,07-0,2 | | ✔ | | ✔ | ✔ | | 18,38 | |
| 73.591.4566 | 1604 | 0,8 | PM | PC20 | 0,45-2,7 | 0,09-0,27 | | ✔ | | ✔ | ✔ | | 18,38 | |

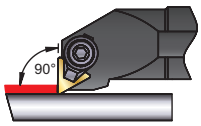
## › 73.595 VCGT Phantom

**N**

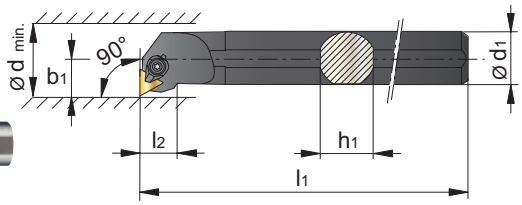
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.595.4220 | 1103 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 18,73 |  |
| 73.595.4240 | 1103 | 0,4 | NM | K10 | 0,05-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 18,73 | |

## › 72.540 Phantom

NL **Blindboorbeitel, 90° S-CTFPR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 90° S-CTFPR/L**
ES **Herramienta para escariar y rectificar, 90° S-CTFPR/L**
DE **Innen-Eckdrehmeissel, 90° S-CTFPR/L**
EN **Internal Boring Bar, 90° S-CTFPR/L**





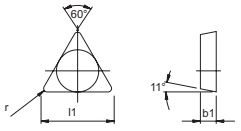




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 incl. | 6 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.540.1122 | S12M-CTFPR 11 | 11 | 9 | 17 | 12 | 150 | 25 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 124,30 |
| 72.540.1160 | S16R-CTFPR 11 | 15 | 11 | 21 | 16 | 200 | 15 | - | 73.998.0020(B<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 129,55 |
| 72.540.1200 | S20S-CTFPR 11 | 18 | 13 | 25 | 20 | 250 | 15 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 163,50 |
| 72.540.1250 | S25T-CTFPR 16 | 23 | 17 | 31.5 | 25 | 300 | 20 | 73.998.0280(B)/-(S) | 73.998.0010(B)<br>73.998.0018(S) | 73.998.0055(B)/-(S) | 73.998.0345(B)/-(S) | T20(B)<br>SW3(S) | TP.. 1603.. | 178,70 |
| 72.540.1320 | S32U-CTFPR 16 | 30 | 22 | 40 | 32 | 350 | 20 | 73.998.0280(B)<br>73.998.0281(S) | 73.998.0010(B)<br>73.998.0017(S) | 73.998.0055(B)/-(S) | 73.998.0345(B)<br>73.998.0343(S) | T20(B)<br>SW3(S) | TP.. 1603.. | 230,00 |
| 72.540.2160 | S16R-CTFPL 11 | 15 | 11 | 21 | 16 | 200 | 15 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 129,55 |
| 72.540.2200 | S20S-CTFPL 11 | 18 | 13 | 25 | 20 | 250 | 15 | - | 73.998.0020(B)<br>73.998.0022(S) | 73.998.0060(B)/-(S) | - | T15(B)<br>SW2,5(S) | TP.. 1103.. | 163,50 |
| 72.540.2250 | S25T-CTFPL 16 | 23 | 17 | 31.5 | 25 | 300 | 20 | 73.998.0280(B)/-(S) | 73.998.0010(B)<br>73.998.0018(S) | 73.998.0055(B)/-(S) | 73.998.0345(B)/-(S) | T20(B)<br>SW3(S) | TP.. 1603.. | 178,70 |

## › 73.171 TPMR Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TP.. | l1 (mm) | b1 (mm) |
|---|---|---|
| 11 | 11,0 | 3,18 |
| 16 | 16,6 | 3,18 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.171.0150 | 1103 | 0,4 | EN | PC10 | 0,5-2 | 0,05-0,15 | | ✔ | | ✔ | ✔ | | 6,61 |  |
| 73.171.0200 | 1103 | 0,8 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,61 | |
| 73.171.0300 | 1603 | 0,4 | EN | PC10 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,86 | |
| 73.171.0350 | 1603 | 0,8 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 6,86 | |

## › 73.175 TPUN Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.175.0450 | 1603 | 0,4 | EN | PC20 | 0,5-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 10,54 |  |
| 73.175.0550 | 1603 | 0,8 | EN | PC20 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 10,54 | |
| 73.175.0650 | 1603 | 1,2 | EN | PC20 | 1,5-5 | 0,1-0,3 | | ✔ | ✔ | ✔ | ✔ | ✔ | 10,54 | |

## › 73.180 TPUX Phantom

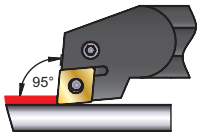
**P M K N**

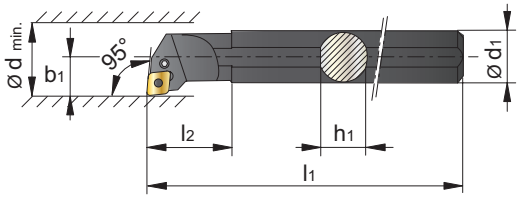
| Ref. | lxd | r (mm) | Geo | Kwaliteit | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.180.0100 | 1103 | 0,4 | FR | P25 | 0,5-2 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 16,66 |  |
| 73.180.0150 | 1103 | 0,4 | FL | P25 | 0,5-2 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 16,66 | |
| 73.180.0500 | 1603 | 0,4 | FR | P25 | 0,5-3 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 20,86 | |
| 73.180.0550 | 1603 | 0,4 | FL | P25 | 0,5-3 | 0,05-0,15 | ✔ | ✔ | | ✔ | | | 20,86 | |
| 73.180.0700 | 1603 | 0,8 | FR | P25 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 20,86 | |
| 73.180.0750 | 1603 | 0,8 | FL | P25 | 1-4 | 0,2-0,5 | | ✔ | | ✔ | ✔ | | 20,86 | |

## › 72.545 Phantom

NL **Blindboorbeitel, 95° S-PCLNR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 95° S-PCLNR**
ES **Herramienta para escariar y rectificar, 95° S-PCLNR**
DE **Innen-Eckdrehmeissel, 95° S-PCLNR**
EN **Internal Boring Bar, 95° S-PCLNR**







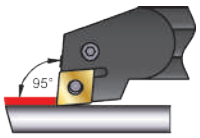


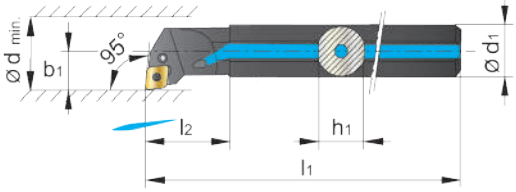
| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.545.1250 | S25T-PCLNR 12 | 23 | 17 | 32 | 25 | 300 | 40 | 73.998.0230 | 73.998.0100 | 73.998.0155 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 234,15 |
| 72.545.1320 | S32U-PCLNR 12 | 30 | 22 | 40 | 32 | 350 | 50 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 304,00 |
| 72.545.1400 | S40V-PCLNR 12 | 38 | 27 | 50 | 40 | 400 | 60 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CN.. 1204.. | 343,00 |

## › 72.550 Phantom

NL **Blindboorbeitel, 95° A-PCLNR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 95° A-PCLNR/L**
ES **Herramienta para escariar y rectificar, 95° A-PCLNR/L**
DE **Innen-Eckdrehmeissel, 95° A-PCLNR/L**
EN **Internal Boring Bar, 95° A-PCLNR/L**





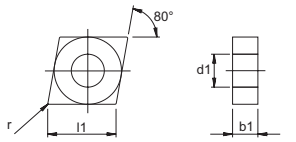




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.550.1250 | A25R-PCLNR 12 | 23 | 17 | 31 | 25 | 200 | 40 | 73.998.0230 | 73.998.0100 | 73.998.0155 | 73.998.0365 | 73.998.0200 | SW3 | CNM. 1204.. | 285,00 |
| 72.550.1320 | A32S-PCLNR 12 | 30 | 22 | 39 | 32 | 250 | 50 | 73.998.0230 | 73.998.0100 | 73.998.0150 | 73.998.0365 | 73.998.0200 | SW3 | CNM. 1204.. | 334,00 |

## › 73.200 CNMG Phantom

NL **WISSELPLAAT**
FR **PLAQUETTE**
ES **PLAQUITA**
DE **WENDEPLATTE**
EN **INSERT**




| CN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 12 | 12,7 | 5,15 | 4,76 |
| 19 | 19,5 | 7,92 | 6,35 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.200.1347 | 1204 | 0,4 | UF | UI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,60 |  |
| 73.200.4367 | 1204 | 0,8 | UM | UI20 | 0,2-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 12,60 |  |

## › 73.201 CNMG Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.201.1346 | 1204 | 0,4 | PF | PC20 | 0,2-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,06 |  |
| 73.201.1364 | 1204 | 0,8 | PF | PC10 | 0,25-1,5 | 0,1-0,4 | ✔ | | | ✔ | ✔ | | 12,06 | |
| 73.201.1366 | 1204 | 0,8 | PF | PC20 | 0,25-1,5 | 0,1-0,4 | ✔ | | | ✔ | ✔ | | 12,06 | |
| 73.201.4366 | 1204 | 0,8 | PM | PC20 | 0,5-5,5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 12,06 |  |
| 73.201.4368 | 1204 | 0,8 | PM | PC30 | 0,5-5,5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.4376 | 1204 | 1,2 | PM | PC20 | 0,8-5,5 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.4378 | 1204 | 1,2 | PM | PC30 | 0,8-5,5 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 12,06 | |
| 73.201.7368 | 1204 | 0,8 | PR | PC30 | 1-7 | 0,2-0,55 | | | ✔ | ✔ | ✔ | ✔ | 12,06 |  |

## › 73.203 CNMG Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.203.1347 | 1204 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,60 |  |
| 73.203.1367 | 1204 | 0,8 | MF | MSI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 12,60 | |
| 73.203.4347 | 1204 | 0,4 | MM | MSI20 | 0,15-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,60 | |
| 73.203.4367 | 1204 | 0,8 | MM | MSI20 | 0,2-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 12,60 | |

## › 73.204 CNMA Phantom

**P K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.204.0364 | 1204 | 0,8 | EN | KC10 | 0,2-8 | 0,15-0,6 | | ✔ | ✔ | ✔ | ✔ | | 10,54 |  |

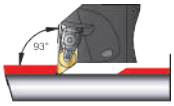
## › 73.206 CNMG Phantom

**P M S**

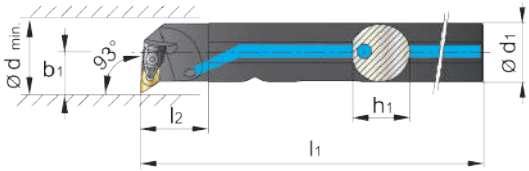
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.206.4347 | 1204 | 0,4 | SM | MSI20 | 0,2-3,6 | 0,1-0,2 | ✔ | ✔ | | ✔ | ✔ | | 12,60 |  |

## › 72.557 Phantom

NL **Blindboorbeitel, 93° A-PDUNR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 93° A-PDUNR**
ES **Herramienta para escariar y rectificar, 93° A-PDUNR**
DE **Innen-Eckdrehmeissel, 93° A-PDUNR**
EN **Internal Boring Bar, 93° A-PDUNR**





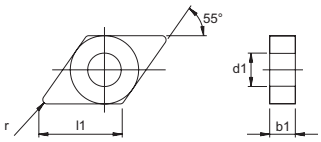




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.557.1252 | A25R-PDUNR 11 | 23 | 17 | 31 | 25 | 200 | 40 | 73.998.0261 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | DN.. 1104.. | 284,00 |
| 72.557.1324 | A32S-PDUNR 15 | 30 | 22 | 39 | 32 | 250 | 50 | 73.998.0265 | 73.998.0120 | 73.998.0155 | 73.998.0365 | 73.998.0200 | SW3 | DN.. 1506.. | 334,00 |
| 72.557.1404 | A40T-PDUNR 15 | 37 | 27 | 48 | 40 | 300 | 60 | 73.998.0265 | 73.998.0120 | 73.998.0155 | 73.998.0365 | 73.998.0200 | SW3 | DN.. 1506.. | 379,00 |

## › 73.211 DNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| DN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,6 | 3,81 | 4,76 |
| 15 | 15,5 | 5,16 | 6,35 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.211.1246 | 1104 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,15 | |
| 73.211.1446 | 1506 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 17,64 | |
| 73.211.4266 | 1104 | 0,8 | PM | PC20 | 0,4-5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,15 |  |
| 73.211.4466 | 1506 | 0,8 | PM | PC20 | 0,5-6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 17,64 | |
| 73.211.4468 | 1506 | 0,8 | PM | PC30 | 0,5-6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 17,64 | |
| 73.211.7568 | 1506 | 0,8 | PR | PC30 | 0,8-6 | 0,2-0,55 | | | ✔ | ✔ | ✔ | ✔ | 17,64 | |

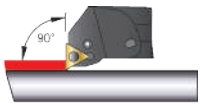
## › 73.213 DNMG Phantom

**P M S**

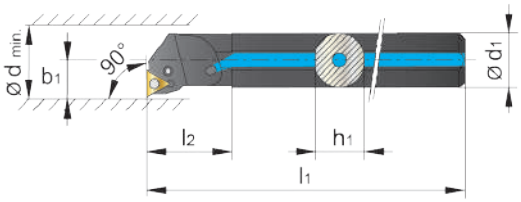
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.213.1247 | 1104 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 12,50 | |
| 73.213.1447 | 1506 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 18,77 | |
| 73.213.4447 | 1506 | 0,4 | MM | MSI20 | 0,15-2 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 18,77 |  |
| 73.213.4467 | 1506 | 0,8 | MM | MSI20 | 0,2-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 18,77 | |

## › 72.565 Phantom

NL **Blindboorbeitel, 90° A-PTFNR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 90° A-PTFNR/L**
ES **Herramienta para escariar y rectificar, 90° A-PTFNR/L**
DE **Innen-Eckdrehmeissel, 90° A-PTFNR/L**
EN **Internal Boring Bar, 90° A-PTFNR/L**





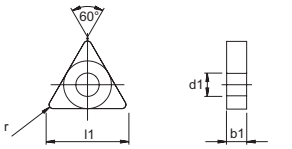




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.565.1250 | A25R-PTFNR 16 | 23 | 17 | 32 | 25 | 200 | 17.5 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 294,00 |
| 72.565.1320 | A32S-PTFNR 16 | 30 | 22 | 40 | 32 | 250 | 18 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 343,00 |
| 72.565.2200 | A20Q-PTFNL 11 | 18.5 | 13 | 25 | 20 | 180 | 32 | - | 73.998.0125 | 73.998.0167 | - | - | SW2,5 | TNM.. 1103.. | 94,30 |
| 72.565.2250 | A25R-PTFNL 16 | 23 | 17 | 32 | 25 | 200 | 17.5 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 294,00 |
| 72.565.2320 | A32S-PTFNL 16 | 30 | 22 | 40 | 32 | 250 | 18 | 73.998.0270 | 73.998.0125 | 73.998.0170 | 73.998.0380 | 73.998.0215 | SW2,5 | TNM. 1604.. | 343,00 |

## › 73.250 TNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 16 | 16,5 | 3,81 | 4,76 |
| 22 | 22,0 | 5,16 | 4,76 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.250.4567 | 1604 | 0,8 | UF | UI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 12,65 |  |

## › 73.251 TNMG Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.251.1546 | 1604 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,25 | ✔ | | | ✔ | ✔ | | 12,15 |  |
| 73.251.4548 | 1604 | 0,4 | PM | PC30 | 0,4-5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 12,15 |  |
| 73.251.4566 | 1604 | 0,8 | PM | PC20 | 0,5-5 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 12,15 | |
| 73.251.4766 | 2204 | 0,8 | PM | PC20 | 0,5-6,6 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 18,09 | |
| 73.251.5546 | 1604 | 0,4 | ER | PC20 | 1-3,5 | 0,12-0,3 | | | | ✔ | ✔ | | 12,15 |  |
| 73.251.5566 | 1604 | 0,8 | ER | PC20 | 1,3-3,5 | 0,15-0,5 | | | | ✔ | ✔ | | 12,15 | |

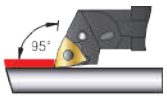
## › 73.253 TNMG Phantom

**P M S**

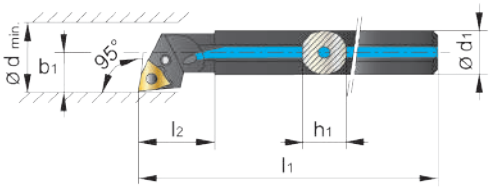
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.253.4547 | 1604 | 0,4 | MM | MSI20 | 0,15-3 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 12,50 |  |
| 73.253.4567 | 1604 | 0,8 | MM | MSI20 | 0,2-3 | 0,1-0,3 | | ✔ | | ✔ | ✔ | ✔ | 12,50 | |

## › 72.570 Phantom

NL **Blindboorbeitel, 95° A-PWLNR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 95° A-PWLNR/L**
ES **Herramienta para escariar y rectificar, 95° A-PWLNR/L**
DE **Innen-Eckdrehmeissel, 95° A-PWLNR/L**
EN **Internal Boring Bar, 95° A-PWLNR/L**





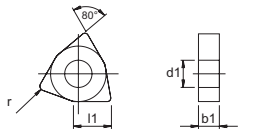




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.570.1200 | A20Q-PWLNR 06 | 19 | 13 | 25 | 20 | 180 | 19.5 | 73.998.0135(B)/73.998.0126(S) | 73.998.0167 | SW2 | WN.. 0604.. | 276,00 |
| 72.570.2250 | A25R-PWLNL 06 | 24 | 17 | 32 | 25 | 200 | 19.5 | 73.998.0135(B)/73.998.0126(S) | 73.998.0167 | SW2 | WN.. 0604.. | 122,15 |

## › 73.291 WNMG Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| WN.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 06 | 6,6 | 3,81 | 4,76 |
| 08 | 8,7 | 5,16 | 4,76 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.291.1046 | 0604 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,3 | ✔ | | | ✔ | ✔ | | 11,27 |  |
| 73.291.1146 | 0804 | 0,4 | PF | PC20 | 0,1-2 | 0,05-0,3 | ✔ | | | ✔ | ✔ | | 13,92 | |
| 73.291.4066 | 0604 | 0,8 | PM | PC20 | 0,5-3 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 11,27 | |
| 73.291.4166 | 0804 | 0,8 | PM | PC20 | 0,5-4 | 0,15-0,5 | | ✔ | | ✔ | ✔ | | 13,92 | |
| 73.291.4168 | 0804 | 0,8 | PM | PC30 | 0,5-4 | 0,15-0,5 | | ✔ | | ✔ | ✔ | ✔ | 13,92 | |
| 73.291.4176 | 0804 | 1,2 | PM | PC20 | 0,8-4 | 0,18-0,6 | | ✔ | | ✔ | ✔ | ✔ | 13,92 | |

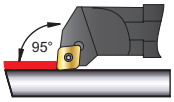
## › 73.293 WNMG Phantom

**P M S**

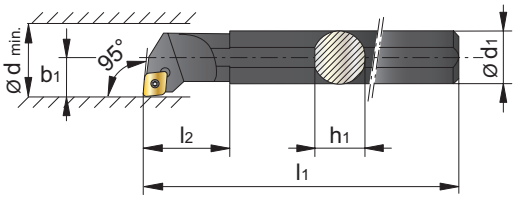
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.293.1047 | 0604 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 11,58 |  |
| 73.293.1147 | 0804 | 0,4 | MF | MSI20 | 0,6-3 | 0,1-0,23 | ✔ | | | ✔ | ✔ | | 14,24 | |
| 73.293.1167 | 0804 | 0,8 | MF | MSI20 | 0,6-3 | 0,12-0,38 | ✔ | | | ✔ | ✔ | ✔ | 14,24 | |
| 73.293.4147 | 0804 | 0,4 | MM | MSI20 | 0,15-2,5 | 0,1-0,3 | | ✔ | | ✔ | ✔ | | 14,24 | |
| 73.293.4167 | 0804 | 0,8 | MM | MSI20 | 0,25-3 | 0,1-0,35 | | ✔ | | ✔ | ✔ | ✔ | 14,24 | |

## › 72.585 Phantom

NL **Blindboorbeitel, 95° S-SCLCR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 95° S-SCLCR**
ES **Herramienta para escariar y rectificar, 95° S-SCLCR**
DE **Innen-Eckdrehmeissel, 95° S-SCLCR**
EN **Internal Boring Bar, 95° S-SCLCR**







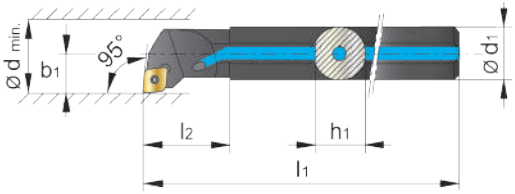


| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.585.1080 | S08K-SCLCR 06 | 7 | 5 | 11 | 8 | 125 | 8 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 124,30 |
| 72.585.1100 | S10M-SCLCR 06 | 9 | 7 | 13 | 10 | 150 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 124,30 |
| 72.585.1120 | S12M-SCLCR 06 | 11 | 9 | 16 | 12 | 150 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 124,30 |
| 72.585.1160 | S16R-SCLCR 09 | 15 | 11 | 20 | 16 | 200 | 16 | 73.998.0075(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 129,55 |
| 72.585.1200 | S20S-SCLCR 09 | 18 | 13 | 25 | 20 | 250 | 16 | 73.998.0075(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 163,50 |
| 72.585.1250 | S25T-SCLCR 09 | 23 | 17 | 32 | 25 | 300 | 16 | 73.998.0070(B)/73.998.0096(S) | T15 | CC.. 09T3.. | 178,70 |

## › 72.590 Phantom

NL **Blindboorbeitel, 95° A-SCLCR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 95° A-SCLCR/L**
ES **Herramienta para escariar y rectificar, 95° A-SCLCR/L**
DE **Innen-Eckdrehmeissel, 95° A-SCLCR/L**
EN **Internal Boring Bar, 95° A-SCLCR/L**





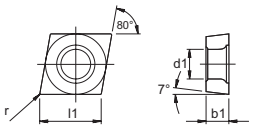




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.590.1080 | A08F-SCLCR 06 | 7.5 | 5 | 11 | 8 | 80 | 8 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.1100 | A10H-SCLCR 06 | 9.5 | 7 | 13 | 10 | 100 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.1120 | A12K-SCLCR 06 | 11.5 | 9 | 16 | 12 | 125 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.1160 | A16M-SCLCR 09 | 15.5 | 11 | 20 | 16 | 150 | 16 | 73.998.0075(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 142,40 |
| 72.590.1200 | A20Q-SCLCR 09 | 19 | 13 | 25 | 20 | 180 | 16 | 73.998.0074(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 179,30 |
| 72.590.1250 | A25R-SCLCR 09 | 24 | 17 | 31.5 | 25 | 200 | 16 | 73.998.0074(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 196,35 |
| 72.590.2080 | A08F-SCLCL 06 | 7.5 | 5 | 11 | 8 | 80 | 8 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.2100 | A10H-SCLCL 06 | 9.5 | 7 | 13 | 10 | 100 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.2120 | A12K-SCLCL 06 | 11.5 | 9 | 16 | 12 | 125 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | 139,40 |
| 72.590.2122 | A12M-SCLCL 06 | 11.5 | 9 | 16 | 12 | 150 | 10 | 73.998.0085(B)/73.998.0086(S) | T8(B)/ T7(S) | CC.. 0602. | |
| 72.590.2160 | A16M-SCLCL 09 | 15.5 | 11 | 20 | 16 | 150 | 16 | 73.998.0075(B)/73.998.0094(S) | T15 | CC.. 09T3.. | 142,40 |

## › 73.500 CCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| CC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 06 | 6,4 | 2,80 | 2,38 |
| 09 | 9,7 | 4,40 | 3,97 |
| 12 | 12,4 | 5,50 | 4,76 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.500.4045 | 0602 | 0,4 | UM | UI10 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 | |
| 73.500.4047 | 0602 | 0,4 | UM | UI20 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 | |
| 73.500.4145 | 09T3 | 0,4 | UM | UI10 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 9,76 | |
| 73.500.4147 | 09T3 | 0,4 | UM | UI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 9,76 | |
| 73.500.4167 | 09T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 9,76 | |
| 73.500.4367 | 1204 | 0,8 | UM | UI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,61 | |



## › 73.501 CCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.501.1026 | 0602 | 0,2 | PF | PC20 | 0,06-1,7 | 0,03-0,11 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1046 | 0602 | 0,4 | PF | PC20 | 0,1-1,7 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1146 | 09T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.1166 | 09T3 | 0,8 | PF | PC20 | 0,15-2 | 0,08-0,45 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.501.4046 | 0602 | 0,4 | PM | PC20 | 0,2-2,4 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4146 | 09T3 | 0,4 | PM | PC20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4166 | 09T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.501.4346 | 1204 | 0,4 | PM | PC20 | 0,3-3,6 | 0,09-0,27 | | ✔ | | ✔ | ✔ | | 13,53 | |
| 73.501.4366 | 1204 | 0,8 | PM | PC20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | | 13,53 | |



## › 73.503 CCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.503.1047 | 0602 | 0,4 | MF | MSI20 | 0,1-1,7 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,14 | |
| 73.503.1147 | 09T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,14 | |
| 73.503.1167 | 09T3 | 0,8 | MF | MSI20 | 0,15-2 | 0,08-0,45 | ✔ | | | ✔ | ✔ | ✔ | 10,14 | |
| 73.503.4147 | 09T3 | 0,4 | MM | MSI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.503.4167 | 09T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,14 | |
| 73.503.4367 | 1204 | 0,8 | MM | MSI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,61 | |



## › 73.505 CCGT Phantom

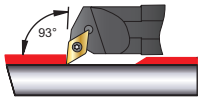
**N**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.505.4020 | 0602 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 15,04 | |
| 73.505.4040 | 0602 | 0,4 | NM | K10 | 0,1-3 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 15,04 | |
| 73.505.4140 | 09T3 | 0,4 | NM | K10 | 0,1-5 | 0,1-0,22 | | ✔ | | ✔ | ✔ | | 16,32 | |
| 73.505.4160 | 09T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,45 | | ✔ | ✔ | ✔ | ✔ | ✔ | 16,32 | |

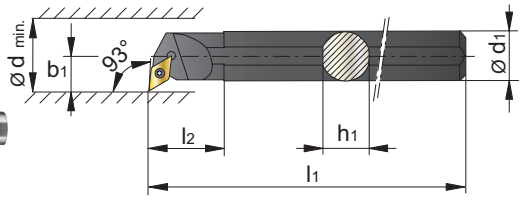


## › 72.595 Phantom

NL **Blindboorbeitel, 93° S-SDUCR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 93° S-SDUCR**
ES **Herramienta para escariar y rectificar, 93° S-SDUCR**
DE **Innen-Eckdrehmeissel, 93° S-SDUCR**
EN **Internal Boring Bar, 93° S-SDUCR**





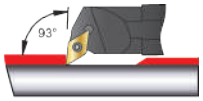




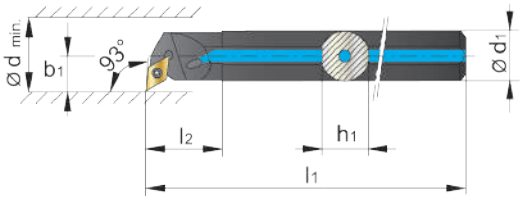
| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.595.1120 | S12Q-SDUCR 07 | 11 | 9 | 16 | 12 | 180 | 12.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 124,30 |
| 72.595.1160 | S16R-SDUCR 07 | 14.5 | 11 | 20 | 16 | 200 | 16.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 129,55 |
| 72.595.1200 | S20S-SDUCR 11 | 18 | 13 | 25 | 20 | 250 | 20.5 | - | - | 73.998.0075(B)/73.998.0094(S) | T15 | DC.. 11T3.. | 163,50 |
| 72.595.1250 | S25T-SDUCR 11 | 23 | 17 | 32 | 25 | 300 | 26 | 73.998.0290(B)/-(S) | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | DC.. 11T3.. | 178,70 |

## › 72.600 Phantom

NL **Blindboorbeitel, 93° A-SDUCR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 93° A-SDUCR/L**
ES **Herramienta para escariar y rectificar, 93° A-SDUCR/L**
DE **Innen-Eckdrehmeissel, 93° A-SDUCR/L**
EN **Internal Boring Bar, 93° A-SDUCR/L**





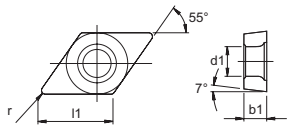




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.600.1120 | A12K-SDUCR 07 | 11.5 | 9 | 17 | 12 | 125 | 12.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 139,40 |
| 72.600.1160 | A16M-SDUCR 07 | 15.5 | 11 | 21 | 16 | 150 | 16.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 142,40 |
| 72.600.1200 | A20Q-SDUCR 11 | 19 | 13 | 25 | 20 | 180 | 21 | - | - | 73.998.0075(B)/73.998.0094(S) | T15 | DC.. 11T3.. | 179,30 |
| 72.600.1250 | A25R-SDUCR 11 | 24 | 17 | 31.5 | 25 | 200 | 26 | 73.998.0290(B)/-(S) | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | DC.. 11T3.. | 196,35 |
| 72.600.2120 | A12K-SDUCL 07 | 11.5 | 9 | 12 | 17 | 125 | 12.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 139,40 |
| 72.600.2160 | A16M-SDUCL 07 | 15.5 | 11 | 16 | 21 | 150 | 16.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | DC.. 0702.. | 142,40 |
| 72.600.2200 | A20Q-SDUCL 11 | 19 | 13 | 25 | 20 | 180 | 21 | - | - | 73.998.0075(B)/73.998.0094(S) | T15 | DC.. 11T3.. | 179,30 |

## › 73.510 DCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| DC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 07 | 7,7 | 2,80 | 2,38 |
| 11 | 11,6 | 4,40 | 3,97 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.510.4047 | 0702 | 0,4 | UM | UI20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 8,32 |  |
| 73.510.4247 | 11T3 | 0,4 | UM | UI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,34 | |
| 73.510.4267 | 11T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,89 | |

## › 73.511 DCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.511.1046 | 0702 | 0,4 | PF | PC20 | 0,08-1,5 | 0,05-0,17 | ✔ | | | ✔ | ✔ | | 10,89 |  |
| 73.511.1246 | 11T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,89 | |
| 73.511.4046 | 0702 | 0,4 | PM | PC20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4066 | 0702 | 0,8 | PM | PC20 | 0,38-2,25 | 0,08-0,35 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4246 | 11T3 | 0,4 | PM | PC20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.511.4266 | 11T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | | 10,89 | |

## › 73.513 DCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.513.1247 | 11T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,14 |  |
| 73.513.4047 | 0702 | 0,4 | MM | MSI20 | 0,19-2,25 | 0,06-0,17 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.513.4247 | 11T3 | 0,4 | MM | MSI20 | 0,25-3 | 0,08-0,23 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.513.4267 | 11T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 10,14 | |

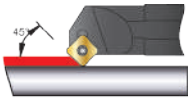
## › 73.515 DCGT Phantom

**N**

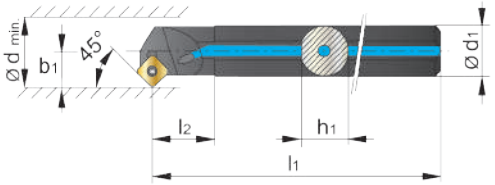
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.515.4020 | 0702 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 15,04 |  |
| 73.515.4240 | 11T3 | 0,4 | NM | K10 | 0,1-5 | 0,1-0,22 | | ✔ | | ✔ | ✔ | | 16,32 | |
| 73.515.4260 | 11T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 16,32 | |

## › 72.610 Phantom

NL **Blindboorbeitel, 45° A-SSSCR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 45° A-SSSCR**
ES **Herramienta para escariar y rectificar, 45° A-SSSCR**
DE **Innen-Eckdrehmeissel, 45° A-SSSCR**
EN **Internal Boring Bar, 45° A-SSSCR**





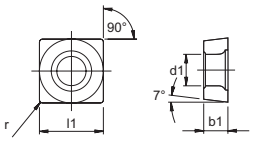




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.610.1160 | A16M-SSSCR 09 | 16 | 11 | 21 | 16 | 150 | 129 | 73.998.0075(B)/73.998.0094(S) | T15 | SC.. 09T3.. | 142,40 |
| 72.610.1200 | A20Q-SSSCR 09 | 19 | 13 | 25 | 20 | 180 | 132 | 73.998.0075(B)/73.998.0094(S) | T15 | SC.. 09T3.. | 179,30 |

## › 73.530 SCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| SC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 09 | 9,5 | 4,40 | 3,97 |
| 12 | 12,7 | 5,60 | 4,76 |

**P M K S**

| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.530.4147 | 09T3 | 0,4 | UM | UI20 | 0,25-3 | 0,06-0,23 | | ✔ | | ✔ | ✔ | | 9,32 |  |
| 73.530.4167 | 09T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 9,32 | |
| 73.530.4367 | 1204 | 0,8 | UM | UI20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 12,64 | |

## › 73.531 SCMT Phantom

**P M K**

| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.531.1146 | 09T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 11,27 |  |
| 73.531.4166 | 09T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,4 | | ✔ | | ✔ | ✔ | ✔ | 11,27 | |
| 73.531.4366 | 1204 | 0,8 | PM | PC20 | 0,6-3,6 | 0,12-0,45 | | ✔ | | ✔ | ✔ | ✔ | 13,53 | |

## › 73.535 SCGT Phantom

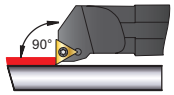
**N**

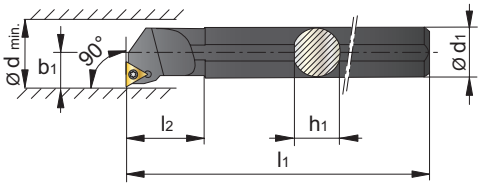
| Ref. | Ixd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.535.4140 | 09T3 | 0,4 | NM | K10 | 0,1-4 | 0,1-0,26 | | ✔ | | ✔ | ✔ | | 15,43 |  |
| 73.535.4160 | 09T3 | 0,8 | NM | K10 | 0,1-5 | 0,15-0,4 | | ✔ | ✔ | ✔ | ✔ | ✔ | 15,43 | |

## › 72.615 Phantom

NL **Blindboorbeitel, 90° S-STFCR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 90° S-STFCR**
ES **Herramienta para escariar y rectificar, 90° S-STFCR**
DE **Innen-Eckdrehmeissel, 90° S-STFCR**
EN **Internal Boring Bar, 90° S-STFCR**







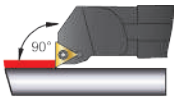


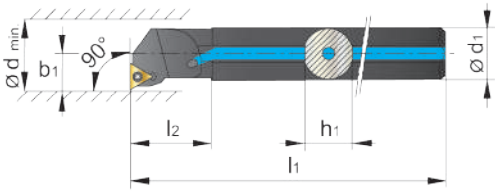
| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.615.1160 | S16R-STFCR 11 | 15 | 11 | 21 | 16 | 200 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 129,55 |
| 72.615.1200 | S20S-STFCR 11 | 18 | 13 | 25 | 20 | 250 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 163,50 |

## › 72.620 Phantom

NL **Blindboorbeitel, 90° A-STFCR/L**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 90° A-STFCR/L**
ES **Herramienta para escariar y rectificar, 90° A-STFCR/L**
DE **Innen-Eckdrehmeissel, 90° A-STFCR/L**
EN **Internal Boring Bar, 90° A-STFCR/L**





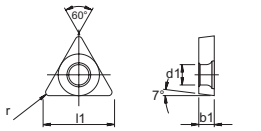




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.620.1120 | A12K-STFCR 11 | 12 | 9 | 17 | 12 | 125 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 139,40 |
| 72.620.1160 | A16M-STFCR 11 | 16 | 11 | 21 | 16 | 150 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 142,40 |
| 72.620.1200 | A20Q-STFCR 11 | 19 | 13 | 25 | 20 | 180 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 179,30 |
| 72.620.2160 | A16M-STFCL 11 | 16 | 11 | 21 | 16 | 150 | 13 | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | TC.. 1102.. | 88,65 |

## › 73.540 TCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| TC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,6 | 2,80 | 2,38 |
| 16 | 16,0 | 4,40 | 3,97 |

**P M K S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.540.4567 | 16T3 | 0,8 | UM | UI20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | ✔ | 10,29 |  |

## › 73.541 TCMT Phantom

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.541.1266 | 1102 | 0,8 | PF | PC20 | 0,13-1,7 | 0,07-0,26 | ✔ | | | ✔ | ✔ | | 10,89 |  |
| 73.541.1546 | 16T3 | 0,4 | PF | PC20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 11,27 | |
| 73.541.4246 | 1102 | 0,4 | PM | PC20 | 0,21-2,5 | 0,06-0,19 | | ✔ | | ✔ | ✔ | | 10,89 | |
| 73.541.4566 | 16T3 | 0,8 | PM | PC20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | | 11,27 | |

## › 73.543 TCMT Phantom

**P M S**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.543.1247 | 1102 | 0,4 | MF | MSI20 | 0,1-1,7 | 0,05-0,19 | ✔ | | | ✔ | ✔ | | 10,14 |  |
| 73.543.1547 | 16T3 | 0,4 | MF | MSI20 | 0,11-2 | 0,06-0,23 | ✔ | | | ✔ | ✔ | | 10,54 | |
| 73.543.4247 | 1102 | 0,4 | MM | MSI20 | 0,21-2,5 | 0,06-0,19 | | ✔ | | ✔ | ✔ | | 10,14 | |
| 73.543.4567 | 16T3 | 0,8 | MM | MSI20 | 0,5-3 | 0,1-0,45 | | ✔ | | ✔ | ✔ | ✔ | 10,54 | |

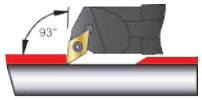
## › 73.545 TCGT Phantom

**N**

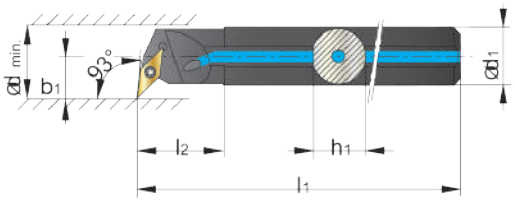
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.545.4240 | 1102 | 0,4 | NM | K10 | 0,1-4 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 15,43 |  |
| 73.545.4540 | 16T3 | 0,4 | NM | K10 | 0,1-5,5 | 0,1-0,2 | | ✔ | | ✔ | ✔ | | 18,73 | |
| 73.545.4560 | 16T3 | 0,8 | NM | K10 | 0,1-5,5 | 0,15-0,5 | | ✔ | ✔ | ✔ | ✔ | ✔ | 18,73 | |

## › 72.630 Phantom

NL **Blindboorbeitel, 93° A-SVUCR**
FR **Porte outil pour plaquette carbure à aléser et à dresser, 93° A-SVUCR**
ES **Herramienta para escariar y rectificar, 93° A-SVUCR**
DE **Innen-Eckdrehmeissel, 93° A-SVUCR**
EN **Internal Boring Bar, 93° A-SVUCR**





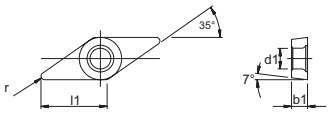




| Ref. | Type | h1 | b1 | d min | d1 | l1 | l2 | 1 incl. | 2 incl. | 3 incl. | 4 incl. | 5 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.630.1160 | A16M-SVUCR 11 | 15.5 | 11 | 21 | 16 | 150 | 16.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.. 1103.. | 142,40 |
| 72.630.1200 | A20Q-SVUCR 11 | 19 | 13 | 25 | 20 | 180 | 20.5 | - | - | 73.998.0080(B)/73.998.0081(S) | T8(B)/ T7(S) | VC.. 1103.. | 179,30 |
| 72.630.1254 | A25R-SVUCR 16 | 23 | 17 | 31 | 25 | 200 | 40 | 73.998.0305 | 73.998.0355 | 73.998.0070(B)/73.998.0096(S) | T15 | VC.T 1604.. | 196,35 |

## › 73.591 VCMT Phantom

NL **Wisselplaat**
FR **Plaquette**
ES **Plaquita**
DE **Wendeplatte**
EN **Insert**




| VC.. | l1 (mm) | d1 (mm) | b1 (mm) |
|---|---|---|---|
| 11 | 11,0 | 2,80 | 3,18 |
| 16 | 16,6 | 4,40 | 4,76 |

**P M K**

| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.591.1226 | 1103 | 0,2 | PF | PC20 | 0,07-1,5 | 0,03-0,13 | ✔ | | | ✔ | ✔ | | 14,36 |  |
| 73.591.1246 | 1103 | 0,4 | PF | PC20 | 0,1-1,5 | 0,05-0,2 | ✔ | | | ✔ | ✔ | | 14,36 | |
| 73.591.1546 | 1604 | 0,4 | PF | PC20 | 0,1-1,8 | 0,05-0,2 | ✔ | | | ✔ | ✔ | | 18,38 | |
| 73.591.4546 | 1604 | 0,4 | PM | PC20 | 0,23-2,7 | 0,07-0,2 | | ✔ | | ✔ | ✔ | | 18,38 | |
| 73.591.4566 | 1604 | 0,8 | PM | PC20 | 0,45-2,7 | 0,09-0,27 | | ✔ | | ✔ | ✔ | | 18,38 | |

## › 73.595 VCGT Phantom

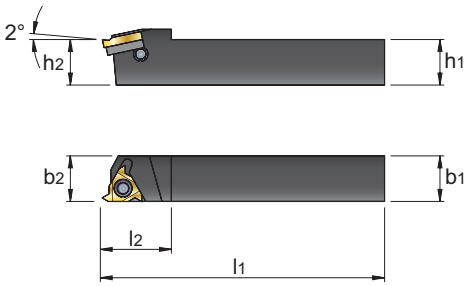
**N**

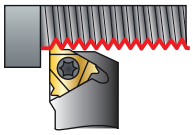
| Ref. | lxd | r (mm) | Geo | HM | $a_p$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ◠ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.595.4220 | 1103 | 0,2 | NM | K10 | 0,05-3 | 0,05-0,12 | ✔ | ✔ | | ✔ | ✔ | | 18,73 |  |
| 73.595.4240 | 1103 | 0,4 | NM | K10 | 0,05-3 | 0,1-0,25 | | ✔ | | ✔ | ✔ | | 18,73 | |

## › 74.101 Phantom

NL **Draadsnijhouder, uitwendig, rechts**
FR **Outil à fileter, extérieur, à droite**
ES **Portaplaquita para roscar, exterior, a derecha**
DE **Klemmhalter, außen, rechts**
EN **Threading Tool Holder, external, right hand**





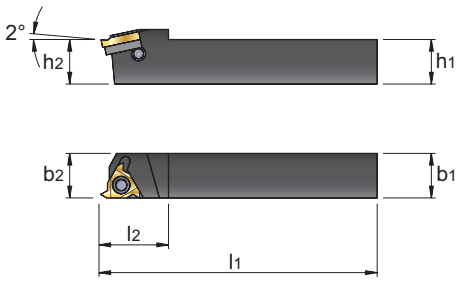


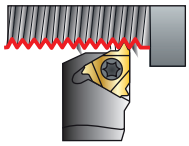

| Ref. | Type | h1 | h2 | b1 | b2 | l1 | l2 | 1 incl. | 2 excl. | 3 excl. | 4 incl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.101.1230 | NL 1212-16 | 12 | 12 | 12 | 16 | 83.2 | 22 | - | - | - | - | 74.398.0105 | T10 | 16ER | 84,65 |
| 74.101.1630 | AL 1616-16 | 16 | 16 | 16 | 16 | 100 | 20.5 | 74.398.0165 | 74.398.0195 | 74.398.0400 | 74.398.0130 | 74.398.0115 | T10 | 16ER | 104,15 |
| 74.101.2030 | AL 2020-16 | 20 | 20 | 20 | 20 | 128.6 | 30 | 74.398.0165 | 74.398.0195 | 74.398.0400 | 74.398.0130 | 74.398.0115 | T10 | 16ER | 104,15 |
| 74.101.2530 | AL 2525-16 | 25 | 25 | 25 | 25 | 153.6 | 30 | 74.398.0165 | 74.398.0195 | 74.398.0400 | 74.398.0130 | 74.398.0115 | T10 | 16ER | 118,80 |
| 74.101.2540 | AL 2525-22 | 25 | 25 | 25 | 25 | 175.7 | 36 | 74.398.0200 | 74.398.0225 | - | 74.398.0135 | 74.398.0120 | T20 | 22ER | 130,15 |
| 74.101.3230 | AL 3232-16 | 32 | 32 | 32 | 32 | 173.6 | 30 | 74.398.0165 | 74.398.0195 | 74.398.0400 | 74.398.0130 | 74.398.0115 | T10 | 16ER | 130,15 |
| 74.101.3240 | AL 3232-22 | 32 | 32 | 32 | 32 | 175.7 | 36 | 74.398.0200 | 74.398.0225 | - | 74.398.0135 | 74.398.0120 | T20 | 22ER | 136,70 |

## › 74.102 Phantom

NL **Draadsnijhouder, uitwendig, links**
FR **Outil à fileter, extérieur, à gauche**
ES **Portaplaquita para roscar, exterior, a la izquierda**
DE **Klemmhalter, außen, links**
EN **Threading Tool Holder, external, left hand**





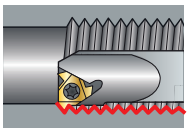





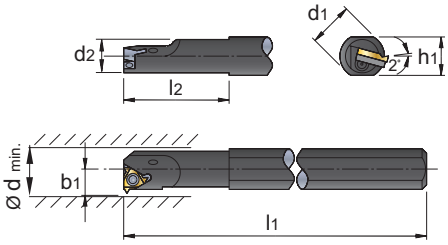

| Ref. | Type | h1 | h2 | b1 | b2 | l1 | l2 | 1 incl. | 2 excl. | 3 excl. | 4 incl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.102.2030 | AL 2020-16LH | 20 | 20 | 20 | 20 | 128.6 | 30 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16EL | 104,15 |
| 74.102.2530 | AL 2525-16LH | 25 | 25 | 25 | 25 | 153.6 | 30 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16EL | 118,80 |

## › 74.125 Phantom

**NL** Draadsnijhouder, inwendig, rechts
**FR** Outil à fileter, intérieur, à droite
**ES** Portaplaquita para roscar, interior, a derecha
**DE** Klemmhalter, innen, rechts
**EN** Threading Tool Holder, internal, right hand







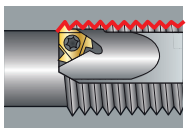




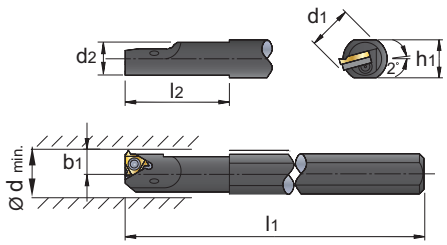
| Ref. | Type | d1 | h1 | l1 | d2 | l2 | b1 | d min | 1 incl. | 2 excl. | 3 excl. | 4 incl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.125.1020 | NVR 10-11 | 20 | 18 | 180 | 10 | 25 | 7.3 | 13 | - | - | - | - | 74.398.0100 | T8 | 11IR | 91,15 |
| 74.125.1330 | NVR 13-16 | 20 | 18 | 180 | 12.7 | 32 | 10.3 | 17 | - | - | - | - | 74.398.0105 | T10 | 16IR | 99,30 |
| 74.125.1630 | NVR 16-16 | 20 | 18 | 180 | 16 | 40 | 11.5 | 20 | - | - | - | - | 74.398.0105 | T10 | 16IR | 99,30 |
| 74.125.2030 | AVR 20-16 | 20 | 18 | 180 | 20 | 80 | 13.4 | 24 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16IR | 117,00 |
| 74.125.2230 | AVR 25D-16 | 25 | 22.6 | 200 | 24.6 | 100 | 16.1 | 29 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16IR | 143,15 |
| 74.125.2530 | AVR 25-16 | 32 | 29 | 250 | 25 | 60 | 16.3 | 29 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16IR | 143,15 |
| 74.125.2540 | AVR 25-22 | 32 | 29 | 250 | 25 | 60 | 17.4 | 32 | 74.398.0290 | 74.398.0315 | - | 74.398.0135 | 74.398.0120 | T20 | 22IR | 143,15 |
| 74.125.3230 | AVR 32-16 | 32 | 29 | 250 | 32 | 128 | 19.6 | 36 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16IR | 152,90 |
| 74.125.3240 | AVR 32-22 | 32 | 29 | 250 | 32 | 128 | 21.5 | 39 | 74.398.0290 | 74.398.0315 | - | 74.398.0135 | 74.398.0120 | T20 | 22IR | 156,20 |
| 74.125.4030 | AVR 40-16 | 40 | 36 | 300 | 40 | 160 | 23.8 | 44 | 74.398.0260 | 74.398.0285 | 74.398.0500 | 74.398.0130 | 74.398.0115 | T10 | 16IR | 227,75 |

## › 74.126 Phantom

**NL** Draadsnijhouder, inwendig, links
**FR** Outil à fileter, intérieur, à gauche
**ES** Portaplaquita para roscar, interior, a la izquierda
**DE** Klemmhalter, innen, links
**EN** Threading Tool Holder, internal, left hand





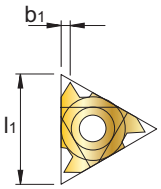






| Ref. | Type | d1 | h1 | l1 | d2 | l2 | b1 | d min | 1 incl. | 2 excl. | 3 excl. | 4 incl. | 5 incl. | 6 incl. | 7 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.126.1630 | NVR 16-16LH | 20 | 18 | 180 | 16 | 40 | 11.5 | 20 | - | - | - | - | 74.398.0105 | T10 | 16IL | 99,30 |

## › 74.150 ER 60° UNI Phantom




NL **Draadsnijwisselplaat, deelprofiel**
FR **Plaquette a fileter, profil partiel**
ES **Plaquita para roscar, perfil parcial**
DE **Gewindeschneidplatte, Teilprofil**
EN **Threading Insert, partial profile, external**

P M K N S

| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.150.0220 | 16ER AG60 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 |  |
| 74.150.0240 | 16ER G60 | UI20 | 16 | 1,7 | 1,75-3 | 14-8 | 0,08-0,33 | 25,10 | |
| 74.150.0270 | 22ER N60 | UI20 | 22 | 2,5 | 3,5-5 | 7-5 | 0,19-0,42 | 43,20 | |

## › 74.151 EL 60° UNI Phantom

P M K N S

| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.151.0220 | 16EL AG60 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 |  |

## › 74.155 IR 60° UNI Phantom

P M K N S

| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.155.0070 | 11IR A60 | UI20 | 11 | 0,9 | 0,5-1,5 | 48-16 | 0,08-0,25 | 23,86 |  |
| 74.155.0220 | 16IR AG60 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 | |
| 74.155.0240 | 16IR G60 | UI20 | 16 | 1,7 | 1,75-3 | 14-8 | 0,08-0,33 | 25,10 | |
| 74.155.0270 | 22IR N60 | UI20 | 22 | 2,5 | 3,5-5 | 7-8 | 0,19-0,42 | 43,20 | |

## › 74.156 IL 60° UNI Phantom

P M K N S

| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.156.0220 | 16IL AG60 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 |  |

## › 74.160 ER 55° UNI Phantom

P M K N S

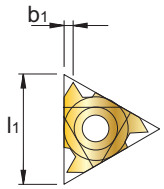
| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.160.0220 | 16ER AG55 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 |  |
| 74.160.0270 | 22ER N55 | UI20 | 22 | 2,5 | 3,5-5 | 7-5 | 0,19-0,42 | 39,95 | |

## › 74.165 IR 55° UNI Phantom

P M K N S

| Ref. | Type | HM | l1 | b1 | P (mm) | P (Inch) | ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.165.0070 | 11IR A55 | UI20 | 11 | 0,9 | 0,5-1,5 | 48-16 | 0,08-0,25 | 23,86 |  |
| 74.165.0220 | 16IR AG55 | UI20 | 16 | 1,7 | 0,5-3 | 48-8 | 0,08-0,33 | 25,10 | |
| 74.165.0270 | 22IR N55 | UI20 | 22 | 2,5 | 3,5-5 | 7-5 | 0,19-0,42 | 43,20 | |

## › 74.170 ER 60° M UNI-INOX Phantom




NL **Draadsnijwisselplaat, volprofiel**
FR **Plaquette a fileter, profil plein**
ES **Plaquita para roscar, perfil completo**
DE **Gewindeschneidplatte, Vollprofil**
EN **Threading Insert Metric Coarse, full profile, external**

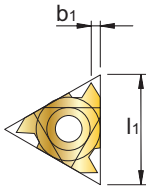
**P M K N S**

| Ref. | Type | HM | l1 | b1 | P (mm) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.170.0720 | 16ER 0,5ISO | UI20 | 16 | 0,4 | 0,5 | 0,08-0,12 | 4-6 | 25,10 | |
| 74.170.0730 | 16ER 0,5ISO | MSI20 | 16 | 0,4 | 0,5 | 0,08-0,12 | 4-6 | 26,05 | |
| 74.170.0800 | 16ER 0,7ISO | UI20 | 16 | 0,6 | 0,7 | 0,1-0,18 | 4-7 | 25,10 | |
| 74.170.0870 | 16ER 0,75ISO | UI20 | 16 | 0,6 | 0,75 | 0,1-0,18 | 4-7 | 25,20 | |
| 74.170.0875 | 16ER 0,8ISO | UI20 | 16 | 0,7 | 0,8 | 0,1-0,18 | 4-6 | 25,10 | |
| 74.170.0970 | 16ER 1,0ISO | UI20 | 16 | 0,7 | 1 | 0,12-0,25 | 4-8 | 25,10 | |
| 74.170.0990 | 16ER 1,0ISO | MSI20 | 16 | 0,7 | 1 | 0,12-0,25 | 4-8 | 26,05 | |
| 74.170.1020 | 16ER 1,25ISO | UI20 | 16 | 0,9 | 1,25 | 0,13-0,25 | 5-9 | 25,10 | |
| 74.170.1040 | 16ER 1,25ISO | MSI20 | 16 | 0,9 | 1,25 | 0,13-0,25 | 5-9 | 26,05 | |
| 74.170.1070 | 16ER 1,5ISO | UI20 | 16 | 1 | 1,5 | 0,15-0,25 | 6-10 | 25,10 | |
| 74.170.1090 | 16ER 1,5ISO | MSI20 | 16 | 1 | 1,5 | 0,15-0,25 | 6-10 | 26,05 | |
| 74.170.1120 | 16ER 1,75ISO | UI20 | 16 | 1,2 | 1,75 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.170.1140 | 16ER 1,75ISO | MSI20 | 16 | 1,2 | 1,75 | 0,15-0,25 | 7-12 | 26,05 | |
| 74.170.1170 | 16ER 2,0ISO | UI20 | 16 | 1,3 | 2 | 0,16-0,28 | 7-12 | 25,10 | |
| 74.170.1190 | 16ER 2,0ISO | MSI20 | 16 | 1,3 | 2 | 0,16-0,28 | 7-12 | 26,05 | |
| 74.170.1220 | 16ER 2,5ISO | UI20 | 16 | 1,5 | 2,5 | 0,18-0,32 | 8-14 | 27,85 | |
| 74.170.1240 | 16ER 2,5ISO | MSI20 | 16 | 1,5 | 2,5 | 0,19-0,33 | 8-14 | 28,90 | |
| 74.170.1270 | 16ER 3,0ISO | UI20 | 16 | 1,6 | 3 | 0,19-0,33 | 9-16 | 27,85 | |
| 74.170.1290 | 16ER 3,0ISO | MSI20 | 16 | 1,6 | 3 | 0,19-0,33 | 9-16 | 28,90 | |
| 74.170.1320 | 22ER 3,5ISO | UI20 | 22 | 2,3 | 3,5 | 0,2-0,35 | 10-18 | 39,95 | |
| 74.170.1370 | 22ER 4,0ISO | UI20 | 22 | 2,3 | 4 | 0,22-0,36 | 11-18 | 43,20 | |
| 74.170.1420 | 22ER 4,5ISO | UI20 | 22 | 2,4 | 4,5 | 0,24-0,4 | 11-19 | 43,20 | |
| 74.170.1470 | 22ER 5,0ISO | UI20 | 22 | 2,5 | 5 | 0,25-0,42 | 12-20 | 44,90 | |
| 74.170.1520 | 22ER 6,0ISO | UI20 | 22 | 2,7 | 6 | 0,3-0,5 | 12-20 | 43,20 | |



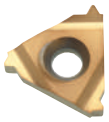
# › 74.175 IR 60° M UNI-INOX Phantom

NL **Draadsnijwisselplaat, volprofiel**
FR **Plaquette a fileter, profil plein**
ES **Plaquita para roscar, perfil completo**
DE **Gewindeschneidplatte, Vollprofil**
EN **Threading Insert Metric Coarse 60°, full profile, internal**



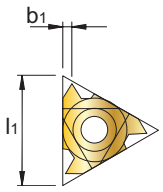

**P M K N S**

| Ref. | Type | HM | l1 | b1 | P (mm) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.175.0175 | 11IR 0,5ISO | UI20 | 11 | 0,4 | 0,5 | 0,08-0,12 | 4-6 | 23,97 | |
| 74.175.0320 | 11IR 0,75ISO | UI20 | 11 | 0,6 | 0,75 | 0,1-0,18 | 4-7 | 23,97 | |
| 74.175.0420 | 11IR 1,0ISO | UI20 | 11 | 0,7 | 1 | 0,12-0,25 | 4-8 | 23,86 | |
| 74.175.0470 | 11IR 1,25ISO | UI20 | 11 | 0,9 | 1,25 | 0,14-0,25 | 5-9 | 23,97 | |
| 74.175.0520 | 11IR 1,5ISO | UI20 | 11 | 1 | 1,5 | 0,15-0,25 | 6-10 | 22,06 | |
| 74.175.0530 | 11IR 1,5ISO | MSI20 | 11 | 1 | 1,5 | 0,15-0,25 | 6-9 | 16,59 | |
| 74.175.0570 | 11IR 1,75ISO | UI20 | 11 | 1,1 | 1,75 | 0,15-0,25 | 7-12 | 23,97 | |
| 74.175.0610 | 11IR 2,0ISO | UI20 | 11 | 1,1 | 2 | 0,16-0,28 | 7-12 | 23,86 | |
| 74.175.0650 | 11IR 2,5ISO | UI20 | 11 | 1,1 | 2,5 | 0,18-0,32 | 8-14 | 23,86 | |
| 74.175.0720 | 16IR 0,5ISO | UI20 | 16 | 0,4 | 0,5 | 0,08-0,12 | 4-6 | 25,20 | |
| 74.175.0970 | 16IR 1,0ISO | UI20 | 16 | 0,7 | 1 | 0,12-0,25 | 4-8 | 25,20 | |
| 74.175.0990 | 16IR 1,0ISO | MSI20 | 16 | 0,7 | 1 | 0,12-0,25 | 4-7 | 26,05 | |
| 74.175.1020 | 16IR 1,25ISO | UI20 | 16 | 0,9 | 1,25 | 0,12-0,25 | 5-9 | 25,10 | |
| 74.175.1040 | 16IR 1,25ISO | MSI20 | 16 | 0,9 | 1,25 | 0,14-0,25 | 5-8 | 26,05 | |
| 74.175.1070 | 16IR 1,5ISO | UI20 | 16 | 1 | 1,5 | 0,14-0,25 | 6-10 | 25,10 | |
| 74.175.1090 | 16IR 1,5ISO | MSI20 | 16 | 1 | 1,5 | 0,15-0,25 | 6-9 | 26,05 | |
| 74.175.1120 | 16IR 1,75ISO | UI20 | 16 | 1,2 | 1,75 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.175.1140 | 16IR 1,75ISO | MSI20 | 16 | 1,2 | 1,75 | 0,15-0,25 | 7-11 | 26,05 | |
| 74.175.1175 | 16IR 2,0ISO | UI20 | 16 | 1,3 | 2 | 0,16-0,28 | 7-12 | 25,10 | |
| 74.175.1190 | 16IR 2,0ISO | MSI20 | 16 | 1,3 | 2 | 0,16-0,28 | 7-11 | 26,05 | |
| 74.175.1220 | 16IR 2,5ISO | UI20 | 16 | 1,5 | 2,5 | 0,18-0,32 | 8-14 | 27,85 | |
| 74.175.1240 | 16IR 2,5ISO | MSI20 | 16 | 1,5 | 2,5 | 0,18-0,32 | 8-12 | 28,90 | |
| 74.175.1270 | 16IR 3,0ISO | UI20 | 16 | 1,6 | 3 | 0,19-0,33 | 9-16 | 27,85 | |
| 74.175.1300 | 16IR 3,5ISO | UI20 | 16 | 1,9 | 3,5 | 0,2-0,35 | 10-18 | 27,85 | |
| 74.175.1320 | 22IR 3,5ISO | UI20 | 22 | 2,3 | 3,5 | 0,2-0,35 | 10-18 | 43,20 | |
| 74.175.1370 | 22IR 4,0ISO | UI20 | 22 | 2,3 | 4 | 0,22-0,36 | 11-18 | 43,20 | |
| 74.175.1420 | 22IR 4,5ISO | UI20 | 22 | 2,4 | 4,5 | 0,24-0,4 | 11-19 | 43,20 | |
| 74.175.1470 | 22IR 5,0ISO | UI20 | 22 | 2,3 | 5 | 0,25-0,42 | 12-20 | 48,50 | |

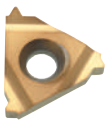


## › 74.180 ER 55° UN

**NL** Draadsnijwisselplaat, volprofiel
**FR** Plaquette a fileter, profil plein
**ES** Plaquita para roscar, perfil completo
**DE** Gewindeschneidplatte, Vollprofil
**EN** Threading Insert UN 60°, full profile, external




P M K N S

| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.180.1370 | 16ER 20UN | UI20 | 16 | 0,9 | 20 | 0,12-0,25 | 5-9 | 25,10 |  |
| 74.180.1420 | 16ER 18UN | UI20 | 16 | 1 | 18 | 0,12-0,25 | 5-9 | 25,20 | |
| 74.180.1470 | 16ER 16UN | UI20 | 16 | 1,1 | 16 | 0,14-0,25 | 6-10 | 25,20 | |
| 74.180.1520 | 16ER 14UN | UI20 | 16 | 1,2 | 14 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.180.1570 | 16ER 13UN | UI20 | 16 | 1,3 | 13 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.180.1620 | 16ER 12UN | UI20 | 16 | 1,4 | 12 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.180.1770 | 16ER 10UN | UI20 | 16 | 1,5 | 10 | 0,16-0,28 | 8-14 | 28,00 | |
| 74.180.1870 | 16ER 8UN | UI20 | 16 | 1,7 | 8 | 0,18-0,32 | 8-14 | 27,85 | |

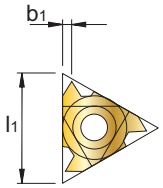
## › 74.185 IR 55° UN

Phantom

P M K N S

| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.185.0620 | 11IR 20UN | UI20 | 16 | 0,9 | 20 | 0,12-0,25 | 5-9 | 23,97 |  |
| 74.185.0670 | 11IR 18UN | UI20 | 16 | 1 | 18 | 0,12-0,25 | 5-9 | 23,97 | |
| 74.185.1470 | 16IR 16UN | UI20 | 16 | 1,1 | 16 | 0,14-0,25 | 6-10 | 25,20 | |
| 74.185.1520 | 16IR 14UN | UI20 | 16 | 1,2 | 14 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.185.1570 | 16IR 13UN | UI20 | 16 | 1,3 | 13 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.185.1620 | 16IR 12UN | UI20 | 16 | 1,4 | 12 | 0,15-0,25 | 7-12 | 25,20 | |
| 74.185.1770 | 16IR 10UN | UI20 | 16 | 1,5 | 10 | 0,16-0,28 | 8-14 | 28,00 | |
| 74.185.1870 | 16IR 8UN | UI20 | 16 | 1,7 | 8 | 0,18-0,32 | 8-14 | 28,00 | |

## › 74.190 ER 55° BSP-BSW Phantom




NL **Draadsnijwisselplaat, volprofiel**
FR **Plaquette à fileter, profil plein**
ES **Plaquita para roscar, perfil completo**
DE **Gewindeschneidplatte, Vollprofil**
EN **Threading Insert BSW/BSF/BSP 55°, full profile, external**

**P M K N S**

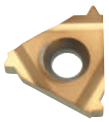
| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.190.1270 | 16ER 28W | UI20 | 16 | 0,7 | 28 | 0,1-0,18 | 4-7 | 25,10 | |
| 74.190.1520 | 16ER 19W | UI20 | 16 | 1 | 19 | 0,12-0,25 | 5-9 | 25,10 | |
| 74.190.1570 | 16ER 18W | UI20 | 16 | 1 | 18 | 0,14-0,25 | 5-9 | 25,20 | |
| 74.190.1620 | 16ER 16W | UI20 | 16 | 1,1 | 16 | 0,15-0,25 | 5-9 | 25,10 | |
| 74.190.1670 | 16ER 14W | UI20 | 16 | 1,2 | 14 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.190.1690 | 16ER 14W | MSI20 | 16 | 1,2 | 14 | 0,15-0,25 | 7-12 | 24,83 | |
| 74.190.1720 | 16ER 12W | UI20 | 16 | 1,4 | 12 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.190.1770 | 16ER 11W | UI20 | 16 | 1,5 | 11 | 0,16-0,28 | 7-12 | 25,10 | |
| 74.190.1780 | 16ER 11W | MSI20 | 16 | 1,5 | 11 | 0,16-0,28 | 7-12 | 26,20 | |
| 74.190.1820 | 16ER 10W | UI20 | 16 | 1,5 | 10 | 0,16-0,28 | 8-14 | 27,85 | |
| 74.190.1870 | 16ER 9W | UI20 | 16 | 1,7 | 9 | 0,16-0,28 | 8-14 | 28,00 | |



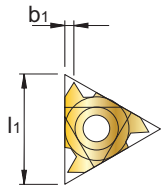
## › 74.195 IR 55° BSP-BSW Phantom

**P M K N S**

| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.195.0420 | 11IR 28W | UI20 | 11 | 0,7 | 28 | 0,1-0,18 | 4-7 | 23,97 | |
| 74.195.0670 | 11IR 19W | UI20 | 11 | 1 | 19 | 0,12-0,25 | 5-9 | 23,97 | |
| 74.195.0720 | 11IR 18W | UI20 | 11 | 1 | 18 | 0,14-0,25 | 5-9 | 23,97 | |
| 74.195.0770 | 11IR 16W | UI20 | 11 | 1,1 | 16 | 0,15-0,25 | 6-10 | 23,97 | |
| 74.195.0820 | 11IR 14W | UI20 | 11 | 1,1 | 14 | 0,15-0,25 | 7-12 | 23,86 | |
| 74.195.1470 | 16IR 19W | UI20 | 16 | 1 | 19 | 0,12-0,25 | 5-9 | 25,10 | |
| 74.195.1520 | 16IR 18W | UI20 | 16 | 1 | 18 | 0,14-0,25 | 5-9 | 25,20 | |
| 74.195.1570 | 16IR 16W | UI20 | 16 | 1,1 | 16 | 0,15-0,25 | 6-10 | 25,20 | |
| 74.195.1620 | 16IR 14W | UI20 | 16 | 1,2 | 14 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.195.1670 | 16IR 12W | UI20 | 16 | 1,4 | 12 | 0,15-0,25 | 7-12 | 25,10 | |
| 74.195.1720 | 16IR 11W | UI20 | 16 | 1,5 | 11 | 0,16-0,28 | 7-12 | 25,10 | |
| 74.195.1770 | 16IR 10W | UI20 | 16 | 1,5 | 10 | 0,16-0,28 | 8-14 | 28,00 | |
| 74.195.1820 | 16IR 9W | UI20 | 16 | 1,7 | 9 | 0,16-0,28 | 8-14 | 28,00 | |



## › 74.240 ER 55° TR Phantom




**NL** Draadsnijwisselplaat Trapezium volprofiel, uitwendig
**FR** Plaquette à fileter Trapèze profil plein, extérieur
**ES** Plaquita para roscar Trapecio perfil completoo, exterior
**DE** Drehplatte Trapezmodel Vollprofil, außen
**EN** Threading Insert Trapezoidal full profile, external

**P**

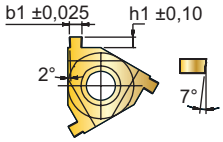
| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.240.1050 | 16ER 1,5TR | P30 | 16 | 1,1 | 1,5 | 0,15-0,25 | 6 | 21,78 |  |
| 74.240.1150 | 16ER 2,0TR | P30 | 16 | 1,3 | 2 | 0,16-0,28 | 8 | 21,78 | |
| 74.240.1250 | 16ER 3,0TR | P30 | 16 | 1,5 | 3 | 0,19-0,33 | 12 | 21,78 | |
| 74.240.1370 | 22ER 4,0TR | P30 | 22 | 1,9 | 4 | 0,22-0,36 | 13 | 37,60 | |
| 74.240.1450 | 22ER 5,0TR | P30 | 22 | 2,5 | 5 | 0,25-0,42 | 14 | 37,60 | |

## › 74.245 IR 55° TR Phantom

**P**

| Ref. | Type | HM | l1 | b1 | P (Inch) | ap [mm] | x ap (mm) | € | |
|---|---|---|---|---|---|---|---|---|---|
| 74.245.1050 | 16IR 1,5TR | P30 | 16 | 1,1 | 1,5 | 0,15-0,25 | 6 | 21,78 |  |
| 74.245.1150 | 16IR 2,0TR | P30 | 16 | 1,3 | 2 | 0,16-0,28 | 8 | 21,78 | |
| 74.245.1250 | 16IR 3,0TR | P30 | 16 | 1,5 | 3 | 0,19-0,33 | 12 | 21,78 | |
| 74.245.1370 | 22IR 4,0TR | P30 | 22 | 1,9 | 4 | 0,22-0,36 | 13 | 37,60 | |
| 74.245.1450 | 22IR 5,0TR | P30 | 22 | 2,5 | 5 | 0,25-0,42 | 14 | 37,60 | |

## › 74.390 ER DIN 471 Phantom




NL **Borgringwisselplaat**
FR **Plaquette pour gorges de circlips**
ES **Plaquita para arandelas de retencion**
DE **Schneidplatte**
EN **Retainer Ring Grooving Insert external**

**P M K N**

| Ref. | Type | HM | l1 | h1 | b1 | m H13 | € | |
|---|---|---|---|---|---|---|---|---|
| 74.390.0070 | 16ER 1,10-1,30 UI20 | UI20 | 16 | 1,3 | 1,19 | 1,1 | 32,55 |  |
| 74.390.0170 | 16ER 1,30-1,50 UI20 | UI20 | 16 | 1,5 | 1,39 | 1,3 | 32,55 | |
| 74.390.0220 | 16ER 1,60-1,85 UI20 | UI20 | 16 | 1,8 | 1,69 | 1,6 | 32,55 | |
| 74.390.0270 | 16ER 1,85-2,00 UI20 | UI20 | 16 | 2 | 1,94 | 1,85 | 32,55 | |
| 74.390.0320 | 16ER 2,15-1,50 UI20 | UI20 | 16 | 1,5 | 2,24 | 2,15 | 32,55 | |

## › 74.395 IR DIN 472 Phantom

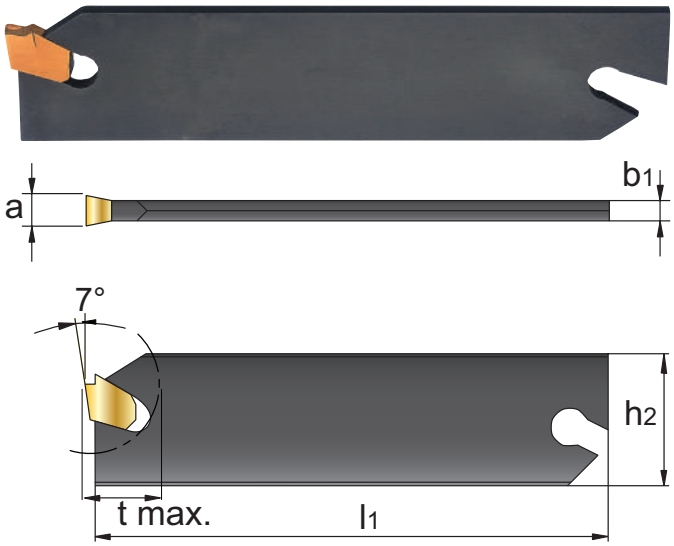
NL **Borgringwisselplaat**
FR **Plaquette pour gorges de circlips**
ES **Plaquita para arandelas de retencion**
DE **Schneidplatte**
EN **Retainer Ring Grooving Insert internal**

**P M K N**

| Ref. | Type | HM | l1 | h1 | b1 | m H13 | € | |
|---|---|---|---|---|---|---|---|---|
| 74.395.0070 | 16IR 1,10-1,30 UI20 | UI20 | 16 | 1,3 | 1,19 | 1,1 | 32,55 |  |
| 74.395.0170 | 16IR 1,30-1,50 UI20 | UI20 | 16 | 1,5 | 1,39 | 1,3 | 32,55 | |
| 74.395.0220 | 16IR 1,60-1,85 UI20 | UI20 | 16 | 1,8 | 1,69 | 1,6 | 32,55 | |
| 74.395.0270 | 16IR 1,85-2,00 UI20 | UI20 | 16 | 2 | 1,94 | 1,85 | 32,55 | |
| 74.395.0320 | 16IR 2,15-1,50 UI20 | UI20 | 16 | 1,5 | 2,24 | 2,15 | 32,55 | |

## › 74.410 Phantom

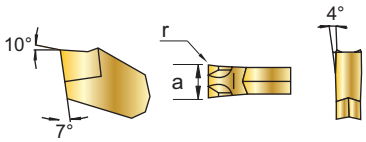
**NL** Steekplaathouder, uitwendig
**FR** Lame à tronçonner, extérieur
**ES** Portaplaquita de tronzado, exterior
**DE** Schneidenträger, außen
**EN** Parting Tool, external




| Ref. | h2 | b1 | l1 | t max | 1 excl. | € |
|---|---|---|---|---|---|---|
| 74.410.0300 | 26 | 2.4 | 110 | 40 | FX3 | 106,75 |
| 74.410.0400 | 26 | 3.2 | 110 | 40 | FX4 | 106,75 |
| 74.410.0500 | 26 | 4.3 | 110 | 60 | FX5 | 74,30 |
| 74.410.1300 | 32 | 2.4 | 150 | 40 | FX3 | 107,75 |
| 74.410.1400 | 32 | 3.2 | 150 | 40 | FX4 | 110,15 |
| 74.410.1500 | 32 | 4.3 | 150 | 60 | FX5 | 106,75 |

## › 74.480 FX Phantom

**NL** Steekplaat
**FR** Plaquette à tronçonner
**ES** Plaquita para tronzar
**DE** Stechplatte
**EN** Cut-off Insert



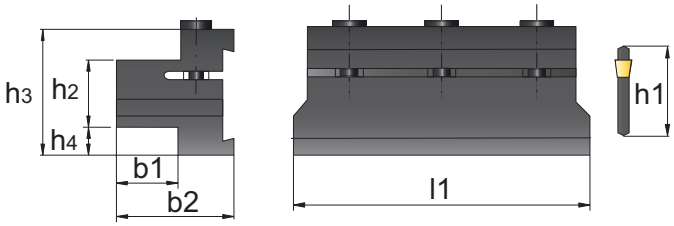

**P** **M** **K**

| Ref. | a [mm] | r | Geo | HM | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⌒ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.480.3001 | 3,1 | 0,2 | UM | UI30 | 0,05-0,12 | | ✔ | | ✔ | ✔ | ✔ | 9,07 |  |
| 74.480.4001 | 4,1 | 0,2 | UM | UI30 | 0,05-0,15 | | ✔ | | ✔ | ✔ | ✔ | 10,54 | |
| 74.480.5001 | 5,1 | 0,2 | UM | UI30 | 0,05-0,18 | | ✔ | | ✔ | ✔ | ✔ | 12,01 | |

## › 74.500 Phantom

NL **Basishouder PTNZ**
FR **Bloc PTNZ**
ES **Bloque PTNZ**
DE **Basishalter PTNZ**
EN **Tool Holder PTNZ**



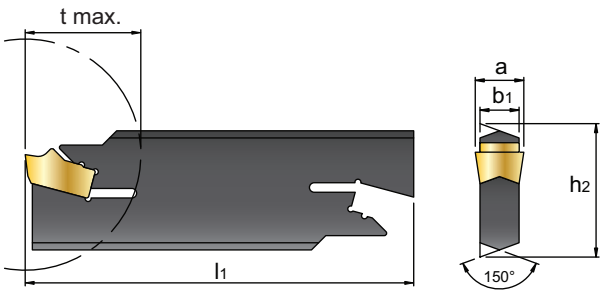



| Ref. | Type | h1 | h2 | h3 | h4 | b1 | b2 | l1 | 1 incl. | 2 incl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.500.1626 | PTNZ 16-26 | 26 | 16 | 39 | 12 | 16 | 29 | 90 | 74.998.0005 | SW5 | 260,00 |
| 74.500.2026 | PTNZ 20-26 | 26 | 20 | 39 | 8 | 20 | 33 | 90 | 74.998.0005 | SW5 | 275,00 |
| 74.500.2032 | PTNZ 20-32 | 32 | 20 | 48 | 13 | 20 | 36 | 100 | 74.998.0005 | SW5 | 268,00 |
| 74.500.2532 | PTNZ 25-32 | 32 | 25 | 48 | 8 | 20 | 36 | 110 | 74.998.0005 | SW5 | 268,00 |

## › 74.510 Phantom

NL **Steekplaathouder, EX/RX, uitwendig**
FR **Lame à tronçonner, EX/RX, extérieur**
ES **Portaplaquita de tronzado, EX/RX, exterior**
DE **Schneidenträger, EX/RX, außen**
EN **Parting Tool, EX/RX, external**





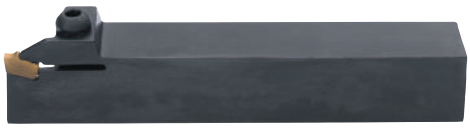


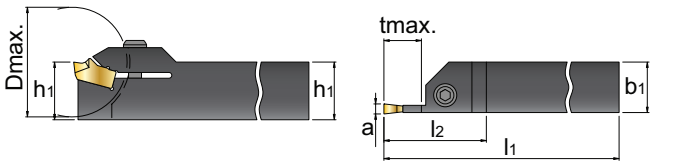


| Ref. | Type | h2 | l1 | a | b1 | t max | 1 excl. | 2 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 74.510.0200 | 26-2,2 | 26 | 110 | 2,2 | 1.8 | 25 | 74.998.0016 | EXN 2,2 | 126,75 |
| 74.510.0300 | 26-3 | 26 | 110 | 3 | 2.4 | 40 | 74.998.0016 | EX . 3 - RXN 3 | 126,75 |
| 74.510.0400 | 26-4 | 26 | 110 | 4 | 3 | 40 | 74.998.0016 | EX . 4 - RXN 4 | 126,75 |
| 74.510.1300 | 32-3 | 32 | 150 | 3 | 2.4 | 50 | 74.998.0016 | EX . 3 - RXN 3 | 130,40 |
| 74.510.1400 | 32-4 | 32 | 150 | 4 | 3 | 50 | 74.998.0016 | EX . 4 - RXN 4 | 130,40 |
| 74.510.1500 | 32-5 | 32 | 150 | 5 | 4.4 | 60 | 74.998.0016 | EX . 5 - RXN 5 | 153,70 |

## › 74.517 Phantom

NL **Steekplaathouder, EX/RX, uitwendig**
FR **Lame à tronçonner, EX/RX, extérieur**
ES **Portaplaquita de tronzado, EX/RX, exterior**
DE **Schneidenträger, EX/RX, außen**
EN **Parting Tool, EX/RX, external**





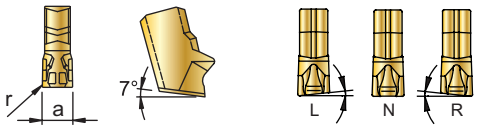




| Ref. | Type | h1 | b1 | l1 | l2 | a | t max | d max | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.517.1122 | R1212-2,2 | 12 | 12 | 91 | 25 | 2,2 | 11 | 22 | 74.998.0019 | SW5 | EXN 2,2 | 168,90 |
| 74.517.1162 | R1616-2,2 | 16 | 12 | 95 | 29 | 2,2 | 16 | 32 | 74.998.0019 | SW5 | EXN 2,2 | 176,60 |
| 74.517.1163 | R1616-3 | 16 | 12 | 95 | 29 | 3 | 16 | 32 | 74.998.0019 | SW5 | EX . 3 - RXN 3 | 176,60 |
| 74.517.1203 | R2020-3 | 20 | 16 | 150 | 35 | 3 | 21 | 42 | 74.998.0021 | SW5 | EX . 3 - RXN 3 | 186,40 |
| 74.517.1204 | R2020-4 | 20 | 16 | 150 | 35 | 4 | 21 | 42 | 74.998.0021 | SW5 | EX . 4 - RXN 4 | 186,40 |
| 74.517.1253 | R2525-3 | 25 | 20 | 150 | 35 | 3 | 21 | 42 | 74.998.0021 | SW5 | EX . 3 - RXN 3 | 204,20 |
| 74.517.1254 | R2525-4 | 25 | 20 | 150 | 35 | 4 | 21 | 42 | 74.998.0021 | SW5 | EX . 4 - RXN 4 | 204,20 |
| 74.517.2203 | L2020-3 | 20 | 16 | 150 | 35 | 3 | 21 | 42 | 74.998.0021 | SW5 | EX . 3 - RXN 3 | 186,40 |
| 74.517.2253 | L2525-3 | 25 | 20 | 150 | 35 | 3 | 21 | 42 | 74.998.0021 | SW5 | EX . 3 - RXN 3 | 204,20 |

## › 74.582 EX Phantom

NL **Steekplaat, enkel**
FR **Plaquette à tronçonner, simple**
ES **Plaquita para tronzar, simple**
DE **Stechplatte, nur**
EN **Cut-off Insert single-sided**




P M K

| Ref. | Type | a [mm] | r | Geo | HM | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⊃ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.582.2000 | EXN | 2,2 | 0,2 | NM | K10 | 0,05-0,09 | | ✔ | | ✔ | | | 20,79 | |
| 74.582.2003 | EXN | 2,2 | 0,2 | PM | UI30 | 0,05-0,09 | | ✔ | | ✔ | | | 22,77 | |
| 74.582.3000 | EXN | 3 | 0,2 | NM | K10 | 0,05-0,12 | | ✔ | | ✔ | | | 21,54 | |
| 74.582.3001 | EXN | 3 | 0,2 | MM | UI30 | 0,05-0,12 | | ✔ | | ✔ | | | 23,23 | |
| 74.582.3003 | EXN | 3 | 0,2 | PM | UI30 | 0,05-0,12 | | ✔ | | ✔ | | | 23,23 | |
| 74.582.3008 | EXR | 3 | 0,2 | PM | UI30 | 0,05-0,12 | | ✔ | | ✔ | | | 23,23 | |
| 74.582.3012 | EXL | 3 | 0,2 | PM | UI30 | 0,05-0,12 | | ✔ | | ✔ | | | 23,23 | |
| 74.582.4001 | EXN | 4 | 0,2 | MM | UI30 | 0,05-0,15 | | ✔ | | ✔ | | | 24,59 | |
| 74.582.4003 | EXN | 4 | 0,2 | PM | UI30 | 0,05-0,15 | | ✔ | | ✔ | | | 24,59 | |
| 74.582.4008 | EXR | 4 | 0,2 | PM | UI30 | 0,05-0,15 | | ✔ | | ✔ | | | 24,59 | |
| 74.582.4012 | EXL | 4 | 0,2 | PM | UI30 | 0,05-0,15 | | ✔ | | ✔ | | | 24,59 | |
| 74.582.5003 | EXN | 5 | 0,3 | PM | UI30 | 0,05-0,18 | | ✔ | | ✔ | | | 26,05 | |



## › 74.599 RXN Phantom

P M K

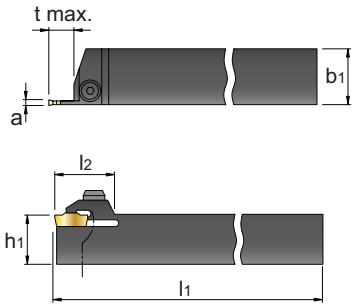
| Ref. | Type | a [mm] | r | Geo | HM | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⊃ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.599.3003 | RXN | 3 | 1,5 | PM | UI30 | 0,05-0,09 | | ✔ | | ✔ | | | 25,60 | |
| 74.599.4003 | RXN | 4 | 2 | PM | UI30 | 0,05-0,09 | | ✔ | | ✔ | | | 33,65 | |
| 74.599.5003 | RXN | 5 | 2,5 | PM | UI30 | 0,05-0,09 | | ✔ | | ✔ | | | 32,85 | |



## › 74.522 Phantom

NL **Steekplaathouder, uitwendig**
FR **Lame à tronçonner, extérieur**
ES **Portaplaquita de tronzado, exterior**
DE **Schneidenträger, außen**
EN **Parting Tool, external**

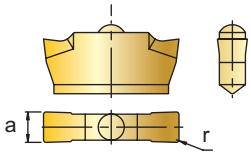





| Ref. | Type | h1 | b1 | l1 | l2 | a | t max | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.522.1163 | R1616-3-4 | 16 | 16 | 100 | 30 | 3-4 | 12 | 74.998.0019 | SW5 | DXN 3 - DXN 4 | 218,90 |
| 74.522.1203 | R2020-3 | 20 | 20 | 120 | 30 | 3-4 | 12 | 74.998.0021 | SW5 | DXN 3 - DXN 4 | 225,75 |
| 74.522.1253 | R2525-3 | 25 | 25 | 120 | 30 | 3-4 | 12 | 74.998.0021 | SW5 | DXN 3 - DXN 4 | 242,85 |

## › 74.596 DXN Phantom

NL **Steekplaat, dubbel**
FR **Plaquette à tronçonner, double**
ES **Plaquita para tronzar, doble**
DE **Stechplatte, doppelseitig**
EN **Parting Tool, external**



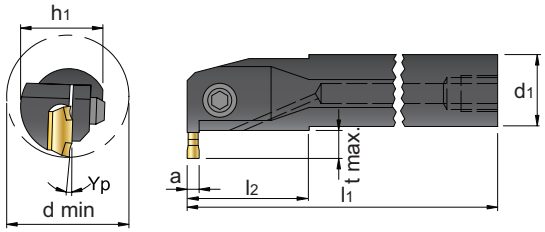

P M

| Ref. | a [mm] | r | HM | $f_n$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⊃ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.596.3003 | 3 | 0,15 | PC30 | 0,05-0,12 | 0,05-0,09 | | ✔ | | ✔ | | | 44,85 |  |
| 75.596.4003 | 4 | 0,2 | PC30 | 0,05-0,15 | 0,05-0,09 | | ✔ | | ✔ | | | 44,85 | |

## › 74.540 Phantom

NL **Steekplaathouder, inwendig**
FR **Lame à tronçonner, intérieur**
ES **Portaplaquita de tronzado, interior**
DE **Schneidenträger, innen**
EN **Parting Tool, internal**

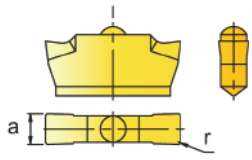





| Ref. | Type | h1 | d1 | l1 | l2 | a | t max | d min | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.540.2003 | R20-3-4 | 18 | 20 | 200 | 30 | 3-4 | 5 | 16.5 | 74.998.0031 | T20 | EJN 3 - EJN 4 | 258,00 |
| 74.540.2503 | R25-3-4 | 23 | 25 | 200 | 50 | 3-4 | 5 | 25 | 74.998.0032 | SW5+Rivet | EJN 3 - EJN 4 | 298,00 |

## › 74.560 Phantom

NL **Steekplaat, dubbel**
FR **Plaquette à tronçonner, double**
ES **Plaquita para tronzar, doble**
DE **Stechplatte, doppelseitig**
EN **Cut-off Insert double-sided**

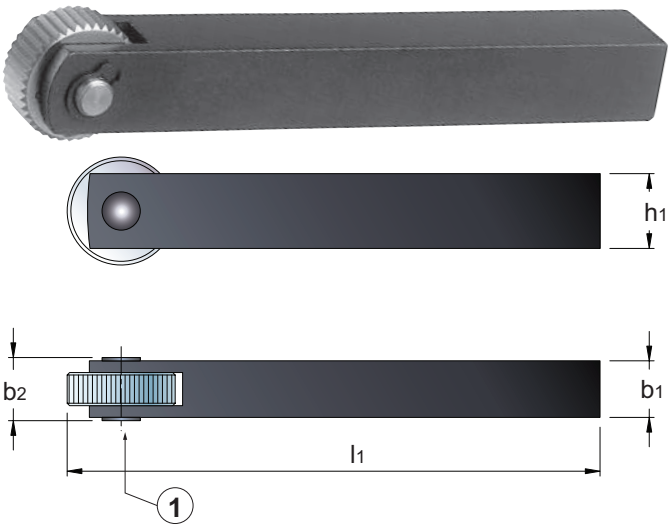



P M

| Ref. | a [mm] | r | HM | $f_n$ (mm) | $f_n$ (mm) | ▽▽▽ | ▽▽ | ▽ | ○ | ⊃ | ◌ | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74.560.3003 | 3 | 0,15 | PC30 | 0,05-0,12 | 0,05-0,09 | | ✔ | | ✔ | | | 49,05 |  |
| 74.560.4003 | 4 | 0,2 | PC30 | 0,05-0,15 | 0,05-0,09 | | ✔ | | ✔ | | | 49,05 | |

## › 75.100 Phantom

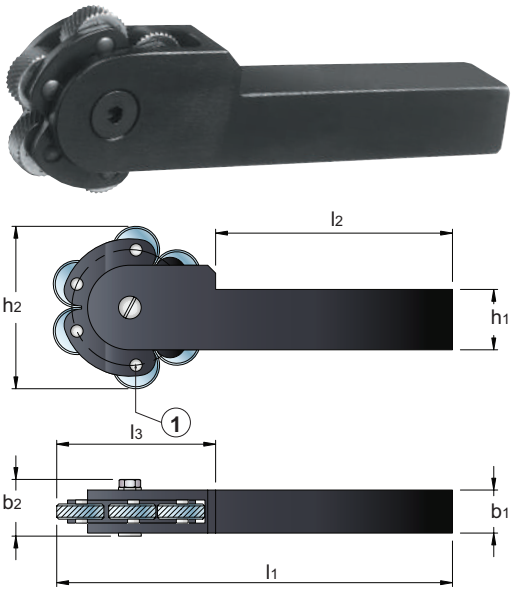
**NL Drukkartelrolhouder type M1**
**FR Outils de moletage par déformation type M1**
**ES Moleteadores por deformación tipo M1**
**DE Rändelhalter zur Verformung Typ M1**
**EN Pressure knurlingtool type M1**




| Ref. | Type | Ø | l1 | b1 | b2 | h1 | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 75.100.1000 | M1 | 8-200 mm | 112 | 14 | 19 | 14 | 75.290.0100 | 50,75 |
| 75.100.1160 | M1 | 8-200 mm | 112 | 16 | 19 | 16 | 75.290.0100 | 55,20 |

## › 75.103 Phantom

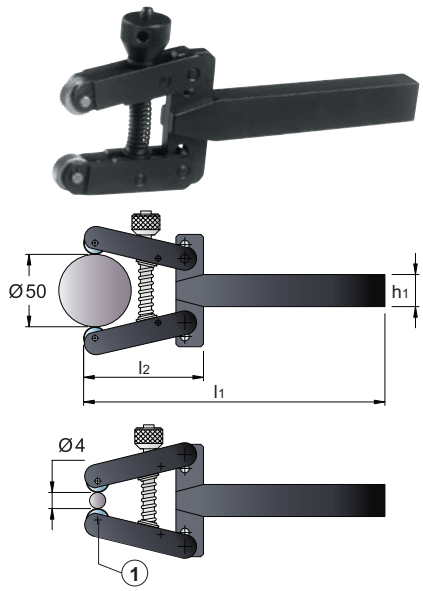
**NL Drukkartelrolhouder type M2**
**FR Outils de moletage par déformation type M2**
**ES Moleteadores por deformación tipo M2**
**DE Rändelhalter zur Verformung Typ M2**
**EN Pressure knurlingtool type M2**




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.103.1000 | M2 | 8-200 mm | 180 | 108 | 25 | 30 | 25 | 62 | 75.290.0201 | 346,00 |

## › 75.106 Phantom

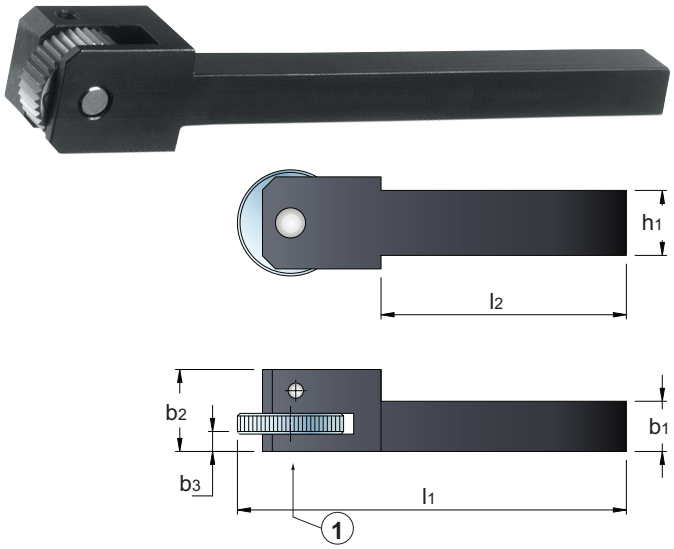
**NL Drukkartelrolhouder type M3**
**FR Outils de moletage par déformation type M3**
**ES Moleteadores por deformación tipo M3**
**DE Rändelhalter zur Verformung Typ M3**
**EN Pressure knurlingtool Type M3**




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.106.1000 | M3 | 4-50 mm | 221 | 87 | 20 | 26.5 | 25 | 107 | 75.290.0301 | 544,00 |

## › 75.109 Phantom

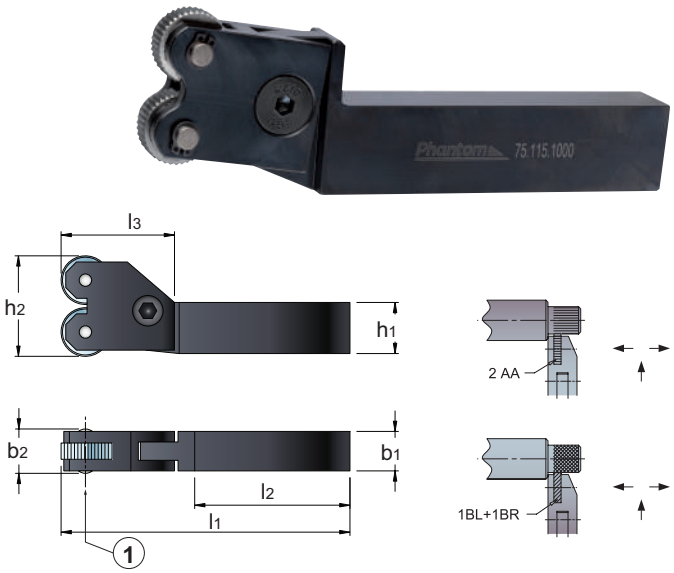
NL **Drukkartelrolhouder type M6**
FR **Outils de moletage par déformation type M6**
ES **Moleteadores por deformación tipo M6**
DE **Rändelhalter zur Verformung Typ M6**
EN **Pressure knurlingtool Type M6**




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | b3 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.109.1010 | M6 | 5-200 mm | 108 | 80 | 10 | 20 | 2.5 | 10 | 20 | 75.290.0600 | 306,00 |
| 75.109.1212 | M6 | 5-200 mm | 108 | 80 | 12 | 20 | 2.5 | 12 | 20 | 75.290.0600 | 306,00 |
| 75.109.1414 | M6 | 5-200 mm | 108 | 80 | 14 | 20 | 2.5 | 14 | 20 | 75.290.0600 | 306,00 |
| 75.109.1616 | M6 | 5-200 mm | 108 | 80 | 16 | 20 | 2.5 | 16 | 20 | 75.290.0600 | 306,00 |
| 75.109.2020 | M6 | 5-200 mm | 108 | 80 | 20 | 20 | 2.5 | 20 | 20 | 75.290.0600 | 306,00 |

## › 75.115 Phantom

NL **Drukkartelrolhouder type M7**
FR **Outils de moletage par déformation type M7**
ES **Moleteadores por deformación tipo M7**
DE **Rändelhalter zur Verformung Typ M7**
EN **Pressure knurlingtool type M7**

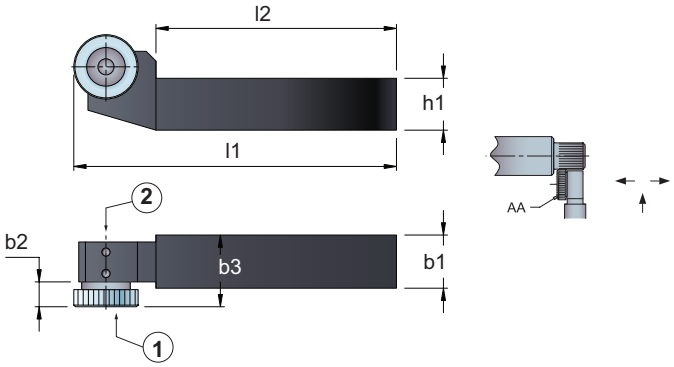



| Ref. | Type | Ø | l1 | l2 | b1 | b2 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.115.1000 | M7 | 8-200 mm | 162 | 115 | 18 | 18 | 25 | 42 | 75.290.0301 | 236,30 |

## › 75.121 Phantom

**NL Drukkartelrolhouder type MCNCS**
**FR Outils de moletage par déformation type MCNCS**
**ES Moleteadores por deformación tipo MCNCS**
**DE Rändelhalter zur Verformung Typ MCNCS**
**EN Pressure knurlingtool type MCNCS**



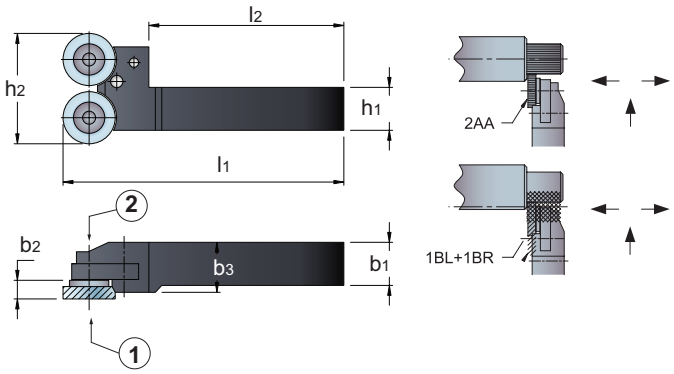




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | b3 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.121.2520 | MCNCS-25 | 8-200 mm | 150 | 125 | 25 | 10 | 32 | 20 | 30 | 75.290.0902 | 720,00 |
| 75.121.2532 | MCNCS-25 | 8-200 mm | 150 | 125 | 25 | 10 | 32 | 25 | 35 | 75.290.0902 | 720,00 |

## › 75.125 Phantom

**NL Drukkartelrolhouder type MCNC**
**FR Outils de moletage par déformation type MCNC**
**ES Moleteadores por deformación tipo MCNC**
**DE Rändelhalter zur Verformung Typ MCNC**
**EN Pressure knurlingtool Type MCNC**



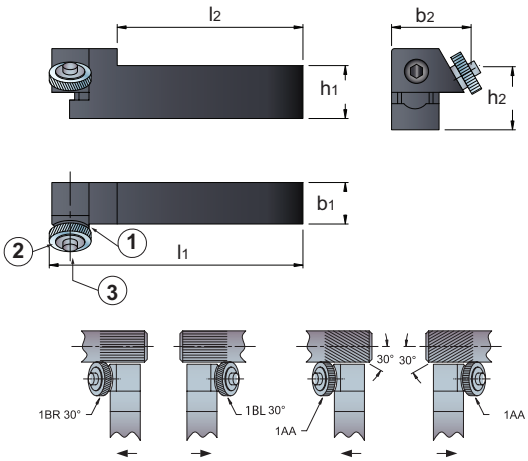




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | b3 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.125.2025 | MCNC-25 | 8-200 mm | 138 | 99 | 25 | 10 | 32 | 20 | 55 | 75.290.1002 | 948,00 |
| 75.125.2525 | MCNC-25 | 8-200 mm | 138 | 99 | 25 | 10 | 32 | 25 | 55 | 75.290.1002 | 948,00 |

## › 75.129 Phantom

**NL Freeskartelrolhouder type MFCNCS**
**FR Outils de moletage par coupe type MFCNCS**
**ES Moleteadores por corte tipo MFCNCS**
**DE Rändelfräshalter Typ MFCNCS**
**EN Cut-knurling tool type MFCNCS**



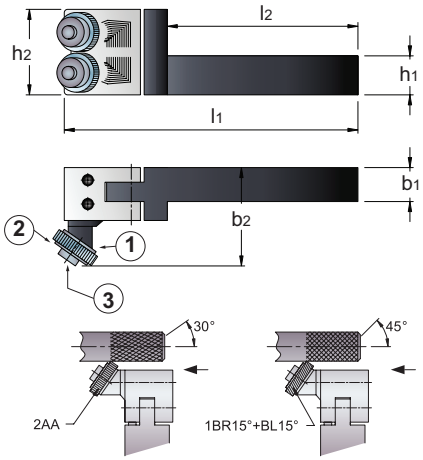



| Ref. | Type | Ø | l1 | l2 | b1 | b2 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.129.2025 | MFCNCS-21,5 | 5-250 mm | 150 | 114 | 25 | 39 | 20 | 36 | 75.290.1101 | 945,00 |
| 75.129.2525 | MFCNCS-21,5 | 5-250 mm | 150 | 114 | 25 | 39 | 25 | 36 | 75.290.1101 | 945,00 |

## › 75.133 Phantom

**NL Freeskartelrolhouder type MFCNC**
**FR Outils de moletage par coupe type MFCNC**
**ES Moleteadores por corte tipo MFCNC**
**DE Rändelfräshalter Typ MFCNC**
**EN Cut-knurling tool type MFCNC**

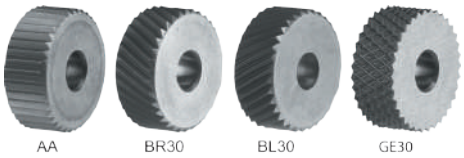


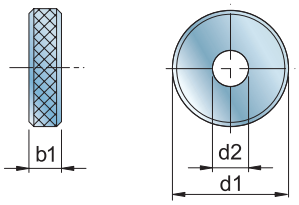




| Ref. | Type | Ø | l1 | l2 | b1 | b2 | h1 | h2 | 1 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 75.133.1616 | MFCNC-14,5 | 4-50 mm | 120 | 78 | 16 | 44 | 16 | 35 | 75.290.1201 | 1.404,00 |
| 75.133.2025 | MFCNC-21,5 | 5-250 mm | 165 | 112 | 25 | 63 | 20 | 50 | 75.290.1101 | 1.441,00 |
| 75.133.2525 | MFCNC-21,5 | 5-250 mm | 165 | 112 | 25 | 63 | 25 | 50 | 75.290.1101 | 1.404,00 |

## › 75.174 Phantom

**NL HSS-E PM Druk-Kartelrol M1, M2, M3, M6, M7**
**FR Molette pour moletage par déformation HSS-E PM M1, M2, M3, M6, M7**
**ES Moleta de deformación HSS-E PM M1, M2, M3, M6, M7**
**DE HSS-E PM Rändelräder M1, M2, M3, M6, M7**
**EN HSS-E PM Pressure knurl M1, M2, M3, M6, M7**



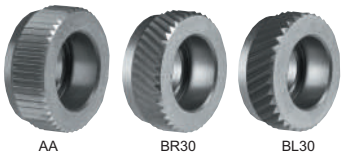

HSS-E PM

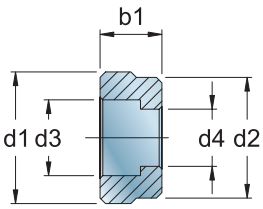
| Ref. | Type | d1 | d2 | b1 | t | € |
|---|---|---|---|---|---|---|
| 75.174.1006 | AA | 20 | 6 | 8 | 0,6 | 54,50 |
| 75.174.1008 | AA | 20 | 6 | 8 | 0,8 | 54,50 |
| 75.174.1010 | AA | 20 | 6 | 8 | 1 | 54,50 |
| 75.174.1012 | AA | 20 | 6 | 8 | 1,2 | 54,50 |
| 75.174.1016 | AA | 20 | 6 | 8 | 1,6 | 54,50 |
| 75.174.1020 | AA | 20 | 6 | 8 | 2 | 54,50 |
| 75.174.4006 | BR30 | 20 | 6 | 8 | 0,6 | 54,50 |
| 75.174.4008 | BR30 | 20 | 6 | 8 | 0,8 | 54,50 |
| 75.174.4010 | BR30 | 20 | 6 | 8 | 1 | 54,50 |
| 75.174.4012 | BR30 | 20 | 6 | 8 | 1,2 | 54,50 |
| 75.174.4016 | BR30 | 20 | 6 | 8 | 1,6 | 54,50 |
| 75.174.4018 | BR30 | 20 | 6 | 8 | 1,8 | 54,50 |
| 75.174.4020 | BR30 | 20 | 6 | 8 | 2 | 54,50 |

| Ref. | Type | d1 | d2 | b1 | t | € |
|---|---|---|---|---|---|---|
| 75.174.5006 | BL30 | 20 | 6 | 8 | 0,6 | 54,50 |
| 75.174.5008 | BL30 | 20 | 6 | 8 | 0,8 | 54,50 |
| 75.174.5010 | BL30 | 20 | 6 | 8 | 1 | 54,50 |
| 75.174.5012 | BL30 | 20 | 6 | 8 | 1,2 | 54,50 |
| 75.174.5016 | BL30 | 20 | 6 | 8 | 1,6 | 54,50 |
| 75.174.5018 | BL30 | 20 | 6 | 8 | 1,8 | 54,50 |
| 75.174.5020 | BL30 | 20 | 6 | 8 | 2 | 54,50 |
| 75.174.6006 | GE30 | 20 | 6 | 8 | 0,6 | 86,15 |
| 75.174.6008 | GE30 | 20 | 6 | 8 | 0,8 | 86,15 |
| 75.174.6010 | GE30 | 20 | 6 | 8 | 1 | 86,15 |
| 75.174.6012 | GE30 | 20 | 6 | 8 | 1,2 | 86,15 |
| 75.174.6016 | GE30 | 20 | 6 | 8 | 1,6 | 86,15 |
| 75.174.6020 | GE30 | 20 | 6 | 8 | 2 | 86,15 |

## › 75.197 Phantom

**NL HSS-E PM Druk-Kartelrol MCNC(S)-25**
**FR Molette pour moletage par déformation HSS-E PM MCNC(S)-25**
**ES Moleta de deformación HSS-E PM MCNC(S)-25**
**DE HSS-E PM Rändelräder MCNC(S)-25**
**EN HSS-E PM Pressure knurl MCNC(S)-25**




HSS-E PM

| Ref. | Type | d1 | d2 | d3 | d4 | b1 | t | € |
|---|---|---|---|---|---|---|---|---|
| 75.197.1006 | AA | 25 | 22 | 15 | 11 | 10 | 0,6 | 95,40 |
| 75.197.1008 | AA | 25 | 22 | 15 | 11 | 10 | 0,8 | 95,40 |
| 75.197.1010 | AA | 25 | 22 | 15 | 11 | 10 | 1 | 95,40 |
| 75.197.1012 | AA | 25 | 22 | 15 | 11 | 10 | 1,2 | 95,40 |
| 75.197.1016 | AA | 25 | 22 | 15 | 11 | 10 | 1,6 | 95,40 |
| 75.197.1020 | AA | 25 | 22 | 15 | 11 | 10 | 2 | 95,40 |
| 75.197.4006 | BR30 | 25 | 22 | 15 | 11 | 10 | 0,6 | 95,40 |
| 75.197.4008 | BR30 | 25 | 22 | 15 | 11 | 10 | 0,8 | 95,40 |
| 75.197.4010 | BR30 | 25 | 22 | 15 | 11 | 10 | 1 | 95,40 |

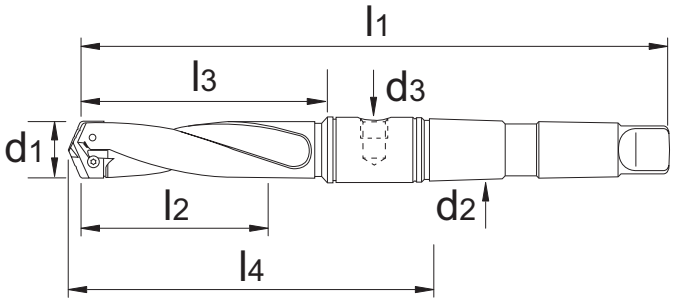
| Ref. | Type | d1 | d2 | d3 | d4 | b1 | t | € |
|---|---|---|---|---|---|---|---|---|
| 75.197.4012 | BR30 | 25 | 22 | 15 | 11 | 10 | 1,2 | 95,40 |
| 75.197.4016 | BR30 | 25 | 22 | 15 | 11 | 10 | 1,6 | 95,40 |
| 75.197.4020 | BR30 | 25 | 22 | 15 | 11 | 10 | 2 | 95,40 |
| 75.197.5006 | BL30 | 25 | 22 | 15 | 11 | 10 | 0,6 | 95,40 |
| 75.197.5008 | BL30 | 25 | 22 | 15 | 11 | 10 | 0,8 | 95,40 |
| 75.197.5010 | BL30 | 25 | 22 | 15 | 11 | 10 | 1 | 95,40 |
| 75.197.5012 | BL30 | 25 | 22 | 15 | 11 | 10 | 1,2 | 95,40 |
| 75.197.5016 | BL30 | 25 | 22 | 15 | 11 | 10 | 1,6 | 95,40 |
| 75.197.5020 | BL30 | 25 | 22 | 15 | 11 | 10 | 2 | 95,40 |

## › 75.600 Phantom

NL **Wisselplaatboor, gespiraliseerd, Morse Conus**
FR **Foret à plaquettes indexables, goujure hélicoïdale, queue cône morse**
ES **Broca de plaquita indexable, helicoidal, cono Morse**
DE **Wendeplattenbohrer, spiralförmig, Morse Kegel**
EN **Insert drill, with spiral flute, Morse taper**






DIN 228-B

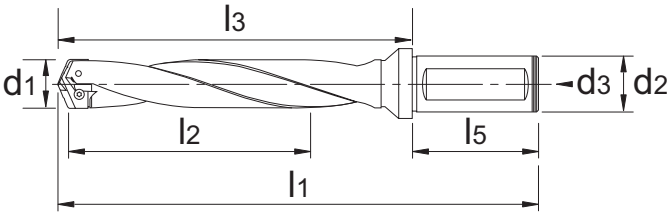
| Ref. | d1 | l2 | l3 | l4 | l1 | d3 | d2 | 1 incl. | 2 incl. | 3 excl. | 4 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.600.0406 | 12,98-15,49 | 89 | 110 | 146 | 218 | NPT 1/16 | MK 2 | 75.698.0400 | T8 | Gr.00 | 75.695.0000 | 146,65 |
| 75.600.0408 | 12,98-15,49 | 114 | 135 | 172 | 244 | NPT 1/16 | MK 2 | 75.698.0400 | T8 | Gr.00 | 75.695.0000 | 148,75 |
| 75.600.0412 | 12,98-15,49 | 178 | 199 | 235 | 307 | NPT 1/16 | MK 2 | 75.698.0400 | T8 | Gr.00 | 75.695.0000 | 194,10 |
| 75.600.0505 | 15,50-17,85 | 89 | 110 | 146 | 218 | NPT 1/16 | MK 2 | 75.698.0500 | T8 | Gr.05 | 75.695.0000 | 146,65 |
| 75.600.0507 | 15,50-17,85 | 114 | 135 | 172 | 244 | NPT 1/16 | MK 2 | 75.698.0500 | T8 | Gr.05 | 75.695.0000 | 148,75 |
| 75.600.0511 | 15,50-17,85 | 178 | 199 | 235 | 307 | NPT 1/16 | MK 2 | 75.698.0500 | T8 | Gr.05 | 75.695.0000 | 194,10 |
| 75.600.1009 | 17,86-21,99 | 172 | 200 | 244 | 334 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.10 | 75.695.1200 | 205,75 |
| 75.600.1011 | 17,86-21,99 | 219 | 251 | 295 | 385 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.10 | 75.695.1200 | 206,80 |
| 75.600.1013 | 17,86-21,99 | 273 | 302 | 346 | 436 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.10 | 75.695.1200 | 220,50 |
| 75.600.1018 | 17,86-21,99 | 363 | 395 | 439 | 529 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.10 | 75.695.1200 | 275,00 |
| 75.600.1507 | 22,00-24,60 | 172 | 200 | 244 | 334 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.15 | 75.695.1200 | 205,75 |
| 75.600.1509 | 22,00-24,60 | 219 | 251 | 295 | 385 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.15 | 75.695.1200 | 206,80 |
| 75.600.1512 | 22,00-24,60 | 273 | 302 | 346 | 436 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.15 | 75.695.1200 | 220,50 |
| 75.600.1515 | 22,00-24,60 | 363 | 395 | 439 | 529 | NPT 1/8 | MK 3 | 75.698.1000 | T9 | Gr.15 | 75.695.1200 | 275,00 |
| 75.600.2007 | 24,61-29,99 | 137 | 216 | 262 | 375 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.20 | 75.695.1200 | 261,00 |
| 75.600.2009 | 24,61-29,99 | 238 | 267 | 313 | 426 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.20 | 75.695.1200 | 268,00 |
| 75.600.2010 | 24,61-29,99 | 289 | 318 | 364 | 477 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.20 | 75.695.1200 | 273,00 |
| 75.600.2015 | 24,61-29,99 | 400 | 429 | 475 | 588 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.20 | 75.695.1200 | 341,00 |
| 75.600.2506 | 30,00-35,50 | 187 | 216 | 269 | 383 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.25 | 75.695.2300 | 261,00 |
| 75.600.2508 | 30,00-35,50 | 289 | 318 | 371 | 484 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.25 | 75.695.2300 | 273,00 |
| 75.600.2512 | 30,00-35,50 | 400 | 429 | 482 | 595 | NPT 1/8 | MK 4 | 75.698.2000 | T15 | Gr.25 | 75.695.2300 | 341,00 |
| 75.600.3005 | 35,51-41,99 | 210 | 241 | 295 | 408 | NPT 1/4 | MK 4 | 75.698.3400 | T20 | Gr.30 | 75.695.2300 | 357,00 |
| 75.600.3009 | 35,51-41,99 | 349 | 381 | 435 | 548 | NPT 1/4 | MK 4 | 75.698.3400 | T20 | Gr.30 | 75.695.2300 | 366,00 |
| 75.600.3505 | 42,00-47,99 | 210 | 241 | 295 | 408 | NPT 1/4 | MK 4 | 75.698.3400 | T20 | Gr.35 | 75.695.2300 | 357,00 |
| 75.600.3508 | 42,00-47,99 | 349 | 381 | 435 | 548 | NPT 1/4 | MK 4 | 75.698.3400 | T20 | Gr.35 | 75.695.2300 | 366,00 |
| 75.600.4004 | 48,00-55,99 | 232 | 267 | 321 | 465 | NPT 1/4 | MK 5 | 75.698.3400 | T20 | Gr.40 | 75.695.4000 | 382,00 |
| 75.600.4008 | 48,00-55,99 | 422 | 457 | 511 | 656 | NPT 1/4 | MK 5 | 75.698.3400 | T20 | Gr.40 | 75.695.4000 | 392,00 |
| 75.600.4504 | 56,00-65,09 | 232 | 267 | 321 | 465 | NPT 1/4 | MK 5 | 75.698.3400 | T20 | Gr.45 | 75.695.4000 | 382,00 |
| 75.600.4507 | 56,00-65,09 | 422 | 547 | 511 | 656 | NPT 1/4 | MK 5 | 75.698.3400 | T20 | Gr.45 | 75.695.4000 | 392,00 |
| 75.600.5004 | 63,50-76,99 | 273 | 318 | 389 | 532 | NPT 1/2 | MK 5 | 75.998.5800 | T25 | Gr.50 | 75.695.5800 | 563,00 |
| 75.600.5007 | 63,50-76,99 | 464 | 508 | 579 | 722 | NPT 1/2 | MK 5 | 75.998.5800 | T25 | Gr.50 | 75.695.5800 | 638,00 |

## › 75.620 Phantom

**NL** Wisselplaatboor, gespiraliseerd, Cilindrisch met plat vlak
**FR** Foret à plaquettes indexables, goujure hélicoïdale, Cylindrique avec 1 méplat
**ES** Broca de plaquita indexable, helicoidal, Mango cilíndrico con 1 plano
**DE** Wendeplattenbohrer, spiralförmig, Zylinderschaft mit Mitnahmefläche
**EN** Insert drill, with spiral flute, Cylindrical with flat





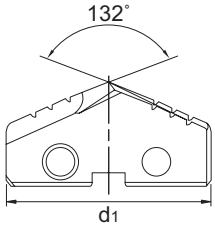




ISO 9766

| Ref. | d1 | l2 | l3 | l1 | d3 | d2 | l5 | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.620.0406 | 12,98-15,49 | 89 | 118 | 168 | NPT 1/8 | 20 mm | 50 | 75.698.0400 | T8 | Gr.00 | 143,50 |
| 75.620.0407 | 12,98-15,49 | 114 | 143 | 193 | NPT 1/8 | 20 mm | 50 | 75.698.0400 | T8 | Gr.00 | 155,10 |
| 75.620.0411 | 12,98-15,49 | 178 | 206 | 256 | NPT 1/8 | 20 mm | 50 | 75.698.0400 | T8 | Gr.00 | 192,00 |
| 75.620.0505 | 15,50-17,85 | 89 | 118 | 168 | NPT 1/8 | 20 mm | 50 | 75.698.0500 | T8 | Gr.05 | 143,50 |
| 75.620.0506 | 15,50-17,85 | 114 | 143 | 193 | NPT 1/8 | 20 mm | 50 | 75.698.0500 | T8 | Gr.05 | 155,10 |
| 75.620.0510 | 15,50-17,85 | 178 | 206 | 256 | NPT 1/8 | 20 mm | 50 | 75.698.0500 | T8 | Gr.05 | 192,00 |
| 75.620.1005 | 17,86-21,99 | 118 | 155 | 211 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.10 | 160,35 |
| 75.620.1008 | 17,86-21,99 | 168 | 206 | 262 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.10 | 183,55 |
| 75.620.1010 | 17,86-21,99 | 219 | 256 | 312 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.10 | 204,65 |
| 75.620.1505 | 22,00-24,60 | 118 | 155 | 211 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.15 | 160,35 |
| 75.620.1509 | 22,00-24,60 | 219 | 256 | 312 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.15 | 204,65 |
| 75.620.1511 | 22,00-24,60 | 270 | 307 | 363 | NPT 1/8 | 25 mm | 56 | 75.698.1000 | T9 | Gr.15 | 227,90 |
| 75.620.2005 | 24,61-29,99 | 137 | 179 | 239 | NPT 1/4 | 32 mm | 60 | 75.698.2000 | T15 | Gr.20 | 208,90 |
| 75.620.2010 | 24,61-29,99 | 289 | 332 | 392 | NPT 1/4 | 32 mm | 60 | 75.698.2000 | T15 | Gr.20 | 281,00 |
| 75.620.2505 | 30,00-35,50 | 187 | 230 | 290 | NPT 1/4 | 32 mm | 60 | 75.698.2000 | T15 | Gr.25 | 236,30 |
| 75.620.2508 | 30,00-35,50 | 289 | 332 | 392 | NPT 1/4 | 32 mm | 60 | 75.698.2000 | T15 | Gr.25 | 281,00 |
| 75.620.3005 | 35,51-41,99 | 210 | 262 | 332 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.30 | 320,00 |
| 75.620.3008 | 35,51-41,99 | 349 | 364 | 434 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.30 | 377,00 |
| 75.620.3503 | 42,00-47,99 | 165 | 218 | 288 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.35 | 295,00 |
| 75.620.3505 | 42,00-47,99 | 260 | 313 | 383 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.35 | 349,00 |
| 75.620.4004 | 48,00-55,99 | 232 | 281 | 351 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.40 | 344,00 |
| 75.620.4006 | 48,00-55,99 | 350 | 399 | 469 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.40 | 372,00 |
| 75.620.4504 | 56,00-65,09 | 232 | 281 | 351 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.45 | 344,00 |
| 75.620.4505 | 56,00-65,09 | 350 | 399 | 469 | NPT 1/4 | 40 mm | 70 | 75.698.3400 | T20 | Gr.45 | 372,00 |

## › 75.650 Phantom

NL **UNI HSS-E PM Boorwisselplaat AlCrN**
FR **Plaquette de perçage indexable HSS-E PM UNI AlCrN**
ES **Plaquita HSS-E PM UNI AlCrN**
DE **UNI HSS-E PM Bohrer wendeplatte AlCrN**
EN **UNI HSS-E PM Drilling insert AlCrN**






HSS-E PM | UNI | AlCrN | 132°

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 52 CuAlFe | N 61 PVC | N 62 GFK/CFK | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40-80 C | 35-70 C | 30-50 B | 20-35 B | 18-32 A | 15-25 A | 40-70 C | 30-60 C | 100-200 B | 100-150 C | 60-80 C | 40-50 C | 50-75 B | 50-90 C | 50-90 C | 8-12 A | 10-14 A |

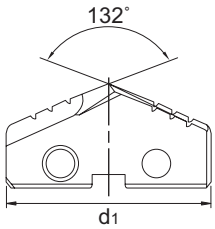
| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.650.1300 | 13 | Gr.00 | 51,80 |
| 75.650.1350 | 13.5 | Gr.00 | 51,80 |
| 75.650.1400 | 14 | Gr.00 | 51,80 |
| 75.650.1450 | 14.5 | Gr.00 | 51,80 |
| 75.650.1500 | 15 | Gr.00 | 51,80 |
| 75.650.1550 | 15.5 | Gr.05 | 51,80 |
| 75.650.1600 | 16 | Gr.05 | 51,80 |
| 75.650.1650 | 16.5 | Gr.05 | 51,80 |
| 75.650.1700 | 17 | Gr.05 | 51,80 |
| 75.650.1750 | 17.5 | Gr.05 | 51,80 |
| 75.650.1800 | 18 | Gr.10 | 61,75 |
| 75.650.1850 | 18.5 | Gr.10 | 61,75 |
| 75.650.1900 | 19 | Gr.10 | 61,75 |
| 75.650.1950 | 19.5 | Gr.10 | 61,75 |
| 75.650.2000 | 20 | Gr.10 | 61,75 |
| 75.650.2050 | 20.5 | Gr.10 | 61,75 |
| 75.650.2100 | 21 | Gr.10 | 61,75 |
| 75.650.2150 | 21.5 | Gr.10 | 59,90 |
| 75.650.2200 | 22 | Gr.15 | 61,75 |
| 75.650.2300 | 23 | Gr.15 | 61,75 |
| 75.650.2400 | 24 | Gr.15 | 61,75 |
| 75.650.2500 | 25 | Gr.20 | 74,15 |
| 75.650.2600 | 26 | Gr.20 | 74,15 |

| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.650.2700 | 27 | Gr.20 | 74,15 |
| 75.650.2800 | 28 | Gr.20 | 74,15 |
| 75.650.2900 | 29 | Gr.20 | 74,15 |
| 75.650.3000 | 30 | Gr.25 | 74,15 |
| 75.650.3100 | 31 | Gr.25 | 74,15 |
| 75.650.3200 | 32 | Gr.25 | 74,15 |
| 75.650.3300 | 33 | Gr.25 | 74,15 |
| 75.650.3400 | 34 | Gr.25 | 74,15 |
| 75.650.3500 | 35 | Gr.25 | 74,15 |
| 75.650.3600 | 36 | Gr.30 | 101,65 |
| 75.650.3700 | 37 | Gr.30 | 101,65 |
| 75.650.3800 | 38 | Gr.30 | 101,65 |
| 75.650.3900 | 39 | Gr.30 | 101,65 |
| 75.650.4000 | 40 | Gr.30 | 101,65 |
| 75.650.4100 | 41 | Gr.30 | 101,65 |
| 75.650.4200 | 42 | Gr.35 | 101,65 |
| 75.650.4300 | 43 | Gr.35 | 101,65 |
| 75.650.4400 | 44 | Gr.35 | 101,65 |
| 75.650.4500 | 45 | Gr.35 | 101,65 |
| 75.650.4600 | 46 | Gr.35 | 101,65 |
| 75.650.4700 | 47 | Gr.35 | 101,65 |
| 75.650.4800 | 48 | Gr.40 | 141,85 |
| 75.650.4900 | 49 | Gr.40 | 141,85 |

| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.650.5000 | 50 | Gr.40 | 141,85 |
| 75.650.5100 | 51 | Gr.40 | 141,85 |
| 75.650.5200 | 52 | Gr.40 | 141,85 |
| 75.650.5300 | 53 | Gr.40 | 141,85 |
| 75.650.5400 | 54 | Gr.40 | 141,85 |
| 75.650.5500 | 55 | Gr.40 | 141,85 |
| 75.650.5600 | 56 | Gr.45 | 141,85 |
| 75.650.5700 | 57 | Gr.45 | 141,85 |
| 75.650.5800 | 58 | Gr.45 | 141,85 |
| 75.650.5900 | 59 | Gr.45 | 141,85 |
| 75.650.6000 | 60 | Gr.45 | 141,85 |
| 75.650.6100 | 61 | Gr.45 | 141,85 |
| 75.650.6200 | 62 | Gr.45 | 141,85 |
| 75.650.6300 | 63 | Gr.45 | 141,85 |
| 75.650.6400 | 64 | Gr.45 | 141,85 |
| 75.650.6500 | 65 | Gr.45 | 141,85 |
| 75.650.6600 | 66 | Gr.50 | 156,50 |
| 75.650.6800 | 68 | Gr.50 | 156,50 |
| 75.650.7000 | 70 | Gr.50 | 156,50 |
| 75.650.7200 | 72 | Gr.50 | 156,50 |
| 75.650.7400 | 74 | Gr.50 | 156,50 |
| 75.650.7600 | 76 | Gr.50 | 156,50 |

## › 75.680 Phantom

NL **UNI Hardmetaal Boorwisselplaat AlCrN**
FR **Plaquette de perçage indexable Carbure UNI AlCrN**
ES **Plaquita Carburo UNI AlCrN**
DE **UNI Hartmetall Bohrer wendeplatte AlCrN**
EN **UNI Carbide Drilling insert AlCrN**






HM | UNI | AlCrN | 132°

| P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 ≤1000 N/mm² | P 14 ≤1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | N 41 Alu | N 42 Alu Si>10% | N 43 Mg | N 51 Cu | N 52 CuAlFe | N 61 PVC | N 62 GFK/CFK | S 71 Ni/Co | S 72 Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80-130 C | 70-95 C | 50-75 B | 35-50 B | 35-65 A | 25-50 A | 80-140 C | 60-120 C | 250-450 B | 250-450 C | 70-90 C | 80-120 C | 70-110 B | 50-90 C | 50-90 C | 16-25 A | 20-35 A |

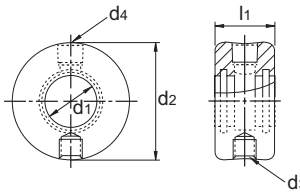
| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.680.1300 | 13 | Gr.00 | 50,15 |
| 75.680.1350 | 13.5 | Gr.00 | 50,15 |
| 75.680.1400 | 14 | Gr.00 | 50,15 |
| 75.680.1450 | 14.5 | Gr.00 | 50,15 |
| 75.680.1500 | 15 | Gr.00 | 50,15 |
| 75.680.1550 | 15.5 | Gr.05 | 50,15 |
| 75.680.1600 | 16 | Gr.05 | 50,15 |
| 75.680.1650 | 16.5 | Gr.05 | 50,15 |
| 75.680.1700 | 17 | Gr.05 | 50,15 |
| 75.680.1750 | 17.5 | Gr.05 | 50,15 |
| 75.680.1800 | 18 | Gr.10 | 65,20 |

| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.680.1850 | 18.5 | Gr.10 | 65,20 |
| 75.680.1900 | 19 | Gr.10 | 65,20 |
| 75.680.1950 | 19.5 | Gr.10 | 65,20 |
| 75.680.2000 | 20 | Gr.10 | 65,20 |
| 75.680.2050 | 20.5 | Gr.10 | 65,20 |
| 75.680.2100 | 21 | Gr.10 | 65,20 |
| 75.680.2200 | 22 | Gr.15 | 65,20 |
| 75.680.2300 | 23 | Gr.15 | 65,20 |
| 75.680.2400 | 24 | Gr.15 | 65,20 |
| 75.680.2500 | 25 | Gr.20 | 76,35 |
| 75.680.2600 | 26 | Gr.20 | 76,35 |

| Ref. | d1 | Type | € |
|---|---|---|---|
| 75.680.2700 | 27 | Gr.20 | 76,35 |
| 75.680.2800 | 28 | Gr.20 | 76,35 |
| 75.680.2900 | 29 | Gr.20 | 76,35 |
| 75.680.3000 | 30 | Gr.25 | 76,35 |
| 75.680.3100 | 31 | Gr.25 | 76,35 |
| 75.680.3200 | 32 | Gr.25 | 76,35 |
| 75.680.3300 | 33 | Gr.25 | 76,35 |
| 75.680.3400 | 34 | Gr.25 | 76,35 |
| 75.680.3500 | 35 | Gr.25 | 76,35 |

## › 75.695 Phantom

**NL Koelmiddelring voor wisselplaatboor**
**FR bague de refroidissement pour forets à plaquettes indexables**
**ES Anillo refrigerante para broca de plaquita**
**DE Kühlmittelring für Wendeplattenbohrer**
**EN Coolant ring for insert drill**







| Ref. | Type | d1 | d2 | d3 | d4 | l1 | € |
|---|---|---|---|---|---|---|---|
| 75.695.0000 | Gr. 00-05 | 19.05 | 44.45 | M8 | NPT 1/8 | 22.23 | 28,50 |
| 75.695.1200 | Gr. 10-20 | 25.4 | 53.97 | M8 | NPT 1/8 | 28.57 | 31,65 |
| 75.695.2300 | Gr. 25-35 | 31.75 | 63.5 | M10 | NPT 1/4 | 34.92 | 39,05 |
| 75.695.4000 | Gr. 40-45 | 44.45 | 76.2 | M10 | NPT 1/4 | 34.92 | 50,65 |
| 75.695.5800 | Gr.50 | 57.15 | 95.27 | M12 | NPT 1/2 | 44.45 | 74,90 |

## › 75.697 Phantom



**NL Blokkeerstang**
**FR Barre de blocage**
**ES Barra de bloqueo**
**DE Sperrbalken**
**EN Blocking bar**

| Ref. | Type | d1 | l1 | € |
|---|---|---|---|---|
| 75.697.0120 | Gr. 00-20 | M8 | 250 | 7,39 |

| Ref. | Type | d1 | l1 | € |
|---|---|---|---|---|
| 75.697.2340 | Gr. 25-45 | M10 | 250 | 8,44 |

| Ref. | Type | d1 | l1 | € |
|---|---|---|---|---|
| 75.697.5780 | Gr.50 | M12 | 250 | 7,39 |

## › 75.698 Phantom



**NL Torx schroef, Wisselplaatboor**
**FR Vis torx, Foret à plaquettes indexables**
**ES Tornillo torx, Broca de plaquita indexable**
**DE Torx-Schraube, Wendeplattenbohrer**
**EN Torx screw, Insert drill**

| Ref. | Type | Contents | € |
|---|---|---|---|
| 75.698.0400 | Gr.00 | M2,5X5,6 T8 | 4,22 |
| 75.698.0500 | Gr.05 | M2,5X6,9 T8 | 4,22 |

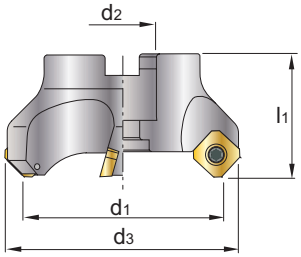
| Ref. | Type | Contents | € |
|---|---|---|---|
| 75.698.1000 | Gr. 10-15 | M3X7,5 T9 | 4,22 |
| 75.698.2000 | Gr. 20-25 | M4X10 T15 | 4,22 |

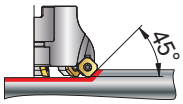
| Ref. | Type | Contents | € |
|---|---|---|---|
| 75.698.3400 | Gr. 30-45 | M5X14 T20 | 4,22 |
| 75.698.5800 | Gr.50 | M6X19 T25 | 4,22 |

## › 76.100 Phantom

NL **Vlakfrees, 45° SEHT**
FR **Corps de fraise pour plaquette carbure, à chanfreiner à 45° SEHT**
ES **Fresa de planear, 45° SEHT**
DE **Planfräser, 45° SEHT**
EN **45° Approach Face Mill SEHT**





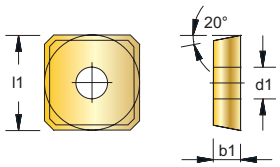




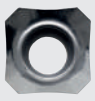
| Ref. | d1 | d2 | d3 | l1 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 76.100.0050 | 50 | 22 | 63 | 40 | 4 | 73.998.0650 | T20 | SEH.. 1204 | 306,00 |
| 76.100.0063 | 63 | 22 | 76 | 40 | 5 | 73.998.0650 | T20 | SEH.. 1204 | 365,00 |
| 76.100.0080 | 80 | 27 | 93 | 50 | 6 | 73.998.0650 | T20 | SEH.. 1204 | 415,00 |
| 76.100.0100 | 100 | 32 | 113 | 50 | 7 | 73.998.0650 | T20 | SEH.. 1204 | 441,00 |

## › 76.615 Phantom

NL **Wisselplaat SEHT 1204**
FR **Plaquette SEHT 1204**
ES **Plaquita SEHT 1204**
DE **Wendeplatte SEHT 1204**
EN **Insert SEHT**



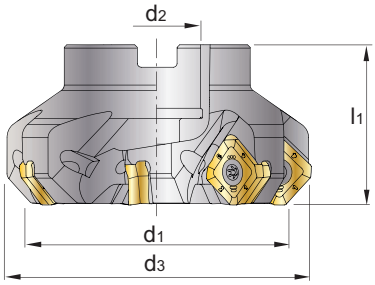

| SE.. | l1(mm) | d1(mm) | b1(mm) |
|---|---|---|---|
| 12 | 12,7 | 5,50 | 4,76 |

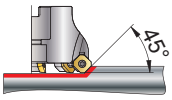
| Ref. | lxb | Geo | HM | | $a_p$ (mm) | $f_z$ (mm) | P | M | K | N | S | H | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.615.0150 | 1204 | ALU | K10 |  | 6 | 0,1-0,5 | | | | N | | | 15,93 |
| 76.615.0200 | 1204 | AFSN | PI20 |  | 6 | 0,1-0,35 | P | | | | | | 15,19 |
| 76.615.0250 | 1204 | AFSN | UI30 |  | 6 | 0,1-0,35 | P | M | K | | S | | 15,19 |

## › 76.125 Phantom

**NL** Vlakfrees, 45° SN
**FR** Corps de fraise pour plaquette carbure, à chanfreiner à 45° SN
**ES** Fresa de planear, 45° SN
**DE** Planfräser, 45° SN
**EN** 45° Approach Face Mill SN





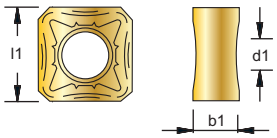




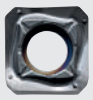
| Ref. | d1 | d2 | d3 | l1 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 76.125.0050 | 50 | 22 | 63 | 40 | 4 | 73.998.0640 | T15 | SNHX 1205 | 341,00 |
| 76.125.0063 | 63 | 22 | 76 | 40 | 6 | 73.998.0640 | T15 | SNHX 1205 | 397,00 |
| 76.125.0080 | 80 | 27 | 93 | 50 | 7 | 73.998.0640 | T15 | SNHX 1205 | 441,00 |
| 76.125.0100 | 100 | 32 | 113 | 50 | 8 | 73.998.0640 | T15 | SNHX 1205 | 530,00 |
| 76.125.0125 | 125 | 40 | 138 | 63 | 10 | 73.998.0640 | T15 | SNHX 1205 | 647,00 |

## › 76.500 Phantom

**NL** Wisselplaat SNHX 1205
**FR** Plaquette SNHX 1205
**ES** Plaquita SNHX 1205
**DE** Wendeplatte SNHX 1205
**EN** Insert SNHX 1205



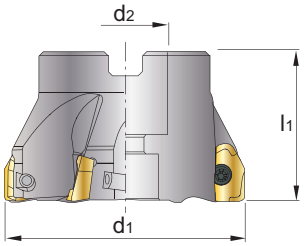

| SN.X | l1(mm) | d1(mm) | b1(mm) |
|---|---|---|---|
| 12 | 12,7 | 6,0 | 5,49 |

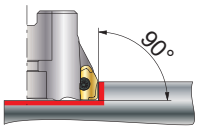
| Ref. | lxb | Geo | HM | | $a_p$ (mm) | $f_z$ (mm) | P | M | K | N | S | H | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.500.0200 | 1205 | AN | PI20 |  | 6 | 0,15-0,45 | P | | K | | | | 18,12 |
| 76.500.0250 | 1205 | AN | UI30 |  | 6 | 0,15-0,45 | P | M | K | | S | | 19,12 |

## › 76.135 Phantom

NL **Hoekfrees, 90° XNEX**
FR **Outil à surfacer, 90° XNEX**
ES **Fresa de Escuadrado, 90° XNEX**
DE **Winkel 90° XNEX**
EN **Shell milling cutter, 90° XNEX**





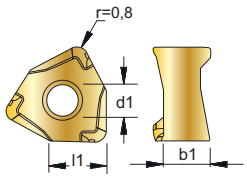




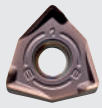
| Ref. | d1 | d2 | l1 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|
| 76.135.0050 | 50 | 22 | 40 | 4 | 73.998.0642 | T15 | XNEX 0806 | 305,00 |
| 76.135.0055 | 50 | 22 | 40 | 5 | 73.998.0642 | T15 | XNEX 0806 | 352,00 |
| 76.135.0063 | 63 | 22 | 40 | 6 | 73.998.0642 | T15 | XNEX 0806 | 397,00 |
| 76.135.0080 | 80 | 27 | 50 | 7 | 73.998.0642 | T15 | XNEX 0806 | 472,00 |
| 76.135.0100 | 100 | 32 | 50 | 8 | 73.998.0642 | T15 | XNEX 0806 | 588,00 |

## › 76.520 Phantom

NL **Wisselplaat XNEX 0806**
FR **Plaquette XNEX 0806**
ES **Plaquita XNEX 0806**
DE **Wendeplatte XNEX 0806**
EN **Insert XNEX 0806**

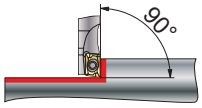


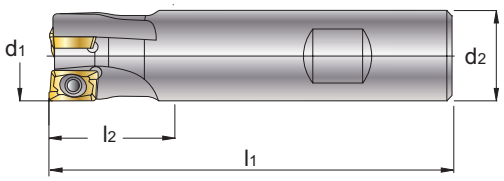

| XN.X | l1(mm) | d1(mm) | b1(mm) |
|---|---|---|---|
| 08 | 7,5 | 4,5 | 6,56 |

| Ref. | lxb | Geo | HM | | $a_p$ (mm) | $f_z$ (mm) | P | M | K | N | S | H | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.520.0200 | 80608 | | PI20 |  | 7 | 0,08-0,4 | P | | K | | | | 24,02 |
| 76.520.0250 | 80608 | | UI30 |  | 7 | 0,08-0,4 | P | M | K | | S | | 23,92 |

## › 76.145 Phantom

**NL Schachtfrees, 90° APKT 1003**
**FR Fraises, 90° APKT 1003**
**ES Fresa integral, 90° APKT 1003**
**DE Schaftfräser, 90° APKT 1003**
**EN Indexable End Mill, 90° APKT 1003**



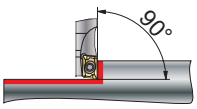


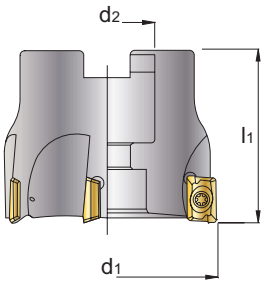


| Ref. | d1 | d2 | l1 | l2 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 76.145.0016 | 16 | 16 | 85 | 26 | 2 | 73.998.0600 | T8 | AP.T 1003 | 150,90 |
| 76.145.0020 | 20 | 20 | 90 | 28 | 3 | 73.998.0600 | T8 | AP.T 1003 | 180,60 |
| 76.145.0025 | 25 | 25 | 95 | 30 | 4 | 73.998.0600 | T8 | AP.T 1003 | 210,35 |
| 76.145.0032 | 32 | 25 | 95 | 35 | 5 | 73.998.0600 | T8 | AP.T 1003 | 309,00 |
| 76.145.0120 | 12 | 16 | 80 | | 1 | 73.998.0600 | T8 | AP.T 1003 | 66,95 |

## › 76.146 Phantom

**NL Hoekfrees, 90° APKT 1003**
**FR Outil à surfacer, 90° APKT 1003**
**ES Fresa de Escuadrado, 90° APKT 1003**
**DE Winkel 90° APKT 1003**
**EN Shell milling cutter, 90° APKT 1003**



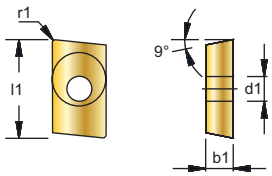




| Ref. | d1 | d2 | l1 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|
| 76.146.0040 | 40 | 16 | 40 | 6 | 73.998.0600 | T8 | AP.T 1003 | 339,00 |
| 76.146.0050 | 50 | 22 | 40 | 7 | 73.998.0600 | T8 | AP.T 1003 | 382,00 |

## › 76.365 Phantom

**NL Wisselplaat APKT, APHT 1003**
**FR Plaquette APKT, APHT 1003**
**ES Plaquita APKT, APHT 1003**
**DE Wendeplatte APKT, APHT 1003**
**EN SC Carbide Insert APKT, APHT 1003**

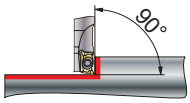



| APKT | l1(mm) | d1(mm) | b1(mm) | r1(mm) |
|---|---|---|---|---|
| 10 | 10,5 | 2,80 | 3,50 | 0,5 |

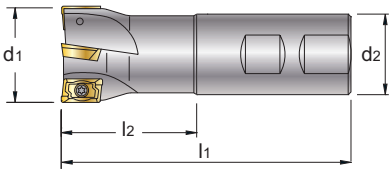
| Ref. | lxb | Geo | HM | | $a_p$ (mm) | $f_z$ (mm) | P | M | K | N | S | H | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.365.0150 | 1003 | ALU | K10 |  | 10 | 0,1-0,5 | | | | N | | | 12,26 |
| 76.365.0200 | 1003 | PDR | PI20 |  | 10 | 0,08-0,3 | P | | K | | | | 8,83 |
| 76.365.0250 | 1003 | PDR | UI30 |  | 10 | 0,08-0,3 | P | M | K | | S | | 8,32 |

## › 76.155 Phantom

NL **Schachtfrees, 90° APKT 1604**
FR **Fraises, 90° APKT 1604**
ES **Fresa integral, 90° APKT 1604**
DE **Schaftfräser, 90° APKT 1604**
EN **Indexable End Mill, 90° APKT 1604**





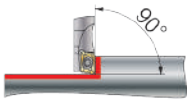




| Ref. | d1 | d2 | l1 | l2 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 76.155.0025 | 25 | 25 | 100 | 44 | 2 | 73.998.0610 | T15 | AP.T 1604 | 161,20 |
| 76.155.0032 | 32 | 25 | 110 | 50 | 3 | 73.998.0630 | T15 | AP.T 1604 | 188,65 |

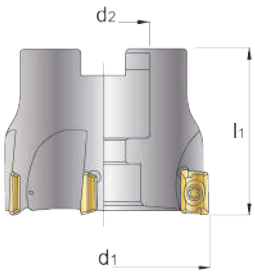
## › 76.156 Phantom

NL **Hoekfrees, 90° APKT 1604**
FR **Outil à surfacer, 90° APKT 1604**
ES **Fresa de Escuadrado, 90° APKT 1604**
DE **Winkel 90° APKT 1604**
EN **Shell milling cutter, 90° APKT 1604**









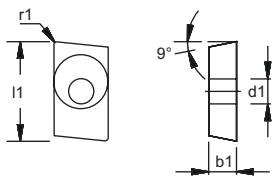




| Ref. | d1 | d2 | l1 | z | 1 incl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|
| 76.156.0040 | 40 | 16 | 40 | 4 | 73.998.0630 | T15 | AP.T 1604 | 235,50 |
| 76.156.0050 | 50 | 22 | 40 | 5 | 73.998.0630 | T15 | AP.T 1604 | 264,00 |
| 76.156.0063 | 63 | 22 | 40 | 6 | 73.998.0630 | T15 | AP.T 1604 | 309,00 |

## › 76.366 Phantom

NL **Wisselplaat APKT, APHT 1604**
FR **Plaquette APKT, APHT 1604**
ES **Plaquita APKT, APHT 1604**
DE **Wendeplatte APKT, APHT 1604**
EN **SC Carbide Insert APKT, APHT 1604**




| APKT | l1 (mm) | d1 (mm) | b1 (mm) | r1 (mm) |
|---|---|---|---|---|
| 16 | 17,0 | 4,40 | 5,26 | 0,8 |

| Ref. | lxb | Geo | HM | | $a_p$ (mm) | $f_z$ (mm) | P | M | K | N | S | H | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.366.0150 | 1604 | ALU | K10 |  | 15 | 0,1-0,5 | | | | N | | | 16,67 |
| 76.366.0200 | 1604 | PDR | PI20 |  | 15 | 0,1-0,4 | P | | K | | | | 13,23 |
| 76.366.0250 | 1604 | PDR | UI30 |  | 15 | 0,1-0,4 | P | M | K | | S | | 13,23 |

## › 79.510 Phantom

**NL Set Kartelen**
**FR Coffret d'outils à moleter**
**ES Juego de herramientas para moletear**
**DE Satz Rändelwerkzeuge**
**EN Knurling set**



| Ref. | Type | Contents | € |
|---|---|---|---|
| 79.510.1000 | M1+M7 | 1 x M7 (75.115.1000)<br>1 x M1 (75.100.1000) | 704,00 |

## › 79.580 Phantom

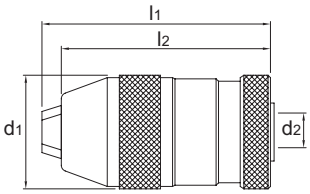
**NL Set Draaibeitels**
**FR Coffret d'outils de tournage**
**ES Juego de herramientas para torneado**
**DE Meißelhaltersatz**
**EN Tool Holders set**



| Ref. | Type | Contents | € |
|---|---|---|---|
| 79.580.0090 | internal | 1 x A08H-SCLCR 06<br>1 x A10J-SCLCR 06<br>1 x A12K-SCLCR 06<br>1 x A16M-SCLCR 06 | 239,00 |
| 79.580.0230 | Set carbide inserts 20/16 mm UNI | 1 x Threading Tool Holder AL2020-16<br>1 x Threading Tool Holder NVR16-16 | 521,00 |
| 79.580.0240 | Set carbide inserts 25/20 mm UNI | 1 x Threading Tool Holder AL2525-16<br>1 x Threading Tool Holder AVR20-16 | 556,00 |
| 79.580.0250 | Set carbide inserts 20/16 mm INOX | 1 x Threading Tool Holder AL2525-16<br>1 x Threading Tool Holder AVR20-16 | 539,00 |
| 79.580.0260 | Set carbide inserts 25/20 mm INOX | 1 x Threading Tool Holder AL2525-16<br>1 x Threading Tool Holder AVR20-16 | 572,00 |
| 79.580.1160 | Tool Holder set 16 mm UNI | 1 x Tool Holder external SCLCR 1616H09<br>1 x Tool Holder internal S16R-SCLCR 09<br>1x parting tool R1616-2,2 | 629,00 |
| 79.580.1200 | Tool Holder set 20 mm UNI | 1 x Tool Holder external SCLCR 2020K09<br>1 x Tool Holder internal S20S-SCLCR 09<br>1x parting tool R2020-3 | 673,00 |

## › 81.200 Phantom

NL **Zelfspannende Boorhouder, type A**
FR **Mandrin de perçage auto-serrant, type A**
ES **Portabroca cierre automático, tipo A**
DE **Selbstspannende Bohrfutter, Typ A**
EN **Industrial Keyless Chuck, type A**





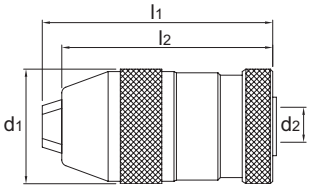

1

TYPE A

| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.200.0810 | 0,8-8 | B10 | 33 | 70 | 65 | 8A | 81.412.0800 | 150,75 |
| 81.200.0812 | 0,8-8 | B12 | 33 | 70 | 65 | 8A | 81.412.0800 | 150,75 |
| 81.200.1012 | 0,8-10 | B12 | 39 | 80 | 73 | 10A | 81.412.0800 | 147,60 |
| 81.200.1016 | 0,8-10 | B16 | 39 | 80 | 73 | 10A | 81.412.0800 | 147,60 |
| 81.200.1020 | 0,8-10 | 3/8"-24 UNF | 39 | 80 | 73 | 10A | 81.412.0800 | 147,60 |
| 81.200.1092 | 0,8-10 | J2 | 39 | 80 | 73 | 10A | 81.412.0800 | 147,60 |
| 81.200.1094 | 0,8-10 | J33 | 39 | 80 | 73 | 10A | 81.412.0800 | 86,55 |
| 81.200.1312 | 1-13 | B12 | 44 | 95 | 86 | 13A | 81.412.1300 | 156,10 |
| 81.200.1316 | 1-13 | B16 | 47 | 102 | 92 | 13A | 81.412.1300 | 156,10 |
| 81.200.1320 | 2-13 | 3/8"-24 UNF | 44 | 95 | 86 | 13A | 81.412.0800 | 156,10 |
| 81.200.1325 | 2-13 | 1/2"-20 UNF | 44 | 95 | 86 | 13A | 81.412.0800 | 156,10 |
| 81.200.1392 | 1-13 | J2 | 44 | 95 | 86 | 13A | 81.412.1300 | 156,10 |
| 81.200.1396 | 1-13 | J6 | 44 | 95 | 86 | 13A | 81.412.1300 | 156,10 |
| 81.200.1616 | 3-16 | B16 | 51 | 105 | 95 | 16A | 81.412.1300 | 185,20 |
| 81.200.1618 | 3-16 | B18 | 51 | 115 | 102 | 16A | 81.412.1300 | 185,20 |
| 81.200.1625 | 3-16 | 1/2"-20 UNF | 51 | 115 | 102 | 16A | 81.412.1300 | 185,20 |
| 81.200.1630 | 3-16 | 5/8"-16 UN | 51 | 115 | 102 | 16A | 81.412.1300 | 185,20 |
| 81.200.1696 | 3-16 | J6 | 51 | 115 | 102 | 16A | 81.412.1300 | 185,20 |
| 81.200.1762 | 5-20 | B18 | 64 | 140 | 127 | 20A | 81.412.1600 | 276,00 |
| 81.200.1828 | 5-20 | B22 | 64 | 140 | 127 | 20A | 81.412.1600 | 276,00 |
| 81.200.1894 | 5-20 | J3 | 64 | 140 | 127 | 20A | 81.412.1600 | 276,00 |

## › 81.230 Phantom

NL **Zelfspannende Precisieboorhouder, verzwaarde uitvoering, type P**
FR **Mandrin de perçage de précision auto-serrant, version extra renforcée, type P**
ES **Portabroca de precisión, cierre automático, versión extra macizo, tipo P**
DE **Selbstspannende Präzisionsbohrfutter, extra stabile Ausführung, Typ P**
EN **High Precision Keyless Chuck, extra heavy duty version, type P**





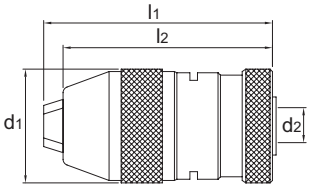

1

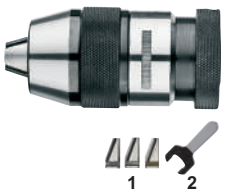
0,04 TYPE P

| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.230.0812 | 0,3-8 | B12 | 38 | 74 | 67 | 8P | 81.412.0800 | 239,90 |
| 81.230.1016 | 0,5-10 | B16 | 43 | 89 | 81 | 10P | 81.412.1000 | 247,15 |
| 81.230.1316 | 1-13 | B16 | 49 | 103 | 91 | 13P | 81.412.1300 | 261,00 |
| 81.230.1616 | 3-16 | B16 | 55 | 107 | 95 | 16P | 81.412.1600 | 274,00 |
| 81.230.1618 | 3-16 | B18 | 55 | 107 | 95 | 16P | 81.412.1600 | 274,00 |

## › 81.250 Phantom

NL **Zelfspannende Precisieboorhouder, verzwaarde uitvoering, type XP**
FR **Mandrin de perçage de précision auto-serrant, version extra renforcée, type XP**
ES **Portabroca de precisión, cierre automático, versión extra macizo, tipo XP**
DE **Selbstspannende Präzisionsbohrfutter, extra stabile Ausführung, Typ XP**
EN **High Precision Keyless Chuck, extra heavy duty version, type XP**



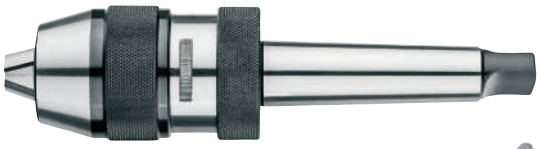
1 2

0,04 TYPE XP

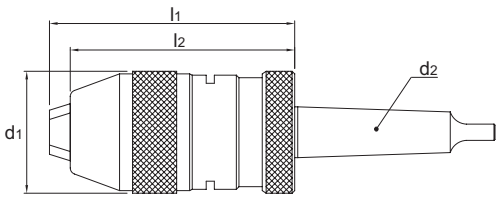
| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | 2 incl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 81.250.1316 | 1-13 | B16 | 49 | 103 | 91 | 13XP | 81.412.1300 | 81.413.1300 | 367,00 |
| 81.250.1616 | 3-16 | B16 | 55 | 107 | 95 | 16XP | 81.412.1600 | 81.413.1600 | 424,00 |
| 81.250.1618 | 3-16 | B18 | 55 | 107 | 95 | 16XP | 81.412.1600 | 81.413.1600 | 417,00 |

## › 81.300 Phantom

NL **Zelfspannende Precisieboorhouder, type XP, DIN 228-B**
FR **Mandrin de perçage de précision auto-serrant, type XP, DIN 228-B**
ES **Portabroca de precisión, cierre automático, tipo XP, DIN 228-B**
DE **Selbstspannende Präzisionsbohrfutter, Typ XP, DIN 228-B**
EN **High Precision Keyless Chuck, type XP, DIN 228-B**






DIN 228-B | 0,04 | TYPE XP

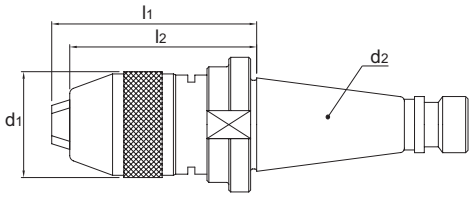
| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | 2 incl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 81.300.0208 | 0,3-8 | MK 2 | 38 | 72 | 65 | 8XP | 81.412.0800 | 81.413.0800 | 378,00 |
| 81.300.0213 | 1-13 | MK 2 | 48 | 92 | 80 | 13XP | 81.412.1300 | 81.413.1300 | 404,00 |
| 81.300.0313 | 1-13 | MK 3 | 48 | 92 | 80 | 13XP | 81.412.1300 | 81.413.1300 | 409,00 |
| 81.300.0316 | 3-16 | MK 3 | 54 | 96 | 85 | 16XP | 81.412.1600 | 81.413.1600 | 448,00 |
| 81.300.0413 | 1-13 | MK 4 | 48 | 92 | 80 | 13XP | 81.412.1300 | 81.413.1300 | 446,00 |
| 81.300.0416 | 3-16 | MK 4 | 54 | 96 | 85 | 16XP | 81.412.1600 | 81.413.1600 | 458,00 |

## › 81.343 Phantom

NL **Ultra Precisieboorhouder, type XPB, DIN 2080**
FR **Mandrin de perçage de ultra haute précision, type XPB, DIN 2080**
ES **Portabroca de precisión super alta, type XPB, DIN 2080**
DE **Ultra-Präzisionsbohrfutter, type XPB, DIN 2080**
EN **Super High Precision Chuck, type XPB, DIN 2080**






AT3 | DIN 2080 | A | SK | G6,3 15.000 RPM | 0,05

NIEUW | NOUVEAU | NUEVO | NEU

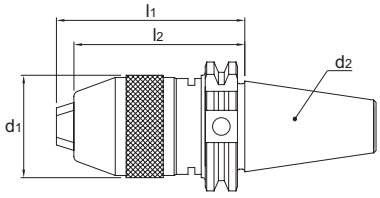
| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.343.4016 | 1-16 | SK40 | 50 | 95.5 | 85 | 16XPB | 81.412.1600 | 242,75 |
| 81.343.5016 | 1-16 | SK50 | 50 | 95.5 | 85 | 16XPB | 81.412.1600 | 353,00 |

## › 81.354 Phantom

NL **Ultra Precisieboorhouder, type XPS, ISO 7388-1 (DIN 69871)**
FR **Mandrin de perçage de ultra haute précision, type XPS, ISO 7388-1 (DIN 69871)**
ES **Portabroca de precisión super alta, type XPS, ISO 7388-1 (DIN 69871)**
DE **Ultra-Präzisionsbohrfutter, type XPS, ISO 7388-1 (DIN 69871)**
EN **Super High Precision Chuck, type XPS, ISO 7388-1 (DIN 69871)**






AT3 | DIN 69871 | SK | G2,5 25.000 RPM | AD | HRc 58±2 | 40 BAR | ISO 7388-1 | RFID | 0,02

NIEUW | NOUVEAU | NUEVO | NEU

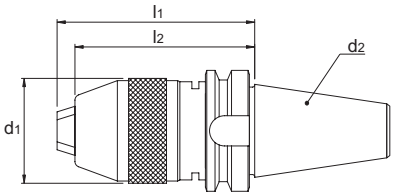
| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.354.4016 | 1-16 | SK40 | 50 | 90 | 80 | 16XPS | 81.412.1600 | 315,00 |
| 81.354.5016 | 1-16 | SK50 | 50 | 90 | 80 | 16XPS | 81.412.1600 | 398,00 |

## › 81.356 Phantom

NL **Ultra Precisieboorhouder, type XPS, ISO 7388-2 (MAS-BT)**
FR **Mandrin de perçage de ultra haute précision, type XPS, ISO 7388-2 (MAS-BT)**
ES **Portabroca de precisión super alta, type XPS, ISO 7388-2 (MAS-BT)**
DE **Ultra-Präzisionsbohrfutter, type XPS, ISO 7388-2 (MAS-BT)**
EN **Super High Precision Chuck, type XPS, ISO 7388-2 (MAS-BT)**



1




AT3 | MAS-BT | G2,5 25.000 RPM | HRc 58±2 | 40 BAR | JD (AD) | ISO 7388-2 | 0,02

NIEUW NOUVEAU NUEVO NEU

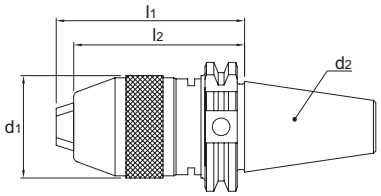
| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.356.4016 | 1-16 | BT40 | 50 | 104 | 95 | 16XPS | 81.412.1600 | 315,00 |
| 81.356.5016 | 1-16 | BT50 | 50 | 116 | 106 | 16XPS | 81.412.1600 | 402,00 |

## › 81.357 Phantom

NL **Ultra Precisieboorhouder, type XPS, ISO 12164 (DIN 69893)**
FR **Mandrin de perçage de ultra haute précision, type XPS, ISO 12164 (DIN 69893)**
ES **Portabroca de precisión super alta, type XPS, ISO 12164 (DIN 69893)**
DE **Ultra-Präzisionsbohrfutter, type XPS, ISO 12164 (DIN 69893)**
EN **Super High Precision Chuck, type XPS, ISO 12164 (DIN 69893)**



1



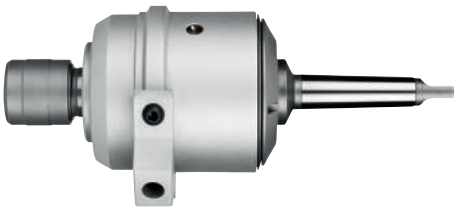

AT3 | A | HSK-A | G2,5 25.000 RPM | HRc 58±2 | 40 BAR | ISO 12164 | RFID | 0,02

NIEUW NOUVEAU NUEVO NEU

| Ref. | Ø | d2 | d1 | l1 | l2 | Type | 1 | € |
|---|---|---|---|---|---|---|---|---|
| 81.357.6016 | 1-16 | HSK63A | 50 | 114 | 104 | 16XPS | 81.412.1600 | 363,00 |

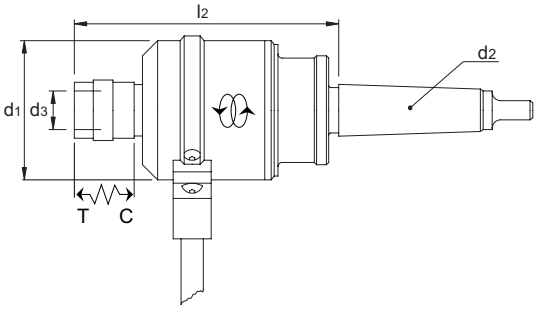
## › 81.540 Phantom

NL **Tapapparaat, met omkeerinrichting, met druk- en trekcompensatie, voor gebruik met tapinzetstukken, DIN 228-B**
FR **Appareil à tarauder, dispositif d'inversion, à compensation de pression et de traction, pour douilles porte-tarauds, DIN 228-B**
ES **Aparato roscador, con dispositivo de inversión, con compensación de presión y de tracción, para casquillos de roscado, DIN 228-B**
DE **Gewindeschneidmaschinen, mit Umkehrvorrichtung, mit Zug-und Druckausgleich, Für den Gebrauch mit Gewindebohrereinsatzstück, DIN 228-B**
EN **Tapping Unit, with reversing arrangement, with push and pull compensation, for usage with bushes for tapping, DIN 228-B**





1 2




C T | DIN 228-B | AUTO REVERSAL

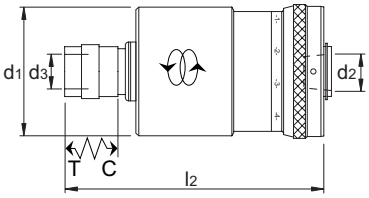
| Ref. | d2 | d3 | d1 | l2 | Ø | 1 | 2 | T | C | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.540.0212 | MK 2 | 19 | 72 | 135 | Gr. 1 - M2-M12 | 81.633/81.634 | 81.653/81.654 | 7 | 3 | 1.739,00 |
| 81.540.0320 | MK 3 | 31 | 83 | 171 | Gr. 2 - M6-M20 | 81.636/81.637 | 81.656/81.657 | 10 | 4 | 2.156,00 |

## › 81.545 Phantom

**NL Tapapparaat, met omkeerinrichting, met druk- en trekcompensatie, met instelbare slipkoppeling, voor gebruik met tapinzetstukken**
**FR Appareil à tarauder, dispositif d'inversion, à compensation de pression et de traction, à réglage de couple par friction, pour douilles porte-tarauds**
**ES Aparato roscador, con dispositivo de inversión, con compensación de presión y de tracción, con ajuste de par por fricción, para casquillos de roscado**
**DE Gewindeschneidmaschinen, mit Umkehrvorrichtung, mit Zug-und Druckausgleich, mit einstellbarer Rutschkupplung, Für den Gebrauch mit Gewindebohrereinsatzstück**
**EN Tapping Unit, with reversing arrangement, with push and pull compensation, with adjustable torque coupling, for usage with bushes for tapping**






C T REVERSAL

| Ref. | d2 | d3 | d1 | l2 | Ø | 1 | 2 excl. | T | C | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.545.0007 | J33 | 13 | 53 | 127 | Gr. 0 - M2-M6 | 81.651 | 84.171 | 7 | 3 | 943,00 |
| 81.545.0012 | J6 | 19 | 68 | 155 | Gr. 1 - M2-M12 | 81.653/81.654 | 84.171 | 7 | 3 | 974,00 |
| 81.545.0020 | M20 | 26 | 83 | 197 | Gr. 1,5 - M8-M20 | 81.655 | 84.172 | 10 | 4 | 1.586,00 |



NL Gebruik tapapparaat met omkeermechanisme
FR Utilisation d'un appareil à tarauder à dispositif d'inversion
ES Uso de un aparato de roscar con dispositivo de inversión
DE Gebrauch Gewindeschneidapparat mit Umkehrvorrichtung
EN Use of self-reversing tapping head

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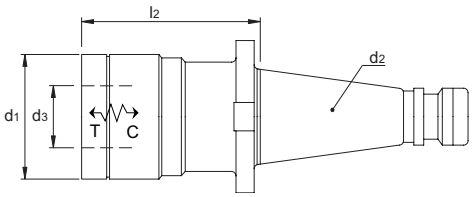
## › 81.613 Phantom

**NL Taphouder, met druk- en trekcompensatie, DIN 2080, voor gebruik met tapinzetstukken**
**FR Mandrin à tarauder porte-douilles, à compensation de pression et de traction, DIN 2080, pour douilles porte-tarauds**
**ES Portamachos de cambio rápido, con compensación de presión y de tracción, DIN 2080, para casquillos de roscado**
**DE Gewindeschneidfutter, mit Zug-und Druckausgleich, DIN 2080, Für den Gebrauch mit Gewindebohrereinsatzstück**
**EN Quick Change Tap Chuck, with push and pull compensation, DIN 2080, for usage with bushes for tapping**






AT3 C T DIN 2080 A SK HRc 58±2

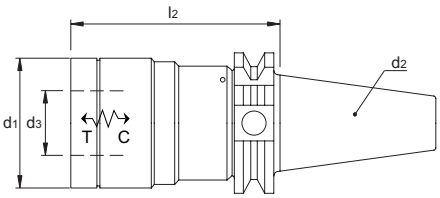
| Ref. | d2 | d3 | d1 | l2 | Ø | 1 | 2 | T | C | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.613.3012 | SK30 | 19 | 36 | 51 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 9 | 9 | 443,00 |
| 81.613.3020 | SK30 | 31 | 53 | 86 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 15 | 15 | 468,00 |
| 81.613.4012 | SK40 | 19 | 36 | 53 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 9 | 9 | 238,95 |
| 81.613.4020 | SK40 | 31 | 53 | 77 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 15 | 15 | 266,00 |
| 81.613.4033 | SK40 | 48 | 78 | 118 | Gr. 3 - M14-M45 | 81.639 | - | 24 | 24 | 541,00 |
| 81.613.5020 | SK50 | 31 | 53 | 79 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 15 | 15 | 389,00 |
| 81.613.5033 | SK50 | 48 | 78 | 125 | Gr. 3 - M14-M45 | 81.639 | - | 24 | 24 | 552,00 |

## › 81.614 Phantom

NL **Taphouder, met druk- en trekcompensatie, voor gebruik met tapinzetstukken, ISO 7388-1 (DIN 69871)**
FR **Mandrin à tarauder porte-douilles, à compensation de pression et de traction, pour douilles porte-tarauds, ISO 7388-1 (DIN 69871)**
ES **Portamachos de cambio rápido, con compensación de presión y de tracción, para casquillos de roscado, ISO 7388-1 (DIN 69871)**
DE **Gewindeschneidfutter, mit Zug-und Druckausgleich, Für den Gebrauch mit Gewindebohrereinsatzstück, ISO 7388-1 (DIN 69871)**
EN **Quick Change Tap Chuck, with push and pull compensation, for usage with bushes for tapping, ISO 7388-1 (DIN 69871)**

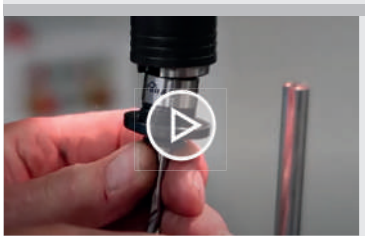





AT3 | C T | DIN 69871 | A | SK | HRc 58±2 | ISO 7388-1 | RFID

| Ref. | d2 | d3 | d1 | l2 | Ø | 1 | 2 | T | C | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.614.4012 | SK40 | 19 | 36 | 60 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 7.5 | 7.5 | 238,95 |
| 81.614.4020 | SK40 | 31 | 53 | 98 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 12.5 | 12.5 | 266,00 |
| 81.614.4033 | SK40 | 48 | 78 | 151 | Gr. 3 - M14-M45 | 81.639 | - | 20 | 20 | 541,00 |
| 81.614.5012 | SK50 | 19 | 36 | 60 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 7.5 | 7.5 | 380,00 |
| 81.614.5020 | SK50 | 31 | 53 | 84 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 12.5 | 12.5 | 385,00 |
| 81.614.5033 | SK50 | 48 | 78 | 139 | Gr. 3 - M14-M45 | 81.639 | - | 20 | 20 | 541,00 |
| 81.614.5048 | SK50 | 60 | 96 | 152 | Gr. 4 - M39-M60 | 81.641 | - | 22.5 | 22.5 | 1.470,00 |



NL Tappotje in taphouder
FR Monter une douille porte-tarauds dans un mandrin à tarauder porte-douilles
ES Sujetar un casquillo en un portamachos
DE Gewindebohrereinsatzstück im Gewindescheidapparat
EN Tap adapter in quickcange tapholder

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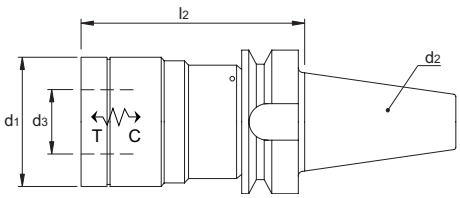
## › 81.616 Phantom

NL **Taphouder, met druk- en trekcompensatie, voor gebruik met tapinzetstukken, ISO 7388-2 (MAS-BT)**
FR **Mandrin à tarauder porte-douilles, à compensation de pression et de traction, pour douilles porte-tarauds, ISO 7388-2 (MAS-BT)**
ES **Portamachos de cambio rápido, con compensación de presión y de tracción, para casquillos de roscado, ISO 7388-2 (MAS-BT)**
DE **Gewindeschneidfutter, mit Zug-und Druckausgleich, Für den Gebrauch mit Gewindebohrereinsatzstück, ISO 7388-2 (MAS-BT)**
EN **Quick Change Tap Chuck, with push and pull compensation, for usage with bushes for tapping, ISO 7388-2 (MAS-BT)**





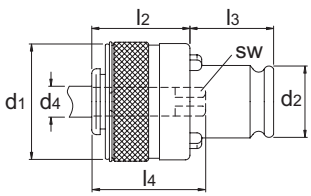




AT3 | C T | MAS-BT | HRc 58±2 | ISO 7388-2 | J (A)

| Ref. | d2 | d3 | d1 | l2 | Ø | 1 | 2 | T | C | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.616.3012 | BT30 | 19 | 36 | 64 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 7.5 | 7.5 | 306,00 |
| 81.616.4012 | BT40 | 19 | 36 | 67.5 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 7.5 | 7.5 | 238,95 |
| 81.616.4020 | BT40 | 31 | 53 | 94.5 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 12.5 | 12.5 | 266,00 |
| 81.616.4033 | BT40 | 48 | 78 | 164.5 | Gr. 3 - M14-M45 | 81.639 | - | 22.5 | 22.5 | 488,00 |
| 81.616.5012 | BT50 | 19 | 36 | 77 | Gr. 1 - M2-M14 | 81.633/81.634 | 81.653/81.654 | 7.5 | 7.5 | 406,00 |
| 81.616.5020 | BT50 | 31 | 53 | 102.5 | Gr. 2 - M6-M27 | 81.636/81.637 | 81.656/81.657 | 12.5 | 12.5 | 389,00 |
| 81.616.5033 | BT50 | 48 | 78 | 142.5 | Gr. 3 - M14-M45 | 81.639 | - | 20 | 20 | 488,00 |
| 81.616.5048 | BT50 | 60 | 96 | 164.5 | Gr. 4 - M39-M60 | 81.641 | - | 22.5 | 22.5 | 1.474,00 |

## › 81.633 Phantom

**NL Tapinzetstuk met ratel, DIN, Gr. 1**
**FR Douille porte-tarauds avec limiteur de couple, DIN, Taille 1**
**ES Casquillo de roscado con embrague de seguridad, DIN, Tam. 1**
**DE Gewindebohrereinsatzstück mit Sicherheitskupplung, DIN, Gr. 1**
**EN Quick Change Tap Adapter with overload clutch, DIN, Size 1**

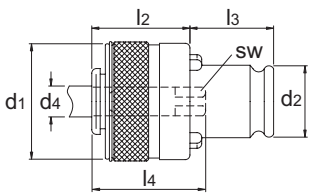





| Ref. | M | DIN | d4 | sw | d1 | d2 | l2 | l3 | l4 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.633.0201 | M2 | DIN 371 | 2.8 | 2.1 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0301 | M3 | DIN 371 | 3.5 | 2.7 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0351 | M3,5 | DIN 371 | 4 | 3 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0401 | M4 | DIN 371 | 4.5 | 3.4 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0406 | M4 | DIN 376 | 2.8 | 2.1 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0501 | M5 | DIN 371 | 6 | 4.9 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0506 | M5 | DIN 376 | 3.5 | 2.7 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0601 | M6 | DIN 371 | 6 | 4.9 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0606 | M6 | DIN 376 | 4.5 | 3.4 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0801 | M8 | DIN 371 | 8 | 6.2 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.0806 | M8 | DIN 376 | 6 | 4.9 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.1001 | M10 | DIN 371 | 10 | 8 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.1006 | M10 | DIN 376 | 7 | 5.5 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.1206 | M12 | DIN 376 | 9 | 7 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |
| 81.633.1406 | M14 | DIN 376 | 11 | 9 | 32 | 19 | 25 | 21.5 | 25 | 56,05 |

## › 81.636 Phantom

**NL Tapinzetstuk met ratel, DIN, Gr. 2**
**FR Douille porte-tarauds avec limiteur de couple, DIN, Taille 2**
**ES Casquillo de roscado con embrague de seguridad, DIN, Tam. 2**
**DE Gewindebohrereinsatzstück mit Sicherheitskupplung, DIN, Gr. 2**
**EN Quick Change Tap Adapter with overload clutch, DIN, Size 2**






| Ref. | M | DIN | d4 | sw | d1 | d2 | l2 | l3 | l4 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.636.0601 | M6 | DIN 371 | 6 | 4.9 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.0801 | M8 | DIN 371 | 8 | 6.2 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.0806 | M8 | DIN 376 | 6 | 4.9 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1001 | M10 | DIN 371 | 10 | 8 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1006 | M10 | DIN 376 | 7 | 5.5 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1206 | M12 | DIN 376 | 9 | 7 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1406 | M14 | DIN 376 | 11 | 9 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1606 | M16 | DIN 376 | 12 | 9 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.1806 | M18 | DIN 376 | 14 | 11 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.2006 | M20 | DIN 376 | 16 | 12 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.2206 | M22 | DIN 376 | 18 | 14.5 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.2406 | M24 | DIN 376 | 18 | 14.5 | 50 | 31 | 34 | 35 | 34 | 78,00 |
| 81.636.2706 | M27 | DIN 376 | 20 | 16 | 50 | 31 | 34 | 35 | 34 | 78,00 |



NL Tap in tappotje monteren en demonteren
FR Monter et démonter un taraud dans une douille porte-tarauds
ES Montar y desmontar un macho en un casquillo de roscado
DE Gewindebohrer montieren und demontieren im Gewindebohrereinsatzstück
EN Mounting tap in quickchange adapter

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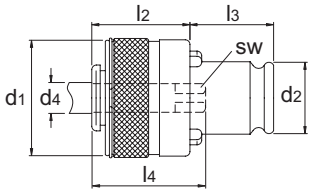
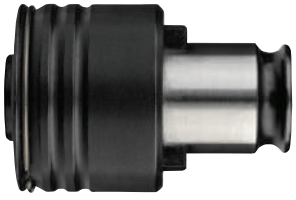
## › 81.639 Phantom

**NL Tapinzetstuk met ratel, DIN, Gr. 3**
**FR Douille porte-tarauds avec limiteur de couple, DIN, Taille 3**
**ES Casquillo de roscado con embrague de seguridad, DIN, Tam. 3**
**DE Gewindebohrereinsatzstück mit Sicherheitskupplung, DIN, Gr. 3**
**EN Quick Change Tap Adapter with overload clutch, DIN, Size 3**

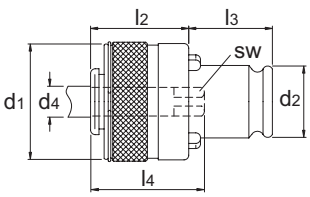


| Ref. | M | DIN | d4 | sw | d1 | d2 | l2 | l3 | l4 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.639.1406 | M14 | DIN 376 | 11 | 9 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.1606 | M16 | DIN 376 | 12 | 9 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.1806 | M18 | DIN 376 | 14 | 11 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.2006 | M20 | DIN 376 | 16 | 12 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.2206 | M22 | DIN 376 | 18 | 14.5 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.2406 | M24 | DIN 376 | 18 | 14.5 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.2706 | M27 | DIN 376 | 20 | 16 | 72 | 48 | 45 | 55.5 | 45 | 219,45 |
| 81.639.3006 | M30 | DIN 376 | 22 | 18 | 72 | 48 | 45 | 55.5 | 45 | 192,65 |
| 81.639.3306 | M33 | DIN 376 | 25 | 20 | 72 | 48 | 45 | 55.5 | 45 | 207,85 |
| 81.639.3606 | M36 | DIN 376 | 28 | 22 | 72 | 48 | 45 | 55.5 | 45 | 219,45 |
| 81.639.3906 | M39 | DIN 376 | 32 | 24 | 72 | 48 | 45 | 55.5 | 45 | 219,45 |
| 81.639.4206 | M42 | DIN 376 | 32 | 24 | 72 | 48 | 45 | 55.5 | 45 | 219,45 |
| 81.639.4506 | M45 | DIN 376 | 36 | 29 | 72 | 48 | 45 | 55.5 | 45 | 219,45 |

## › 81.641 Phantom

NL **Tapinzetstuk met ratel, DIN, Gr. 4**
FR **Douille porte-tarauds avec limiteur de couple, DIN, Taille 4**
ES **Casquillo de roscado con embrague de seguridad, DIN, Tam. 4**
DE **Gewindebohrereinsatzstück mit Sicherheitskupplung, DIN, Gr. 4**
EN **Quick Change Tap Adapter with overload clutch, DIN, Size 4**






| Ref. | M | DIN | d4 | sw | d1 | d2 | l2 | l3 | l4 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 81.641.3906 | M39 | DIN 376 | 32 | 24 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.4206 | M42 | DIN 376 | 32 | 26 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.4506 | M45 | DIN 376 | 36 | 29 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.4806 | M48 | DIN 376 | 36 | 29 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.5206 | M52 | DIN 376 | 40 | 32 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.5606 | M56 | DIN 376 | 45 | 35 | 95 | 60 | 68 | 63 | 68 | 309,00 |
| 81.641.6006 | M60 | DIN 376 | 45 | 35 | 95 | 60 | 68 | 63 | 68 | 309,00 |

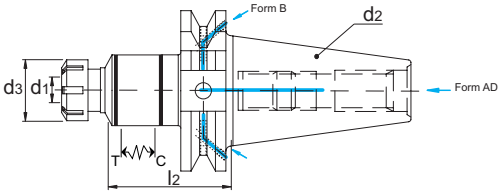
## › 81.684 Phantom

NL **Synchro Taphouder voor ER spantangen (met vierkant), ISO 7388-1 (DIN 69871)**
FR **Mandrin à tarauder Synchro pour utilisation avec pinces ER (avec carré d'entraînement), ISO 7388-1 (DIN 69871)**
ES **Portamachos Synchro para uso con ER pinzas (con cuadrado interior), ISO 7388-1 (DIN 69871)**
DE **Synchro Gewindeschneidfutter für ER-Spannzangen (mit Vierkant), ISO 7388-1 (DIN 69871)**
EN **Synchro Tapping Holder for usage with ER collets (with square socket), ISO 7388-1 (DIN 69871)**





1




AT3 | DIN 69871 | DIN 6499 | ER | SK | MICRO C T | G2,5 25.000 RPM | HRc 58±2 | AD/AF (AD/B) | ISO 7388-1 | ISO 15488 | RFID

| Ref. | d2 | d1 | Ø | l2 | d3 | T | C | 1 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 81.684.4016 | SK40 | ER16 | 1-10 | 79 | 32 | 0.5 | 0.5 | 82.880 | 491,00 |
| 81.684.4025 | SK40 | ER25 | 3,5-16 | 84 | 42 | 0.5 | 0.5 | 82.885 | 553,00 |
| 81.684.5025 | SK50 | ER25 | 3,5-16 | 84 | 42 | 0.5 | 0.5 | 82.885 | 642,00 |

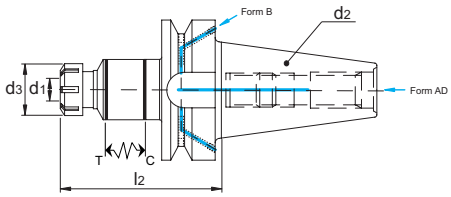
## › 81.686 Phantom

NL **Synchro Taphouder voor ER spantangen (met vierkant), ISO 7388-2 (MAS-BT)**
FR **Mandrin à tarauder Synchro pour utilisation avec pinces ER (avec carré d'entraînement), ISO 7388-2 (MAS-BT)**
ES **Portamachos Synchro para uso con ER pinzas (con cuadrado interior), ISO 7388-2 (MAS-BT)**
DE **Synchro Gewindeschneidfutter für ER-Spannzangen (mit Vierkant), ISO 7388-2 (MAS-BT)**
EN **Synchro Tapping Holder for usage with ER collets (with square socket), ISO 7388-2 (MAS-BT)**





1

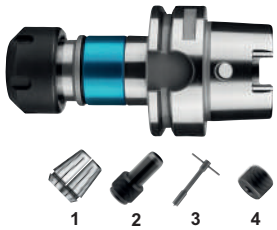


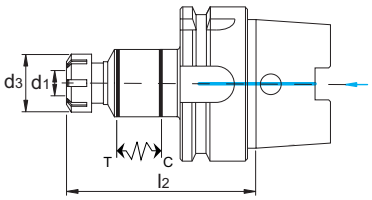

AT3 | DIN 6499 | ER | MAS-BT | MICRO C T | HRc 58±2 | JD/JF (AD/B) | ISO 7388-2 | ISO 15488

| Ref. | d2 | d1 | Ø | l2 | d3 | T | C | 1 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 81.686.4016 | BT40 | ER16 | 1-10 | 79 | 32 | 0.5 | 0.5 | 82.880 | 491,00 |
| 81.686.4025 | BT40 | ER25 | 3,5-16 | 89 | 42 | 0.5 | 0.5 | 82.885 | 553,00 |
| 81.686.5025 | BT50 | ER25 | 3,5-16 | 110 | 42 | 0.5 | 0.5 | 82.885 | 642,00 |

## › 81.687 Phantom

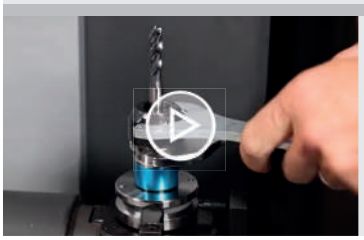
**NL Synchro Taphouder voor ER spantangen (met vierkant), ISO 12164 (DIN 69893)**
**FR Mandrin à tarauder Synchro pour utilisation avec pinces ER (avec carré d'entraînement), ISO 12164 (DIN 69893)**
**ES Portamachos Synchro para uso con ER pinzas (con cuadrado interior), ISO 12164 (DIN 69893)**
**DE Synchro Gewindeschneidfutter für ER-Spannzangen (mit Vierkant), ISO 12164 (DIN 69893)**
**EN Synchro Tapping Holder for usage with ER collets (with square socket), ISO 12164 (DIN 69893)**




AT3 | DIN 6499 | ER | A | MICRO C T | HSK-A | G2,5 25.000 RPM | HRc 58±2 | ISO 12164 | ISO 15488 | RFID

| Ref. | d2 | d1 | Ø | l2 | d3 | T | C | 1 excl. | 2 excl. | 3 excl. | 4 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81.687.0631 | HSK63A | ER16 | 1-10 | 89 | 32 | 0.5 | 0.5 | 82.880 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 698,00 |
| 81.687.0632 | HSK63A | ER25 | 3,5-16 | 94 | 42 | 0.5 | 0.5 | 82.885 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 732,00 |
| 81.687.1002 | HSK100A | ER25 | 3,5-16 | 101 | 42 | 0.5 | 0.5 | 82.885 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 828,00 |



**NL** Demonteren tap en spantang uit synchrohouder
**FR** Démonter un taraud et une pince d'un mandrin à tarauder synchro
**ES** Desmontar macho y pinza de un portamachos Synchro
**DE** Demontieren Gewindebohrer und Spannzange aus Synchro Gewindeschneidhalter
**EN** Remove tap and collet from synchro-toolholder

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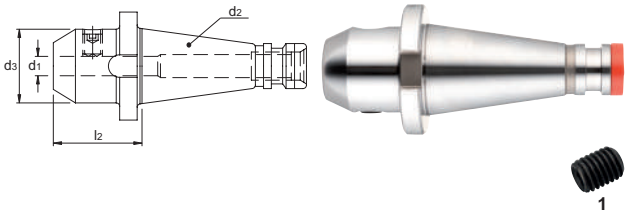
## › 82.153 Phantom

**NL Weldonhouder, DIN 2080**
**FR Porte-outils, DIN 2080**
**ES Portaherramientas Weldon, DIN 2080**
**DE Weldon-Halter, DIN 2080**
**EN End Mill Holder (Weldon), DIN 2080**



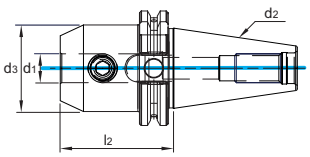

AT3 | DIN 1835-B | DIN 2080 | DIN 6359 | 0,005 | SK | AD | HRc 58±2

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.153.3006 | SK30 | 6 | 40 | 25 | M12 | 82.159.0600 | 56,95 |
| 82.153.3008 | SK30 | 8 | 40 | 28 | M12 | 82.159.0800 | 48,40 |
| 82.153.3010 | SK30 | 10 | 40 | 35 | M12 | 82.159.1000 | 48,40 |
| 82.153.3012 | SK30 | 12 | 40 | 42 | M12 | 82.159.1200 | 48,40 |
| 82.153.3016 | SK30 | 16 | 50 | 48 | M12 | 82.159.1400 | 48,40 |
| 82.153.3020 | SK30 | 20 | 63 | 52 | M12 | 82.159.1600 | 48,40 |
| 82.153.4006 | SK40 | 6 | 50 | 25 | M16 | 82.159.0600 | 49,00 |
| 82.153.4008 | SK40 | 8 | 50 | 28 | M16 | 82.159.0800 | 49,95 |
| 82.153.4010 | SK40 | 10 | 50 | 35 | M16 | 82.159.1000 | 49,00 |
| 82.153.4012 | SK40 | 12 | 50 | 42 | M16 | 82.159.1200 | 49,00 |
| 82.153.4016 | SK40 | 16 | 63 | 48 | M16 | 82.159.1400 | 49,00 |
| 82.153.4020 | SK40 | 20 | 63 | 52 | M16 | 82.159.1600 | 49,00 |

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.153.4025 | SK40 | 25 | 80 | 65 | M16 | 82.159.1800 | 49,95 |
| 82.153.4032 | SK40 | 32 | 80 | 72 | M16 | 82.159.2000 | 49,95 |
| 82.153.5006 | SK50 | 6 | 63 | 25 | M24 | 82.159.0600 | 52,50 |
| 82.153.5008 | SK50 | 8 | 63 | 28 | M24 | 82.159.0800 | 49,35 |
| 82.153.5010 | SK50 | 10 | 63 | 35 | M24 | 82.159.1000 | 49,35 |
| 82.153.5012 | SK50 | 12 | 63 | 42 | M24 | 82.159.1200 | 49,35 |
| 82.153.5014 | SK50 | 14 | 63 | 44 | M24 | 82.159.1200 | 49,35 |
| 82.153.5016 | SK50 | 16 | 63 | 48 | M24 | 82.159.1400 | 90,30 |
| 82.153.5020 | SK50 | 20 | 63 | 52 | M24 | 82.159.1600 | 90,30 |
| 82.153.5025 | SK50 | 25 | 80 | 65 | M24 | 82.159.1800 | 92,20 |
| 82.153.5032 | SK50 | 32 | 80 | 72 | M24 | 82.159.2000 | 92,20 |
| 82.153.5040 | SK50 | 40 | 90 | 80 | M24 | 82.159.2000 | 100,80 |

## › 82.154 Phantom

NL **Weldonhouder, ISO 7388-1 (DIN 69871)**
FR **Porte-outils, ISO 7388-1 (DIN 69871)**
ES **Portaherramientas Weldon, ISO 7388-1 (DIN 69871)**
DE **Weldon-Halter, ISO 7388-1 (DIN 69871)**
EN **End Mill Holder (Weldon), ISO 7388-1 (DIN 69871)**





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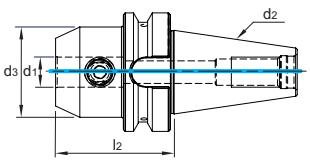
AT3 | DIN 1835-B | DIN 69871 | DIN 6359 | SK | 0,005 | G6,3 15.000 RPM | AD | HRc 58±2 | ISO 7388-1 | RFID

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.154.4061 | SK40 | 6 | 50 | 25 | M16 | 82.159.0600 | 49,60 |
| 82.154.4062 | SK40 | 6 | 100 | 25 | M16 | 82.159.0600 | 58,85 |
| 82.154.4066 | SK40 | 6 | 160 | 25 | M16 | 82.159.0600 | 97,65 |
| 82.154.4081 | SK40 | 8 | 50 | 28 | M16 | 82.159.0800 | 46,45 |
| 82.154.4082 | SK40 | 8 | 100 | 28 | M16 | 82.159.0800 | 54,25 |
| 82.154.4086 | SK40 | 8 | 160 | 28 | M16 | 82.159.0800 | 94,60 |
| 82.154.4101 | SK40 | 10 | 50 | 35 | M16 | 82.159.1000 | 46,45 |
| 82.154.4102 | SK40 | 10 | 100 | 35 | M16 | 82.159.1000 | 54,25 |
| 82.154.4106 | SK40 | 10 | 160 | 35 | M16 | 82.159.1000 | 94,60 |
| 82.154.4121 | SK40 | 12 | 50 | 42 | M16 | 82.159.1200 | 46,45 |
| 82.154.4122 | SK40 | 12 | 100 | 42 | M16 | 82.159.1200 | 54,25 |
| 82.154.4126 | SK40 | 12 | 160 | 42 | M16 | 82.159.1200 | 94,60 |
| 82.154.4141 | SK40 | 14 | 50 | 44 | M16 | 82.159.1200 | 46,45 |
| 82.154.4142 | SK40 | 14 | 100 | 44 | M16 | 82.159.1200 | 54,25 |
| 82.154.4146 | SK40 | 14 | 160 | 44 | M16 | 82.159.1200 | 94,60 |
| 82.154.4161 | SK40 | 16 | 63 | 48 | M16 | 82.159.1400 | 46,45 |
| 82.154.4162 | SK40 | 16 | 100 | 48 | M16 | 82.159.1400 | 54,25 |
| 82.154.4166 | SK40 | 16 | 160 | 48 | M16 | 82.159.1400 | 94,60 |
| 82.154.4181 | SK40 | 18 | 63 | 50 | M16 | 82.159.1400 | 46,45 |
| 82.154.4182 | SK40 | 18 | 100 | 50 | M16 | 82.159.1400 | 54,25 |
| 82.154.4186 | SK40 | 18 | 160 | 50 | M16 | 82.159.1400 | 94,60 |
| 82.154.4201 | SK40 | 20 | 63 | 52 | M16 | 82.159.1600 | 46,45 |
| 82.154.4202 | SK40 | 20 | 100 | 52 | M16 | 82.159.1600 | 54,25 |
| 82.154.4206 | SK40 | 20 | 160 | 52 | M16 | 82.159.1600 | 94,60 |
| 82.154.4252 | SK40 | 25 | 100 | 65 | M16 | 82.159.1800 | 54,25 |
| 82.154.4256 | SK40 | 25 | 160 | 65 | M16 | 82.159.1800 | 102,30 |
| 82.154.4322 | SK40 | 32 | 100 | 72 | M16 | 82.159.2000 | 57,40 |
| 82.154.4326 | SK40 | 32 | 160 | 72 | M16 | 82.159.2000 | 108,50 |
| 82.154.4402 | SK40 | 40 | 115 | 80 | M16 | 82.159.2000 | 71,30 |
| 82.154.5006 | SK50 | 6 | 63 | 25 | M24 | 82.159.0600 | 52,50 |
| 82.154.5008 | SK50 | 8 | 63 | 28 | M24 | 82.159.0800 | 49,35 |
| 82.154.5010 | SK50 | 10 | 63 | 35 | M24 | 82.159.1000 | 49,35 |

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.154.5061 | SK50 | 6 | 63 | 25 | M24 | 82.159.0600 | 69,75 |
| 82.154.5062 | SK50 | 6 | 100 | 25 | M24 | 82.159.0600 | 83,70 |
| 82.154.5066 | SK50 | 6 | 160 | 25 | M24 | 82.159.0600 | 125,55 |
| 82.154.5081 | SK50 | 8 | 63 | 28 | M24 | 82.159.0800 | 66,70 |
| 82.154.5082 | SK50 | 8 | 100 | 28 | M24 | 82.159.0800 | 82,15 |
| 82.154.5086 | SK50 | 8 | 160 | 28 | M24 | 82.159.0800 | 122,50 |
| 82.154.5101 | SK50 | 10 | 63 | 35 | M24 | 82.159.1000 | 66,70 |
| 82.154.5102 | SK50 | 10 | 100 | 35 | M24 | 82.159.1000 | 82,15 |
| 82.154.5106 | SK50 | 10 | 160 | 35 | M24 | 82.159.1000 | 122,50 |
| 82.154.5121 | SK50 | 12 | 63 | 42 | M24 | 82.159.1200 | 66,70 |
| 82.154.5122 | SK50 | 12 | 100 | 42 | M24 | 82.159.1200 | 82,15 |
| 82.154.5126 | SK50 | 12 | 160 | 42 | M24 | 82.159.1200 | 122,50 |
| 82.154.5141 | SK50 | 14 | 63 | 44 | M24 | 82.159.1200 | 66,70 |
| 82.154.5142 | SK50 | 14 | 100 | 44 | M24 | 82.159.1200 | 82,15 |
| 82.154.5146 | SK50 | 14 | 160 | 44 | M24 | 82.159.1200 | 122,50 |
| 82.154.5161 | SK50 | 16 | 63 | 48 | M24 | 82.159.1400 | 66,70 |
| 82.154.5162 | SK50 | 16 | 100 | 48 | M24 | 82.159.1400 | 82,15 |
| 82.154.5166 | SK50 | 16 | 160 | 48 | M24 | 82.159.1400 | 122,50 |
| 82.154.5181 | SK50 | 18 | 63 | 50 | M24 | 82.159.1400 | 66,70 |
| 82.154.5182 | SK50 | 18 | 100 | 50 | M24 | 82.159.1400 | 82,15 |
| 82.154.5186 | SK50 | 18 | 160 | 50 | M24 | 82.159.1400 | 122,50 |
| 82.154.5201 | SK50 | 20 | 63 | 52 | M24 | 82.159.1600 | 66,70 |
| 82.154.5202 | SK50 | 20 | 100 | 52 | M24 | 82.159.1600 | 82,15 |
| 82.154.5206 | SK50 | 20 | 160 | 52 | M24 | 82.159.1600 | 122,50 |
| 82.154.5251 | SK50 | 25 | 80 | 65 | M24 | 82.159.1800 | 74,40 |
| 82.154.5252 | SK50 | 25 | 100 | 65 | M24 | 82.159.1800 | 97,65 |
| 82.154.5256 | SK50 | 25 | 160 | 65 | M24 | 82.159.1800 | 125,55 |
| 82.154.5322 | SK50 | 32 | 100 | 72 | M24 | 82.159.2000 | 82,15 |
| 82.154.5326 | SK50 | 32 | 160 | 72 | M24 | 82.159.2000 | 130,20 |
| 82.154.5404 | SK50 | 40 | 120 | 80 | M24 | 82.159.2000 | 88,35 |
| 82.154.5406 | SK50 | 40 | 160 | 80 | M24 | 82.159.2000 | 139,45 |

## › 82.156 Phantom

NL **Weldonhouder, ISO 7388-2 (MAS-BT)**
FR **Porte-outils, ISO 7388-2 (MAS-BT)**
ES **Portaherramientas Weldon, ISO 7388-2 (MAS-BT)**
DE **Weldon-Halter, ISO 7388-2 (MAS-BT)**
EN **End Mill Holder (Weldon), ISO 7388-2 (MAS-BT)**








1

AT3 | DIN 1835-B | DIN 6359 | MAS-BT | 0,005 | G6,3 15.000 RPM | HRc 58±2 | JD (AD) | ISO 7388-2

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.156.3061 | BT30 | 6 | 50 | 25 | M12 | 82.159.0600 | 65,40 |
| 82.156.3081 | BT30 | 8 | 50 | 28 | M12 | 82.159.0800 | 62,25 |
| 82.156.3101 | BT30 | 10 | 50 | 35 | M12 | 82.159.1000 | 62,25 |
| 82.156.3121 | BT30 | 12 | 55 | 42 | M12 | 82.159.1200 | 62,25 |
| 82.156.3141 | BT30 | 14 | 55 | 44 | M12 | 82.159.1200 | 62,25 |
| 82.156.3161 | BT30 | 16 | 63 | 48 | M12 | 82.159.1400 | 65,40 |
| 82.156.3181 | BT30 | 18 | 63 | 50 | M12 | 82.159.1400 | 65,40 |
| 82.156.3201 | BT30 | 20 | 70 | 52 | M12 | 82.159.1600 | 65,40 |
| 82.156.4061 | BT40 | 6 | 50 | 25 | M16 | 82.159.0600 | 49,60 |
| 82.156.4062 | BT40 | 6 | 100 | 25 | M16 | 82.159.0600 | 58,85 |
| 82.156.4066 | BT40 | 6 | 160 | 25 | M16 | 82.159.0600 | 97,65 |
| 82.156.4081 | BT40 | 8 | 50 | 28 | M16 | 82.159.0800 | 46,45 |
| 82.156.4082 | BT40 | 8 | 100 | 28 | M16 | 82.159.0800 | 54,25 |
| 82.156.4086 | BT40 | 8 | 160 | 28 | M16 | 82.159.0800 | 94,60 |
| 82.156.4101 | BT40 | 10 | 63 | 35 | M16 | 82.159.1000 | 46,45 |
| 82.156.4102 | BT40 | 10 | 100 | 35 | M16 | 82.159.1000 | 54,25 |
| 82.156.4106 | BT40 | 10 | 160 | 35 | M16 | 82.159.1000 | 94,60 |
| 82.156.4121 | BT40 | 12 | 63 | 42 | M16 | 82.159.1200 | 46,45 |
| 82.156.4122 | BT40 | 12 | 100 | 42 | M16 | 82.159.1200 | 54,25 |
| 82.156.4126 | BT40 | 12 | 160 | 42 | M16 | 82.159.1200 | 94,60 |
| 82.156.4141 | BT40 | 14 | 63 | 44 | M16 | 82.159.1200 | 46,45 |
| 82.156.4142 | BT40 | 14 | 100 | 44 | M16 | 82.159.1200 | 54,25 |
| 82.156.4146 | BT40 | 14 | 160 | 44 | M16 | 82.159.1200 | 94,60 |
| 82.156.4161 | BT40 | 16 | 63 | 48 | M16 | 82.159.1400 | 46,45 |
| 82.156.4162 | BT40 | 16 | 100 | 48 | M16 | 82.159.1400 | 54,25 |

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.156.4166 | BT40 | 16 | 160 | 48 | M16 | 82.159.1400 | 94,60 |
| 82.156.4181 | BT40 | 18 | 63 | 50 | M16 | 82.159.1400 | 46,45 |
| 82.156.4182 | BT40 | 18 | 100 | 50 | M16 | 82.159.1400 | 54,25 |
| 82.156.4186 | BT40 | 18 | 160 | 50 | M16 | 82.159.1400 | 94,60 |
| 82.156.4201 | BT40 | 20 | 63 | 52 | M16 | 82.159.1600 | 46,45 |
| 82.156.4202 | BT40 | 20 | 100 | 52 | M16 | 82.159.1600 | 54,25 |
| 82.156.4206 | BT40 | 20 | 160 | 52 | M16 | 82.159.1600 | 94,60 |
| 82.156.4252 | BT40 | 25 | 90 | 65 | M16 | 82.159.1800 | 54,25 |
| 82.156.4256 | BT40 | 25 | 160 | 65 | M16 | 82.159.1800 | 102,30 |
| 82.156.4322 | BT40 | 32 | 100 | 72 | M16 | 82.159.2000 | 57,40 |
| 82.156.4326 | BT40 | 32 | 160 | 72 | M16 | 82.159.2000 | 108,50 |
| 82.156.4402 | BT40 | 40 | 105 | 80 | M16 | 82.159.2000 | 71,30 |
| 82.156.5006 | BT50 | 6 | 63 | 25 | M24 | 82.159.0600 | 52,50 |
| 82.156.5014 | BT50 | 14 | 80 | 44 | M24 | 82.159.1200 | 49,35 |
| 82.156.5061 | BT50 | 6 | 63 | 25 | M24 | 82.159.0600 | 83,70 |
| 82.156.5062 | BT50 | 6 | 100 | 25 | M24 | 82.159.0600 | 96,05 |
| 82.156.5066 | BT50 | 6 | 160 | 25 | M24 | 82.159.0600 | 158,10 |
| 82.156.5081 | BT50 | 8 | 63 | 28 | M24 | 82.159.0800 | 83,70 |
| 82.156.5082 | BT50 | 8 | 100 | 28 | M24 | 82.159.0800 | 96,05 |
| 82.156.5086 | BT50 | 8 | 160 | 28 | M24 | 82.159.0800 | 158,10 |
| 82.156.5101 | BT50 | 10 | 80 | 35 | M24 | 82.159.1000 | 83,70 |
| 82.156.5102 | BT50 | 10 | 100 | 35 | M24 | 82.159.1000 | 96,05 |
| 82.156.5106 | BT50 | 10 | 160 | 35 | M24 | 82.159.1000 | 153,45 |
| 82.156.5121 | BT50 | 12 | 80 | 42 | M24 | 82.159.1200 | 83,70 |
| 82.156.5122 | BT50 | 12 | 100 | 42 | M24 | 82.159.1200 | 96,05 |

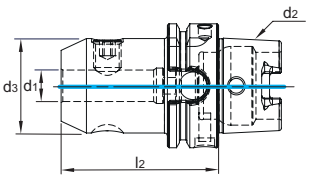
## › 82.156 Phantom

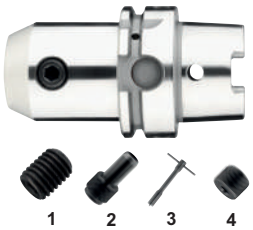
| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.156.5126 | BT50 | 12 | 160 | 42 | M24 | 82.159.1200 | 153,45 |
| 82.156.5141 | BT50 | 14 | 80 | 44 | M24 | 82.159.1200 | 83,70 |
| 82.156.5142 | BT50 | 14 | 100 | 44 | M24 | 82.159.1200 | 96,05 |
| 82.156.5146 | BT50 | 14 | 160 | 44 | M24 | 82.159.1200 | 159,65 |
| 82.156.5161 | BT50 | 16 | 80 | 48 | M24 | 82.159.1400 | 83,70 |
| 82.156.5162 | BT50 | 16 | 100 | 48 | M24 | 82.159.1400 | 96,05 |
| 82.156.5166 | BT50 | 16 | 160 | 48 | M24 | 82.159.1400 | 153,45 |
| 82.156.5181 | BT50 | 18 | 80 | 50 | M24 | 82.159.1400 | 83,70 |
| 82.156.5182 | BT50 | 18 | 100 | 50 | M24 | 82.159.1400 | 96,05 |
| 82.156.5186 | BT50 | 18 | 160 | 50 | M24 | 82.159.1400 | 159,65 |

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | € |
|---|---|---|---|---|---|---|---|
| 82.156.5201 | BT50 | 20 | 80 | 52 | M24 | 82.159.1600 | 83,70 |
| 82.156.5202 | BT50 | 20 | 100 | 52 | M24 | 82.159.1600 | 96,05 |
| 82.156.5206 | BT50 | 20 | 160 | 52 | M24 | 82.159.1600 | 153,45 |
| 82.156.5252 | BT50 | 25 | 100 | 65 | M24 | 82.159.1800 | 88,35 |
| 82.156.5256 | BT50 | 25 | 160 | 65 | M24 | 82.159.1800 | 159,65 |
| 82.156.5322 | BT50 | 32 | 105 | 72 | M24 | 82.159.2000 | 94,60 |
| 82.156.5326 | BT50 | 32 | 160 | 72 | M24 | 82.159.2000 | 159,65 |
| 82.156.5402 | BT50 | 40 | 115 | 80 | M24 | 82.159.2000 | 103,85 |
| 82.156.5406 | BT50 | 40 | 160 | 80 | M24 | 82.159.2000 | 176,70 |

## › 82.157 Phantom

**NL** Weldonhouder, ISO 12164 (DIN 69893)
**FR** Porte-outils, ISO 12164 (DIN 69893)
**ES** Portaherramientas Weldon, ISO 12164 (DIN 69893)
**DE** Weldon-Halter, ISO 12164 (DIN 69893)
**EN** End Mill Holder (Weldon), ISO 12164 (DIN 69893)



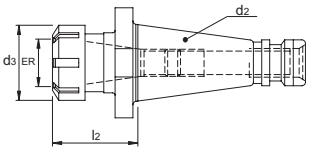



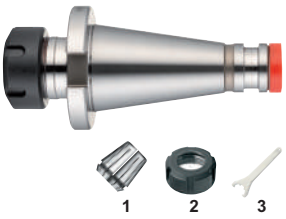

AT3 | DIN 1835-B | DIN 6359 | A | 0,005 | HSK-A | G6,3 20.000 RPM | HRc 58±2 | ISO 12164 | RFID

| Ref. | d2 | d1 | l2 | d3 | M | 1 incl. | 2 excl. | 3 excl. | 4 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 82.157.6061 | HSK63A | 6 | 65 | 25 | M18X1 | 82.159.0600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6062 | HSK63A | 6 | 100 | 25 | M18X1 | 82.159.0600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6066 | HSK63A | 6 | 160 | 25 | M18X1 | 82.159.0600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6081 | HSK63A | 8 | 65 | 28 | M18X1 | 82.159.0800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6082 | HSK63A | 8 | 100 | 28 | M18X1 | 82.159.0800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6086 | HSK63A | 8 | 160 | 28 | M18X1 | 82.159.0800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6101 | HSK63A | 10 | 65 | 35 | M18X1 | 82.159.1000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6102 | HSK63A | 10 | 100 | 35 | M18X1 | 82.159.1000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6106 | HSK63A | 10 | 160 | 35 | M18X1 | 82.159.1000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6121 | HSK63A | 12 | 80 | 42 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6122 | HSK63A | 12 | 100 | 42 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6126 | HSK63A | 12 | 160 | 42 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6141 | HSK63A | 14 | 80 | 44 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6142 | HSK63A | 14 | 100 | 44 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6146 | HSK63A | 14 | 160 | 44 | M18X1 | 82.159.1200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6161 | HSK63A | 16 | 80 | 48 | M18X1 | 82.159.1400 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6162 | HSK63A | 16 | 100 | 48 | M18X1 | 82.159.1400 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6166 | HSK63A | 16 | 160 | 48 | M18X1 | 82.159.1400 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6181 | HSK63A | 18 | 80 | 50 | M18X1 | 82.159.1400 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6201 | HSK63A | 20 | 80 | 52 | M18X1 | 82.159.1600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.157.6202 | HSK63A | 20 | 100 | 52 | M18X1 | 82.159.1600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 147,25 |
| 82.157.6206 | HSK63A | 20 | 160 | 52 | M18X1 | 82.159.1600 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 190,05 |
| 82.157.6252 | HSK63A | 25 | 110 | 65 | M18X1 | 82.159.1800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 144,15 |
| 82.157.6254 | HSK63A | 25 | 125 | 65 | M18X1 | 82.159.1800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 165,90 |
| 82.157.6256 | HSK63A | 25 | 160 | 65 | M18X1 | 82.159.1800 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 196,85 |
| 82.157.6322 | HSK63A | 32 | 110 | 72 | M18X1 | 82.159.2000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 151,85 |
| 82.157.6326 | HSK63A | 32 | 160 | 72 | M18X1 | 82.159.2000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 204,60 |

## › 82.513 Phantom

**NL** ER Spantanghouder, DIN 2080
**FR** Mandrin porte-pinces ER, DIN 2080
**ES** Portapinzas ER, DIN 2080
**DE** ER-Spannzangenfutter, DIN 2080
**EN** ER Collet Chuck, DIN 2080



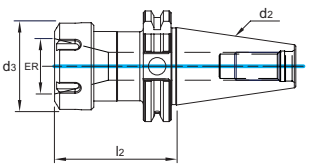




AT3 | DIN 2080 | DIN 6499 | ER | 0,005 | SK | AD | HRc 58±2 | ISO 15488

| Ref. | d2 | Type | Ø | l2 | d3 | M | 1 excl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 82.513.3065 | SK30 | ER32 | 2-20 | 50 | 50 | M12 | ER32 | 82.960.3200 | 82.990.3200 | 51,40 |
| 82.513.4053 | SK40 | ER25 | 1-20 | 50 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 51,40 |
| 82.513.4063 | SK40 | ER32 | 2-20 | 50 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 51,40 |
| 82.513.4071 | SK40 | ER40 | 3-30 | 80 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 57,10 |
| 82.513.5071 | SK50 | ER40 | 3-30 | 80 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 103,50 |

## › 82.514 Phantom

NL **ER Spantanghouder, ISO 7388-1 (DIN 69871)**
FR **Mandrin porte-pinces ER, ISO 7388-1 (DIN 69871)**
ES **Portapinzas ER, ISO 7388-1 (DIN 69871)**
DE **ER-Spannzangenfutter, ISO 7388-1 (DIN 69871)**
EN **ER Collet Chuck, ISO 7388-1 (DIN 69871)**





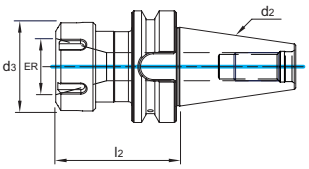


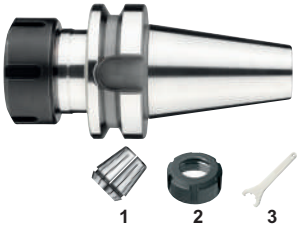
AT3 | DIN 69871 | DIN 6499 | ER | SK | 0,005 | G6,3 15.000 RPM | AD | HRc 58±2 | ISO 7388-1 | ISO 15488 | RFID

| Ref. | d2 | Type | Ø | l2 | d3 | M | 1 excl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 82.514.4161 | SK40 | ER16 | 1-12 | 70 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 60,45 |
| 82.514.4162 | SK40 | ER16 | 1-12 | 100 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 68,20 |
| 82.514.4166 | SK40 | ER16 | 1-12 | 160 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 114,70 |
| 82.514.4251 | SK40 | ER25 | 1-20 | 70 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 60,45 |
| 82.514.4252 | SK40 | ER25 | 1-20 | 100 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 75,95 |
| 82.514.4256 | SK40 | ER25 | 1-20 | 160 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 114,70 |
| 82.514.4321 | SK40 | ER32 | 2-20 | 70 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 63,50 |
| 82.514.4322 | SK40 | ER32 | 2-20 | 100 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 75,95 |
| 82.514.4326 | SK40 | ER32 | 2-20 | 160 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 117,80 |
| 82.514.4401 | SK40 | ER40 | 3-30 | 70 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 66,70 |
| 82.514.4402 | SK40 | ER40 | 3-30 | 100 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 85,25 |
| 82.514.4406 | SK40 | ER40 | 3-30 | 160 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 122,50 |
| 82.514.5162 | SK50 | ER16 | 1-12 | 100 | 32 | M24 | ER16 | 82.960.1600 | 82.990.1600 | 114,70 |
| 82.514.5166 | SK50 | ER16 | 1-12 | 160 | 32 | M24 | ER16 | 82.960.1600 | 82.990.1600 | 156,50 |
| 82.514.5251 | SK50 | ER25 | 1-20 | 70 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 94,60 |
| 82.514.5252 | SK50 | ER25 | 1-20 | 100 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 114,70 |
| 82.514.5256 | SK50 | ER25 | 1-20 | 160 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 156,50 |
| 82.514.5321 | SK50 | ER32 | 2-20 | 70 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 97,65 |
| 82.514.5322 | SK50 | ER32 | 2-20 | 100 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 136,40 |
| 82.514.5326 | SK50 | ER32 | 2-20 | 160 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 156,50 |
| 82.514.5401 | SK50 | ER40 | 3-30 | 80 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 97,65 |
| 82.514.5402 | SK50 | ER40 | 3-30 | 100 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 139,45 |
| 82.514.5406 | SK50 | ER40 | 3-30 | 160 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 161,20 |

## › 82.516 Phantom

NL **ER Spantanghouder, ISO 7388-2 (MAS-BT)**
FR **Mandrin porte-pinces ER, ISO 7388-2 (MAS-BT)**
ES **Portapinzas ER, ISO 7388-2 (MAS-BT)**
DE **ER-Spannzangenfutter, ISO 7388-2 (MAS-BT)**
EN **ER Collet Chuck, ISO 7388-2 (MAS-BT)**



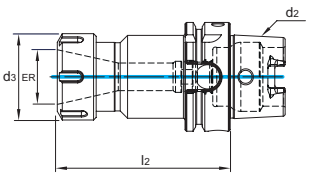




AT3 | DIN 6499 | ER | MAS-BT | 0,005 | G6,3 15.000 RPM | HRc 58±2 | JD (AD) | ISO 7388-2 | ISO 15488

| Ref. | d2 | Type | Ø | l2 | d3 | M | 1 excl. | 2 incl. | 3 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 82.516.3321 | BT30 | ER32 | 2-20 | 60 | 50 | M12 | ER32 | 82.960.3200 | 82.990.3200 | 82,30 |
| 82.516.4161 | BT40 | ER16 | 1-12 | 70 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 60,45 |
| 82.516.4162 | BT40 | ER16 | 1-12 | 100 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 68,20 |
| 82.516.4166 | BT40 | ER16 | 1-12 | 160 | 32 | M16 | ER16 | 82.960.1600 | 82.990.1600 | 114,70 |
| 82.516.4251 | BT40 | ER25 | 1-20 | 70 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 60,45 |
| 82.516.4252 | BT40 | ER25 | 1-20 | 100 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 75,95 |
| 82.516.4256 | BT40 | ER25 | 1-20 | 160 | 42 | M16 | ER25 | 82.960.2500 | 82.990.2500 | 114,70 |
| 82.516.4321 | BT40 | ER32 | 2-20 | 70 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 63,50 |
| 82.516.4322 | BT40 | ER32 | 2-20 | 100 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 84,55 |
| 82.516.4326 | BT40 | ER32 | 2-20 | 160 | 50 | M16 | ER32 | 82.960.3200 | 82.990.3200 | 117,80 |
| 82.516.4401 | BT40 | ER40 | 3-30 | 70 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 66,70 |
| 82.516.4402 | BT40 | ER40 | 3-30 | 100 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 85,25 |
| 82.516.4406 | BT40 | ER40 | 3-30 | 160 | 63 | M16 | ER40 | 82.960.4000 | 82.990.4000 | 122,50 |
| 82.516.5162 | BT50 | ER16 | 1-12 | 100 | 32 | M24 | ER16 | 82.960.1600 | 82.990.1600 | 114,70 |
| 82.516.5166 | BT50 | ER16 | 1-12 | 160 | 32 | M24 | ER16 | 82.960.1600 | 82.990.1600 | 156,50 |
| 82.516.5251 | BT50 | ER25 | 1-20 | 80 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 94,60 |
| 82.516.5252 | BT50 | ER25 | 1-20 | 100 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 114,70 |
| 82.516.5256 | BT50 | ER25 | 1-20 | 160 | 42 | M24 | ER25 | 82.960.2500 | 82.990.2500 | 156,50 |
| 82.516.5321 | BT50 | ER32 | 2-20 | 80 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 97,65 |
| 82.516.5322 | BT50 | ER32 | 2-20 | 100 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 136,40 |
| 82.516.5326 | BT50 | ER32 | 2-20 | 160 | 50 | M24 | ER32 | 82.960.3200 | 82.990.3200 | 156,50 |
| 82.516.5401 | BT50 | ER40 | 3-30 | 80 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 97,65 |
| 82.516.5402 | BT50 | ER40 | 3-30 | 100 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 139,45 |
| 82.516.5406 | BT50 | ER40 | 3-30 | 160 | 63 | M24 | ER40 | 82.960.4000 | 82.990.4000 | 161,20 |

## › 82.517 Phantom

NL **ER Spantanghouder, ISO 12164 (DIN 69893)**
FR **Mandrin porte-pinces ER, ISO 12164 (DIN 69893)**
ES **Portapinzas ER, ISO 12164 (DIN 69893)**
DE **ER-Spannzangenfutter, ISO 12164 (DIN 69893)**
EN **ER Collet Chuck, ISO 12164 (DIN 69893)**

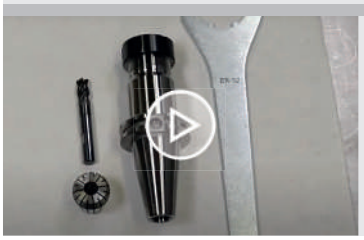






AT3 | DIN 6499 | ER | A | 0,005 | HSK-A | G6,3 20.000 RPM | HRc 58±2 | ISO 12164 | ISO 15488 | RFID

| Ref. | d2 | Type | Ø | l2 | d3 | 1 excl. | 2 incl. | 3 excl. | 4 excl. | 5 excl. | 6 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.517.6252 | HSK63A | ER25 | 1-20 | 100 | 42 | ER25 | 82.960.2500 | 82.990.2500 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 117,80 |
| 82.517.6256 | HSK63A | ER25 | 1-20 | 160 | 42 | ER25 | 82.960.2500 | 82.990.2500 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 156,50 |
| 82.517.6322 | HSK63A | ER32 | 2-20 | 100 | 50 | ER32 | 82.960.3200 | 82.990.3200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 122,50 |
| 82.517.6326 | HSK63A | ER32 | 2-20 | 160 | 50 | ER32 | 82.960.3200 | 82.990.3200 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 159,65 |
| 82.517.6404 | HSK63A | ER40 | 3-30 | 120 | 63 | ER40 | 82.960.4000 | 82.990.4000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 130,20 |
| 82.517.6406 | HSK63A | ER40 | 3-30 | 160 | 63 | ER40 | 82.960.4000 | 82.990.4000 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 167,40 |



NL Voor betere rondloop, montage frees in ER spantanghouder met tikken
FR Montage d'une fraise dans un mandrin porte-pinces ER
ES Sujetar una fresa en un portapinzas ER
DE Montieren Fräser im ER Spannzanghalter mit klopfen
EN Mounting end mill into ER collet chuck with ticking

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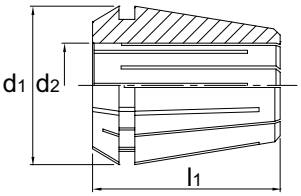
www.phantom.eu

## › 82.816 Phantom

NL **Spantang ER 16 426E, standaard, 15 µm**
FR **Pince ER 16 426E, standard, 15 µm**
ES **Pinza ER 16 426E, estándar, 15 µm**
DE **Spannzange ER 16 426E, standard, 15 µm**
EN **Collet ER 16 426E, standard, 15 µm**





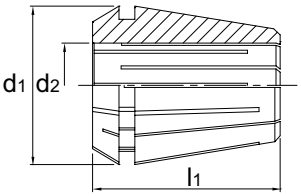

DIN 6499-B | ER-16 | 0,015

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.816.0100 | ER16 | 1 | 1-0,5 | 17 | 27 | 18,07 |
| 82.816.0150 | ER16 | 1.5 | 1,5-1 | 17 | 27 | 18,07 |
| 82.816.0200 | ER16 | 2 | 2-1,5 | 17 | 27 | 18,07 |
| 82.816.0250 | ER16 | 2.5 | 2,5-2 | 17 | 27 | 18,07 |
| 82.816.0300 | ER16 | 3 | 3-2 | 17 | 27 | 15,26 |
| 82.816.0400 | ER16 | 4 | 4-3 | 17 | 27 | 15,26 |
| 82.816.0500 | ER16 | 5 | 5-4 | 17 | 27 | 15,26 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.816.0600 | ER16 | 6 | 6-5 | 17 | 27 | 15,26 |
| 82.816.0700 | ER16 | 7 | 7-6 | 17 | 27 | 15,26 |
| 82.816.0800 | ER16 | 8 | 8-7 | 17 | 27 | 15,26 |
| 82.816.0900 | ER16 | 9 | 9-8 | 17 | 27 | 15,26 |
| 82.816.1000 | ER16 | 10 | 10-9 | 17 | 27 | 15,26 |
| 82.816.1200 | ER16 | 12 | 12-11 | 17 | 27 | 28,90 |

## › 82.817 Phantom

NL **Spantang ER 16 426E, Ultra precies, 5 µm**
FR **Pince ER 16 426E, Ultra précis, 5 µm**
ES **Pinza ER 16 426E, Ultrapreciso, 5 µm**
DE **Spannzange ER 16 426E, Ultrapräzise, 5 µm**
EN **Collet ER 16 426E, Ultra precise, 5 µm**






DIN 6499-B | ER-16 | 0,005

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.817.0100 | ER16 | 1 | 1-0,5 | 17 | 27 | 28,90 |
| 82.817.0150 | ER16 | 1.5 | 1,5-1 | 17 | 27 | 28,90 |
| 82.817.0200 | ER16 | 2 | 2-1,5 | 17 | 27 | 28,90 |
| 82.817.0300 | ER16 | 3 | 3-2,5 | 17 | 27 | 26,85 |
| 82.817.0400 | ER16 | 4 | 4-3,5 | 17 | 27 | 26,85 |
| 82.817.0500 | ER16 | 5 | 5-4,5 | 17 | 27 | 26,85 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.817.0600 | ER16 | 6 | 6-5,5 | 17 | 27 | 26,85 |
| 82.817.0700 | ER16 | 7 | 7-6,5 | 17 | 27 | 26,85 |
| 82.817.0800 | ER16 | 8 | 8-7,5 | 17 | 27 | 26,85 |
| 82.817.0900 | ER16 | 9 | 9-8,5 | 17 | 27 | 26,85 |
| 82.817.1000 | ER16 | 10 | 10-9,5 | 17 | 27 | 26,85 |



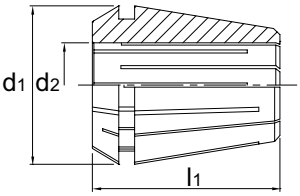
NL Keuzehulp spangtangen
FR Pinces ER Phantom selon DIN 6499 B / ISO 15488 B
ES Ayuda para la selección de pinzas
DE Auswahlhilfe Spannzange
EN Selection guide for collets

Read me

www.phantom.eu

## › 82.820 Phantom

NL **Spantang ER 20 428E, standaard, 15 µm**
FR **Pince ER 20 428E, standard, 15 µm**
ES **Pinza ER 20 428E, estándar, 15 µm**
DE **Spannzange ER 20 428E, standard, 15 µm**
EN **Collet ER 20 428E, standard, 15 µm**





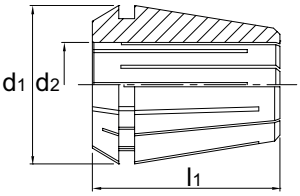

DIN 6499-B | ER-20 | 0,015

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.820.0100 | ER20 | 1 | 1-0,5 | 21 | 31 | 18,07 |
| 82.820.0150 | ER20 | 1.5 | 1,5-1 | 21 | 31 | 18,07 |
| 82.820.0200 | ER20 | 2 | 2-1,5 | 21 | 31 | 18,07 |
| 82.820.0250 | ER20 | 2.5 | 2,5-2 | 21 | 31 | 18,07 |
| 82.820.0300 | ER20 | 3 | 3-2 | 21 | 31 | 15,47 |
| 82.820.0400 | ER20 | 4 | 4-3 | 21 | 31 | 15,47 |
| 82.820.0500 | ER20 | 5 | 5-4 | 21 | 31 | 15,47 |
| 82.820.0600 | ER20 | 6 | 6-5 | 21 | 31 | 15,47 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.820.0700 | ER20 | 7 | 7-6 | 21 | 31 | 15,47 |
| 82.820.0800 | ER20 | 8 | 8-7 | 21 | 31 | 15,47 |
| 82.820.0900 | ER20 | 9 | 9-8 | 21 | 31 | 15,47 |
| 82.820.1000 | ER20 | 10 | 10-9 | 21 | 31 | 15,47 |
| 82.820.1100 | ER20 | 11 | 11-10 | 21 | 31 | 15,47 |
| 82.820.1200 | ER20 | 12 | 12-11 | 21 | 31 | 15,47 |
| 82.820.1300 | ER20 | 13 | 13-12 | 21 | 31 | 15,47 |

## › 82.825 Phantom

NL **Spantang ER 25 430E, standaard, 15 µm**
FR **Pince ER 25 430E, standard, 15 µm**
ES **Pinza ER 25 430E, estándar, 15 µm**
DE **Spannzange ER 25 430E, standard, 15 µm**
EN **Collet ER 25 430E, standard, 15 µm**





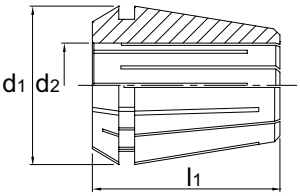

DIN 6499-B | ER-25 | 0,015

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.825.0100 | ER25 | 1 | 1-0,5 | 26 | 35 | 18,07 |
| 82.825.0150 | ER25 | 1.5 | 1,5-1 | 26 | 35 | 18,07 |
| 82.825.0200 | ER25 | 2 | 2-1,5 | 26 | 35 | 18,07 |
| 82.825.0250 | ER25 | 2.5 | 2,5-2 | 26 | 35 | 18,07 |
| 82.825.0300 | ER25 | 3 | 3-2 | 26 | 35 | 15,47 |
| 82.825.0400 | ER25 | 4 | 4-3 | 26 | 35 | 15,47 |
| 82.825.0500 | ER25 | 5 | 5-4 | 26 | 35 | 15,47 |
| 82.825.0600 | ER25 | 6 | 6-5 | 26 | 35 | 15,47 |
| 82.825.0700 | ER25 | 7 | 7-6 | 26 | 35 | 15,47 |
| 82.825.0800 | ER25 | 8 | 8-7 | 26 | 35 | 15,47 |
| 82.825.0900 | ER25 | 9 | 9-8 | 26 | 35 | 15,47 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.825.1000 | ER25 | 10 | 10-9 | 26 | 35 | 15,47 |
| 82.825.1100 | ER25 | 11 | 11-10 | 26 | 35 | 15,47 |
| 82.825.1200 | ER25 | 12 | 12-11 | 26 | 35 | 15,47 |
| 82.825.1300 | ER25 | 13 | 13-12 | 26 | 35 | 15,47 |
| 82.825.1400 | ER25 | 14 | 14-13 | 26 | 35 | 15,47 |
| 82.825.1500 | ER25 | 15 | 15-14 | 26 | 35 | 15,47 |
| 82.825.1600 | ER25 | 16 | 16-15 | 26 | 35 | 15,47 |
| 82.825.1700 | ER25 | 17 | 17-16 | 26 | 35 | 32,05 |
| 82.825.1800 | ER25 | 18 | 18-17 | 26 | 35 | 32,05 |
| 82.825.1900 | ER25 | 19 | 19-18 | 26 | 35 | 32,05 |
| 82.825.2000 | ER25 | 20 | 20-19 | 26 | 35 | 32,05 |

## › 82.826 Phantom

NL **Spantang ER 25 430E, Ultra precies, 5 µm**
FR **Pince ER 25 430E, Ultra précis, 5 µm**
ES **Pinza ER 25 430E, Ultrapreciso, 5 µm**
DE **Spannzange ER 25 430E, Ultrapräzise, 5 µm**
EN **Collet ER 25 430E, Ultra precise, 5 µm**





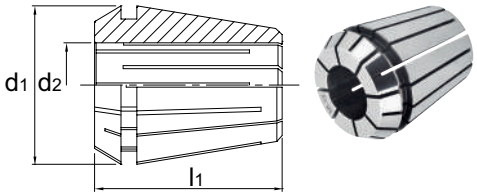

DIN 6499-B | ER-25 | 0,005

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.826.0100 | ER25 | 1 | 1-0,5 | 26 | 35 | 28,90 |
| 82.826.0150 | ER25 | 1.5 | 1,5-1 | 26 | 35 | 28,90 |
| 82.826.0200 | ER25 | 2 | 2-1,5 | 26 | 35 | 28,90 |
| 82.826.0300 | ER25 | 3 | 3-2,5 | 26 | 35 | 26,85 |
| 82.826.0400 | ER25 | 4 | 4-3,5 | 26 | 35 | 26,85 |
| 82.826.0500 | ER25 | 5 | 5-4,5 | 26 | 35 | 26,85 |
| 82.826.0600 | ER25 | 6 | 6-5,5 | 26 | 35 | 26,85 |
| 82.826.0700 | ER25 | 7 | 7-6,5 | 26 | 35 | 26,85 |
| 82.826.0800 | ER25 | 8 | 8-7,5 | 26 | 35 | 26,85 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.826.0900 | ER25 | 9 | 9-8,5 | 26 | 35 | 26,85 |
| 82.826.1000 | ER25 | 10 | 10-9,5 | 26 | 35 | 26,85 |
| 82.826.1100 | ER25 | 11 | 11-10,5 | 26 | 35 | 26,85 |
| 82.826.1200 | ER25 | 12 | 12-11,5 | 26 | 35 | 26,85 |
| 82.826.1300 | ER25 | 13 | 13-12,5 | 26 | 35 | 26,85 |
| 82.826.1400 | ER25 | 14 | 14-13,5 | 26 | 35 | 26,85 |
| 82.826.1500 | ER25 | 15 | 15-14,5 | 26 | 35 | 26,85 |
| 82.826.1600 | ER25 | 16 | 16-15,5 | 26 | 35 | 26,85 |

## › 82.832 Phantom

**NL** Spantang ER 32 470E, standaard, 15 µm
**FR** Pince ER 32 470E, standard, 15 µm
**ES** Pinza ER 32 470E, estándar, 15 µm
**DE** Spannzange ER 32 470E, standard, 15 µm
**EN** Collet ER 32 470E, standard, 15 µm



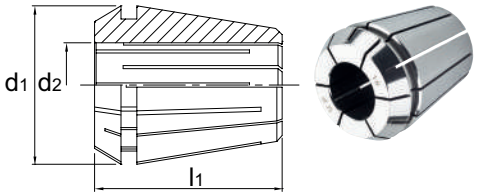

DIN 6499-B | ER-32 | 0,015

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.832.0200 | ER32 | 2 | 2-1,5 | 33 | 40 | 18,07 |
| 82.832.0300 | ER32 | 3 | 3-2 | 33 | 40 | 15,47 |
| 82.832.0400 | ER32 | 4 | 4-3 | 33 | 40 | 15,47 |
| 82.832.0500 | ER32 | 5 | 5-4 | 33 | 40 | 15,47 |
| 82.832.0600 | ER32 | 6 | 6-5 | 33 | 40 | 15,47 |
| 82.832.0700 | ER32 | 7 | 7-6 | 33 | 40 | 15,47 |
| 82.832.0800 | ER32 | 8 | 8-7 | 33 | 40 | 15,47 |
| 82.832.0900 | ER32 | 9 | 9-8 | 33 | 40 | 15,47 |
| 82.832.1000 | ER32 | 10 | 10-9 | 33 | 40 | 15,47 |
| 82.832.1100 | ER32 | 11 | 11-10 | 33 | 40 | 15,47 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.832.1200 | ER32 | 12 | 12-11 | 33 | 40 | 15,47 |
| 82.832.1300 | ER32 | 13 | 13-12 | 33 | 40 | 15,47 |
| 82.832.1400 | ER32 | 14 | 14-13 | 33 | 40 | 15,47 |
| 82.832.1500 | ER32 | 15 | 15-14 | 33 | 40 | 15,47 |
| 82.832.1600 | ER32 | 16 | 16-15 | 33 | 40 | 15,47 |
| 82.832.1700 | ER32 | 17 | 17-16 | 33 | 40 | 15,47 |
| 82.832.1800 | ER32 | 18 | 18-17 | 33 | 40 | 15,47 |
| 82.832.1900 | ER32 | 19 | 19-18 | 33 | 40 | 15,47 |
| 82.832.2000 | ER32 | 20 | 20-19 | 33 | 40 | 15,47 |

## › 82.833 Phantom

**NL** Spantang ER 32 470E, Ultra precies, 5 µm
**FR** Pince ER 32 470E, Ultra précis, 5 µm
**ES** Pinza ER 32 470E, Ultrapreciso, 5 µm
**DE** Spannzange ER 32 470E, Ultrapräzise, 5 µm
**EN** Collet ER 32 470E, Ultra precise, 5 µm



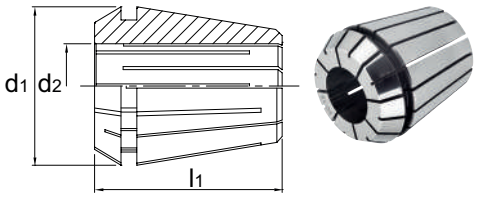

DIN 6499-B | ER-32 | 0,005

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.833.0200 | ER32 | 2 | 2-1,5 | 33 | 40 | 28,90 |
| 82.833.0300 | ER32 | 3 | 3-2,5 | 33 | 40 | 25,85 |
| 82.833.0400 | ER32 | 4 | 4-3,5 | 33 | 40 | 25,85 |
| 82.833.0500 | ER32 | 5 | 5-4,5 | 33 | 40 | 25,85 |
| 82.833.0600 | ER32 | 6 | 6-5,5 | 33 | 40 | 25,85 |
| 82.833.0700 | ER32 | 7 | 7-6,5 | 33 | 40 | 25,85 |
| 82.833.0800 | ER32 | 8 | 8-7,5 | 33 | 40 | 25,85 |
| 82.833.0900 | ER32 | 9 | 9-8,5 | 33 | 40 | 25,85 |
| 82.833.1000 | ER32 | 10 | 10-9,5 | 33 | 40 | 25,85 |
| 82.833.1100 | ER32 | 11 | 11-10,5 | 33 | 40 | 25,85 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.833.1200 | ER32 | 12 | 12-11,5 | 33 | 40 | 25,85 |
| 82.833.1300 | ER32 | 13 | 13-12,5 | 33 | 40 | 25,85 |
| 82.833.1400 | ER32 | 14 | 14-13,5 | 33 | 40 | 25,85 |
| 82.833.1500 | ER32 | 15 | 15-14,5 | 33 | 40 | 25,85 |
| 82.833.1600 | ER32 | 16 | 16-15,5 | 33 | 40 | 25,85 |
| 82.833.1700 | ER32 | 17 | 17-16,5 | 33 | 40 | 25,85 |
| 82.833.1800 | ER32 | 18 | 18-17,5 | 33 | 40 | 25,85 |
| 82.833.1900 | ER32 | 19 | 19-18,5 | 33 | 40 | 25,85 |
| 82.833.2000 | ER32 | 20 | 20-19,5 | 33 | 40 | 25,85 |

## › 82.840 Phantom

**NL** Spantang ER 40 472E, standaard, 15 µm
**FR** Pince ER 40 472E, standard, 15 µm
**ES** Pinza ER 40 472E, estándar, 15 µm
**DE** Spannzange ER 40 472E, standard, 15 µm
**EN** Collet ER 40 472E, standard, 15 µm



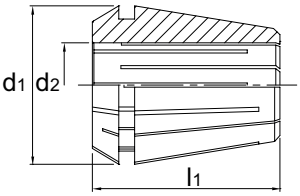

DIN 6499-B | ER-40 | 0,015

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.840.0300 | ER40 | 3 | 3-2 | 41 | 46 | 26,10 |
| 82.840.0400 | ER40 | 4 | 4-3 | 41 | 46 | 26,10 |
| 82.840.0500 | ER40 | 5 | 5-4 | 41 | 46 | 22,09 |
| 82.840.0600 | ER40 | 6 | 6-5 | 41 | 46 | 22,09 |
| 82.840.0700 | ER40 | 7 | 7-6 | 41 | 46 | 22,09 |
| 82.840.0800 | ER40 | 8 | 8-7 | 41 | 46 | 22,09 |
| 82.840.0900 | ER40 | 9 | 9-8 | 41 | 46 | 22,09 |
| 82.840.1000 | ER40 | 10 | 10-9 | 41 | 46 | 22,09 |
| 82.840.1100 | ER40 | 11 | 11-10 | 41 | 46 | 22,09 |
| 82.840.1200 | ER40 | 12 | 12-11 | 41 | 46 | 22,09 |
| 82.840.1300 | ER40 | 13 | 13-12 | 41 | 46 | 22,09 |
| 82.840.1400 | ER40 | 14 | 14-13 | 41 | 46 | 22,09 |
| 82.840.1500 | ER40 | 15 | 15-14 | 41 | 46 | 22,09 |
| 82.840.1600 | ER40 | 16 | 16-15 | 41 | 46 | 22,09 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.840.1700 | ER40 | 17 | 17-16 | 41 | 46 | 22,09 |
| 82.840.1800 | ER40 | 18 | 18-17 | 41 | 46 | 22,09 |
| 82.840.1900 | ER40 | 19 | 19-18 | 41 | 46 | 22,09 |
| 82.840.2000 | ER40 | 20 | 20-19 | 41 | 46 | 22,09 |
| 82.840.2100 | ER40 | 21 | 21-20 | 41 | 46 | 22,09 |
| 82.840.2200 | ER40 | 22 | 22-21 | 41 | 46 | 22,09 |
| 82.840.2300 | ER40 | 23 | 23-22 | 41 | 46 | 22,09 |
| 82.840.2400 | ER40 | 24 | 24-23 | 41 | 46 | 22,09 |
| 82.840.2500 | ER40 | 25 | 25-24 | 41 | 46 | 22,09 |
| 82.840.2600 | ER40 | 26 | 26-25 | 41 | 46 | 22,09 |
| 82.840.2700 | ER40 | 27 | 27-26 | 41 | 46 | 37,20 |
| 82.840.2800 | ER40 | 28 | 28-27 | 41 | 46 | 37,20 |
| 82.840.2900 | ER40 | 29 | 29-28 | 41 | 46 | 37,20 |
| 82.840.3000 | ER40 | 30 | 30-29 | 41 | 46 | 37,20 |

## › 82.841 Phantom

NL **Spantang ER 40 472E, Ultra precies, 5 µm**
FR **Pince ER 40 472E, Ultra précis, 5 µm**
ES **Pinza ER 40 472E, Ultrapreciso, 5 µm**
DE **Spannzange ER 40 472E, Ultrapräzise, 5 µm**
EN **Collet ER 40 472E, Ultra precise, 5 µm**





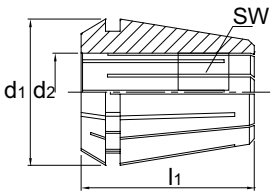

DIN 6499-B | ER-40 | 0,005

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.841.0300 | ER40 | 3 | 3-2,5 | 41 | 46 | 36,20 |
| 82.841.0400 | ER40 | 4 | 4-3,5 | 41 | 46 | 36,20 |
| 82.841.0500 | ER40 | 5 | 5-4,5 | 41 | 46 | 30,95 |
| 82.841.0600 | ER40 | 6 | 6-5,5 | 41 | 46 | 30,95 |
| 82.841.0700 | ER40 | 7 | 7-6,5 | 41 | 46 | 30,95 |
| 82.841.0800 | ER40 | 8 | 8-7,5 | 41 | 46 | 30,95 |
| 82.841.0900 | ER40 | 9 | 9-8,5 | 41 | 46 | 30,95 |
| 82.841.1000 | ER40 | 10 | 10-9,5 | 41 | 46 | 30,95 |
| 82.841.1100 | ER40 | 11 | 11-10,5 | 41 | 46 | 30,95 |
| 82.841.1200 | ER40 | 12 | 12-11,5 | 41 | 46 | 30,95 |
| 82.841.1300 | ER40 | 13 | 13-12,5 | 41 | 46 | 30,95 |
| 82.841.1400 | ER40 | 14 | 14-13,5 | 41 | 46 | 30,95 |
| 82.841.1500 | ER40 | 15 | 15-14,5 | 41 | 46 | 30,95 |
| 82.841.1600 | ER40 | 16 | 16-15,5 | 41 | 46 | 30,95 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.841.1700 | ER40 | 17 | 17-16,5 | 41 | 46 | 30,95 |
| 82.841.1800 | ER40 | 18 | 18-17,5 | 41 | 46 | 30,95 |
| 82.841.1900 | ER40 | 19 | 19-18,5 | 41 | 46 | 30,95 |
| 82.841.2000 | ER40 | 20 | 20-19,5 | 41 | 46 | 30,95 |
| 82.841.2100 | ER40 | 21 | 21-20,5 | 41 | 46 | 30,95 |
| 82.841.2200 | ER40 | 22 | 22-21,5 | 41 | 46 | 30,95 |
| 82.841.2300 | ER40 | 23 | 23-22,5 | 41 | 46 | 30,95 |
| 82.841.2400 | ER40 | 24 | 24-23,5 | 41 | 46 | 30,95 |
| 82.841.2500 | ER40 | 25 | 25-24,5 | 41 | 46 | 30,95 |
| 82.841.2600 | ER40 | 26 | 26-25,5 | 41 | 46 | 30,95 |
| 82.841.2700 | ER40 | 27 | 27-26,5 | 41 | 46 | 30,95 |
| 82.841.2800 | ER40 | 28 | 28-27,5 | 41 | 46 | 30,95 |
| 82.841.2900 | ER40 | 29 | 29-28,5 | 41 | 46 | 30,95 |
| 82.841.3000 | ER40 | 30 | 30-29,5 | 41 | 46 | 30,95 |

## › 82.880 Phantom

NL **Spantang ER 16G 426G, voor tappen, 15 µm**
FR **Pince ER 16G 426G, pour tarauds, 15 µm**
ES **Pinza ER 16G 426G, para machos, 15 µm**
DE **Spannzange ER 16G 426G, für Maschinengewindebohrer, 15 µm**
EN **Collet ER 16G 426G, for taps, 15 µm**





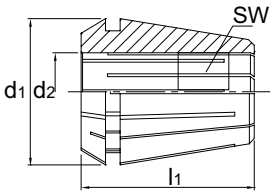

DIN 6499 | ER-16 | 0,015

| Ref. | Type | d2 | sw | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.880.0350 | ER16G | 3.5 | 2.7 | 17 | 27 | 33,70 |
| 82.880.0400 | ER16G | 4 | 3 | 17 | 27 | 33,70 |
| 82.880.0450 | ER16G | 4.5 | 3.4 | 17 | 27 | 33,70 |
| 82.880.0500 | ER16G | 5 | 4 | 17 | 27 | 33,70 |
| 82.880.0600 | ER16G | 6 | 4.9 | 17 | 27 | 33,70 |

| Ref. | Type | d2 | sw | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.880.0630 | ER16G | 6.3 | 5 | 17 | 27 | 33,70 |
| 82.880.0700 | ER16G | 7 | 5.5 | 17 | 27 | 33,70 |
| 82.880.0800 | ER16G | 8 | 6.2 | 17 | 27 | 33,70 |
| 82.880.0900 | ER16G | 9 | 7.1 | 17 | 27 | 33,70 |
| 82.880.1000 | ER16G | 10 | 8 | 17 | 27 | 33,70 |

## › 82.885 Phantom

NL **Spantang ER 25G 430G, voor tappen, 15 µm**
FR **Pince ER 25G 430G, pour tarauds, 15 µm**
ES **Pinza ER 25G 430G, para machos, 15 µm**
DE **Spannzange ER 25G 430G, für Maschinengewindebohrer, 15 µm**
EN **Collet ER 25G 430G, for taps, 15 µm**





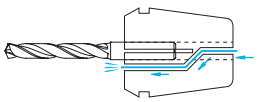

DIN 6499 | ER-25 | 0,015

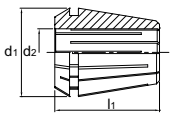
| Ref. | Type | d2 | sw | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.885.0350 | ER25G | 3.5 | 2.7 | 26 | 35 | 41,35 |
| 82.885.0400 | ER25G | 4 | 3 | 26 | 35 | 41,35 |
| 82.885.0450 | ER25G | 4.5 | 3.4 | 26 | 35 | 34,60 |
| 82.885.0500 | ER25G | 5 | 4 | 26 | 35 | 34,60 |
| 82.885.0550 | ER25G | 5.5 | 4.3 | 26 | 35 | 41,35 |
| 82.885.0600 | ER25G | 6 | 4.9 | 26 | 35 | 34,60 |
| 82.885.0630 | ER25G | 6.3 | 5 | 26 | 35 | 34,60 |

| Ref. | Type | d2 | sw | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.885.0700 | ER25G | 7 | 5.5 | 26 | 35 | 34,60 |
| 82.885.0800 | ER25G | 8 | 6.2 | 26 | 35 | 34,60 |
| 82.885.0900 | ER25G | 9 | 7 | 26 | 35 | 34,60 |
| 82.885.1000 | ER25G | 10 | 8 | 26 | 35 | 34,60 |
| 82.885.1100 | ER25G | 11 | 9 | 26 | 35 | 41,35 |
| 82.885.1120 | ER25G | 11.2 | 9 | 26 | 35 | 34,60 |
| 82.885.1200 | ER25G | 12 | 9 | 26 | 35 | 41,35 |

## › 82.918 Phantom

NL **Spantang ER 16 425E, Coolant Jet, 8 µm**
FR **Pince ER 16 425E, Coolant Jet, 8 µm**
ES **Pinza ER 16 425E, Coolant Jet, 8 µm**
DE **Spannzange ER 16 425E, Coolant Jet, 8 µm**
EN **Collet ER 16 425E, Coolant Jet, 8 µm**





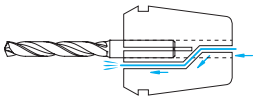
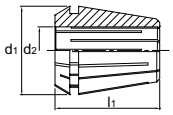



DIN 6499 | ER-16 | 0,008 | 40 BAR

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.918.0300 | ER16 | 3 | 3h10 | 17 | 27 | 54,55 |
| 82.918.0400 | ER16 | 4 | 4h10 | 17 | 27 | 54,55 |
| 82.918.0500 | ER16 | 5 | 5h10 | 17 | 27 | 54,55 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.918.0600 | ER16 | 6 | 6h10 | 17 | 27 | 54,55 |
| 82.918.0700 | ER16 | 7 | 7h10 | 17 | 27 | 54,55 |

## › 82.927 Phantom



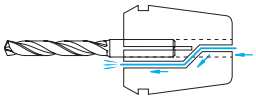
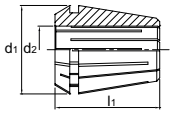
**NL** Spantang ER 25 429E, Coolant Jet, 8 µm
**FR** Pince ER 25 429E, Coolant Jet, 8 µm
**ES** Pinza ER 25 429E, Coolant Jet, 8 µm
**DE** Spannzange ER 25 429E, Coolant Jet, 8 µm
**EN** Collet ER 25 429E, Coolant Jet, 8 µm

DIN 6499 | ER-25 | 0,008 | 40 BAR

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.927.0300 | ER25 | 3 | 3h10 | 26 | 35 | 57,00 |
| 82.927.0400 | ER25 | 4 | 4h10 | 26 | 35 | 57,00 |
| 82.927.0500 | ER25 | 5 | 5h10 | 26 | 35 | 57,00 |
| 82.927.0600 | ER25 | 6 | 6h10 | 26 | 35 | 57,00 |
| 82.927.0700 | ER25 | 7 | 7h10 | 26 | 35 | 57,00 |
| 82.927.0800 | ER25 | 8 | 8h10 | 26 | 35 | 57,00 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.927.0900 | ER25 | 9 | 9h10 | 26 | 35 | 57,00 |
| 82.927.1000 | ER25 | 10 | 10h10 | 26 | 35 | 57,00 |
| 82.927.1100 | ER25 | 11 | 11h10 | 26 | 35 | 57,00 |
| 82.927.1200 | ER25 | 12 | 12h10 | 26 | 35 | 57,00 |
| 82.927.1300 | ER25 | 13 | 13h10 | 26 | 35 | 57,00 |
| 82.927.1400 | ER25 | 14 | 14h10 | 26 | 35 | 57,00 |

## › 82.934 Phantom



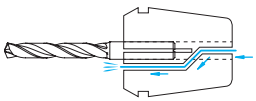
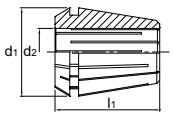
**NL** Spantang ER 32 469E, Coolant Jet, 8 µm
**FR** Pince ER 32 469E, Coolant Jet, 8 µm
**ES** Pinza ER 32 469E, Coolant Jet, 8 µm
**DE** Spannzange ER 32 469E, Coolant Jet, 8 µm
**EN** Collet ER 32 469E, Coolant Jet, 8 µm

DIN 6499 | ER-32 | 0,008 | 40 BAR

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.934.0300 | ER32 | 3 | 3h10 | 33 | 40 | 58,70 |
| 82.934.0400 | ER32 | 4 | 4h10 | 33 | 40 | 58,70 |
| 82.934.0500 | ER32 | 5 | 5h10 | 33 | 40 | 58,70 |
| 82.934.0600 | ER32 | 6 | 6h10 | 33 | 40 | 58,70 |
| 82.934.0700 | ER32 | 7 | 7h10 | 33 | 40 | 58,70 |
| 82.934.0800 | ER32 | 8 | 8h10 | 33 | 40 | 58,70 |
| 82.934.0900 | ER32 | 9 | 9h10 | 33 | 40 | 58,70 |
| 82.934.1000 | ER32 | 10 | 10h10 | 33 | 40 | 58,70 |
| 82.934.1100 | ER32 | 11 | 11h10 | 33 | 40 | 58,70 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.934.1200 | ER32 | 12 | 12h10 | 33 | 40 | 58,70 |
| 82.934.1300 | ER32 | 13 | 13h10 | 33 | 40 | 58,70 |
| 82.934.1400 | ER32 | 14 | 14h10 | 33 | 40 | 58,70 |
| 82.934.1500 | ER32 | 15 | 15h10 | 33 | 40 | 58,70 |
| 82.934.1600 | ER32 | 16 | 16h10 | 33 | 40 | 58,70 |
| 82.934.1700 | ER32 | 17 | 17h10 | 33 | 40 | 58,70 |
| 82.934.1800 | ER32 | 18 | 18h10 | 33 | 40 | 58,70 |
| 82.934.1900 | ER32 | 19 | 19h10 | 33 | 40 | 58,70 |
| 82.934.2000 | ER32 | 20 | 20h10 | 33 | 40 | 58,70 |

## › 82.942 Phantom



**NL** Spantang ER 40 471E, Coolant Jet, 8 µm
**FR** Pince ER 40 471E, Coolant Jet, 8 µm
**ES** Pinza ER 40 471E, Coolant Jet, 8 µm
**DE** Spannzange ER 40 471E, Coolant Jet, 8 µm
**EN** Collet ER 40 471E, Coolant Jet, 8 µm

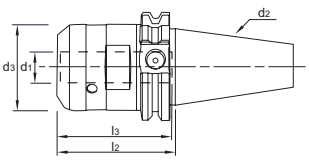
DIN 6499 | ER-40 | 0,008 | 40 BAR

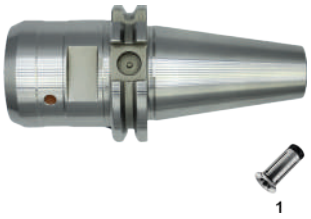
| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.942.0400 | ER40 | 4 | 4h10 | 41 | 46 | 70,30 |
| 82.942.0500 | ER40 | 5 | 5h10 | 41 | 46 | 70,30 |
| 82.942.0600 | ER40 | 6 | 6h10 | 41 | 46 | 70,30 |
| 82.942.0700 | ER40 | 7 | 7h10 | 41 | 46 | 70,30 |
| 82.942.0800 | ER40 | 8 | 8h10 | 41 | 46 | 70,30 |
| 82.942.0900 | ER40 | 9 | 9h10 | 41 | 46 | 70,30 |
| 82.942.1000 | ER40 | 10 | 10h10 | 41 | 46 | 70,30 |
| 82.942.1100 | ER40 | 11 | 11h10 | 41 | 46 | 70,30 |
| 82.942.1200 | ER40 | 12 | 12h10 | 41 | 46 | 70,30 |
| 82.942.1300 | ER40 | 13 | 13h10 | 41 | 46 | 70,30 |
| 82.942.1400 | ER40 | 14 | 14h10 | 41 | 46 | 70,30 |

| Ref. | Type | d2 | Ø | d1 | l1 | € |
|---|---|---|---|---|---|---|
| 82.942.1500 | ER40 | 15 | 15h10 | 41 | 46 | 70,30 |
| 82.942.1600 | ER40 | 16 | 16h10 | 41 | 46 | 70,30 |
| 82.942.1700 | ER40 | 17 | 17h10 | 41 | 46 | 70,30 |
| 82.942.1800 | ER40 | 18 | 18h10 | 41 | 46 | 70,30 |
| 82.942.1900 | ER40 | 19 | 19h10 | 41 | 46 | 70,30 |
| 82.942.2000 | ER40 | 20 | 20h10 | 41 | 46 | 70,30 |
| 82.942.2100 | ER40 | 21 | 21h10 | 41 | 46 | 70,30 |
| 82.942.2200 | ER40 | 22 | 22h10 | 41 | 46 | 70,30 |
| 82.942.2300 | ER40 | 23 | 23h10 | 41 | 46 | 70,30 |
| 82.942.2400 | ER40 | 24 | 24h10 | 41 | 46 | 70,30 |
| 82.942.2500 | ER40 | 25 | 25h10 | 41 | 46 | 70,30 |

## › 83.644 Phantom

NL **Hydrodehnhouder, Heavy Duty, ISO 7388-1 (DIN 69871)**
FR **Mandrin expansible hydraulique, grande capacité, ISO 7388-1 (DIN 69871)**
ES **Portaherramientas hidráulico, Gran capacidad, ISO 7388-1 (DIN 69871)**
DE **Hydrodehnspannfutter, Heavy Duty, ISO 7388-1 (DIN 69871)**
EN **Hydraulic expansion chuck, Heavy Duty, ISO 7388-1 (DIN 69871)**



1

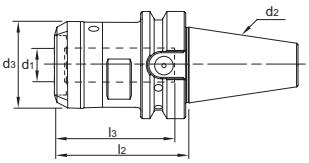
AT3 | DIN 69871 | SK | G2,5 25.000 RPM | AD | HRc 58±2 | ISO 7388-1 | RFID | 0,003

NIEUW NOUVEAU NUEVO NEU

| Ref. | d2 | d1 | Ø | l2 | l3 | d3 | M | 1 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 83.644.4201 | SK40 | 20 | 3-20 | 64.5 | 42 | 50 | M16 | 83.691.2xx1 | 209,95 |
| 83.644.5201 | SK50 | 20 | 3-20 | 64.5 | 42 | 50 | M24 | 83.691.2xx1 | 273,00 |
| 83.644.5321 | SK50 | 32 | 6-32 | 81 | 55 | 72 | M24 | 83.691.3xx1 | 284,00 |

## › 83.646 Phantom

NL **Hydrodehnhouder, Heavy Duty, ISO 7388-2 (MAS-BT)**
FR **Mandrin expansible hydraulique, grande capacité, ISO 7388-2 (MAS-BT)**
ES **Portaherramientas hidráulico, Gran capacidad, ISO 7388-2 (MAS-BT)**
DE **Hydrodehnspannfutter, Heavy Duty, ISO 7388-2 (MAS-BT)**
EN **Hydraulic expansion chuck, Heavy Duty, ISO 7388-2 (MAS-BT)**






1

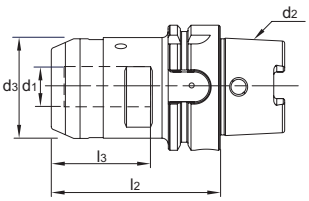
AT3 | MAS-BT | G2,5 25.000 RPM | HRc 58±2 | JD (AD) | ISO 7388-2 | 0,003

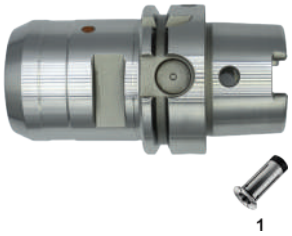
NIEUW NOUVEAU NUEVO NEU

| Ref. | d2 | d1 | Ø | l2 | l3 | d3 | M | 1 excl. | € |
|---|---|---|---|---|---|---|---|---|---|
| 83.646.4201 | BT40 | 20 | 3-20 | 72.5 | 42 | 50 | M16 | 83.691.2xx1 | 209,95 |
| 83.646.5201 | BT50 | 20 | 3-20 | 83 | 42 | 50 | M24 | 83.691.2xx1 | 273,00 |
| 83.646.5321 | BT50 | 32 | 6-32 | 90 | 55 | 72 | M24 | 83.691.3xx1 | 284,00 |

## › 83.647 Phantom

NL **Hydrodehnhouder, Heavy Duty, ISO 12164 (DIN 69893)**
FR **Mandrin expansible hydraulique, grande capacité, ISO 12164 (DIN 69893)**
ES **Portaherramientas hidráulico, Gran capacidad, ISO 12164 (DIN 69893)**
DE **Hydrodehnspannfutter, Heavy Duty, ISO 12164 (DIN 69893)**
EN **Hydraulic expansion chuck, Heavy Duty, ISO 12164 (DIN 69893)**



1

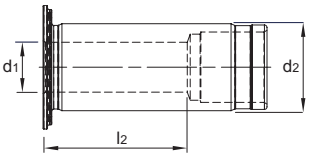
AT3 | A | HSK-A | G2,5 25.000 RPM | HRc 58±2 | ISO 12164 | RFID | 0,003

NIEUW NOUVEAU NUEVO NEU

| Ref. | d2 | d1 | Ø | l2 | l3 | d3 | M | 1 excl. | 2 excl. | 3 excl. | 4 excl. | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.647.6201 | HSK63A | 20 | 3-20 | 80 | 42 | 50 | M18X1 | 83.691.2xx1 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 252,00 |
| 83.647.6321 | HSK63A | 32 | 6-32 | 125 | 55 | 72 | M18X1 | 83.691.3xx1 | 84.790.1800 | 84.791.1800 | 84.789.1800 | 474,00 |

## › 83.691 Phantom

NL **Reduceerhuls**
FR **Douille de réduction**
ES **Casquillo de reducción**
DE **Reduzierhülsen**
EN **Reducing Bush**





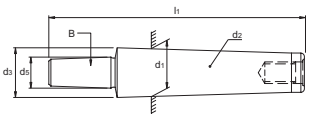

NIEUW NOUVEAU NUEVO NEU

| Ref. | d2 | d1 | l2 | € |
|---|---|---|---|---|
| 83.691.2061 | 20 | 6 | 25 | 70,45 |
| 83.691.2081 | 20 | 8 | 30 | 70,45 |
| 83.691.2101 | 20 | 10 | 33 | 70,45 |
| 83.691.2121 | 20 | 12 | 34 | 70,45 |
| 83.691.2141 | 20 | 14 | 34 | 70,45 |
| 83.691.2161 | 20 | 16 | 40 | 70,45 |
| 83.691.3061 | 32 | 6 | 25 | 76,30 |
| 83.691.3081 | 32 | 8 | 25 | 76,30 |

| Ref. | d2 | d1 | l2 | € |
|---|---|---|---|---|
| 83.691.3101 | 32 | 10 | 33 | 76,30 |
| 83.691.3121 | 32 | 12 | 34 | 76,30 |
| 83.691.3141 | 32 | 14 | 34 | 76,30 |
| 83.691.3161 | 32 | 16 | 40 | 76,30 |
| 83.691.3181 | 32 | 18 | 40 | 76,30 |
| 83.691.3201 | 32 | 20 | 40 | 76,30 |
| 83.691.3251 | 32 | 25 | 42 | 76,30 |

## › 84.160 International Tools

NL **ECO PRO Boorhouderstift B-opname**
FR **Arbre de mandrin de perçage ECO PRO cône B**
ES **Espiga para portabrocas ECO PRO sujeción B**
DE **ECO PRO Bohrfutterkegel B-Aufnahme**
EN **ECO PRO Drill Chuck Arbor B taper**






DIN 238 | ECO PRO | DIN 228-A

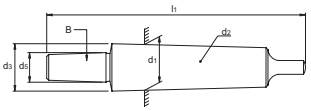
NIEUW / NOUVEAU / NUEVO / NEU

| Ref. | d2 | B | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|
| 84.160.0316 | MK 3 | B16 | 130 | 23.825 | 15.733 | 24.1 | 5,41 |

| Ref. | d2 | B | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|

## › 84.170 International Tools

NL **ECO PRO Boorhouderstift B-opname MK**
FR **Arbre de mandrin de perçage ECO PRO cône B CM**
ES **Espiga para portabrocas ECO PRO sujeción B CM**
DE **ECO PRO Bohrfutterkegel B-Aufnahme MK**
EN **ECO PRO Drill Chuck Arbor B taper MT**





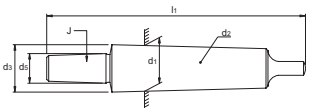

DIN 228-B | DIN 238 | ECO PRO

| Ref. | d2 | B | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|
| 84.170.0110 | MK 1 | B10 | 86 | 12.065 | 10.095 | 12.22 | 5,41 |
| 84.170.0112 | MK 1 | B12 | 90 | 12.065 | 12.065 | 12.22 | 5,41 |
| 84.170.0116 | MK 1 | B16 | 96 | 12.065 | 15.733 | 12.22 | 5,41 |
| 84.170.0118 | MK 1 | B18 | 104 | 12.065 | 17.78 | 12.22 | 5,41 |
| 84.170.0210 | MK 2 | B10 | 105 | 17.78 | 10.095 | 18 | 5,98 |
| 84.170.0212 | MK 2 | B12 | 105 | 17.78 | 12.065 | 18 | 5,98 |
| 84.170.0216 | MK 2 | B16 | 112 | 17.78 | 15.733 | 18 | 5,98 |
| 84.170.0218 | MK 2 | B18 | 119 | 17.78 | 17.78 | 18 | 5,98 |
| 84.170.0222 | MK 2 | B22 | 128 | 17.78 | 21.793 | 18 | 5,98 |
| 84.170.0312 | MK 3 | B12 | 124 | 23.825 | 12.065 | 24.1 | 7,75 |

| Ref. | d2 | B | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|
| 84.170.0316 | MK 3 | B16 | 130 | 23.825 | 15.733 | 24.1 | 7,75 |
| 84.170.0318 | MK 3 | B18 | 138 | 23.825 | 17.78 | 24.1 | 7,75 |
| 84.170.0322 | MK 3 | B22 | 147 | 23.825 | 21.793 | 24.1 | 8,35 |
| 84.170.0416 | MK 4 | B16 | 156 | 31.267 | 15.733 | 31.6 | 11,53 |
| 84.170.0418 | MK 4 | B18 | 164 | 31.267 | 17.78 | 31.6 | 11,53 |
| 84.170.0422 | MK 4 | B22 | 176 | 31.267 | 21.793 | 31.6 | 11,53 |
| 84.170.0516 | MK 5 | B16 | 188 | 44.399 | 15.733 | 44.7 | 24,21 |
| 84.170.0518 | MK 5 | B18 | 198 | 44.399 | 17.78 | 44.7 | 24,21 |
| 84.170.0522 | MK 5 | B22 | 207 | 44.399 | 21.793 | 44.7 | 24,21 |

## › 84.171 International Tools

NL **ECO PRO Boorhouderstift J-opname MK**
FR **Arbre de mandrin de perçage ECO PRO cône Jacobs CM**
ES **Espiga para portabrocas ECO PRO cono Jacobs CM**
DE **ECO PRO Bohrfutterkegel J-Aufnahme MK**
EN **ECO PRO Drill Chuck Arbor Jacobs taper MT**





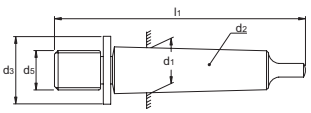

DIN 228-B | ECO PRO

| Ref. | d2 | J | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|
| 84.171.0101 | MK 1 | J1 | 83.8 | 12.065 | 9.754 | 12.22 | 6,95 |
| 84.171.0102 | MK 1 | J2 | 90.5 | 12.065 | 14.199 | 12.22 | 6,95 |
| 84.171.0103 | MK 1 | J3 | 100.5 | 12.065 | 20.599 | 12.22 | 6,95 |
| 84.171.0201 | MK 2 | J1 | 102.5 | 17.78 | 9.754 | 18 | 7,76 |
| 84.171.0202 | MK 2 | J2 | 106 | 17.78 | 14.199 | 18 | 7,76 |
| 84.171.0203 | MK 2 | J3 | 112.5 | 17.78 | 20.599 | 18 | 7,76 |
| 84.171.0206 | MK 2 | J6 | 107 | 17.78 | 17.17 | 18 | 7,76 |

| Ref. | d2 | J | l1 | d1 | d5 | d3 | € |
|---|---|---|---|---|---|---|---|
| 84.171.0233 | MK 2 | J33 | 107 | 17.78 | 15.85 | 18 | 7,76 |
| 84.171.0302 | MK 3 | J2 | 127 | 23.825 | 14.199 | 24.1 | 10,09 |
| 84.171.0303 | MK 3 | J3 | 131.5 | 23.825 | 20.599 | 24.1 | 10,09 |
| 84.171.0306 | MK 3 | J6 | 129 | 23.825 | 17.17 | 24.1 | 10,09 |
| 84.171.0333 | MK 3 | J33 | 126 | 23.825 | 15.85 | 24.1 | 10,09 |
| 84.171.0403 | MK 4 | J3 | 160.5 | 31.267 | 20.599 | 31.6 | 14,64 |
| 84.171.0406 | MK 4 | J6 | 155 | 31.267 | 17.17 | 31.6 | 14,64 |

## › 84.172 International Tools

NL **ECO PRO Boorhouderstift UNF-UN-M-draadopname MK**
FR **Arbre de mandrin de perçage ECO PRO filetage UNF-UN-M CM**
ES **Espiga para portabrocas ECO PRO sujeción con rosca UNF-UN-M CM**
DE **ECO PRO Bohrfutterkegel UNF-UN-M-Gewindeaufnahme MK**
EN **ECO PRO Drill Chuck Arbor UNF-UN-M-thread MT**





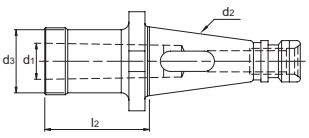

DIN 228-B | ECO PRO

| Ref. | d2 | d5 | l1 | d1 | d3 | € |
|---|---|---|---|---|---|---|
| 84.172.0212 | MK 2 | 1/2"-20 UNF | 104 | 17.78 | 18 | 7,32 |
| 84.172.0305 | MK 3 | 5/8"-16 UN | 122 | 23.825 | 24.1 | 18,85 |

| Ref. | d2 | d5 | l1 | d1 | d3 | € |
|---|---|---|---|---|---|---|
| 84.172.0320 | MK 3 | M20 | 125 | 23.825 | 24.1 | 18,85 |
| 84.172.0420 | MK 4 | M20 | 150 | 31.267 | 31.6 | 18,85 |

## › 84.203 Phantom

NL **Verloophuls voor MK opname, DIN 2080**
FR **Adapteur pour queues cône morse, DIN 2080**
ES **Reductor a Morse, DIN 2080**
DE **Reduzierhülsen für MK Aufnahme, DIN 2080**
EN **Adapter for Morse Taper shanks, DIN 2080**





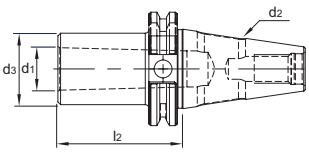

AT3 | DIN 228-B | DIN 2080 | DIN 6383 | 0,005 | SK | AD | HRc 58±2

| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.203.3001 | SK30 | MK 1 | 50 | 25 | 56,85 |
| 84.203.3002 | SK30 | MK 2 | 50 | 32 | 56,85 |
| 84.203.3003 | SK30 | MK 3 | 75 | 40 | 56,85 |
| 84.203.4001 | SK40 | MK 1 | 50 | 25 | 56,85 |
| 84.203.4002 | SK40 | MK 2 | 50 | 32 | 56,85 |
| 84.203.4003 | SK40 | MK 3 | 65 | 40 | 56,85 |

| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.203.4004 | SK40 | MK 4 | 95 | 48 | 62,10 |
| 84.203.5001 | SK50 | MK 1 | 45 | 25 | 97,20 |
| 84.203.5002 | SK50 | MK 2 | 60 | 32 | 97,20 |
| 84.203.5003 | SK50 | MK 3 | 65 | 40 | 97,20 |
| 84.203.5004 | SK50 | MK 4 | 70 | 48 | 101,40 |
| 84.203.5005 | SK50 | MK 5 | 105 | 63 | 105,05 |

## › 84.204 Phantom

NL **Verloophuls voor MK opname, ISO 7388-1 (DIN 69871)**
FR **Adapteur pour queues cône morse, ISO 7388-1 (DIN 69871)**
ES **Reductor a Morse, ISO 7388-1 (DIN 69871)**
DE **Reduzierhülsen für MK Aufnahme, ISO 7388-1 (DIN 69871)**
EN **Adapter for Morse Taper shanks, ISO 7388-1 (DIN 69871)**





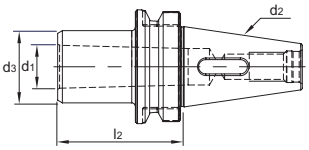

AT3 | DIN 69871 | DIN 6383 | SK | 0,005 | G6,3 15.000 RPM | AD | HRc 58±2 | ISO 7388-1 | RFID

| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.204.4001 | SK40 | MK 1 | 50 | 25 | 46,45 |
| 84.204.4002 | SK40 | MK 2 | 50 | 32 | 46,45 |
| 84.204.4003 | SK40 | MK 3 | 70 | 40 | 46,45 |
| 84.204.4004 | SK40 | MK 4 | 95 | 48 | 51,15 |
| 84.204.5001 | SK50 | MK 1 | 45 | 25 | 65,10 |

| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.204.5002 | SK50 | MK 2 | 60 | 32 | 65,10 |
| 84.204.5003 | SK50 | MK 3 | 65 | 40 | 65,10 |
| 84.204.5004 | SK50 | MK 4 | 95 | 48 | 65,10 |
| 84.204.5005 | SK50 | MK 5 | 105 | 63 | 71,30 |

## › 84.206 Phantom

NL **Verloophuls voor MK opname, ISO 7388-2 (MAS-BT)**
FR **Adapteur pour queues cône morse, ISO 7388-2 (MAS-BT)**
ES **Reductor a Morse, ISO 7388-2 (MAS-BT)**
DE **Reduzierhülsen für MK Aufnahme, ISO 7388-2 (MAS-BT)**
EN **Adapter for Morse Taper shanks, ISO 7388-2 (MAS-BT)**





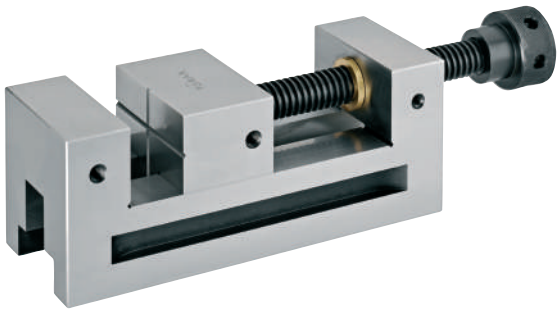

AT3 | DIN 6383 | MAS-BT | 0,005 | G6,3 15.000 RPM | HRc 58±2 | JD (AD) | ISO 7388-2

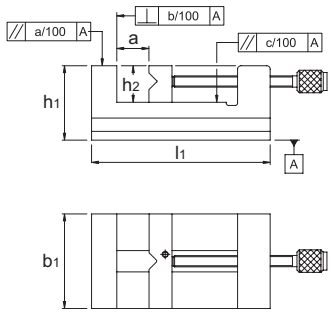
| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.206.4001 | BT40 | MK 1 | 50 | 25 | 46,45 |
| 84.206.4002 | BT40 | MK 2 | 50 | 32 | 46,45 |
| 84.206.4003 | BT40 | MK 3 | 70 | 40 | 46,45 |
| 84.206.4004 | BT40 | MK 4 | 95 | 48 | 51,15 |
| 84.206.5001 | BT50 | MK 1 | 45 | 25 | 71,30 |

| Ref. | d2 | d1 | l2 | d3 | € |
|---|---|---|---|---|---|
| 84.206.5002 | BT50 | MK 2 | 60 | 32 | 71,30 |
| 84.206.5003 | BT50 | MK 3 | 65 | 40 | 71,30 |
| 84.206.5004 | BT50 | MK 4 | 95 | 48 | 71,30 |
| 84.206.5005 | BT50 | MK 5 | 105 | 63 | 80,60 |

## › 88.340 Phantom

**NL Precisie Slijpklem**
**FR Etau de précision**
**ES Mordaza de precisión**
**DE Präzisions-Schleifschraubstöcke**
**EN Precision Vise**

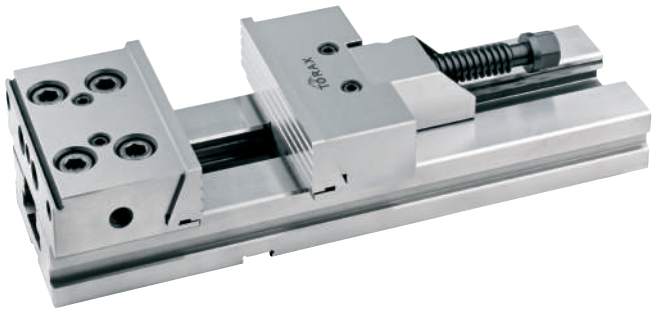


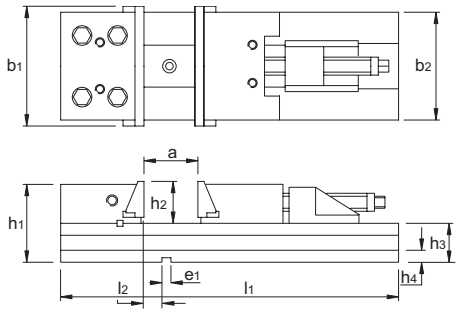



| Ref. | b1 | l1 | h1 | h2 | a max | Tol. a | Tol. b | Tol. c | € |
|---|---|---|---|---|---|---|---|---|---|
| 88.340.0050 | 50 | 155 | 50 | 25 | 65 | 0.005 | 0.005 | 0.005 | 258,00 |
| 88.340.0063 | 63 | 190 | 65 | 32 | 85 | 0.005 | 0.005 | 0.005 | 295,00 |
| 88.340.0080 | 80 | 220 | 84 | 40 | 100 | 0.005 | 0.005 | 0.005 | 367,00 |
| 88.340.0100 | 100 | 260 | 95 | 45 | 125 | 0.007 | 0.005 | 0.005 | 572,00 |

## › 88.440 TORAX

**NL Precisie Machinespanklem**
**FR Étau de fraisage de précision**
**ES Mordaza mecánica de precisión**
**DE Präzisionsschraubstöcke**
**EN Precision Compact Vise**

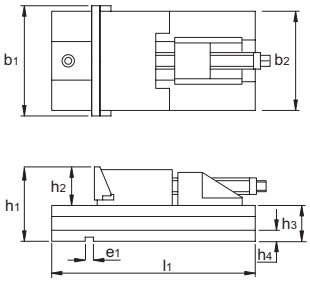


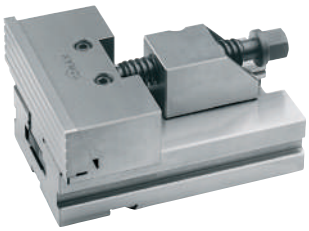



| Ref. | b1 | b2 | l1 | l2 | h1 | h2 | h3 | h4 | a max | e1 N6 | Max. daN | € |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 88.440.1027 | 100 | 75 | 270 | 25.61 | 65 | 30 | 35 | 15 | 100 | 16 | 3000 | 675,00 |
| 88.440.1234 | 125 | 95 | 345 | 25.61 | 80 | 40 | 40 | 15 | 150 | 16 | 3000 | 789,00 |
| 88.440.1542 | 150 | 125 | 420 | 25.61 | 100 | 50 | 50 | 20 | 200 | 16 | 5000 | 840,00 |
| 88.440.1552 | 150 | 125 | 520 | 25.61 | 100 | 50 | 50 | 20 | 300 | 16 | 5000 | 1.019,00 |
| 88.440.1745 | 175 | 145 | 455 | 25.61 | 118 | 60 | 58 | 20 | 200 | 16 | 6000 | 1.152,00 |
| 88.440.1755 | 175 | 145 | 555 | 25.61 | 118 | 60 | 58 | 20 | 300 | 16 | 6000 | 1.299,00 |
| 88.440.1765 | 175 | 145 | 655 | 25.61 | 118 | 60 | 58 | 20 | 400 | 16 | 6000 | 1.399,00 |
| 88.440.1775 | 175 | 145 | 755 | 25.61 | 118 | 60 | 58 | 20 | 500 | 16 | 6000 | 1.599,00 |
| 88.440.2059 | 200 | 170 | 595 | 25.61 | 135 | 65 | 70 | 26 | 300 | 16 | 10000 | 1.699,00 |
| 88.440.2069 | 200 | 170 | 695 | 25.61 | 135 | 65 | 70 | 26 | 400 | 16 | 10000 | 1.989,00 |
| 88.440.2079 | 200 | 170 | 795 | 25.61 | 135 | 65 | 70 | 26 | 500 | 16 | 10000 | 2.399,00 |
| 88.440.3063 | 300 | 195 | 635 | 25.61 | 158 | 80 | 78 | 26 | 300 | 16 | 12000 | 2.499,00 |
| 88.440.3073 | 300 | 195 | 735 | 25.61 | 158 | 80 | 78 | 26 | 400 | 16 | 12000 | 2.569,00 |
| 88.440.3083 | 300 | 195 | 835 | 25.61 | 158 | 80 | 78 | 26 | 500 | 16 | 12000 | 2.769,00 |
| 88.440.3093 | 300 | 195 | 935 | 25.61 | 158 | 80 | 78 | 26 | 600 | 16 | 12000 | 2.989,00 |

## › 88.470 TORAX

NL **Beweegbare Precisie Machinespanklem**
FR **Étau machine mobile de précision**
ES **Mordaza mecánica de alta precisión rotativa**
DE **Bewegbare Präzisions Maschinenklemme**
EN **Movable Precision Machine Vise**



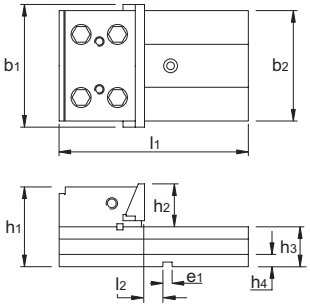



| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|
| 88.470.1250 | 125 | 95 | 80 | 40 | 40 | 15 | 160 | 16 | 409,00 |
| 88.470.1500 | 150 | 125 | 100 | 50 | 50 | 20 | 230 | 16 | 555,00 |

| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|
| 88.470.1750 | 175 | 145 | 118 | 60 | 58 | 20 | 240 | 16 | 741,00 |
| 88.470.2000 | 200 | 170 | 135 | 65 | 70 | 26 | 300 | 16 | 1.010,00 |

## › 88.472 TORAX

NL **Vaste Precisie Machinespanklem**
FR **Étau machine fixe de précision**
ES **Mordaza Mecánica de precisión fija**
DE **Präzisions Maschinenschraubstöcke**
EN **Fixed Precision Machine Vise**



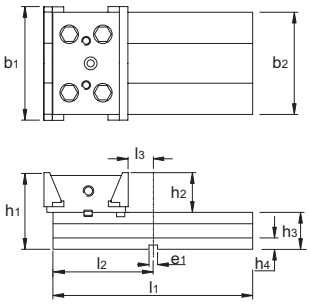


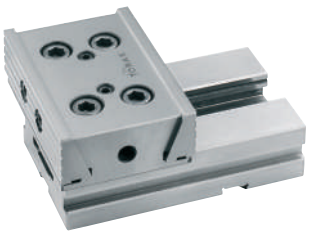

| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | l2 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 88.472.1250 | 125 | 95 | 80 | 40 | 40 | 15 | 160 | 25.61 | 16 | 349,00 |
| 88.472.1500 | 150 | 125 | 100 | 50 | 50 | 20 | 230 | 25.61 | 16 | 481,00 |

| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | l2 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 88.472.1750 | 175 | 145 | 118 | 60 | 58 | 20 | 240 | 25.61 | 16 | 653,00 |
| 88.472.2000 | 200 | 170 | 135 | 65 | 70 | 26 | 300 | 25.61 | 16 | 892,00 |

## › 88.474 TORAX

NL **Vaste Dubbele Precisie Machinespanklem**
FR **Étau machine fixe double de précision**
ES **Mordaza Mecánica de doble precisión fija**
DE **Präzisions Maschinenschraubstock mit Doppelspannung**
EN **Fixed Double Precision Machine Vise**



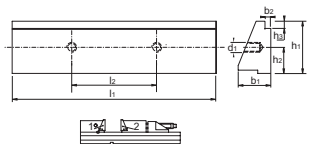



| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | l2 | l3 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 88.474.1250 | 125 | 95 | 80 | 40 | 40 | 15 | 160 | 71 | 33.6 | 16 | 431,00 |
| 88.474.1500 | 150 | 125 | 100 | 50 | 50 | 20 | 230 | 122.5 | 33.6 | 16 | 573,00 |

| Ref. | b1 | b2 | h1 | h2 | h3 | h4 | l1 | l2 | l3 | e1 N6 | € |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 88.474.1750 | 175 | 145 | 118 | 60 | 58 | 20 | 240 | 79 | 33.6 | 16 | 741,00 |
| 88.474.2000 | 200 | 170 | 135 | 65 | 70 | 26 | 300 | 155 | 33.6 | 16 | 997,00 |

## › 88.475 TORAX

NL **Getrapte Bek voor precisie machinespanklem 88.440, 88.470 en 88.472**
FR **Mors avec méplat pour étau de haute précision 88.440, 88.470 et 88.472**
ES **Garra escalonada para mordaza mecánica de alta precisión 88.440, 88.470 y 88.472**
DE **Trat Back für Präzisionsschraubstöcke 88.440, 88.470 und 88.472**
EN **Step jaw plate for Precision Vise 88.440, 88.470 and 88.472**






| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | b2 | h3 | Type | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 88.475.1002 | 100 | 24.5 | 14 | 20 | 10 | M6 | 3 | 5 | 1 | 59,60 |
| 88.475.1004 | 100 | 24.5 | 14 | 62 | 10 | M6 | 3 | 5 | 2 | 61,10 |
| 88.475.1202 | 125 | 32 | 19 | 32 | 15 | M8 | 3 | 5 | 1 | 69,05 |
| 88.475.1204 | 125 | 32 | 19 | 80 | 15 | M8 | 3 | 5 | 2 | 69,05 |
| 88.475.1502 | 150 | 40 | 24 | 50 | 19 | M8 | 5 | 5 | 1 | 83,20 |

| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | b2 | h3 | Type | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 88.475.1504 | 150 | 40 | 24 | 90 | 19 | M8 | 5 | 5 | 2 | 83,20 |
| 88.475.1702 | 175 | 43 | 24 | 50 | 20.5 | M8 | 5 | 5 | 1 | 104,25 |
| 88.475.1704 | 175 | 43 | 24 | 116 | 20.5 | M8 | 4 | 5 | 2 | 104,25 |
| 88.475.2002 | 200 | 53 | 30 | 76 | 25.5 | M10 | 5 | 10 | 1 | 146,55 |
| 88.475.2004 | 200 | 53 | 30 | 138 | 25.5 | M10 | 5 | 10 | 2 | 146,55 |



NL Opspannen product in precisieklem
FR Serrer une pièce dans un étau de précision
ES Sujetar un producto en una mordaza de precisión
DE Einspannen von Werkstücken im präzision Machineschraubstock
EN Clamping material in precision vice

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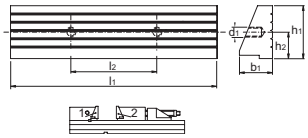
## › 88.476 TORAX

**NL** Standaard Gegroefde Bek voor precisie machinespanklem 88.440, 88.470 en 88.472
**FR** Mors rainuré standard pour étau de haute précision 88.440, 88.470 et 88.472
**ES** Garra ranurada para mordaza mécanica de alta precisión 88.440, 88.470 y 88.472
**DE** Gerillt Back für Präzisionsschraubstöcke 88.440, 88.470 und 88.472
**EN** Grooved jaw plate for Precision Vise 88.440, 88.470 and 88.472



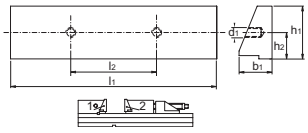



| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.476.1002 | 100 | 24.5 | 14 | 20 | 10 | M6 | 1 | 61,10 |
| 88.476.1004 | 100 | 24.5 | 14 | 62 | 10 | M6 | 2 | 61,10 |
| 88.476.1202 | 125 | 32 | 19 | 32 | 15 | M8 | 1 | 69,05 |
| 88.476.1204 | 125 | 32 | 19 | 80 | 15 | M8 | 2 | 69,05 |
| 88.476.1502 | 150 | 40 | 24 | 50 | 19 | M8 | 1 | 83,20 |
| 88.476.1504 | 150 | 40 | 24 | 90 | 19 | M8 | 2 | 83,20 |

| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.476.1702 | 175 | 43 | 24 | 50 | 20.5 | M8 | 1 | 104,25 |
| 88.476.1704 | 175 | 43 | 24 | 116 | 20.5 | M8 | 2 | 104,25 |
| 88.476.2002 | 200 | 53 | 30 | 76 | 25.5 | M10 | 1 | 145,20 |
| 88.476.2004 | 200 | 53 | 30 | 138 | 25.5 | M10 | 2 | 145,20 |
| 88.476.3002 | 300 | 63 | 35 | 90 | 30.5 | M10 | 1 | 184,40 |
| 88.476.3004 | 300 | 63 | 35 | 181 | 30.5 | M10 | 2 | 184,40 |

## › 88.477 TORAX

**NL** Gladde Bek voor precisie machinespanklem, 88.440, 88.470 en 88.472
**FR** Mors lisse pour étau de haute précision 88.440, 88.470 et 88.472
**ES** Garra lisa para mordaza mécanica de alta precisión 88.440, 88.470 y 88.472
**DE** Glatte Back für Präzisionsschraubstöcke 88.440, 88.470 und 88.472
**EN** Smooth jaw plate for Precision Vise 88.440, 88.470 and 88.472



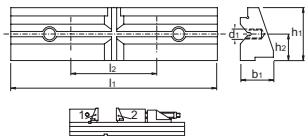



| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.477.1002 | 100 | 24.5 | 14 | 20 | 10 | M6 | 1 | 59,60 |
| 88.477.1004 | 100 | 24.5 | 14 | 62 | 10 | M6 | 2 | 59,60 |
| 88.477.1202 | 125 | 32 | 19 | 32 | 15 | M8 | 1 | 67,35 |
| 88.477.1204 | 125 | 32 | 19 | 80 | 15 | M8 | 2 | 67,35 |
| 88.477.1502 | 150 | 40 | 24 | 50 | 19 | M8 | 1 | 79,50 |
| 88.477.1504 | 150 | 40 | 24 | 90 | 19 | M8 | 2 | 79,50 |

| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.477.1702 | 175 | 43 | 24 | 50 | 20.5 | M8 | 1 | 99,70 |
| 88.477.1704 | 175 | 43 | 24 | 116 | 20.5 | M8 | 2 | 99,70 |
| 88.477.2002 | 200 | 53 | 30 | 76 | 25.5 | M10 | 1 | 142,95 |
| 88.477.2004 | 200 | 53 | 30 | 138 | 25.5 | M10 | 2 | 142,95 |
| 88.477.3002 | 300 | 63 | 35 | 90 | 30.5 | M10 | 1 | 515,00 |
| 88.477.3004 | 300 | 63 | 35 | 181 | 30.5 | M10 | 2 | 515,00 |

## › 88.478 TORAX

**NL** Prismabek voor precisie machinespanklem, 88.440, 88.470 en 88.472
**FR** Mors prismatique pour étau de haute précision 88.440, 88.470 et 88.472
**ES** Garra prismatica para mordaza mécanica de alta precisión 88.440, 88.470 y 88.472
**DE** Prisma Back für Präzisionsschraubstöcke 88.440, 88.470 und 88.472
**EN** Vee jaw plate for Precision Vise 88.440, 88.470 and 88.472






| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.478.1004 | 100 | 24.5 | 14 | 62 | 10 | M6 | 2 | 114,10 |
| 88.478.1204 | 125 | 32 | 19 | 80 | 15 | M8 | 2 | 127,25 |
| 88.478.1504 | 150 | 40 | 24 | 90 | 19 | M8 | 2 | 154,35 |

| Ref. | l1 | h1 | b1 | l2 | h2 | d1 | Type | € |
|---|---|---|---|---|---|---|---|---|
| 88.478.1704 | 175 | 43 | 24 | 116 | 20.5 | M8 | 2 | 161,90 |
| 88.478.2004 | 200 | 53 | 30 | 138 | 25.5 | M10 | 2 | 264,00 |



**NL** Neerdrukwerking bekken precisie machineklem en spanwijdte
**FR** Montage des mors sur un étau de précision
**ES** Acción de amarre-descendente, garras de mordaza de precisión
**DE** Niederzugwirkung Spannbacken präzision Machineschraubstock
**EN** Pull down action jaws precision vice

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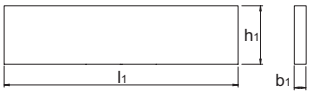
## › 88.870 International Tools

NL **ECO PRO Set Parallelvlakstukken**
FR **Coffret de Cales parallèles ECO PRO**
ES **Juego Bases paralelas ECO PRO**
DE **ECO PRO Satz Parallelunterlagen**
EN **ECO PRO Set of Parallel Supports**






ECO PRO

| Ref. | Nr. Ø | l1 | h1xb1 | € |
|---|---|---|---|---|
| 88.870.0104 | 8 | 100 | 10-14-18-22-26-30-34-38-42 (4 mm) | 187,30 |
| 88.870.0128 | 8 | 120 | 12-17-22-25-28-32-36-38 (8 mm) | 247,15 |
| 88.870.0164 | 9 | 160 | 10-14-18-22-26-30-34-38-42 (4 mm) | 219,30 |
| 88.870.0168 | 8 | 160 | 12-17-22-25-28-32-36-38 (8 mm) | 331,00 |
| 88.870.0208 | 8 | 200 | 17-22-26-28-32-36-38-42 (8 mm) | 363,00 |

## › 89.250 Phantom

NL **Set Spantangen, standaard kwaliteit, 15 µm**
FR **Jeu de Pinces, qualité standard, 15 µm**
ES **Juego de Pinzas, calidad estándar, 15 µm**
DE **Satz Spannzangen, Standard-Qualität, 15 µm**
EN **Set of Collets, standard quality, 15 µm**



DIN 6499-B | ER | 0,015

| Ref. | NR | Type | Ø | € |
|---|---|---|---|---|
| 89.250.1600 | 10 | ER16 | 1-10 | 191,75 |
| 89.250.2500 | 15 | ER25 | 2-16 | 294,00 |
| 89.250.3200 | 18 | ER32 | 3-20 | 331,00 |
| 89.250.4000 | 23 | ER40 | 4-26 | 580,00 |

## › 89.252 Phantom

NL **Set Spantangen, Ultra precies, 5 µm**
FR **Jeu de Pinces, Ultra précis, 5 µm**
ES **Juego de Pinzas, Ultrapreciso, 5 µm**
DE **Satz Spannzangen, Ultrapräzise, 5 µm**
EN **Set of Collets, Ultra precise, 5 µm**



DIN 6499-B | ER | 0,005

| Ref. | NR | Type | Ø | € |
|---|---|---|---|---|
| 89.252.1600 | 10 | ER16 | 1-10 | 365,00 |
| 89.252.2500 | 15 | ER25 | 2-16 | 483,00 |
| 89.252.3200 | 18 | ER32 | 3-20 | 552,00 |
| 89.252.4000 | 23 | ER40 | 4-26 | 809,00 |

## › 89.264 Phantom

NL **Set Spantangen, Coolant Jet, 8 µm**
FR **Jeu de Pinces, Coolant Jet, 8 µm**
ES **Juego de Pinzas, Coolant Jet, 8 µm**
DE **Satz Spannzangen, Coolant Jet, 8 µm**
EN **Set of Collets, Coolant Jet, 8 µm**



DIN 6499 | ER | 0,008 | 40 BAR

| Ref. | NR | Type | Ø | € |
|---|---|---|---|---|
| 89.264.1600 | 5 | ER16 | 3,4,6,8,10 | 342,00 |
| 89.264.2500 | 8 | ER25 | 3,4,6,8,10,12,14,16 | 528,00 |
| 89.264.3200 | 10 | ER32 | 3,4,6,8,10,12,14,16,18,20 | 663,00 |
| 89.264.4000 | 9 | ER40 | 4,6,8,10,12,14,16,18,20 | 760,00 |

## › 89.282 Phantom

NL **Set Spantanghouder met Spantangen**
FR **Coffret avec Mandrin porte-pinces et pinces ER**
ES **Juego de Portapinzas, pinzas y llave**
DE **Spannzangensätze mit Spannzangenfutter**
EN **Set of Collets Chucks**




DIN 6499-B | ER | 0,015

| Ref. | 1 | 2 | 3 | 4 | € |
|---|---|---|---|---|---|
| 89.282.0225 | MK2 - ER25 | - | ER25 Ø 6-10-12-16 | 82.990.2500 | 126,45 |
| 89.282.0332 | MK3 - ER32 | - | ER32 Ø6-10-12-16-20 | 82.990.3200 | 152,30 |
| 89.282.0432 | MK4 - ER32 | - | ER32 Ø6-10-12-16-20 | 82.990.3200 | 157,10 |
| 89.282.3032 | - | SK30 - ER32 | ER32 Ø6-10-12-16-20 | 82.990.3200 | 146,85 |
| 89.282.4032 | - | SK40 - ER32 | ER32 Ø6-10-12-16-20 | 82.990.3200 | 155,05 |

## › 90.130 Phantom




NL **Heavy Duty Snijolie EP (Extreme Pressure), chloor- en silicoonvrij, op mineraaloliebasis**
FR **Huile de coupe Heavy Duty EP (Haute Pression), sans chlore, à base d'huile minérale**
ES **Aceite de corte Heavy Duty EP (Alta Presión), sin cloro, base de aceite mineral**
DE **Heavy Duty Schneidöl EP (Hochdruck), Chlor- und Silikonfrei, auf Mineralölbasis**
EN **Heavy Duty Cutting oil EP (Extreme Pressure), chlorine-free, mineral oil based**

**INOX**

| Ref. | Contents | € |
|---|---|---|
| 90.130.0250 | 250 ml | 23,92 |
| 90.130.0251 | Box with 10 x 250 ml | 199,75 |
| 90.130.5005 | 5 l | 170,60 |
| 90.130.5010 | 10 l | 270,00 |

| Ref. | Contents | € |
|---|---|---|
| 90.130.5025 | 25 l | 730,00 |
| 90.130.5060 | 60 l | 1.452,00 |
| 90.130.5200 | 200 l | 4.223,00 |
| | | |

## › 90.150 Phantom




NL **Extreme Snijpasta, chloor- en silicoonvrij**
FR **Pâte de coupe Extrême, sans chlore**
ES **Pasta de corte Extreme, sin cloro**
DE **Hochleistungs-Schneidpaste, Chlor- und Silikonfrei**
EN **Extreme Cutting paste, chlorine-free**

**INOX**

| Ref. | Contents | € |
|---|---|---|
| 90.150.0250 | 250 gr. | 29,55 |
| 90.150.0251 | Box with 10 x 250 gr. | 271,00 |

| Ref. | Contents | € |
|---|---|---|
| 90.150.2500 | 2,5 kg. | 152,20 |
| 90.150.5000 | 5 kg. | 239,85 |

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