# UTENSILI IN METALLO DURO INTEGRALE

HARD METAL TOOLS

RIECO UTECH
tooling solutions

# INDICE

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## TABELLA GENERALE CLASSIFICAZIONE MATERIALI

| | SOTTO GRUPPO | INDICE | COMPOSIZIONE STRUTTURA TRATTAMENTO TERMICO | | RESISTENZA N/mm²*/ HB / HRC | SIGLA | DENOMINAZIONE | SIGLA | DENOMINAZIONE |
|---|---|---|---|---|---|---|---|---|---|
| P | Acciaio non legato | P.1.1 | < 0,15 % C | ricotto | 420 N/mm2 / 125 HB | 1.0401 | C15 | 1.1141 | Ck15 |
| | | P.1.2 | < 0,45 % C | ricotto | 640 N/mm2 / 190 HB | 1.1191 | C45E | 1.0718 | 9SMnPb28 |
| | | P.1.3 | | bonificato | 840 N/mm2 / 250 HB | 1.1191 | C45E | 1.0535 | C55 |
| | | P.1.4 | < 0,75 % C | ricotto | 910 N/mm2 / 270 HB | 1.1223 | C60R | 1.0535 | C55 |
| | | P.1.5 | | bonificato | 1010 N/mm2 / 300 HB | 1.1223 | C60R | 1.0727 | 45S20 |
| | Acciaio a basso legante | P.2.1 | | ricotto | 610 N/mm2 / 180 HB | 1.7131 | 16MnCr5 | 1.6587 | 17CrNiMo6 |
| | | P.2.2 | | bonificato | 930 N/mm2 / 275 HB | 1.7131 | 16MnCr5 | 1.6587 | 17CrNiMo6 |
| | | P.2.3 | | bonificato | 1010 N/mm2 / 300 HB | 1.7225 | 42CrMo4 | 1.3505 | 100Cr6 |
| | | P.2.4 | | bonificato | 1200 N/mm2 / 375 HB | 1.7225 | 42CrMo4 | 1.3505 | 100Cr6 |
| | Acciaio ad alto legante e Acciaio per utensili | P.3.1 | | ricotto | 680 N/mm2 / 200 HB | 1.4021 | X20Cr13 | 1.4034 | X46Cr13 |
| | | P.3.2 | | temprato e rinvenuto | 1100 N/mm2 / 300 HB | 1.2343 | X38CrMoV5-1 | 1.4034 | X46Cr13 |
| | | P.3.3 | | temprato e rinvenuto | 1300 N/mm2 / 400 HB | 1.2343 | X38CrMoV5-1 | 1.4034 | X46Cr13 |
| | Acciaio resistente alla corrosione | P.4.1 | perlitico / martensitico | ricotto | 680 N/mm2 / 200 HB | 1.4016 | X6Cr17 | 1.2316 | X36CrMo16 |
| | | P.4.2 | martensitico | bonificato | 1010 N/mm2 / 300 HB | 1.4112 | X90CrMoV18 | 1.2316 | X36CrMo16 |
| M | Acciaio resistente alla corrosione | M.1.1 | austenitico, austenitico / ferritico | temprato | 610 N/mm2 / 180 HB | 1.4301 | X5CrNi18-10 | 1.4571 | X6CrNiMoTi17-12-2 |
| | | M.2.1 | austenitico | bonificato | 300 HB | 1.4841 | X15CrNiSi25-21 | 1.4539 | X1NiCrMoCu25-20-5 |
| | | M.3.1 | austenitico / ferritico (duplex) | | 780 N/mm2 / 230 HB | 1.4462 | X2CrNiMoN22-5-3 | 1.4501 | X2CrNiMoCuWN25-7-4 |
| K | Ghisa grigia | K.1.1 | perlitico / ferritico | | 350 N/mm2 / 180 HB | 0.6010 | GG-10 | 0.6025 | GG-25 |
| | | K.1.2 | perlitico (martensitico) | | 500 N/mm2 / 260 HB | 0.6030 | GG-30 | 0.6045 | GG-45 |
| | Ghisa grigia sferoidale | K.2.1 | ferritico | | 540 N/mm2 / 160 HB | 0.7040 | GGG-40 | 0.7060 | GGG-60 |
| | | K.2.2 | perlitico | | 845 N/mm2 / 250 HB | 0.7070 | GGG-70 | 0.7080 | GGG-80 |
| | Ghisa temprata | K.3.1 | ferritico | | 440 N/mm2 / 130 HB | 0.8035 | GTW-35-04 | 0.8045 | GTW-45 |
| | | K.3.2 | perlitico | | 780 N/mm2 / 230 HB | 0.8165 | GTS-65-02 | 0.8170 | GTS-70-02 |
| N | Leghe di alluminio estruso | N.1.1 | non invecchiabile | | 60 HB | 3.0255 | Al99,5 | 3.3315 | AlMg1 |
| | | N.1.2 | invecchiabile | invecchiato | 340 N/mm2 / 100 HB | 3.1355 | AlCuMg2 | 3.2315 | AlMgSi1 |
| | Leghe di alluminio fuso | N.2.1 | ≤ 12 % Si, non invecchiabile | | 250 N/mm2 / 75 HB | 3.2581 | G-AlSi12 | 3.2163 | G-AlSi9Cu3 |
| | | N.2.2 | ≤ 12 % Si, invecchiabile | invecchiato | 300 N/mm2 / 90 HB | 3.2134 | G-AlSi5Cu1Mg | 3.2373 | G-AlSi9Mg |
| | | N.2.3 | > 12 % Si, non invecchiabile | | 440 N/mm2 / 130 HB | | G-AlSi17Cu4Mg | | G-AlSi18CuNiMg |
| | Rame e leghe di rame (bronzo, ottone) | N.3.1 | leghe automatiche, PB > 1 % | | 375 N/mm2 / 110 HB | 2.0380 | CuZn39Pb2 (Ms58) | 2.0410 | CuZn44Pb2 |
| | | N.3.2 | CuZn, CuSnZn | | 300 N/mm2 / 90 HB | 2.0331 | CuZn15 | 2.4070 | CuZn28Sn1As |
| | | N.3.3 | CuSn, rame senza piombo e rame elettrolitico | | 340 N/mm2 / 100 HB | 2.0060 | E-Cu57 | 2.0590 | CuZn40Fe |
| | Leghe di magnesio | N.4.1 | magnesio e leghe di magnesio | | 70 HB | 3.5612 | MgAl6Zn | 3.5312 | MgAl3Zn |

## TABELLA GENERALE CLASSIFICAZIONE MATERIALI

| | SOTTO GRUPPO | INDICE | COMPOSIZIONE STRUTTURA TRATTAMENTO TERMICO | | RESISTENZA N/mm²*/ HB / HRC | SIGLA | DENOMINAZIONE | SIGLA | DENOMINAZIONE |
|---|---|---|---|---|---|---|---|---|---|
| S | Leghe resistenti al calore | S.1.1 | base Fe | ricotto | 680 N/mm2 / 200 HB | 1.4864 | X12NiCrSi 36-16 | 1.4865 | G-X40NiCrSi38-18 |
| | | S.1.2 | | invecchiato | 950 N/mm2 / 280 HB | 1.4980 | X6NiCrTiMoVB25-15-2 | 1.4876 | X10NiCrAlTi32-20 |
| | | S.2.1 | base Ni oppure Co | ricotto | 840 N/mm2 / 250 HB | 2.4631 | NiCr20TiAl (Nimonic80A) | 3.4856 | NiCr22Mo9Nb |
| | | S.2.2 | | invecchiato | 1180 N/mm2 / 350 HB | 2.4668 | NiCr19Nb5Mo3 (Inconel 718) | 2.4955 | NiFe25Cr20NbTi |
| | | S.2.3 | | colato | 1080 N/mm2 / 320 HB | 2.4765 | CoCr20W15Ni | 1.3401 | G-X120Mn12 |
| | Leghe di titanio | S.3.1 | titanio puro | | 400 N/mm2 | 3.7025 | Ti99,8 | 3.7034 | Ti99,7 |
| | | S.3.2 | leghe alfa e beta | invecchiato | 1050 N/mm2 / 320 HB | 3.7165 | TiAl6V4 | Ti-6246 | Ti-6Al-2Sn-4Zr-6Mo |
| | | S.3.3 | leghe beta | | 1400 N/mm2 / 410 HB | Ti555.3 | Ti-5Al-5V-5Mo-3Cr | R56410 | Ti-10V-2Fe-3Al |
| H | Acciaio temprato Ghisa bianca | H.1.1 | temprato e rinvenuto | | 46-55 HRC | | | | |
| | | H.1.2 | temprato e rinvenuto | | 56-60 HRC | | | | |
| | | H.1.3 | temprato e rinvenuto | | 61-65 HRC | | | | |
| | | H.1.4 | temprato e rinvenuto | | 66-70 HRC | | | | |
| | | H.2.1 | colato | | 400 HB | | | | |
| | Ghisa temprata | H.3.1 | temprato e rinvenuto | | 55 HRC | | | | |
| O | Materiali non metallici | 0.1.1 | materie plastiche, materiali termoindurenti | | ≤ 150 N/mm2 | | | | |
| | | 0.1.2 | materie plastiche, materiali termoplastici | | ≤ 100 N/mm2 | | | | |
| | | 0.2.1 | materie plastiche rinforzate con fibra di ammide | | ≤ 1000 N/mm2 | | | | |
| | | 0.2.2 | materie plastiche rinforzate con fibra di vetro o carbonio | | ≤ 1000 N/mm2 | | | | |
| | | 0.3.1 | grafite | | | | | | |

## MATERIAL EXAMPLES FOR CUTTING DATA TABLES

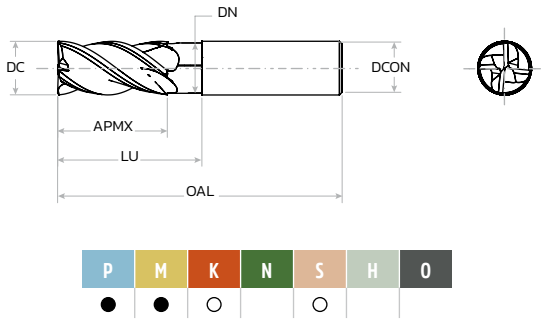
| | SUB-GROUP | INDEX | COMPOSITION STRUCTURE HEAT TREATMENT | | TENSILE STRENGTH N/mm²*/ HB / HRC | N° | DESIGNATION | N° | DESIGNATION |
|---|---|---|---|---|---|---|---|---|---|
| P | Unalloyed steel | P.1.1 | < 0,15 % C | Annealed | 420 N/mm2 / 125 HB | 1.0401 | C15 | 1.1141 | Ck15 |
| | | P.1.2 | < 0,45 % C | Annealed | 640 N/mm2 / 190 HB | 1.1191 | C45E | 1.0718 | 9SMnPb28 |
| | | P.1.3 | | Tempered | 840 N/mm2 / 250 HB | 1.1191 | C45E | 1.0535 | C55 |
| | | P.1.4 | < 0,75 % C | Annealed | 910 N/mm2 / 270 HB | 1.1223 | C60R | 1.0535 | C55 |
| | | P.1.5 | | Tempered | 1010 N/mm2 / 300 HB | 1.1223 | C60R | 1.0727 | 45S20 |
| | Low-alloy steel | P.2.1 | | Annealed | 610 N/mm2 / 180 HB | 1.7131 | 16MnCr5 | 1.6587 | 17CrNiMo6 |
| | | P.2.2 | | Tempered | 930 N/mm2 / 275 HB | 1.7131 | 16MnCr5 | 1.6587 | 17CrNiMo6 |
| | | P.2.3 | | Tempered | 1010 N/mm2 / 300 HB | 1.7225 | 42CrMo4 | 1.3505 | 100Cr6 |
| | | P.2.4 | | Tempered | 1200 N/mm2 / 375 HB | 1.7225 | 42CrMo4 | 1.3505 | 100Cr6 |
| | High-alloy steel and high-alloy tool steel | P.3.1 | | Annealed | 680 N/mm2 / 200 HB | 1.4021 | X20Cr13 | 1.4034 | X46Cr13 |
| | | P.3.2 | | Hardened and tempered | 1100 N/mm2 / 300 HB | 1.2343 | X38CrMoV5-1 | 1.4034 | X46Cr13 |
| | | P.3.3 | | Hardened and tempered | 1300 N/mm2 / 400 HB | 1.2343 | X38CrMoV5-1 | 1.4034 | X46Cr13 |
| | Stainless steel | P.4.1 | Ferritic / martensitic | Annealed | 680 N/mm2 / 200 HB | 1.4016 | X6Cr17 | 1.2316 | X36CrMo16 |
| | | P.4.2 | Martensitic | Tempered | 1010 N/mm2 / 300 HB | 1.4112 | X90CrMoV18 | 1.2316 | X36CrMo16 |
| M | Stainless steel | M.1.1 | Austenitic / waustenitic-ferritic | Quenched | 610 N/mm2 / 180 HB | 1.4301 | X5CrNi18-10 | 1.4571 | X6CrNiMoTi17-12-2 |
| | | M.2.1 | Austenitic | Tempered | 300 HB | 1.4841 | X15CrNiSi25-21 | 1.4539 | X1NiCrMoCu25-20-5 |
| | | M.3.1 | Austenitic / ferritic (Duplex) | | 780 N/mm2 / 230 HB | 1.4462 | X2CrNiMoN22-5-3 | 1.4501 | X2CrNiMoCuWN25-7-4 |
| K | Grey cast iron | K.1.1 | Pearlitic / ferritic | | 350 N/mm2 / 180 HB | 0.6010 | GG-10 | 0.6025 | GG-25 |
| | | K.1.2 | Pearlitic (martensitic) | | 500 N/mm2 / 260 HB | 0.6030 | GG-30 | 0.6045 | GG-45 |
| | Spherulitic graphite cast iron | K.2.1 | Ferritic | | 540 N/mm2 / 160 HB | 0.7040 | GGG-40 | 0.7060 | GGG-60 |
| | | K.2.2 | Pearlitic | | 845 N/mm2 / 250 HB | 0.7070 | GGG-70 | 0.7080 | GGG-80 |
| | Malleable iron | K.3.1 | Ferritic | | 440 N/mm2 / 130 HB | 0.8035 | GTW-35-04 | 0.8045 | GTW-45 |
| | | K.3.2 | Pearlitic | | 780 N/mm2 / 230 HB | 0.8165 | GTS-65-02 | 0.8170 | GTS-70-02 |
| N | Aluminium wrought alloy | N.1.1 | Non-hardenable | | 60 HB | 3.0255 | Al99,5 | 3.3315 | AlMg1 |
| | | N.1.2 | Hardenable | Age-hardened | 340 N/mm2 / 100 HB | 3.1355 | AlCuMg2 | 3.2315 | AlMgSi1 |
| | Cast aluminium alloy | N.2.1 | ≤ 12 % Si, non-hardenable | | 250 N/mm2 / 75 HB | 3.2581 | G-AlSi12 | 3.2163 | G-AlSi9Cu3 |
| | | N.2.2 | ≤ 12 % Si, hardenable | Age-hardened | 300 N/mm2 / 90 HB | 3.2134 | G-AlSi5Cu1Mg | 3.2373 | G-AlSi9Mg |
| | | N.2.3 | > 12 % Si, non-hardenable | | 440 N/mm2 / 130 HB | | G-AlSi17Cu4Mg | | G-AlSi18CuNiMg |
| | Copper and copper alloys (bronze/brass) | N.3.1 | Free-machining alloys, PB > 1 % | | 375 N/mm2 / 110 HB | 2.0380 | CuZn39Pb2 (Ms58) | 2.0410 | CuZn44Pb2 |
| | | N.3.2 | CuZn, CuSnZn | | 300 N/mm2 / 90 HB | 2.0331 | CuZn15 | 2.4070 | CuZn28Sn1As |
| | | N.3.3 | CuSn, lead-free copper and electrolytic copper | | 340 N/mm2 / 100 HB | 2.0060 | E-Cu57 | 2.0590 | CuZn40Fe |
| | Magnesium alloys | N.4.1 | Magnesium and magnesium alloys | | 70 HB | 3.5612 | MgAl6Zn | 3.5312 | MgAl3Zn |

## MATERIAL EXAMPLES FOR CUTTING DATA TABLES

| | SUB-GROUP | INDEX | COMPOSITION STRUCTURE HEAT TREATMENT | | TENSILE STRENGTH N/mm²*/ HB / HRC | N° | DESIGNATION | N° | DESIGNATION |
|---|---|---|---|---|---|---|---|---|---|
| S | Heat-resistant alloys | S.1.1 | Fe - basis | Annealed | 680 N/mm2 / 200 HB | 1.4864 | X12NiCrSi 36-16 | 1.4865 | G-X40NiCrSi38-18 |
| | | S.1.2 | | Age-hardened | 950 N/mm2 / 280 HB | 1.4980 | X6NiCrTiMoVB25-15-2 | 1.4876 | X10NiCrAlTi32-20 |
| | | S.2.1 | Ni or Co basis | Annealed | 840 N/mm2 / 250 HB | 2.4631 | NiCr20TiAl (Nimonic80A) | 3.4856 | NiCr22Mo9Nb |
| | | S.2.2 | | Age-hardened | 1180 N/mm2 / 350 HB | 2.4668 | NiCr19Nb5Mo3 (Inconel 718) | 2.4955 | NiFe25Cr20NbTi |
| | | S.2.3 | | Cast | 1080 N/mm2 / 320 HB | 2.4765 | CoCr20W15Ni | 1.3401 | G-X120Mn12 |
| | Titanium alloys | S.3.1 | Pure titanium | | 400 N/mm2 | 3.7025 | Ti99,8 | 3.7034 | Ti99,7 |
| | | S.3.2 | Alpha + beta alloys | Age-hardened | 1050 N/mm2 / 320 HB | 3.7165 | TiAl6V4 | Ti-6246 | Ti-6Al-2Sn-4Zr-6Mo |
| | | S.3.3 | Beta alloys | | 1400 N/mm2 / 410 HB | Ti555.3 | Ti-5Al-5V-5Mo-3Cr | R56410 | Ti-10V-2Fe-3Al |
| H | Hardened steel Chilled iron | H.1.1 | Hardened and tempered | | 46–55 HRC | | | | |
| | | H.1.2 | Hardened and tempered | | 56–60 HRC | | | | |
| | | H.1.3 | Hardened and tempered | | 61–65 HRC | | | | |
| | | H.1.4 | Hardened and tempered | | 66–70 HRC | | | | |
| | | H.2.1 | Cast | | 400 HB | | | | |
| | Hardened cast iron | H.3.1 | Hardened and tempered | | 55 HRC | | | | |
| O | Non-metal materials | O.1.1 | Plastics, duroplastic | | ≤ 150 N/mm2 | | | | |
| | | O.1.2 | Plastics, thermoplastic | | ≤ 100 N/mm2 | | | | |
| | | O.2.1 | Aramid fibre-reinforced | | ≤ 1000 N/mm2 | | | | |
| | | O.2.2 | Glass/carbon-fibre reinforced | | ≤ 1000 N/mm2 | | | | |
| | | O.3.1 | Graphite | | | | | | |

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese ad alte performance multimateriale | High Perfomance End Mills Multipurpose




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 38° ß = 5° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| NECK REDUCTION | | UNEQUAL FLUTE SPACING | |
| UNEQUAL HELIX | vario | COATING | M1 Coat |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## 4MF

Fresa 4 taglienti elica e passo differenziato rivestita M1 Coating |
4 Flute End Mill with unequal flute spacing M1 Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|---|
| | | DC mm e8 | DCON mm h6 | APMX mm | OAL mm | LU mm | DN mm |
| **FWFCR.030.4MF.01** | FWFCR.030.4MF.01 | 3 | 6 | 8 | 57 | 12 | 2,8 |
| **FWFCR.040.4MF.01** | FWFCR.040.4MF.01 | 4 | 6 | 11 | 57 | 15 | 3,8 |
| **FWFCR.050.4MF.01** | FWFCR.050.4MF.01 | 5 | 6 | 13 | 57 | 19 | 4,8 |
| **FWFCR.060.4MF.01** | FWFCR.060.4MF.01 | 6 | 6 | 13 | 57 | 19 | 5,7 |
| **FWFCR.070.4MF.01** | FWFCR.070.4MF.01 | 7 | 8 | 15 | 63 | 21 | 6,7 |
| **FWFCR.080.4MF.01** | FWFCR.080.4MF.01 | 8 | 8 | 19 | 63 | 25 | 7,5 |
| **FWFCR.090.4MF.01** | FWFCR.090.4MF.01 | 9 | 10 | 21 | 72 | 29 | 8,5 |
| **FWFCR.100.4MF.01** | FWFCR.100.4MF.01 | 10 | 10 | 22 | 72 | 30 | 9,5 |
| **FWFCR.110.4MF.01** | FWFCR.110.4MF.01 | 11 | 12 | 24 | 83 | 34 | 10 |
| **FWFCR.120.4MF.01** | FWFCR.120.4MF.01 | 12 | 12 | 26 | 83 | 36 | 11 |
| **FWFCR.130.4MF.01** | FWFCR.130.4MF.01 | 13 | 14 | 26 | 83 | 36 | 12 |
| **FWFCR.140.4MF.01** | FWFCR.140.4MF.01 | 14 | 14 | 26 | 83 | 36 | 13 |
| **FWFCR.150.4MF.01** | FWFCR.150.4MF.01 | 15 | 16 | 30 | 92 | 40 | 14 |
| **FWFCR.160.4MF.01** | FWFCR.160.4MF.01 | 16 | 16 | 32 | 92 | 42 | 15 |
| **FWFCR.180.4MF.01** | FWFCR.180.4MF.01 | 18 | 18 | 34 | 92 | 44 | 17 |
| **FWFCR.200.4MF.01** | FWFCR.200.4MF.01 | 20 | 20 | 38 | 104 | 48 | 19 |

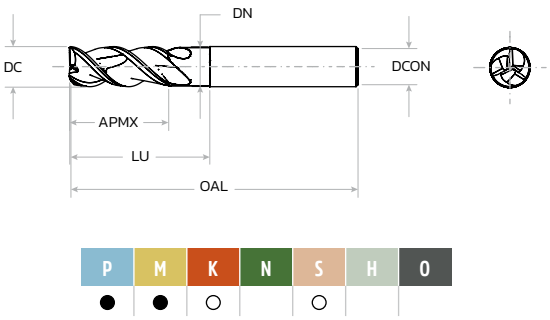
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese ad alte performance multimateriale | High Perfomance End Mills Multipurpose




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 47° ß = 10° |
| THREE CUTTING EDGES | Z3 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| NECK REDUCTION | | COATING | M1 Coat |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## 3XF

Fresa 3 taglienti elica e passo differenziato Rivestita M1 Coating |
3 Flute End Mill with unequal flute spacing M1 Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|---|
| | | DC mm e8 | DCON mm h6 | APMX mm | OAL mm | LU mm | DN mm |
| **FWFCR.030.3XF.01** | FWFCR.030.3XF.01 | 3 | 6 | 10 | 57 | 20 | 2,8 |
| **FWFCR.035.3XF.01** | FWFCR.035.3XF.01 | 3,5 | 6 | 10 | 57 | 20 | 3,3 |
| **FWFCR.040.3XF.01** | FWFCR.040.3XF.01 | 4 | 6 | 13 | 57 | 23 | 3,8 |
| **FWFCR.045.3XF.01** | FWFCR.045.3XF.01 | 4,5 | 6 | 13 | 57 | 23 | 4,3 |
| **FWFCR.050.3XF.01** | FWFCR.050.3XF.01 | 5 | 6 | 15 | 57 | 23 | 4,8 |
| **FWFCR.060.3XF.01** | FWFCR.060.3XF.01 | 6 | 6 | 15 | 57 | 23 | 5,7 |
| **FWFCR.070.3XF.01** | FWFCR.070.3XF.01 | 7 | 8 | 22 | 63 | 30 | 6,7 |
| **FWFCR.080.3XF.01** | FWFCR.080.3XF.01 | 8 | 8 | 22 | 63 | 30 | 7,5 |
| **FWFCR.090.3XF.01** | FWFCR.090.3XF.01 | 9 | 10 | 25 | 72 | 35 | 8,5 |
| **FWFCR.100.3XF.01** | FWFCR.100.3XF.01 | 10 | 10 | 25 | 72 | 35 | 9,5 |
| **FWFCR.110.3XF.01** | FWFCR.110.3XF.01 | 11 | 12 | 29 | 83 | 41 | 10,5 |
| **FWFCR.120.3XF.01** | FWFCR.120.3XF.01 | 12 | 12 | 29 | 83 | 41 | 11,5 |
| **FWFCR.130.3XF.01** | FWFCR.130.3XF.01 | 13 | 14 | 29 | 83 | 41 | 12,5 |
| **FWFCR.140.3XF.01** | FWFCR.140.3XF.01 | 14 | 14 | 29 | 83 | 41 | 13,5 |
| **FWFCR.150.3XF.01** | FWFCR.150.3XF.01 | 15 | 16 | 35 | 92 | 47 | 14,5 |
| **FWFCR.160.3XF.01** | FWFCR.160.3XF.01 | 16 | 16 | 35 | 92 | 47 | 15,5 |
| **FWFCR.180.3XF.01** | FWFCR.180.3XF.01 | 18 | 18 | 35 | 92 | 47 | 17,5 |
| **FWFCR.200.3XF.01** | FWFCR.200.3XF.01 | 20 | 20 | 41 | 104 | 57 | 19,5 |

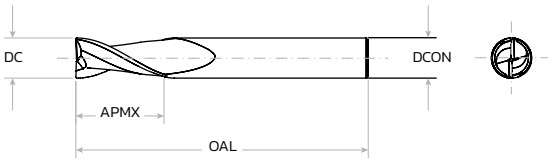
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 30° ß = 10° |
| TWO CUTTING EDGES | Z2 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| | | WITH COOLANT | |

## F202

Fresa 2 taglienti rivestita MARS | 2 flute end mill MARS Coating

**PARAMETRI DI LAVORO**
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCR1775** | F202.02.00.003A04 | 2 | 4 | 3,5 | 50 |
| **FWFCR1793** | F202.02.00.006A04 | 2 | 4 | 6 | 50 |
| **FWFCR1918** | F202.02.50.004A04 | 2,5 | 4 | 4 | 50 |
| **FWFCR1919** | F202.02.90.005A04 | 2,9 | 4 | 5 | 50 |
| **FWFCR1920** | F202.03.00.005A04 | 3 | 4 | 5 | 50 |
| **FWFCR1921** | F202.03.00.008A04 | 3 | 4 | 8 | 55 |
| **FWFCR1922** | F202.03.50.005A06 | 3,5 | 6 | 5 | 50 |
| **FWFCR1923** | F202.03.50.009A06 | 3,5 | 6 | 9 | 55 |
| **FWFCR1924** | F202.03.90.006A06 | 3,9 | 6 | 6 | 50 |
| **FWFCR1774** | F202.04.00.006A06 | 4 | 6 | 6 | 50 |
| **FWFCR1925** | F202.04.00.010A06 | 4 | 6 | 10 | 55 |
| **FWFCR1926** | F202.04.50.006A06 | 4,5 | 6 | 6 | 50 |
| **FWFCR1927** | F202.04.50.011A06 | 4,5 | 6 | 11 | 55 |
| **FWFCR1928** | F202.04.90.007A06 | 4,9 | 6 | 7 | 50 |
| **FWFCR1929** | F202.04.90.012A06 | 4,9 | 6 | 12 | 55 |
| **FWFCR1930** | F202.05.00.007A06 | 5 | 6 | 7 | 50 |
| **FWFCR1865** | F202.05.00.012A06 | 5 | 6 | 12 | 55 |
| **FWFCR1931** | F202.05.50.013A06 | 5,5 | 6 | 13 | 58 |
| **FWFCR1932** | F202.05.90.008A06 | 5,9 | 6 | 8 | 50 |
| **FWFCR1753** | F202.06.00.008A06 | 6 | 6 | 8 | 50 |
| **FWFCR1933** | F202.06.00.014A06 | 6 | 6 | 14 | 58 |
| **FWFCR1934** | F202.06.50.008A08 | 6,5 | 8 | 8 | 50 |
| **FWFCR1449** | F202.06.50.015A08 | 6,5 | 8 | 15 | 64 |
| **FWFCR1935** | F202.07.00.008A08 | 7 | 8 | 8 | 50 |
| **FWFCR1936** | F202.07.00.016A08 | 7 | 8 | 16 | 64 |
| **FWFCR1900** | F202.07.50.017A08 | 7,5 | 8 | 17 | 64 |
| **FWFCR1937** | F202.07.90.008A08 | 7,9 | 8 | 8 | 50 |
| **FWFCR1879** | F202.08.00.008A08 | 8 | 8 | 8 | 50 |
| **FWFCR1938** | F202.08.00.018A08 | 8 | 8 | 18 | 64 |
| **FWFCR1901** | F202.08.50.019A10 | 8,5 | 10 | 19 | 67 |

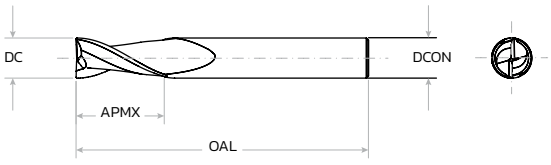
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 30° ß = 10° |
| TWO CUTTING EDGES | Z2 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| | | WITH COOLANT | |

## F202

Fresa 2 taglienti rivestita MARS | 2 flute end mill MARS Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCR1939** | F202.09.00.009A10 | 9 | 10 | 9 | 55 |
| **FWFCR1905** | F202.09.00.020A10 | 9 | 10 | 20 | 67 |
| **FWFCR1716** | F202.09.50.021A10 | 9,5 | 10 | 21 | 73 |
| **FWFCR1940** | F202.09.90.010A10 | 9,9 | 10 | 10 | 55 |
| **FWFCR1941** | F202.09.90.022A10 | 9,9 | 10 | 22 | 73 |
| **FWFCR1731** | F202.10.00.010A10 | 10 | 10 | 10 | 55 |
| **FWFCR1782** | F202.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWFCR1711** | F202.10.50.023A12 | 10,5 | 12 | 23 | 79 |
| **FWFCR1942** | F202.11.00.013A12 | 11 | 12 | 13 | 74 |
| **FWFCR1943** | F202.11.00.024A12 | 11 | 12 | 24 | 79 |
| **FWFCR1944** | F202.11.50.013A12 | 11,5 | 12 | 13 | 74 |
| **FWFCR1904** | F202.11.50.025A12 | 11,5 | 12 | 25 | 79 |
| **FWFCR1945** | F202.11.90.014A12 | 11,9 | 12 | 14 | 74 |
| **FWFCR1946** | F202.12.00.014A12 | 12 | 12 | 14 | 74 |
| **FWFCR1947** | F202.12.00.026A12 | 12 | 12 | 26 | 79 |

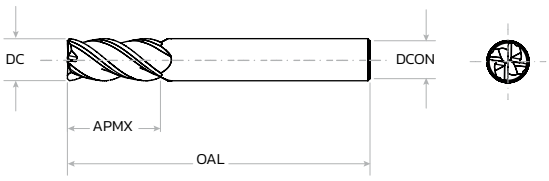
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 38° ß = 10° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| UNEQUAL HELIX | vario | UNEQUAL FLUTE SPACING | |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| | | WITH COOLANT | |

## F216

Fresa 4 taglienti rivestita MARS | 4 Flute End Mill MARS Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCR1972** | F216.04.00.006A06 | 4 | 6 | 6 | 50 |
| **FWFCR1973** | F216.04.00.014A06 | 4 | 6 | 14 | 55 |
| **FWFCR1974** | F216.05.00.007A06 | 5 | 6 | 7 | 50 |
| **FWFCR1975** | F216.05.00.017A06 | 5 | 6 | 17 | 58 |
| **FWFCR1976** | F216.06.00.008A06 | 6 | 6 | 8 | 50 |
| **FWFCR1977** | F216.06.00.025A06 | 6 | 6 | 25 | 69 |
| **FWFCR1978** | F216.07.00.009A08 | 7 | 8 | 9 | 50 |
| **FWFCR1980** | F216.07.00.025A08 | 7 | 8 | 25 | 69 |
| **FWFCR1981** | F216.08.00.010A08 | 8 | 8 | 10 | 50 |
| **FWFCR1894** | F216.08.00.024A08 | 8 | 8 | 24 | 69 |
| **FWFCR1982** | F216.08.00.030A08 | 8 | 8 | 30 | 79 |
| **FWFCR1984** | F216.10.00.012A10 | 10 | 10 | 12 | 55 |
| **FWFCR1985** | F216.10.00.036A10 | 10 | 10 | 36 | 89 |
| **FWFCR1986** | F216.11.00.013A12 | 11 | 12 | 13 | 55 |
| **FWFCR1988** | F216.11.00.035A12 | 11 | 12 | 35 | 86 |
| **FWFCR1989** | F216.12.00.014A12 | 12 | 12 | 14 | 55 |
| **FWFCR1531** | F216.12.00.032A12 | 12 | 12 | 32 | 84 |
| **FWFCR1990** | F216.12.00.040A12 | 12 | 12 | 40 | 100 |
| **FWFCR1991** | F216.14.00.016A14 | 14 | 14 | 16 | 60 |
| **FWFCR1992** | F216.14.00.045A14 | 14 | 14 | 45 | 100 |
| **FWFCR1993** | F216.16.00.018A16 | 16 | 16 | 18 | 65 |
| **FWFCR1605** | F216.16.00.045A16 | 16 | 16 | 45 | 109 |
| **FWFCR1681** | F216.16.00.052A16 | 16 | 16 | 52 | 109 |
| **FWFCR1995** | F216.18.00.038A18 | 18 | 18 | 38 | 93 |
| **FWFCR1996** | F216.18.00.056A18 | 18 | 18 | 56 | 109 |
| **FWFCR1997** | F216.20.00.022A20 | 20 | 20 | 22 | 75 |
| **FWFCR1998** | F216.20.00.045A20 | 20 | 20 | 45 | 105 |
| **FWFCR1912** | F216.20.00.055A20 | 20 | 20 | 55 | 109 |
| **FWFCR1909** | F216.20.00.065A20 | 20 | 20 | 65 | 119 |

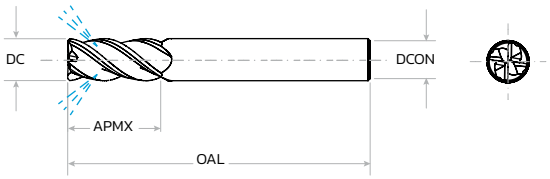
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 38° ß = 10° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| UNEQUAL HELIX | vario | UNEQUAL FLUTE SPACING | a b c g |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| INTERNAL COOLING | | WITH COOLANT | |

## F516

Fresa 4 taglienti rivestita MARS Passaggio Lubrificante |
4 Flute End Mill MARS Coating Internal Cooling

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCRL0003** | F516.06.00.014A06 | 6 | 6 | 14 | 58 |
| **FWFCRL0004** | F516.08.00.018A08 | 8 | 8 | 18 | 64 |
| **FWFCRL0002** | F516.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWFCRL0001** | F516.12.00.026A12 | 12 | 12 | 26 | 84 |
| **FWFCRL0012** | F516.14.00.030A14 | 14 | 14 | 30 | 84 |
| **FWFCRL0005** | F516.16.00.034A16 | 16 | 16 | 34 | 93 |
| **FWFCRL0013** | F516.18.00.038A18 | 18 | 18 | 38 | 93 |
| **FWFCRL0014** | F516.20.00.045A20 | 20 | 20 | 45 | 105 |

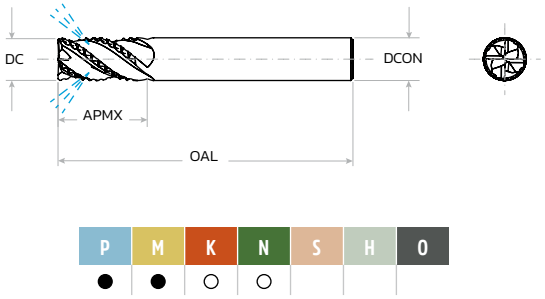
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 40° ß = 10° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | ANGLE 45° CHAMFER | 45° |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| INTERNAL COOLING | | WITH COOLANT | |

### F237

Fresa 4 taglienti a sgrossare passo fine rivestita MARS Passaggio Lubrificante | Roughing 4 Flute End Mill MARS Coating Internal Cooling

**PARAMETRI DI LAVORO**
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWSCRL0001** | F237.06.00.014A06 | 6 | 6 | 14 | 58 |
| **FWSCRL0002** | F237.08.00.018A08 | 8 | 8 | 18 | 64 |
| **FWSCRL0003** | F237.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWSCRL0004** | F237.12.00.026A12 | 12 | 12 | 26 | 84 |
| **FWSCRL0005** | F237.14.00.030A14 | 14 | 14 | 30 | 84 |
| **FWSCRL0006** | F237.16.00.034A16 | 16 | 16 | 34 | 93 |
| **FWSCRL0007** | F237.18.00.038A18 | 18 | 18 | 38 | 93 |
| **FWSCRL0008** | F237.20.00.045A20 | 20 | 20 | 45 | 105 |

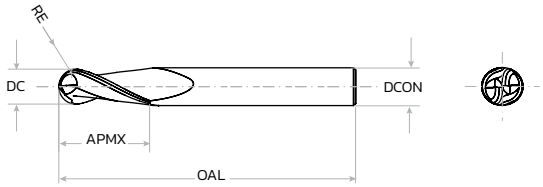
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 40° ß = 10° |
| TWO CUTTING EDGES | Z2 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | FULL RADIUS | RE |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| | | WITH COOLANT | |

## F208

Fresa 2 taglienti Semisferica rivestita MARS |
BallNose 2 Flute End Mill MARS Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | | |
|---|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm | RE mm |
| **FWRCR1261** | F208.03.00.007A06 | 3 | 6 | 7 | 50 | 1.5 |
| **FWRCR1186** | F208.04.00.010A06 | 4 | 6 | 10 | 50 | 2 |
| **FWRCR1262** | F208.05.00.012A06 | 5 | 6 | 12 | 50 | 2.5 |
| **FWRCR1263** | F208.06.00.014A06 | 6 | 6 | 14 | 58 | 3 |
| **FWRCR1264** | F208.08.00.018A08 | 8 | 8 | 18 | 64 | 4 |
| **FWRCR1214** | F208.10.00.022A10 | 10 | 10 | 22 | 73 | 5 |
| **FWRCR1265** | F208.12.00.026A12 | 12 | 12 | 26 | 79 | 6 |
| **FWRCR1266** | F208.14.00.030A14 | 14 | 14 | 30 | 79 | 7 |
| **FWRCR1267** | F208.16.00.034A16 | 16 | 16 | 34 | 93 | 8 |
| **FWRCR1268** | F208.18.00.038A18 | 18 | 18 | 38 | 93 | 9 |
| **FWRCR1269** | F208.20.00.042A20 | 20 | 20 | 42 | 105 | 10 |

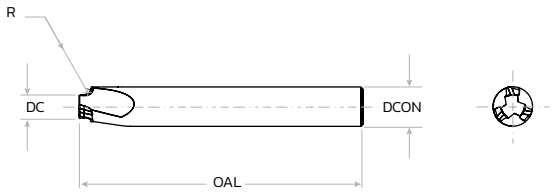
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 5° ß = 10° |
| THREE CUTTING EDGES | Z3 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | CONCAVE RADIUS | RE |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTION | | FULL SLOT | |
| | | WITH COOLANT | |

## F241

Fresa 3 taglienti Raggio concavo rivestita MARS |
3 Flute End Mill Concave Radius MARS Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC* mm h10 | DCON mm h6 | R mm | OAL mm |
| **FWDCR0013** | F241.03.90.002A06 | 4 | 6 | 0,5 | 58 |
| **FWDCR0004** | F241.04.90.003A08 | 5 | 8 | 1 | 64 |
| **FWDCR0005** | F241.05.90.003A10 | 6 | 10 | 1,5 | 67 |
| **FWDCR0006** | F241.04.89.004A10 | 5 | 10 | 2 | 67 |
| **FWDCR0014** | F241.05.89.004A12 | 6 | 12 | 2,5 | 74 |
| **FWDCR0012** | F241.04.89.005A12 | 5 | 12 | 3 | 74 |
| **FWDCR0015** | F241.05.88.005A14 | 6 | 14 | 3,5 | 75 |
| **FWDCR0016** | F241.04.88.006A14 | 5 | 14 | 4 | 75 |
| **FWDCR0017** | F241.04.87.007A16 | 5 | 16 | 5 | 83 |
| **FWDCR0018** | F241.04.86.008A18 | 5 | 18 | 6 | 84 |

** DC è il diametro da cui inizia il raggio senza contare l'apertura di 5° - DC is the Radius starting point without 5° tangent angle*

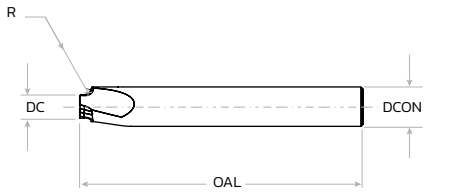
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 5° ß = 10° |
| THREE CUTTING EDGES | Z3 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | CONCAVE RADIUS | RE |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTION | | FULL SLOT | |
| | | WITH COOLANT | |

### F241KIT

Kit Fresa 3 taglienti Raggio concavo rivestita MARS |
Kit 3 Flute End Mill Concave Radius MARS Coating

PARAMETRI DI LAVORO
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | | |
|---|---|---|---|---|---|---|
| | | DC* mm h10 | DCON mm h6 | R mm | OAL mm | N° pcs |
| | F241.04.90.003A08 | 5 | 8 | 1 | 64 | 1 |
| | F241.05.90.003A10 | 6 | 10 | 1,5 | 67 | 1 |
| FWSET0023 | F241.04.89.004A10 | 5 | 10 | 2 | 67 | 1 |
| | F241.05.89.004A12 | 6 | 12 | 2,5 | 74 | 1 |
| | F241.04.89.005A12 | 5 | 12 | 3 | 74 | 1 |

** DC è il diametro da cui inizia il raggio senza contare l'apertura di 5° - DC is the Radius starting point without 5° tangent angle*

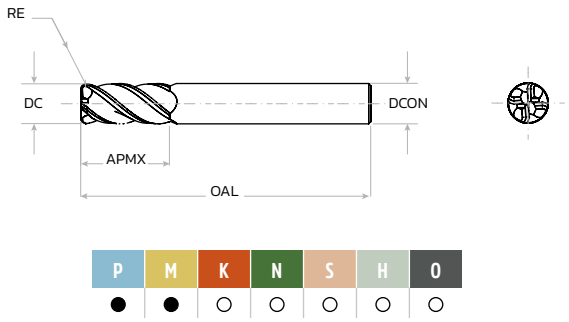
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 38° ß = 10° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | CORNER RADIUS | RE |
| UNEQUAL HELIX | vario | UNEQUAL FLUTE SPACING | a b d g |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTIONS | | FULL SLOT | |
| | | WITH COOLANT | |

## F236

Fresa 4 taglienti Torica rivestita MARS | Torus 4 Flute End Mill MARS Coating

**PARAMETRI DI LAVORO**
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | | |
|---|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm | RE mm |
| **FWTCR1666** | F236.06.00.014R05 | 6 | 6 | 14 | 58 | 0,5 |
| **FWTCR1667** | F236.06.00.014R10 | 6 | 6 | 14 | 58 | 1,0 |
| **FWTCR1668** | F236.08.00.018R05 | 8 | 8 | 18 | 64 | 0,5 |
| **FWTCR1669** | F236.08.00.018R10 | 8 | 8 | 18 | 64 | 1,0 |
| **FWTCR1670** | F236.10.00.022R05 | 10 | 10 | 22 | 73 | 0,5 |
| **FWTCR1671** | F236.10.00.022R10 | 10 | 10 | 22 | 73 | 1,0 |
| **FWTCR1672** | F236.10.00.032R20 | 10 | 10 | 32 | 79 | 2,0 |
| **FWTCR1673** | F236.10.00.032R30 | 10 | 10 | 32 | 79 | 3,0 |
| **FWTCR1674** | F236.12.00.026R10 | 12 | 12 | 26 | 79 | 1,0 |
| **FWTCR1675** | F236.12.00.026R20 | 12 | 12 | 26 | 79 | 2,0 |
| **FWTCR1676** | F236.12.00.026R30 | 12 | 12 | 26 | 79 | 3,0 |
| **FWTCR1677** | F236.16.00.034R10 | 16 | 16 | 34 | 93 | 1,0 |
| **FWTCR1678** | F236.16.00.034R20 | 16 | 16 | 34 | 93 | 2,0 |
| **FWTCR1679** | F236.16.00.034R30 | 16 | 16 | 34 | 93 | 3,0 |
| **FWTCR1680** | F236.20.00.042R20 | 20 | 20 | 42 | 105 | 2,0 |
| **FWTCR1681** | F236.20.00.042R30 | 20 | 20 | 42 | 105 | 3,0 |

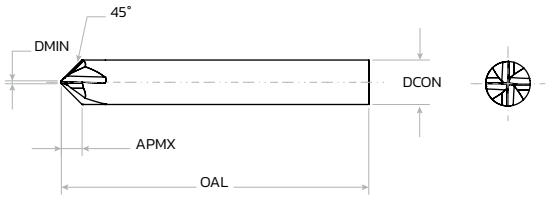
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | | | |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 0° ß = 10° |
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| MAX WORK HARDNESS | HRC 52 | 45° CHAMFER | 45° |
| COATING | MARS | COUNTURING | |
| WORKING DIRECTION | | FULL SLOT | |
| | | WITH COOLANT | |

## F242

Fresa per smussi rivestita MARS | Chamfering End Mill MARS Coating

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | | |
|---|---|---|---|---|---|---|
| | | DC mm h10 | Dmin mm | DCON mm h6 | APMX mm | OAL mm |
| **FWGCR0020** | F242.04.00.001E04 | 4 | 1 | 4 | 1,5 | 58 |
| **FWGCR0021** | F242.06.00.002E06 | 6 | 1 | 6 | 2,5 | 58 |
| **FWGCR0022** | F242.08.00.003E08 | 8 | 1 | 8 | 3,5 | 64 |
| **FWGCR0023** | F242.10.00.004E10 | 10 | 1 | 10 | 4,5 | 73 |
| **FWGCR0040** | F242.12.00.005E12 | 12 | 1 | 12 | 5,5 | 79 |
| **FWGCR0041** | F242.14.00.006E14 | 14 | 1 | 14 | 6,5 | 79 |
| **FWGCR0042** | F242.16.00.007E16 | 16 | 1 | 16 | 7,5 | 83 |

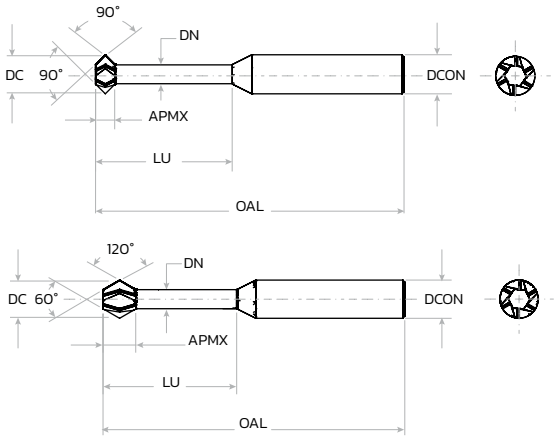
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per impieghi su più materiali | Multipurpose End Mills




| HARD METAL | HM | HELIX/RAKE | ∂ = 0° ß = 10° |
|---|---|---|---|
| FOUR CUTTING EDGES | Z4 | TOOL DIMENSIONS | Norma Interna |
| 45° CHAMFER | 90° | 60° CHAMFER | 120° |
| COATING | MARS | MAX WORK HARDNESS | HRC 52 |
| WORKING DIRECTION | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ○ | ○ | ○ |

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

## F243

Fresa per smussi 90° rivestita MARS | Chamfering End Mill MARS Coating 90°

| | | DIMENSIONI - DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | DC mm | DN mm | DCON mm | APMX mm | LU* mm | OAL mm | ZEFP |
| **FWGCR0031** | F243.04.00.015E06 | 4 | 2 | 6 | 2 | 15 | 58 | 3 |
| **FWGCR0032** | F243.06.00.017E06 | 6 | 3 | 6 | 3 | 17 | 58 | 4 |
| **FWGCR0033** | F243.08.00.028E08 | 8 | 4 | 8 | 4 | 28 | 69 | 4 |
| **FWGCR0034** | F243.10.00.033E10 | 10 | 5 | 10 | 5 | 33 | 79 | 4 |
| **FWGCR0035** | F243.12.00.040E12 | 12 | 6 | 12 | 6 | 40 | 90 | 4 |
| **FWGCR0036** | F243.14.00.040E14 | 14 | 7 | 14 | 7 | 40 | 90 | 4 |
| **FWGCR0037** | F243.16.00.048E16 | 16 | 8 | 16 | 8 | 48 | 105 | 4 |
| **FWGCR0038** | F243.18.00.048E18 | 18 | 9 | 18 | 9 | 48 | 105 | 4 |
| **FWGCR0039** | F243.20.00.053E20 | 20 | 10 | 20 | 10 | 53 | 109 | 4 |

** LU personalizzabile a richiesta - Different LU avaiable under request*

## F249

Fresa per smussi 60° rivestita MARS | Chamfering End Mill MARS Coating 60°

| | | DIMENSIONI - DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | DC mm | DN mm | DCON mm | APMX mm | LU* mm | OAL mm | ZEFP |
| **FWGCR0068** | F249.04.00.015E06 | 4 | 2 | 6 | 3,4 | 15 | 58 | 3 |
| **FWGCR0069** | F249.06.00.017E06 | 6 | 3 | 6 | 5,2 | 17 | 58 | 4 |
| **FWGCR0070** | F249.08.00.028E08 | 8 | 4 | 8 | 6,9 | 28 | 69 | 4 |
| **FWGCR0071** | F249.10.00.033E10 | 10 | 5 | 10 | 8,6 | 33 | 79 | 4 |
| **FWGCR0072** | F249.12.00.040E12 | 12 | 6 | 12 | 10,4 | 40 | 90 | 4 |
| **FWGCR0073** | F249.14.00.040E14 | 14 | 7 | 14 | 12,1 | 40 | 90 | 4 |
| **FWGCR0074** | F249.16.00.048E16 | 16 | 8 | 16 | 13,8 | 48 | 105 | 4 |
| **FWGCR0075** | F249.18.00.048E18 | 18 | 9 | 18 | 15,5 | 48 | 105 | 4 |
| **FWGCR0076** | F249.20.00.053E20 | 20 | 10 | 20 | 17,32 | 53 | 109 | 4 |

** LU personalizzabile a richiesta - Different LU avaiable under request*

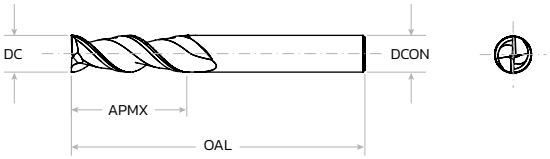
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ● | | | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 45° ß = 16° |
| TWO CUTTING EDGES | Z2 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | LAPPED | |
| | | WITH COOLANT | |

### F372

Fresa 2 taglienti Lappata | Lapped 2 Flute End Mill

**PARAMETRI DI LAVORO**
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCN0621** | F372.03.00.008A06 | 3 | 6 | 8 | 50 |
| **FWFCN0622** | F372.03.00.012A06 | 3 | 6 | 12 | 55 |
| **FWFCN0623** | F372.04.00.012A06 | 4 | 6 | 12 | 55 |
| **FWFCN0624** | F372.04.00.016A06 | 4 | 6 | 16 | 58 |
| **FWFCN0625** | F372.05.00.012A06 | 5 | 6 | 12 | 55 |
| **FWFCN0626** | F372.05.00.017A06 | 5 | 6 | 17 | 58 |
| **FWFCN0627** | F372.06.00.014A06 | 6 | 6 | 14 | 58 |
| **FWFCN0628** | F372.06.00.022A06 | 6 | 6 | 22 | 58 |
| **FWFCN0629** | F372.08.00.022A08 | 8 | 8 | 22 | 73 |
| **FWFCN0630** | F372.08.00.032A08 | 8 | 8 | 32 | 76 |
| **FWFCN0631** | F372.08.00.042A08 | 8 | 8 | 42 | 89 |
| **FWFCN0632** | F372.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWFCN0633** | F372.10.00.032A10 | 10 | 10 | 32 | 80 |
| **FWFCN0634** | F372.10.00.042A10 | 10 | 10 | 42 | 89 |
| **FWFCN0635** | F372.12.00.026A12 | 12 | 12 | 26 | 84 |
| **FWFCN0636** | F372.12.00.032A12 | 12 | 12 | 32 | 84 |
| **FWFCN0637** | F372.12.00.042A12 | 12 | 12 | 42 | 89 |
| **FWFCN0638** | F372.14.00.032A14 | 14 | 14 | 32 | 84 |
| **FWFCN0639** | F372.14.00.052A14 | 14 | 14 | 52 | 100 |
| **FWFCN0640** | F372.16.00.034A16 | 16 | 16 | 34 | 93 |
| **FWFCN0641** | F372.16.00.042A16 | 16 | 16 | 42 | 93 |
| **FWFCN0644** | F372.16.00.052A16 | 16 | 16 | 52 | 105 |
| **FWFCN0645** | F372.16.00.062A16 | 16 | 16 | 62 | 115 |
| **FWFCN0646** | F372.20.00.045A20 | 20 | 20 | 45 | 93 |
| **FWFCN0647** | F372.20.00.052A20 | 20 | 20 | 52 | 109 |
| **FWFCN0648** | F372.20.00.062A20 | 20 | 20 | 62 | 109 |
| **FWFCN0649** | F372.20.00.072A20 | 20 | 20 | 72 | 120 |
| **FWFCN0650** | F372.20.00.082A20 | 20 | 20 | 82 | 130 |

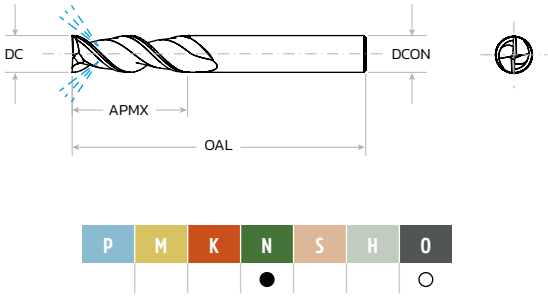
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ● | | | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 45° ß = 16° |
| TWO CUTTING EDGES | Z2 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| INTERNAL COOLING | | FULL SLOT | |
| WORKING DIRECTIONS | | COUNTURING | |
| LAPPED | | WITH COOLANT | |

### F352

Fresa 2 taglienti Lappata passaggio refrigerante |
Lapped 2 Flute End Mill internal cooling

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCNL0006** | F352.06.00.014A06 | 6 | 6 | 14 | 58 |
| **FWFCNL0009** | F352.06.00.022A06 | 6 | 6 | 22 | 76 |
| **FWFCNL0005** | F352.08.00.022A08 | 8 | 8 | 22 | 64 |
| **FWFCNL0010** | F352.08.00.032A08 | 8 | 8 | 32 | 101 |
| **FWFCNL0011** | F352.08.00.042A08 | 8 | 8 | 42 | 101 |
| **FWFCNL0002** | F352.10.00.022A10 | 10 | 10 | 22 | 67 |
| **FWFCNL0012** | F352.10.00.032A10 | 10 | 10 | 32 | 101 |
| **FWFCNL0013** | F352.10.00.042A10 | 10 | 10 | 42 | 101 |
| **FWFCNL0003** | F352.12.00.026A12 | 12 | 12 | 26 | 84 |
| **FWFCNL0014** | F352.12.00.032A12 | 12 | 12 | 32 | 84 |
| **FWFCNL0015** | F352.12.00.042A12 | 12 | 12 | 42 | 101 |
| **FWFCNL0016** | F352.14.00.032A14 | 14 | 14 | 32 | 84 |
| **FWFCNL0017** | F352.14.00.052A14 | 14 | 14 | 52 | 101 |
| **FWFCNL0004** | F352.16.00.034A16 | 16 | 16 | 34 | 93 |
| **FWFCNL0018** | F352.16.00.042A16 | 16 | 16 | 42 | 101 |
| **FWFCNL0019** | F352.16.00.052A16 | 16 | 16 | 52 | 101 |
| **FWFCNL0001** | F352.20.00.045A20 | 20 | 20 | 45 | 105 |
| **FWFCNL0008** | F352.20.00.052A20 | 20 | 20 | 52 | 150 |
| **FWFCNL0020** | F352.20.00.062A20 | 20 | 20 | 62 | 150 |
| **FWFCNL0021** | F352.20.00.072A20 | 20 | 20 | 72 | 150 |
| **FWFCNL0022** | F352.20.00.082A20 | 20 | 20 | 82 | 150 |

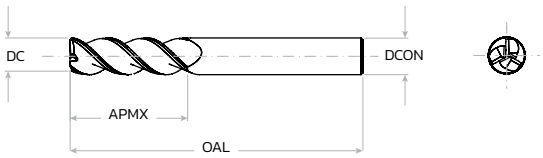
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ● | | | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 45° ß = 16° |
| THREE CUTTING EDGES | Z3 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | LAPPED | |
| | | WITH COOLANT | |

## F373

Fresa 3 taglienti Lappata | Lapped 3 Flute End Mill

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWFCN0651** | F373.08.00.032A08 | 8 | 8 | 32 | 76 |
| **FWFCN0652** | F373.08.00.042A08 | 8 | 8 | 42 | 89 |
| **FWFCN0588** | F373.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWFCN0653** | F373.10.00.032A10 | 10 | 10 | 32 | 80 |
| **FWFCN0654** | F373.10.00.042A10 | 10 | 10 | 42 | 89 |
| **FWFCN0602** | F373.12.00.026A12 | 12 | 12 | 26 | 84 |
| **FWFCN0587** | F373.12.00.032A12 | 12 | 12 | 32 | 84 |
| **FWFCN0608** | F373.12.00.042A12 | 12 | 12 | 42 | 97 |
| **FWFCN0655** | F373.14.00.032A14 | 14 | 14 | 32 | 94 |
| **FWFCN0656** | F373.14.00.052A14 | 14 | 14 | 52 | 105 |
| **FWFCN0657** | F373.16.00.034A16 | 16 | 16 | 34 | 93 |
| **FWFCN0658** | F373.16.00.042A16 | 16 | 16 | 42 | 95 |
| **FWFCN0659** | F373.16.00.052A16 | 16 | 16 | 52 | 105 |
| **FWFCN0607** | F373.16.00.062A16 | 16 | 16 | 62 | 115 |
| **FWFCN0660** | F373.20.00.045A20 | 20 | 20 | 45 | 105 |
| **FWFCN0597** | F373.20.00.052A20 | 20 | 20 | 52 | 109 |
| **FWFCN0661** | F373.20.00.062A20 | 20 | 20 | 62 | 120 |
| **FWFCN0662** | F373.20.00.072A20 | 20 | 20 | 72 | 130 |
| **FWFCN0663** | F373.20.00.082A20 | 20 | 20 | 82 | 140 |

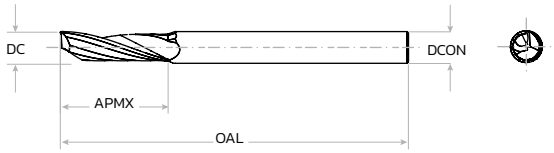
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ● | | | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 20° ß = 25° |
| ONE CUTTING EDGE | Z1 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## F101

Fresa 1 tagliente Elica Dx Rotazione Dx |
Single Flute End Mill Right Helix Right Cut

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWMCN0148** | F101.01.00.003A03 | 1 | 3 | 3 | 39 |
| **FWMCN0149** | F101.01.00.003A06 | 1 | 6 | 3 | 50 |
| **FWMCN0150** | F101.02.00.006A03 | 2 | 3 | 6 | 39 |
| **FWMCN0151** | F101.02.00.006A06 | 2 | 6 | 6 | 50 |
| **FWMCN0152** | F101.03.00.008A03 | 3 | 3 | 8 | 39 |
| **FWMCN0112** | F101.03.00.008A06 | 3 | 6 | 8 | 50 |
| **FWMCN0063** | F101.03.00.012A03 | 3 | 3 | 12 | 50 |
| **FWMCN0118** | F101.03.00.012A06 | 3 | 6 | 12 | 50 |
| **FWMCN0153** | F101.03.00.015A06 | 3 | 6 | 15 | 55 |
| **FWMCN0129** | F101.04.00.012A04 | 4 | 4 | 12 | 50 |
| **FWMCN0131** | F101.04.00.012A06 | 4 | 6 | 12 | 50 |
| **FWMCN0093** | F101.04.00.017A04 | 4 | 4 | 17 | 55 |
| **FWMCN0154** | F101.04.00.017A06 | 4 | 6 | 17 | 55 |
| **FWMCN0073** | F101.04.00.020A06 | 4 | 6 | 20 | 58 |
| **FWMCN0155** | F101.05.00.012A05 | 5 | 5 | 12 | 50 |
| **FWMCN0156** | F101.05.00.012A06 | 5 | 6 | 12 | 50 |
| **FWMCN0157** | F101.05.00.017A05 | 5 | 5 | 17 | 55 |
| **FWMCN0158** | F101.05.00.017A06 | 5 | 6 | 17 | 55 |
| **FWMCN0159** | F101.05.00.022A05 | 5 | 5 | 22 | 58 |
| **FWMCN0160** | F101.05.00.022A06 | 5 | 6 | 22 | 58 |
| **FWMCN0130** | F101.06.00.017A06 | 6 | 6 | 17 | 55 |
| **FWMCN0094** | F101.06.00.022A06 | 6 | 6 | 22 | 58 |
| **FWMCN0081** | F101.06.00.027A06 | 6 | 6 | 27 | 65 |
| **FWMCN0161** | F101.06.00.032A06 | 6 | 6 | 32 | 70 |
| **FWMCN0162** | F101.07.00.022A07 | 7 | 7 | 22 | 64 |
| **FWMCN0163** | F101.07.00.032A07 | 7 | 7 | 32 | 73 |
| **FWMCN0086** | F101.08.00.022A08 | 8 | 8 | 22 | 64 |
| **FWMCN0082** | F101.08.00.032A08 | 8 | 8 | 32 | 73 |
| **FWMCN0107** | F101.08.00.042A08 | 8 | 8 | 42 | 90 |
| **FWMCN0164** | F101.09.00.032A09 | 9 | 9 | 32 | 80 |

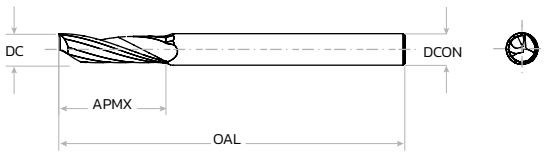
NOTE

● *specifico | specific* – ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
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| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 20° ß = 25° |
| ONE CUTTING EDGE | Z1 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## F101

Fresa 1 tagliente Elica Dx Rotazione Dx |
Single Flute End Mill Right Helix Right Cut

PARAMETRI DI LAVORO
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWMCN0061** | F101.10.00.022A10 | 10 | 10 | 22 | 73 |
| **FWMCN0165** | F101.10.00.032A10 | 10 | 10 | 32 | 80 |
| **FWMCN0166** | F101.10.00.042A10 | 10 | 10 | 42 | 89 |
| **FWMCN0104** | F101.10.00.052A10 | 10 | 10 | 52 | 100 |
| **FWMCN0066** | F101.12.00.032A12 | 12 | 12 | 32 | 84 |
| **FWMCN0167** | F101.12.00.042A12 | 12 | 12 | 42 | 89 |
| **FWMCN0100** | F101.12.00.052A12 | 12 | 12 | 52 | 100 |
| **FWMCN0168** | F101.14.00.032A14 | 14 | 14 | 32 | 84 |
| **FWMCN0169** | F101.14.00.052A14 | 14 | 14 | 52 | 100 |
| **FWMCN0069** | F101.16.00.042A16 | 16 | 16 | 42 | 93 |
| **FWMCN0170** | F101.16.00.072A16 | 16 | 16 | 72 | 120 |

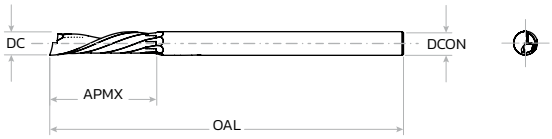
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
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| | | | ● | | | ○ |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 20° ß = 25° |
| ONE CUTTING EDGE | Z1 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## F100

Fresa 1 tagliente Elica Sx Rotazione Dx |
Single Flute End Mill Left Helix Right Cut

**PARAMETRI DI LAVORO**
**WORKING PARAMETERS**

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWMCN0171** | F100.02.00.010B06 | 2 | 6 | 10 | 50 |
| **FWMCN0172** | F100.03.00.012B03 | 3 | 3 | 12 | 50 |
| **FWMCN0173** | F100.03.00.015B06 | 3 | 6 | 15 | 58 |
| **FWMCN0134** | F100.04.00.012B04 | 4 | 4 | 12 | 50 |
| **FWMCN0132** | F100.04.00.015B06 | 4 | 6 | 15 | 58 |
| **FWMCN0074** | F100.04.00.020B06 | 4 | 6 | 20 | 58 |
| **FWMCN0174** | F100.05.00.017B05 | 5 | 5 | 17 | 57 |
| **FWMCN0175** | F100.05.00.022B06 | 5 | 6 | 22 | 64 |
| **FWMCN0095** | F100.06.00.015B06 | 6 | 6 | 15 | 58 |
| **FWMCN0176** | F100.06.00.022B06 | 6 | 6 | 22 | 64 |
| **FWMCN0177** | F100.08.00.022B08 | 8 | 8 | 22 | 64 |
| **FWMCN0113** | F100.08.00.032B08 | 8 | 8 | 32 | 80 |
| **FWMCN0178** | F100.10.00.032B10 | 10 | 10 | 32 | 90 |

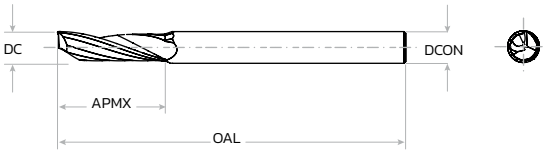
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

## Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ○ | | | ● |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 25° ß = 25° |
| ONE CUTTING EDGE | Z1 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

## F156

Fresa 1 tagliente Elica Dx Rotazione Dx |
Single Flute End Mill Right Helix Right Cut

PARAMETRI DI LAVORO
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWMCN0012** | F156.02.00.010A02 | 2 | 2 | 10 | 40 |
| **FWMCN0038** | F156.02.00.012A06 | 2 | 6 | 12 | 80 |
| **FWMCN0010** | F156.03.00.012A03 | 3 | 3 | 12 | 60 |
| **FWMCN0055** | F156.03.00.014A06 | 3 | 6 | 14 | 80 |
| **FWMCN0092** | F156.04.00.015A04 | 4 | 4 | 15 | 60 |
| **FWMCN0139** | F156.04.00.018A06 | 4 | 6 | 18 | 80 |
| **FWMCN0001** | F156.05.00.016A05 | 5 | 5 | 16 | 60 |
| **FWMCN0142** | F156.05.00.018A06 | 5 | 6 | 18 | 80 |
| **FWMCN0179** | F156.05.00.030A06 | 5 | 6 | 30 | 80 |
| **FWMCN0141** | F156.06.00.018A06 | 6 | 6 | 18 | 80 |
| **FWMCN0002** | F156.06.00.022A06 | 6 | 6 | 22 | 60 |
| **FWMCN0080** | F156.06.00.030A06 | 6 | 6 | 30 | 80 |
| **FWMCN0003** | F156.08.00.022A08 | 8 | 8 | 22 | 60 |
| **FWMCN0111** | F156.08.00.032A08 | 8 | 8 | 32 | 80 |
| **FWMCN0067** | F156.10.00.035A10 | 10 | 10 | 35 | 80 |
| **FWMCN0071** | F156.10.00.042A10 | 10 | 10 | 42 | 90 |

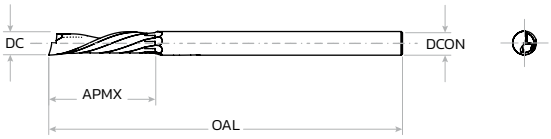
NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

## FRESE IN METALLO DURO INTEGRALE | SOLID CARBIDE MILLING CUTTERS

Frese per Leghe Leggere e materie plastiche | Light Alloyes and Plastic End Mills




| P | M | K | N | S | H | O |
|---|---|---|---|---|---|---|
| | | | ○ | | | ● |

| | | | |
|---|---|---|---|
| HARD METAL | HM | HELIX/RAKE | ∂ = 25° ß = 25° |
| ONE CUTTING EDGE | Z1 | TOOL DIMENSIONS | Norma Interna |
| COOLANT CONDITION | DRY/ AIR | ANGLE 45° CHAMFER | 45° |
| WORKING DIRECTIONS | | FULL SLOT | |
| COUNTURING | | WITH COOLANT | |

### F155

Fresa 1 tagliente Elica Sx Rotazione Dx |
Single Flute End Mill Left Helix Right Cut

**PARAMETRI DI LAVORO**
WORKING PARAMETERS

| | | DIMENSIONI - DIMENSIONS | | | |
|---|---|---|---|---|---|
| | | DC mm h10 | DCON mm h6 | APMX mm | OAL mm |
| **FWMCN0137** | F155.02.00.012B06 | 2 | 6 | 12 | 80 |
| **FWMCN0180** | F155.03.00.012B03 | 3 | 3 | 12 | 60 |
| **FWMCN0144** | F155.03.00.014B06 | 3 | 6 | 14 | 80 |
| **FWMCN0014** | F155.04.00.015B04 | 4 | 4 | 15 | 60 |
| **FWMCN0004** | F155.04.00.018B06 | 4 | 6 | 18 | 80 |
| **FWMCN0005** | F155.05.00.016B05 | 5 | 5 | 16 | 60 |
| **FWMCN0145** | F155.05.00.018B06 | 5 | 6 | 18 | 80 |
| **FWMCN0023** | F155.05.00.030B06 | 5 | 6 | 30 | 80 |
| **FWMCN0146** | F155.06.00.018B06 | 6 | 6 | 18 | 80 |
| **FWMCN0006** | F155.06.00.022B06 | 6 | 6 | 22 | 60 |
| **FWMCN0025** | F155.06.00.030B06 | 6 | 6 | 30 | 80 |
| **FWMCN0007** | F155.08.00.022B08 | 8 | 8 | 22 | 60 |
| **FWMCN0031** | F155.08.00.032B08 | 8 | 8 | 32 | 80 |
| **FWMCN0181** | F155.10.00.035B10 | 10 | 10 | 35 | 80 |
| **FWMCN0182** | F155.10.00.042B10 | 10 | 10 | 42 | 90 |

NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

NOTE

● *specifico | specific* - ○ *adatto | suitable*
*Frese di qualsiasi misura prodotte su ordinazione | Different dimensions avaible under request*

*Attacco Weldon disponibile su richiesta.| Weldon avaiable under request*
*Scarico dopo il tagliente disponibile o personalizzabile su richiesta. | Neck reduction aviable under request*

# INSERTI SPECIALI

SPECIAL INSERTS