

BLUE-MASTER®
by celesa



FRESAS
METAL DURO

FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE CORTA

USO
GENERAL

MD

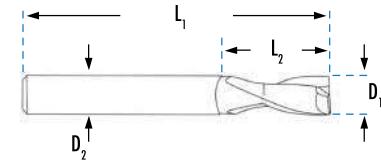


CILÍNDRICO

2 Z



3 Z



SERIE CORTA

| MATERIAL ACABADO CALIDAD | | | | FMD2 | FMD2TL | FMD63 | FMD63TL | |
|--------------------------------|----------------------|----------------------|----------------------|----------------------------------|-------------------------------|----------------------------------|-------------------------------|-----------------|
| D ₁ mm | L ₁ mm | L ₂ mm | D ₂ mm | MD BRILLANTE ★★ 2Z € | MD TiAIN ★★★ 2Z € | MD BRILLANTE ★★ 3Z € | MD TiAIN ★★★ 3Z € | |
| 1,00 | 38 | 3 | 3 | FMD20100 | 18,26 | FMD20100TIALN | 24,21 | FMD630100 |
| 1,00 | 50 | 3 | 4 | FMD20100X50 | 19,56 | FMD20100X50TIALN | 26,71 | FMD630100X50 |
| 1,50 | 38 | 4 | 3 | FMD20150 | 18,26 | FMD20150TIALN | 24,21 | FMD630150 |
| 1,50 | 50 | 4 | 4 | FMD20150X50 | 19,56 | FMD20150X50TIALN | 26,71 | FMD630150X50 |
| 2,00 | 38 | 6 | 3 | FMD20200 | 18,26 | FMD20200TIALN | 24,21 | FMD630200 |
| 2,00 | 50 | 6 | 4 | FMD20200X50 | 19,56 | FMD20200X50TIALN | 26,71 | FMD630200X50 |
| 2,50 | 38 | 8 | 3 | FMD20250 | 18,26 | FMD20250TIALN | 24,21 | FMD630250 |
| 2,50 | 50 | 8 | 4 | FMD20250X50 | 19,56 | FMD20250X50TIALN | 26,71 | FMD630250X50 |
| 3,00 | 38 | 8 | 3 | FMD20300 | 17,52 | FMD20300TIALN | 23,47 | FMD630300 |
| 3,00 | 50 | 8 | 4 | FMD20300X5004 | 19,26 | FMD20300X5004TIALN | 27,61 | FMD630300X5004 |
| 3,00 | 50 | 8 | 6 | FMD20300X5006 | 20,68 | FMD20300X5006TIALN | 28,86 | FMD630300X5006 |
| 3,50 | 50 | 11 | 4 | FMD20350 | 20,48 | FMD20350TIALN | 26,43 | FMD630350 |
| 4,00 | 50 | 11 | 4 | FMD20400 | 17,41 | FMD20400TIALN | 23,36 | FMD630400 |
| 4,00 | 50 | 11 | 6 | FMD20400X5006 | 21,21 | FMD20400X5006TIALN | 28,96 | FMD630400X5006 |
| 4,50 | 50 | 11 | 6 | FMD20450 | 22,43 | FMD20450TIALN | 28,38 | FMD630450 |
| 5,00 | 50 | 13 | 5 | FMD20500 | 19,77 | FMD20500TIALN | 25,72 | FMD630500 |
| 5,00 | 50 | 13 | 6 | FMD20500X5006 | 21,96 | FMD20500X5006TIALN | 29,15 | FMD630500X5006 |
| 5,50 | 50 | 16 | 6 | FMD20550 | 21,63 | FMD20550TIALN | 29,18 | FMD630550 |
| 6,00 | 50 | 16 | 6 | FMD20600 | 21,63 | FMD20600TIALN | 27,58 | FMD630600 |
| 6,00 | 58 | 22 | 6 | FMD20600X58 | 23,25 | FMD20600X58TIALN | 29,36 | FMD630600X58 |
| 6,35 | 60 | 19 | 8 | FMD20635 | 25,25 | FMD20635TIALN | 31,25 | FMD630635 |
| 6,50 | 60 | 19 | 8 | FMD20650 | 28,36 | FMD20650TIALN | 35,65 | FMD630650 |
| 7,00 | 60 | 19 | 8 | FMD20700 | 35,39 | FMD20700TIALN | 42,54 | FMD630700 |
| 7,50 | 60 | 19 | 8 | FMD20750 | 35,39 | FMD20750TIALN | 42,54 | FMD630750 |
| 8,00 | 60 | 19 | 8 | FMD20800 | 32,16 | FMD20800TIALN | 39,30 | FMD630800 |
| 8,50 | 72 | 22 | 10 | FMD20850 | 37,37 | FMD20850TIALN | 44,36 | FMD630850 |
| 9,00 | 72 | 22 | 10 | FMD20900 | 38,63 | FMD20900TIALN | 45,36 | FMD630900 |
| 9,50 | 72 | 22 | 10 | FMD20950 | 51,11 | FMD20950TIALN | 61,21 | FMD630950 |
| 10,00 | 72 | 22 | 10 | FMD21000 | 48,30 | FMD21000TIALN | 56,63 | FMD631000 |
| 10,00 | 80 | 32 | 10 | FMD21000X80 | 52,36 | FMD21000X80TIALN | 60,12 | FMD631000X80 |
| 10,50 | 75 | 26 | 12 | FMD21050 | 52,36 | FMD21050TIALN | 61,11 | FMD631050 |
| 11,00 | 75 | 26 | 12 | FMD21100 | 70,67 | FMD21100TIALN | 80,19 | FMD631100 |
| 12,00 | 75 | 26 | 12 | FMD21200 | 61,59 | FMD21200TIALN | 71,10 | FMD631200 |
| 12,50 | 84 | 30 | 14 | FMD21250 | 62,63 | FMD21250TIALN | 71,11 | FMD631250 |
| 13,00 | 84 | 30 | 14 | FMD21300 | 63,36 | FMD21300TIALN | 71,25 | FMD631300 |
| 14,00 | 84 | 30 | 14 | FMD21400 | 94,63 | FMD21400TIALN | 106,54 | FMD631400 |
| 14,00 | 100 | 50 | 14 | FMD21400X100 | 105,36 | FMD21400X100TIALN | 118,36 | FMD631400X100 |
| 15,00 | 92 | 32 | 16 | FMD21500 | 108,25 | FMD21500TIALN | 121,25 | FMD631500 |
| 16,00 | 92 | 32 | 16 | FMD21600 | 122,26 | FMD21600TIALN | 135,36 | FMD631600 |
| 16,00 | 100 | 50 | 16 | FMD21600X100 | 131,36 | FMD21600X100TIALN | 145,36 | FMD631600X100 |
| 17,00 | 100 | 38 | 18 | FMD21700 | 124,36 | FMD21700TIALN | 138,96 | FMD631700 |
| 18,00 | 100 | 38 | 18 | FMD21800 | 179,14 | FMD21800TIALN | 197,00 | FMD631800 |
| 18,00 | 100 | 50 | 18 | FMD21800X10050 | 196,36 | FMD21800X10050TIALN | 216,36 | FMD631800X10050 |
| 19,00 | 100 | 38 | 20 | FMD21900 | 201,36 | FMD21900TIALN | 221,36 | FMD631900 |
| 20,00 | 100 | 38 | 20 | FMD22000 | 203,76 | FMD22000TIALN | 226,38 | FMD632000 |
| 20,00 | 100 | 50 | 20 | FMD22000X10050 | 215,36 | FMD22000X10050TIALN | 238,36 | FMD632000X10050 |
| 22,00 | 100 | 38 | 22 | FMD22200 | 289,36 | FMD22200TIALN | 325,36 | FMD632200 |
| 25,00 | 100 | 45 | 25 | FMD22500 | 353,57 | FMD22500TIALN | 388,10 | FMD632500 |
| 25,00 | 110 | 55 | 25 | FMD22500X110 | 389,36 | FMD22500X110TIALN | 436,36 | FMD632500X110 |



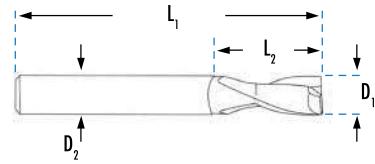
FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE CORTA

USO
GENERAL

MD



4 Z

TOL D1
+0 -0,05TOL D2
h6

SERIE CORTA

| MATERIAL ACABADO CALIDAD | FMD48 | | | | FMD48TL | | | |
|--------------------------------|-----------------|-----------|----------------------|----------|---------|-------|----|---|
| | MD | BRILLANTE | 4Z | € | MD | TiAIN | 4Z | € |
| | D1 mm | L1 mm | L2 mm | D2 mm | | | | |
| 1,00 38 3 3 | FMD480100 | 18,26 | FMD480100TIALN | 24,21 | | | | |
| 1,00 50 3 4 | FMD480100X50 | 19,56 | FMD480100X50TIALN | 26,71 | | | | |
| 1,50 38 4 3 | FMD480150 | 18,26 | FMD480150TIALN | 24,21 | | | | |
| 1,50 50 4 4 | FMD480150X50 | 19,56 | FMD480150X50TIALN | 26,71 | | | | |
| 2,00 38 6 3 | FMD480200 | 18,26 | FMD480200TIALN | 24,21 | | | | |
| 2,00 50 6 4 | FMD480200X50 | 19,56 | FMD480200X50TIALN | 26,71 | | | | |
| 2,50 38 8 3 | FMD480250 | 18,26 | FMD480250TIALN | 24,21 | | | | |
| 2,50 50 8 4 | FMD480250X50 | 19,56 | FMD480250X50TIALN | 26,71 | | | | |
| 3,00 38 8 3 | FMD480300 | 17,52 | FMD480300TIALN | 23,47 | | | | |
| 3,00 50 8 4 | FMD480300X5004 | 19,26 | FMD480300X5004TIALN | 27,61 | | | | |
| 3,00 50 8 6 | FMD480300X5006 | 20,68 | FMD480300X5006TIALN | 28,86 | | | | |
| 3,50 50 11 4 | FMD480350 | 20,48 | FMD480350TIALN | 26,43 | | | | |
| 4,00 50 11 4 | FMD480400 | 17,41 | FMD480400TIALN | 23,36 | | | | |
| 4,00 50 11 6 | FMD480400X5006 | 21,21 | FMD480400X5006TIALN | 28,96 | | | | |
| 4,50 50 11 6 | FMD480450 | 22,43 | FMD480450TIALN | 28,38 | | | | |
| 5,00 50 13 5 | FMD480500 | 19,77 | FMD480500TIALN | 25,72 | | | | |
| 5,00 50 13 6 | FMD480500X5006 | 21,96 | FMD480500X5006TIALN | 29,15 | | | | |
| 5,50 50 16 6 | FMD480550 | 21,63 | FMD480550TIALN | 29,18 | | | | |
| 6,00 50 16 6 | FMD480600 | 21,63 | FMD480600TIALN | 27,58 | | | | |
| 6,00 58 22 6 | FMD480600X58 | 23,25 | FMD480600X58TIALN | 29,36 | | | | |
| 6,35 60 19 8 | FMD480635 | 25,25 | FMD480635TIALN | 31,25 | | | | |
| 6,50 60 19 8 | FMD480650 | 28,36 | FMD480650TIALN | 35,65 | | | | |
| 7,00 60 19 8 | FMD480700 | 35,39 | FMD480700TIALN | 42,54 | | | | |
| 7,50 60 19 8 | FMD480750 | 35,39 | FMD480750TIALN | 42,54 | | | | |
| 8,00 60 19 8 | FMD480800 | 32,16 | FMD480800TIALN | 39,30 | | | | |
| 8,50 72 22 10 | FMD480850 | 37,37 | FMD480850TIALN | 44,36 | | | | |
| 9,00 72 22 10 | FMD480900 | 38,63 | FMD480900TIALN | 45,36 | | | | |
| 9,50 72 22 10 | FMD480950 | 51,11 | FMD480950TIALN | 61,21 | | | | |
| 10,00 72 22 10 | FMD481000 | 48,30 | FMD481000TIALN | 56,63 | | | | |
| 10,00 80 32 10 | FMD481000X80 | 52,36 | FMD481000X80TIALN | 60,12 | | | | |
| 10,50 75 26 12 | FMD481050 | 52,36 | FMD481050TIALN | 61,11 | | | | |
| 11,00 75 26 12 | FMD481100 | 70,67 | FMD481100TIALN | 80,19 | | | | |
| 12,00 75 26 12 | FMD481200 | 61,59 | FMD481200TIALN | 71,10 | | | | |
| 12,50 84 30 14 | FMD481250 | 62,63 | FMD481250TIALN | 71,11 | | | | |
| 13,00 84 30 14 | FMD481300 | 63,36 | FMD481300TIALN | 71,25 | | | | |
| 14,00 84 30 14 | FMD481400 | 94,63 | FMD481400TIALN | 106,54 | | | | |
| 14,00 100 50 14 | FMD481400X100 | 105,36 | FMD481400X100TIALN | 118,36 | | | | |
| 15,00 92 32 16 | FMD481500 | 108,25 | FMD481500TIALN | 121,25 | | | | |
| 16,00 92 32 16 | FMD481600 | 122,26 | FMD481600TIALN | 135,36 | | | | |
| 16,00 100 50 16 | FMD481600X100 | 131,36 | FMD481600X100TIALN | 145,36 | | | | |
| 17,00 100 38 18 | FMD481700 | 124,36 | FMD481700TIALN | 138,96 | | | | |
| 18,00 100 38 18 | FMD481800 | 179,14 | FMD481800TIALN | 197,00 | | | | |
| 18,00 100 50 18 | FMD481800X10050 | 196,36 | FMD481800X10050TIALN | 216,36 | | | | |
| 19,00 100 38 20 | FMD481900 | 201,36 | FMD481900TIALN | 221,36 | | | | |
| 20,00 100 38 20 | FMD482000 | 203,76 | FMD482000TIALN | 226,38 | | | | |
| 20,00 100 50 20 | FMD482000X10050 | 215,36 | FMD482000X10050TIALN | 238,36 | | | | |
| 22,00 100 38 22 | FMD482200 | 289,36 | FMD482200TIALN | 325,36 | | | | |
| 25,00 100 45 25 | FMD482500 | 353,57 | FMD482500TIALN | 388,10 | | | | |
| 25,00 110 55 25 | FMD482500X110 | 389,36 | FMD482500X110TIALN | 436,36 | | | | |



FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE LARGA

USO
GENERAL

MD



CILÍNDRICO

2 Z



3 Z



4 Z



SERIE LARGA

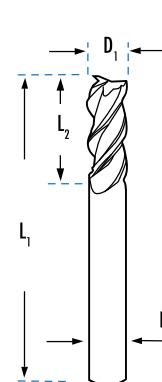
| MATERIAL | | | | FMD54 | | FMD54TL | | FMD73 | | FMD73TL | |
|----------------------|----------------------|----------------------|----------------------|-----------------|-----------|----------------------|--------|-----------------|-----------|----------------------|--------|
| ACABADO | | | | MD | BRILLANTE | MD | TiAIN | MD | BRILLANTE | MD | TiAIN |
| CALIDAD | | | | ★★ | 2Z | ★★★ | 2Z | ★★ | 3Z | ★★ | 3Z |
| D ₁ mm | L ₁ mm | L ₂ mm | D ₂ mm | | € | | € | | € | | € |
| 1,00 | 60 | 5 | 3 | FMD540100 | 18,41 | FMD540100TIALN | 25,55 | FMD730100 | 18,41 | FMD730100TIALN | 25,55 |
| 2,00 | 60 | 10 | 3 | FMD540200 | 18,89 | FMD540200TIALN | 26,03 | FMD730200 | 18,89 | FMD730200TIALN | 26,03 |
| 3,00 | 60 | 15 | 3 | FMD540300 | 19,40 | FMD540300TIALN | 26,54 | FMD730300 | 19,40 | FMD730300TIALN | 26,54 |
| 4,00 | 80 | 20 | 4 | FMD540400 | 20,45 | FMD540400TIALN | 27,58 | FMD730400 | 20,45 | FMD730400TIALN | 27,58 |
| 5,00 | 80 | 25 | 5 | FMD540500 | 25,45 | FMD540500TIALN | 32,59 | FMD730500 | 25,45 | FMD730500TIALN | 32,59 |
| 6,00 | 80 | 25 | 6 | FMD540600 | 35,89 | FMD540600TIALN | 43,02 | FMD730600 | 35,89 | FMD730600TIALN | 43,02 |
| 7,00 | 90 | 35 | 8 | FMD540700 | 37,85 | FMD540700TIALN | 47,69 | FMD730700 | 37,85 | FMD730700TIALN | 47,69 |
| 8,00 | 90 | 35 | 8 | FMD540800 | 40,86 | FMD540800TIALN | 50,39 | FMD730800 | 40,86 | FMD730800TIALN | 50,39 |
| 9,00 | 100 | 45 | 10 | FMD540900 | 53,36 | FMD540900TIALN | 64,25 | FMD730900 | 53,36 | FMD730900TIALN | 64,25 |
| 10,00 | 100 | 45 | 10 | FMD541000 | 57,74 | FMD541000TIALN | 67,27 | FMD731000 | 57,74 | FMD731000TIALN | 67,27 |
| 12,00 | 100 | 50 | 12 | FMD541200 | 78,82 | FMD541200TIALN | 90,73 | FMD731200 | 78,82 | FMD731200TIALN | 90,73 |
| 14,00 | 150 | 65 | 14 | FMD541400 | 129,70 | FMD541400TIALN | 145,17 | FMD731400 | 129,70 | FMD731400TIALN | 145,17 |
| 16,00 | 150 | 65 | 16 | FMD541600 | 142,10 | FMD541600TIALN | 157,57 | FMD731600 | 142,10 | FMD731600TIALN | 157,57 |
| 16,00 | 150 | 90 | 16 | FMD541600X15090 | 156,30 | FMD541600X15090TIALN | 173,33 | FMD731600X15090 | 156,30 | FMD731600X15090TIALN | 173,33 |
| 20,00 | 150 | 70 | 20 | FMD542000 | 252,06 | FMD542000TIALN | 275,88 | FMD732000 | 252,06 | FMD732000TIALN | 275,88 |
| 25,00 | 150 | 75 | 25 | FMD542500 | 496,36 | FMD542500TIALN | 523,31 | FMD732500 | 496,36 | FMD732500TIALN | 523,31 |

FMD54 FMD73



SERIE LARGA

| MATERIAL | | | | FMD58 | | FMD58TL | |
|----------------------|----------------------|----------------------|----------------------|-----------------|-----------|----------------------|--------|
| ACABADO | | | | MD | BRILLANTE | MD | TiAIN |
| CALIDAD | | | | ★★ | 4Z | ★★★ | 4Z |
| D ₁ mm | L ₁ mm | L ₂ mm | D ₂ mm | | € | | € |
| 1,00 | 60 | 5 | 3 | FMD580100 | 18,41 | FMD580100TIALN | 25,55 |
| 2,00 | 60 | 10 | 3 | FMD580200 | 18,89 | FMD580200TIALN | 26,03 |
| 3,00 | 60 | 15 | 3 | FMD580300 | 19,40 | FMD580300TIALN | 26,54 |
| 4,00 | 80 | 20 | 4 | FMD580400 | 20,45 | FMD580400TIALN | 27,58 |
| 5,00 | 80 | 25 | 5 | FMD580500 | 25,45 | FMD580500TIALN | 32,59 |
| 6,00 | 80 | 25 | 6 | FMD580600 | 35,89 | FMD580600TIALN | 43,02 |
| 7,00 | 90 | 35 | 8 | FMD580700 | 37,85 | FMD580700TIALN | 47,69 |
| 8,00 | 90 | 35 | 8 | FMD580800 | 40,86 | FMD580800TIALN | 50,39 |
| 9,00 | 100 | 45 | 10 | FMD580900 | 53,36 | FMD580900TIALN | 64,25 |
| 10,00 | 100 | 45 | 10 | FMD581000 | 57,74 | FMD581000TIALN | 67,27 |
| 12,00 | 100 | 50 | 12 | FMD581200 | 78,82 | FMD581200TIALN | 90,73 |
| 14,00 | 150 | 65 | 14 | FMD581400 | 129,70 | FMD581400TIALN | 145,17 |
| 16,00 | 150 | 65 | 16 | FMD581600 | 142,10 | FMD581600TIALN | 157,57 |
| 16,00 | 150 | 90 | 16 | FMD581600X15090 | 156,30 | FMD581600X15090TIALN | 173,33 |
| 20,00 | 150 | 70 | 20 | FMD582000 | 252,06 | FMD582000TIALN | 275,88 |
| 25,00 | 150 | 75 | 25 | FMD582500 | 496,36 | FMD582500TIALN | 523,31 |



FMD58 FMD58TL

FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE EXTRALARGA

USO
GENERAL

MD

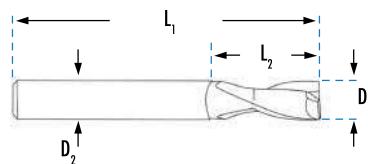


CILÍNDRICO

2 Z



4 Z



SERIE EXTRA LARGA

| MATERIAL ACABADO CALIDAD | | | | FMD53 | | FMD53TL | | FMD56 | | FMD56TL | |
|--------------------------------|----------|----------|----------|-----------------------|--------|----------------------|--------|-----------------------|--------|----------------------|--------|
| Ø mm | L1 mm | L2 mm | D2 mm | MD BRILLANTE ★★ | 2Z | MD TiAIN ★★★ | 2Z | MD BRILLANTE ★★ | 4Z | MD TiAIN ★★★ | 4Z |
| 3,00 | 75 | 25 | 3 | FMD530300 | 41,71 | FMD530300TIALN | 53,62 | FMD560300 | 43,16 | FMD560300TIALN | 55,07 |
| 3,00 | 100 | 25 | 3 | FMD530300X100 | 44,46 | FMD530300X100TIALN | 56,54 | FMD560300X100 | 45,66 | FMD560300X100TIALN | 57,36 |
| 4,00 | 100 | 25 | 4 | FMD530400 | 45,32 | FMD530400TIALN | 57,23 | FMD560400 | 46,74 | FMD560400TIALN | 58,65 |
| 5,00 | 100 | 25 | 5 | FMD530500 | 51,22 | FMD530500TIALN | 63,13 | FMD560500 | 53,82 | FMD560500TIALN | 65,73 |
| 6,00 | 100 | 25 | 6 | FMD530600X10025 | 77,25 | FMD530600X10025TIALN | 96,96 | FMD560600X10025 | 79,57 | FMD560600X10025TIALN | 99,87 |
| 6,00 | 100 | 40 | 6 | FMD530600X10040 | 78,85 | FMD530600X10040TIALN | 98,11 | FMD560600X10040 | 81,22 | FMD560600X10040TIALN | 101,05 |
| 6,00 | 150 | 25 | 6 | FMD530600X15025 | 80,80 | FMD530600X15025TIALN | 99,36 | FMD560600X15025 | 83,22 | FMD560600X15025TIALN | 102,34 |
| 6,00 | 150 | 40 | 6 | FMD530600X15040 | 83,36 | FMD530600X15040TIALN | 102,25 | FMD560600X15040 | 85,86 | FMD560600X15040TIALN | 105,32 |
| 6,00 | 150 | 75 | 6 | FMD530600 | 85,49 | FMD530600TIALN | 104,54 | FMD560600 | 90,42 | FMD560600TIALN | 108,73 |
| 8,00 | 100 | 45 | 8 | FMD530800X10045 | 106,33 | FMD530800X10045TIALN | 132,36 | FMD560800X10045 | 109,52 | FMD560800X10045TIALN | 136,33 |
| 8,00 | 150 | 25 | 8 | FMD530800X15025 | 111,11 | FMD530800X15025TIALN | 135,37 | FMD560800X15025 | 114,44 | FMD560800X15025TIALN | 139,43 |
| 8,00 | 150 | 45 | 8 | FMD530800X15045 | 114,45 | FMD530800X15045TIALN | 137,89 | FMD560800X15045 | 117,88 | FMD560800X15045TIALN | 142,03 |
| 8,00 | 150 | 75 | 8 | FMD530800 | 117,71 | FMD5308TIALN | 140,34 | FMD560800 | 124,50 | FMD5608TIALN | 146,25 |
| 10,00 | 150 | 38 | 10 | FMD531000X15038 | 137,36 | FMD531000X15038TIALN | 169,69 | FMD561000X15038 | 141,48 | FMD561000X15038TIALN | 174,78 |
| 10,00 | 150 | 50 | 10 | FMD531000X15050 | 141,41 | FMD531000X15050TIALN | 172,25 | FMD561000X15050 | 145,65 | FMD561000X15050TIALN | 177,42 |
| 10,00 | 150 | 65 | 10 | FMD531000X15065 | 145,36 | FMD531000X15065TIALN | 175,75 | FMD561000X15065 | 149,72 | FMD561000X15065TIALN | 181,02 |
| 10,00 | 150 | 75 | 10 | FMD531000 | 149,10 | FMD531000TIALN | 178,87 | FMD561000 | 164,01 | FMD561000TIALN | 193,77 |
| 12,00 | 150 | 38 | 12 | FMD531200X15038 | 199,96 | FMD531200X15038TIALN | 241,14 | FMD561200X15038 | 205,96 | FMD561200X15038TIALN | 248,37 |
| 12,00 | 150 | 50 | 12 | FMD531200X15050 | 205,36 | FMD531200X15050TIALN | 247,47 | FMD561200X15050 | 211,52 | FMD561200X15050TIALN | 254,89 |
| 12,00 | 150 | 75 | 12 | FMD531200 | 218,16 | FMD531200TIALN | 256,26 | FMD561200 | 239,97 | FMD561200TIALN | 278,08 |
| 12,00 | 200 | 38 | 12 | FMD531200X20038 | 231,25 | FMD531200X20038TIALN | 272,36 | FMD561200X20038 | 258,36 | FMD561200X20038TIALN | 281,11 |
| 14,00 | 150 | 75 | 14 | FMD531400 | 301,59 | FMD531400TIALN | 348,03 | FMD561400 | 331,75 | FMD561400TIALN | 378,19 |
| 16,00 | 200 | 75 | 16 | FMD531600 | 409,75 | FMD531600TIALN | 463,33 | FMD561600 | 450,73 | FMD561600TIALN | 504,31 |
| 20,00 | 200 | 75 | 20 | FMD532000 | 639,35 | FMD532000TIALN | 710,79 | FMD562000 | 639,35 | FMD562000TIALN | 710,79 |

FMD53 FMD56

44
HRc

FRESAS ESFÉRICAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE CORTA Y LARGA

USO
GENERAL

MD

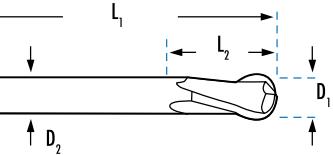


CILÍNDRICO

2 Z



4 Z



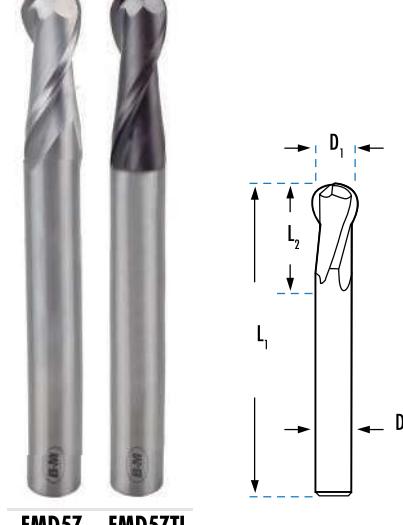
SERIE CORTA

| MATERIAL ACABADO CALIDAD | | | | FMD92 | FMD92TL | FMD51 | FMD51TL | TOL D1 +0 -0,05 | TOL D2 h6 | |
|--------------------------------|----------|----------|----------|-----------------------------|--------------------------|-----------------------------|--------------------------|--------------------|-------------------|--------|
| D1 mm | L1 mm | L2 mm | D2 mm | MD BRILLANTE ★★ 2Z | MD TiAIN ★★★ 2Z | MD BRILLANTE ★★ 4Z | MD TiAIN ★★★ 4Z | € | € | |
| 1,00 | 38 | 2 | 3 | FMD920100 | 21,91 | FMD920100TIALN | 27,86 | FMD510100 | FMD510100TIALN | |
| 1,00 | 50 | 2 | 4 | FMD920100X50 | 26,56 | FMD920100X50TIALN | 34,12 | FMD510100X50 | FMD510100X50TIALN | |
| 1,50 | 38 | 3 | 3 | FMD920150 | 21,91 | FMD920150TIALN | 27,86 | FMD510150 | FMD510150TIALN | |
| 1,50 | 50 | 3 | 4 | FMD920150X50 | 26,56 | FMD920150X50TIALN | 34,12 | FMD510150X50 | FMD510150X50TIALN | |
| 2,00 | 38 | 4 | 3 | FMD920200 | 21,91 | FMD920200TIALN | 27,86 | FMD510200 | FMD510200TIALN | |
| 2,00 | 50 | 4 | 4 | FMD920200X50 | 26,56 | FMD920200X50TIALN | 34,12 | FMD510200X50 | FMD510200X50TIALN | |
| 2,50 | 38 | 5 | 3 | FMD920250 | 21,91 | FMD920250TIALN | 27,86 | FMD510250X50 | FMD510250X50TIALN | |
| 3,00 | 38 | 6 | 3 | FMD920300 | 21,91 | FMD920300TIALN | 27,86 | FMD510300 | FMD510300TIALN | |
| 3,00 | 50 | 6 | 4 | FMD920300X50 | 26,56 | FMD920300X50TIALN | 34,12 | FMD510300X50 | FMD510300X50TIALN | |
| 4,00 | 50 | 8 | 4 | FMD920400 | 24,97 | FMD920400TIALN | 30,92 | FMD510400 | FMD510400TIALN | |
| 5,00 | 50 | 10 | 5 | FMD920500 | 26,42 | FMD920500TIALN | 32,38 | FMD510500 | FMD510500TIALN | |
| 6,00 | 50 | 12 | 6 | FMD920600 | 31,09 | FMD920600TIALN | 37,04 | FMD510600 | FMD510600TIALN | |
| 7,00 | 60 | 15 | 8 | FMD920700 | 37,85* | FMD920700TIALN | 44,25 | FMD510700 | FMD510700TIALN | |
| 8,00 | 60 | 15 | 8 | FMD920800 | 38,38 | FMD920800TIALN | 45,52 | FMD510800 | FMD510800TIALN | |
| 10,00 | 75 | 20 | 10 | FMD921000 | 57,67 | FMD921000TIALN | 66,00 | FMD511000 | FMD511000TIALN | |
| 12,00 | 75 | 20 | 12 | FMD921200 | 71,65 | FMD921200TIALN | 81,17 | FMD511200 | FMD511200TIALN | |
| 14,00 | 90 | 25 | 14 | FMD921400 | 106,06 | FMD921400TIALN | 117,97 | FMD511400 | FMD511400TIALN | |
| 16,00 | 100 | 25 | 16 | FMD921600 | 134,19 | FMD921600TIALN | 147,28 | FMD511600 | FMD511600TIALN | |
| 18,00 | 100 | 30 | 18 | FMD921800 | 199,51 | FMD921800TIALN | 217,37 | FMD511800 | FMD511800TIALN | |
| 20,00 | 100 | 30 | 20 | FMD922000 | 206,84 | FMD922000TIALN | 229,46 | FMD512000 | FMD512000TIALN | |
| | | | | | | | | 258,53 | FMD512000TIALN | 286,82 |

*Hasta fin de existencias

SERIE LARGA

| MATERIAL ACABADO CALIDAD | | | | FMD57 | FMD57TL | FMD57 | FMD57TL | 44 HRc |
|--------------------------------|----------|----------|----------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------|
| D1 mm | L1 mm | L2 mm | D2 mm | MD BRILLANTE ★★ 2Z | MD TiAIN ★★★ 2Z | MD BRILLANTE ★★ 4Z | MD TiAIN ★★★ 4Z | € |
| 1,00 | 60 | 2 | 3 | FMD570100 | 33,03 | FMD570100TIALN | 40,18 | |
| 1,50 | 60 | 3 | 3 | FMD570150 | 33,03 | FMD570150TIALN | 40,18 | |
| 2,00 | 60 | 3 | 3 | FMD570200 | 33,03 | FMD570200TIALN | 40,18 | |
| 2,50 | 60 | 3 | 3 | FMD570250 | 33,03 | FMD570250TIALN | 40,18 | |
| 3,00 | 60 | 4 | 3 | FMD570300 | 33,03 | FMD570300TIALN | 40,18 | |
| 4,00 | 80 | 5 | 4 | FMD570400 | 38,34 | FMD570400TIALN | 45,49 | |
| 5,00 | 80 | 6 | 5 | FMD570500 | 45,35 | FMD570500TIALN | 52,50 | |
| 6,00 | 80 | 8 | 6 | FMD570600 | 53,01 | FMD570600TIALN | 60,14 | |
| 8,00 | 100 | 12 | 8 | FMD570800 | 69,96 | FMD570800TIALN | 79,49 | |
| 10,00 | 100 | 15 | 10 | FMD571000 | 86,44 | FMD571000TIALN | 97,16 | |
| 12,00 | 100 | 15 | 12 | FMD571200 | 149,80 | FMD571200TIALN | 161,71 | |
| 14,00 | 150 | 20 | 14 | FMD571400 | 187,83 | FMD571400TIALN | 203,32 | |
| 16,00 | 150 | 20 | 16 | FMD571600 | 237,24 | FMD571600TIALN | 252,72 | |
| 20,00 | 150 | 25 | 20 | FMD572000 | 489,69 | FMD572000TIALN | 513,50 | |



FRESAS ESFÉRICAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE EXTRALARGA

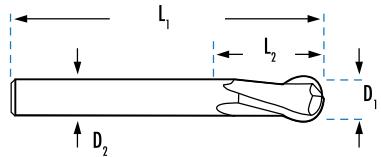
USO
GENERAL

MD



CILÍNDRICO

2 Z



SERIE EXTRA LARGA

| MATERIAL ACABADO CALIDAD | | | | FMD55 | FMD55TL |
|--------------------------------|----------------------|----------------------|----------------------|----------------------------------|-------------------------------|
| D ₁ mm | L ₁ mm | L ₂ mm | D ₂ mm | MD BRILLANTE ★★ 2Z € | MD TiAlN ★★★ 2Z € |
| 3,00 | 75 | 6 | 3 | FMD550300 | 39,59 |
| 3,00 | 100 | 6 | 3 | FMD550300X100 | 42,42 |
| 4,00 | 100 | 6 | 4 | FMD550400 | 45,67 |
| 5,00 | 100 | 6 | 5 | FMD550500 | 55,19 |
| 6,00 | 100 | 15 | 6 | FMD550600 | 69,36 |
| 6,00 | 150 | 15 | 6 | FMD550600X150 | 81,81 |
| 6,00 | 200 | 30 | 6 | FMD550600X200 | 96,36 |
| 8,00 | 150 | 25 | 8 | FMD550800 | 93,17 |
| 8,00 | 200 | 50 | 8 | FMD550800X200 | 112,12 |
| 10,00 | 150 | 25 | 10 | FMD551000 | 131,27 |
| 10,00 | 200 | 50 | 10 | FMD551000X200 | 149,99 |
| 12,00 | 150 | 25 | 12 | FMD551200 | 208,78 |
| 12,00 | 200 | 25 | 12 | FMD551200X200 | 256,36 |
| 14,00 | 200 | 50 | 14 | FMD551400 | 256,40 |
| 16,00 | 200 | 50 | 16 | FMD551600 | 344,51 |
| | | | | FMD551600TIALN | 386,18 |



FMD55 FMD55TL



| CONDICIONES DE CORTE ORIENTATIVAS | | | | | | | | | |
|-----------------------------------|---------------------------|-------|-------|------|------|------|------|------|------|
| | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø8 | Ø 10 | Ø12 | Ø14 |
| 44 HRc | RPM AVANCE (mm/min) | 4000 | 2600 | 2000 | 1600 | 1300 | 1000 | 800 | 660 |
| INOX | RPM AVANCE (mm/min) | 8000 | 5300 | 4000 | 3200 | 2600 | 2000 | 1600 | 1300 |
| Ti | RPM AVANCE (mm/min) | 55 | 55 | 55 | 55 | 60 | 60 | 60 | 60 |
| AI | RPM AVANCE (mm/min) | 16000 | 11000 | 8000 | 6400 | 5300 | 4000 | 3200 | 2600 |
| | | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 300 |

* Para obtener parámetros de corte recomendados para fresas recubiertas de TiAlN, multiplicar valores del recuadro por el factor 1,3

FRESAS FRONTALES DE MD DESBASTE MEDIO


**USO
GENERAL**
MD
CILÍNDRICO
TiAIN

Fresas

Rosa

**SERIE CORTA**

| FMD3 | | | | | |
|----------------------|----------------------|----------------------|----------------------|---|--------|
| D ₁ mm | D ₂ mm | L ₁ mm | L ₂ mm | Z | € |
| 6 | 6 | 50 | 16 | 4 | 35,85 |
| 8 | 8 | 60 | 19 | 4 | 48,58 |
| 10 | 10 | 75 | 22 | 4 | 74,76 |
| 12 | 12 | 75 | 26 | 4 | 102,61 |
| 16 | 16 | 92 | 32 | 4 | 233,43 |
| 20 | 20 | 100 | 38 | 4 | 349,80 |

**SERIE LARGA**

| FMD43 | | | | | |
|----------------------|----------------------|----------------------|----------------------|---|--------|
| D ₁ mm | D ₂ mm | L ₁ mm | L ₂ mm | Z | € |
| 6 | 6 | 80 | 25 | 4 | 51,95 |
| 8 | 8 | 90 | 35 | 4 | 72,59 |
| 10 | 10 | 100 | 45 | 4 | 110,55 |
| 12 | 12 | 100 | 50 | 4 | 146,00 |
| 16 | 16 | 150 | 65 | 4 | 337,03 |
| 20 | 20 | 150 | 70 | 4 | 515,70 |



FRESAS FRONTALES DE MD INTEGRAL DESBASTE FINO Y GRUESO


**USO
GENERAL**
MD
CILÍNDRICO

**USO
GENERAL**
MD
CILÍNDRICO


| FMD1 | | | | | |
|----------------------|----------------------|----------------------|----------------------|---|----------|
| D ₁ mm | D ₂ mm | L ₁ mm | L ₂ mm | Z | € |
| 6 | 6 | 63 | 19 | 3 | 29,03 * |
| 8 | 8 | 63 | 19 | 3 | 31,16 * |
| 12 | 12 | 75 | 25 | 4 | 50,31 * |
| 16 | 16 | 88 | 32 | 4 | 86,09 * |
| 20 | 20 | 100 | 38 | 4 | 100,77 * |



| FMD6 | | | | | |
|----------------------|----------------------|----------------------|----------------------|---|---------|
| D ₁ mm | D ₂ mm | L ₁ mm | L ₂ mm | Z | € |
| 6 | 6 | 63 | 19 | 3 | 29,03 * |
| 8 | 8 | 63 | 19 | 3 | 31,16 * |
| 12 | 12 | 75 | 25 | 4 | 50,31 * |
| 16 | 16 | 88 | 32 | 4 | 86,09 * |
| 20 | 20 | 100 | 38 | 4 | 100,77 |



*Hasta fin de existencias

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