

WWX200 / 400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

| Material | Properties | Cutting conditions | Grade | Vc | | |
|---|--------------------------|--------------------|--------|---------------|---------------|---------------|
| | | | | ae ≥ 0.5 DC | ae ≥ 0.8 DC | ae = DC |
| Mild steel | ≤180HB | ● | MP6120 | 240 (200–280) | 220 (180–260) | 200 (160–240) |
| | | ● | MP6130 | 230 (190–270) | 210 (170–250) | 190 (150–230) |
| | | ✘ | MP6130 | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| | | ✘ | VP15TF | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| Carbon steel Alloy steel | 180 – 280HB | ● | MP6120 | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| | | ● | MP6130 | 200 (160–240) | 180 (140–220) | 160 (120–200) |
| | | ✘ | MP6130 | 180 (140–220) | 160 (120–200) | 140 (100–180) |
| | | ✘ | VP15TF | 180 (140–220) | 160 (120–200) | 140 (100–180) |
| Carbon steel Alloy steel Alloy tool steel | 280 – 350HB ≤350HB | ● | MP6120 | 200 (160–240) | 180 (140–220) | 160 (120–200) |
| | | ● | MP6130 | 190 (150–230) | 170 (130–210) | 150 (110–190) |
| | | ✘ | MP6130 | 170 (130–210) | 150 (110–190) | 130 (90–170) |
| | | ✘ | VP15TF | 170 (130–210) | 150 (110–190) | 130 (90–170) |
| Pre-hardened steel | 35 – 45HRC | ● | MP6120 | 140 (120–160) | – | – |
| | | ● | MP6130 | 120 (100–140) | – | – |
| | | ✘ | MP6130 | 110 (90–130) | – | – |
| | | ✘ | VP15TF | 110 (90–130) | – | – |
| Austenitic stainless steel | ≤200HB | ● | MP7130 | 180 (160–200) | 160 (140–180) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| | | ● | VP15TF | 170 (150–190) | 150 (130–170) | – |
| | | ✘ | MP7130 | 150 (130–170) | 130 (110–150) | – |
| | >200HB | ✘ | VP15TF | 150 (130–170) | 130 (110–150) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| | | ● | MP7130 | 160 (140–180) | 140 (120–160) | – |
| | | ● | VP15TF | 160 (140–180) | 140 (120–160) | – |
| Ferritic and martensitic Stainless steel | ≤200HB | ✘ | MP7130 | 140 (120–160) | 120 (100–140) | – |
| | | ✘ | VP15TF | 140 (120–160) | 120 (100–140) | – |
| | | ● | MP7130 | 180 (160–200) | 160 (140–180) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| Duplex stainless steel | ≤280HB | ● | VP15TF | 170 (150–190) | 150 (130–170) | – |
| | | ● | MP7130 | 150 (130–170) | 130 (110–150) | – |
| | | ● | VP15TF | 150 (130–170) | 130 (110–150) | – |
| | | ● | MP7130 | 130 (110–150) | 110 (90–130) | – |
| | | ● | VP15TF | 130 (110–150) | 110 (90–130) | – |
| | | ● | MP7130 | 130 (110–150) | 110 (90–130) | – |
| Precipitation hardening Stainless steel | <450HB | ● | MP7130 | 140 (120–160) | – | – |
| | | ● | MP7130 | 130 (110–150) | – | – |
| | | ● | VP15TF | 130 (110–150) | – | – |
| | | ✘ | MP7130 | 110 (90–130) | – | – |
| | | ✘ | VP15TF | 110 (90–130) | – | – |

WWX200 / 400

RECOMMENDED CUTTING CONDITIONS

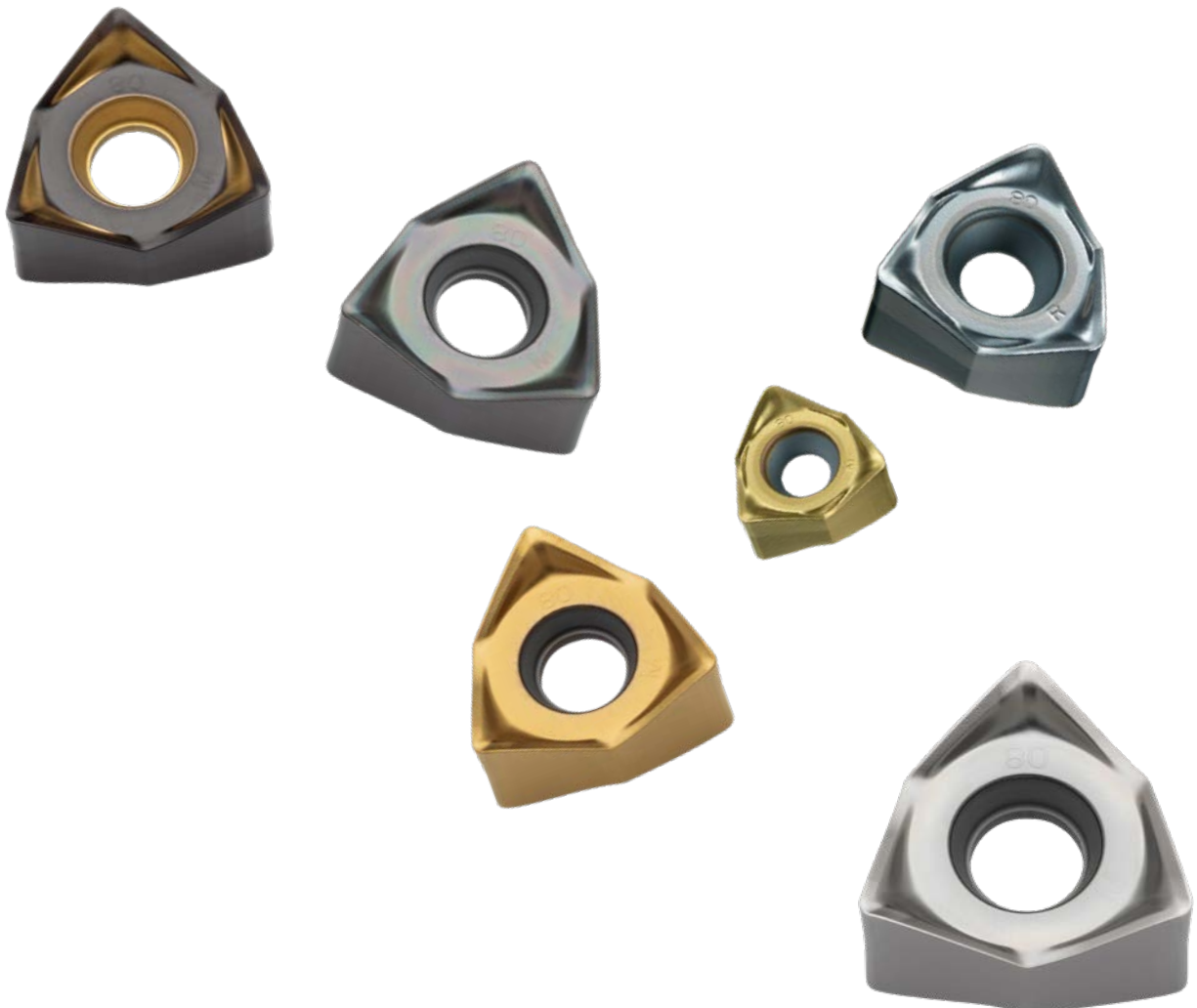
CUTTING SPEED / DRY CUTTING

| Material | Properties | Cutting conditions | Grade | Vc | | |
|---|--------------------------|--------------------|--------|---------------|---------------|---------------|
| | | | | ae ≥ 0.5 DC | ae ≥ 0.8 DC | ae = DC |
| Mild steel | ≤180HB | ● | MP6120 | 240 (200–280) | 220 (180–260) | 200 (160–240) |
| | | ● | MP6130 | 230 (190–270) | 210 (170–250) | 190 (150–230) |
| | | ✘ | MP6130 | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| | | ✘ | VP15TF | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| Carbon steel Alloy steel | 180 – 280HB | ● | MP6120 | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| | | ● | MP6130 | 200 (160–240) | 180 (140–220) | 160 (120–200) |
| | | ✘ | MP6130 | 180 (140–220) | 160 (120–200) | 140 (100–180) |
| | | ✘ | VP15TF | 180 (140–220) | 160 (120–200) | 140 (100–180) |
| Carbon steel Alloy steel Alloy tool steel | 280 – 350HB ≤350HB | ● | MP6120 | 200 (160–240) | 180 (140–220) | 160 (120–200) |
| | | ● | MP6130 | 190 (150–230) | 170 (130–210) | 150 (110–190) |
| | | ✘ | MP6130 | 170 (130–210) | 150 (110–190) | 130 (90–170) |
| | | ✘ | VP15TF | 170 (130–210) | 150 (110–190) | 130 (90–170) |
| Pre-hardened steel | 35 – 45HRC | ● | MP6120 | 140 (120–160) | – | – |
| | | ● | MP6130 | 120 (100–140) | – | – |
| | | ✘ | MP6130 | 110 (90–130) | – | – |
| | | ✘ | VP15TF | 110 (90–130) | – | – |
| Austenitic stainless steel | ≤200HB | ● | MP7130 | 180 (160–200) | 160 (140–180) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| | | ● | VP15TF | 170 (150–190) | 150 (130–170) | – |
| | | ✘ | MP7130 | 150 (130–170) | 130 (110–150) | – |
| | >200HB | ✘ | VP15TF | 150 (130–170) | 130 (110–150) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| | | ● | MP7130 | 160 (140–180) | 140 (120–160) | – |
| | | ● | VP15TF | 160 (140–180) | 140 (120–160) | – |
| Ferritic and martensitic Stainless steel | ≤200HB | ✘ | MP7130 | 140 (120–160) | 120 (100–140) | – |
| | | ✘ | VP15TF | 140 (120–160) | 120 (100–140) | – |
| | | ● | MP7130 | 180 (160–200) | 160 (140–180) | – |
| | | ● | MP7130 | 170 (150–190) | 150 (130–170) | – |
| Duplex stainless steel | ≤280HB | ● | VP15TF | 170 (150–190) | 150 (130–170) | – |
| | | ● | MP7130 | 150 (130–170) | 130 (110–150) | – |
| | | ● | VP15TF | 150 (130–170) | 130 (110–150) | – |
| | | ✘ | MP7130 | 130 (110–150) | 110 (90–130) | – |
| | | ✘ | VP15TF | 130 (110–150) | 110 (90–130) | – |
| Precipitation hardening Stainless steel | <450HB | ● | MP7130 | 140 (120–160) | – | – |
| | | ● | MP7130 | 130 (110–150) | – | – |
| | | ● | VP15TF | 130 (110–150) | – | – |
| | | ✘ | MP7130 | 110 (90–130) | – | – |
| | | ✘ | VP15TF | 110 (90–130) | – | – |

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CUTTING SPEED / DRY CUTTING

| Material | Properties | Cutting conditions | Grade | Vc | | |
|---------------------|------------|--------------------|--------|---------------|---------------|---------------|
| | | | | ae ≥ 0.5 DC | ae ≥ 0.8 DC | ae = DC |
| Gray cast iron | ≤350MPa | ● | MC5020 | 250 (210–290) | 230 (190–270) | 210 (170–250) |
| | | ● | MC5020 | 240 (200–280) | 220 (180–260) | 200 (160–240) |
| | | ● | VP15TF | 240 (200–280) | 220 (180–260) | — |
| | | ✘ | MC5020 | 220 (180–260) | 200 (160–240) | 180 (140–220) |
| | | ✘ | VP15TF | 220 (180–260) | 200 (160–240) | 180 (140–220) |
| K Ductile cast iron | ≤450MPa | ● | MC5020 | 220 (180–260) | 200 (160–240) | 180 (140–220) |
| | | ● | MC5020 | 210 (170–250) | 190 (150–230) | 170 (130–210) |
| | | ● | VP15TF | 210 (170–250) | 190 (150–230) | — |
| | | ✘ | MC5020 | 190 (150–230) | 170 (130–210) | 150 (110–190) |
| | | ✘ | VP15TF | 190 (150–230) | 170 (130–210) | 150 (110–190) |
| Ductile cast iron | ≤800MPa | ● | MC5020 | 180 (140–220) | 160 (120–200) | 140 (100–180) |
| | | ● | MC5020 | 170 (130–210) | 150 (110–190) | 130 (90–170) |
| | | ● | VP15TF | 170 (130–210) | 150 (110–190) | — |
| | | ✘ | MC5020 | 150 (110–190) | 130 (90–170) | 110 (70–150) |
| | | ✘ | VP15TF | 150 (110–190) | 130 (90–170) | 110 (70–150) |
| H Hardened steel | 40 – 55HRC | ●● | VP15TF | 50 (30– 70) | — | — |
| | | ● | MP6120 | 40 (30– 70) | — | — |



WWX200 / 400

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / WET CUTTING

| Material | Properties | Cutting conditions | Grade | Vc | | |
|--|---|--------------------------|---------------|---------------|---------------|---------------|
| | | | | ae ≥ 0.5 DC | ae ≥ 0.8 DC | ae = DC |
| P | Mild steel | ≤180HB | ● MP6120 | 150 (140-160) | 130 (120-140) | 120 (110-130) |
| | | | ● MP6130 | 140 (130-150) | 120 (110-130) | 110 (100-120) |
| | | | ✚ MP6130 | 120 (110-130) | 100 (90-110) | 90 (80-100) |
| | | | ✚ VP15TF | 120 (110-130) | 100 (90-110) | 90 (80-100) |
| | Carbon steel Alloy steel | 180 - 280HB | ● MP6120 | 150 (140-160) | 130 (120-140) | 120 (110-130) |
| | | | ● MP6130 | 140 (130-150) | 120 (110-130) | 110 (100-120) |
| | | | ✚ MP6130 | 120 (110-130) | 100 (90-110) | 90 (80-100) |
| | | | ✚ VP15TF | 120 (110-130) | 100 (90-110) | 90 (80-100) |
| | Carbon steel Alloy steel Alloy tool steel | 280 - 350HB ≤350HB | ● MP6120 | 140 (130-150) | 120 (110-130) | 110 (100-120) |
| | | | ● MP6130 | 130 (120-140) | 110 (100-120) | 100 (90-110) |
| | | | ✚ MP6130 | 110 (100-120) | 90 (80-100) | 80 (70- 90) |
| | | | ✚ VP15TF | 110 (100-120) | 90 (80-100) | 80 (70- 90) |
| Pre-hardened steel | 35 - 45HRC | ● MP6120 | 110 (100-120) | — | — | |
| | | ● MP6130 | 100 (90-110) | — | — | |
| | | ✚ MP6130 | 80 (70- 90) | — | — | |
| | | ✚ VP15TF | 80 (70- 90) | — | — | |
| M | Austenitic stainless steel | ≤200HB | ● MP7130 | 130 (120-140) | 110 (100-120) | — |
| | | | ● MP7130 | 120 (110-130) | 100 (90-110) | — |
| | | | ● VP15TF | 120 (110-130) | 100 (90-110) | — |
| | | | ✚ MP7130 | 100 (90-110) | 80 (70- 90) | — |
| | | >200HB | ✚ VP15TF | 100 (90-110) | 80 (70- 90) | — |
| | | | ● MP7130 | 130 (120-140) | 110 (100-120) | — |
| | | | ● MP7130 | 120 (110-130) | 100 (90-110) | — |
| | | | ● VP15TF | 120 (110-130) | 100 (90-110) | — |
| | Ferritic and martensitic Stainless steel | ≤200HB | ● MP7130 | 130 (120-140) | 110 (100-120) | — |
| | | | ● MP7130 | 120 (110-130) | 100 (90-110) | — |
| | | | ● VP15TF | 120 (110-130) | 100 (90-110) | — |
| | | | ✚ MP7130 | 100 (90-110) | 80 (70- 90) | — |
| Duplex stainless steel | ≤280HB | ✚ VP15TF | 100 (90-110) | 80 (70- 90) | — | |
| | | ● MP7130 | 120 (110-130) | 100 (90-110) | — | |
| | | ● MP7130 | 110 (100-120) | 90 (80-100) | — | |
| | | ● VP15TF | 110 (100-120) | 90 (80-100) | — | |
| Precipitation hardening Stainless steel | <450HB | ✚ MP7130 | 90 (80-100) | 70 (60- 80) | — | |
| | | ✚ VP15TF | 90 (80-100) | 70 (60- 80) | — | |
| | | ● MP7130 | 120 (110-130) | — | — | |
| | | ● MP7130 | 110 (100-120) | — | — | |
| | | | ● VP15TF | 110 (100-120) | — | — |
| | | | ✚ MP7130 | 90 (80-100) | — | — |
| | | | ✚ VP15TF | 90 (80-100) | — | — |

WWX200 / 400

CUTTING SPEED / WET CUTTING

| Material | Properties | Cutting conditions | Grade | Vc | | | |
|----------|----------------------|--------------------|-------|-------------|---------------|---------------|---------------|
| | | | | ae ≥ 0.5 DC | ae ≥ 0.8 DC | ae = DC | |
| K | Gray cast iron | ≤350MPa | ● | MC5020 | 170 (150-190) | 150 (130-170) | 130 (110-150) |
| | | | ● | MC5020 | 160 (140-180) | 140 (120-160) | 120 (100-140) |
| | | | ● | VP15TF | 160 (140-180) | 140 (120-160) | — |
| | | | ✘ | MC5020 | 140 (120-160) | 120 (100-140) | 100 (80-120) |
| | | | ✘ | VP15TF | 140 (120-160) | 120 (100-140) | 100 (80-120) |
| K | Ductile cast iron | ≤450MPa | ● | MC5020 | 170 (150-190) | 150 (130-170) | 130 (110-150) |
| | | | ● | MC5020 | 160 (140-180) | 140 (120-160) | 120 (100-140) |
| | | | ● | VP15TF | 160 (140-180) | 140 (120-160) | — |
| | | | ✘ | MC5020 | 140 (120-160) | 120 (100-140) | 100 (80-120) |
| | | | ✘ | VP15TF | 140 (120-160) | 120 (100-140) | 100 (80-120) |
| K | Ductile cast iron | ≤800MPa | ● | MC5020 | 160 (150-170) | 140(130-150) | 120 (110-130) |
| | | | ● | MC5020 | 150 (140-160) | 130 (120-140) | 110 (100-120) |
| | | | ● | VP15TF | 150 (140-160) | 130 (120-140) | — |
| | | | ✘ | MC5020 | 130 (120-140) | 110 (100-120) | 90 (80-100) |
| | | | ✘ | VP15TF | 130 (120-140) | 110 (100-120) | 90 (80-100) |
| N | Aluminium alloy | Si<5% | ● | TF15 | 500 (300-900) | 500 (300-900) | 500 (300-900) |
| | | | ● | TF15 | 500 (300-900) | 500 (300-900) | 500 (300-900) |
| | | | ✘ | TF15 | 400 (200-800) | 400 (200-800) | 400 (200-800) |
| S | Titanium alloy | — | ● | MP9120 | 80 (60-100) | — | — |
| | | | ● | MP9120 | 70 (50- 90) | — | — |
| | | | ✘ | MP9130 | 60 (40- 80) | — | — |
| | Heat resistant alloy | — | ● | MP9120 | 60 (50- 70) | — | — |
| | | | ● | MP9120 | 50 (30- 60) | — | — |
| H | Hardened steel | 40 - 55HRC | ● | VP15TF | 50 (30- 70) | — | — |
| | | | ● | MP6120 | 40 (30- 70) | — | — |
| | | | ● | MP6120 | 40 (30- 70) | — | — |

1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

WWX200











































RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

| Material | Properties | Cutting conditions | Coolant | Grade | ae ≥ 0.5 DC | | ae ≥ 0.8 DC | | ae = DC | | | | |
|---|-----------------------|--------------------|---------|--------|-------------|-------|------------------|----|---------|------------------|---|-------|------------------|
| | | | | | ap | fz | ap | fz | ap | fz | | | |
| Mild steel | ≤180HB | ● | ✗ | MP6120 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | R | ≤ 3.0 | 0.16 [0.10-0.20] | R | ≤ 3.0 | 0.16 [0.10-0.20] | — | — | — |
| | | ✚ | ✗ | MP6130 | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ✚ | ✗ | VP15TF | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| Carbon steel Alloy steel Alloy tool steel | 180 – 280HB | ● | ✗ | MP6120 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | R | ≤ 3.0 | 0.16 [0.10-0.20] | R | ≤ 3.0 | 0.16 [0.10-0.20] | — | — | — |
| | | ✚ | ✗ | MP6130 | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ✚ | ✗ | VP15TF | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| Carbon steel Alloy steel Alloy tool steel | 280 – 350HB ≤350HB | ● | ✗ | MP6120 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ● | ✗ | MP6130 | R | ≤ 3.0 | 0.16 [0.10-0.20] | R | ≤ 3.0 | 0.16 [0.10-0.20] | — | — | — |
| | | ✚ | ✗ | MP6130 | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| | | ✚ | ✗ | VP15TF | R | ≤ 3.0 | 0.13 [0.10-0.15] | R | ≤ 3.0 | 0.13 [0.10-0.15] | M | ≤ 2.0 | 0.13 [0.10-0.15] |
| Pre-hardened steel | 35 – 45HRC | ● | ✗ | MP6120 | M | ≤ 2.0 | 0.13 [0.10-0.15] | — | — | — | — | — | — |
| | | ● | ✗ | MP6130 | M | ≤ 2.0 | 0.13 [0.10-0.15] | — | — | — | — | — | — |
| | | ● | ✗ | MP6130 | R | ≤ 2.0 | 0.16 [0.10-0.20] | — | — | — | — | — | — |
| | | ✚ | ✗ | MP6130 | R | ≤ 2.0 | 0.13 [0.10-0.15] | — | — | — | — | — | — |
| | | ✚ | ✗ | VP15TF | R | ≤ 2.0 | 0.13 [0.10-0.15] | — | — | — | — | — | — |

WWX200

DEPTH OF CUT / FEED PER TOOTH

| Material | Properties | Cutting conditions | Coolant | Grade | ae ≥ 0.5 DC | | | ae ≥ 0.8 DC | | | ae = DC | | | | | |
|---|--|---|---|---|---|---|-------------|---|---|-------|---|---|-------------|-------|-------------|-------------|
| | | | | |  |  | |  |  | |  |  | | | | |
| M | Austenitic stainless steel | ≤200HB |     | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | VP15TF | M | ≤ 3.0 | 0.16 | [0.10-0.20] | M | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — | |
| | | | | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | VP15TF | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | >200HB |    | MP7130 | M | ≤ 2.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | MP7130 | M | ≤ 2.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | VP15TF | M | ≤ 2.0 | 0.16 | [0.10-0.20] | M | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — | |
| | Ferritic and martensitic Stainless steel | ≤200HB |     | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | VP15TF | M | ≤ 3.0 | 0.16 | [0.10-0.20] | M | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — | |
| | | | | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | | | VP15TF | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — | |
| | | Duplex stainless steel | ≤280HB |     | MP7130 | M | ≤ 2.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — |
| | | | | | MP7130 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | — | — | — |
| | | | | | VP15TF | M | ≤ 2.0 | 0.16 | [0.10-0.20] | M | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — |
| | | | | | VP15TF | M | ≤ 3.0 | 0.16 | [0.10-0.20] | M | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — |
| Precipitation Hardening stainless steel | <450HB |     | MP7130 | M | ≤ 2.0 | 0.13 | [0.10-0.15] | — | — | — | — | — | — | | | |
| | | | VP15TF | M | ≤ 2.0 | 0.16 | [0.10-0.20] | — | — | — | — | — | — | | | |
| | | | MP7130 | M | ≤ 2.0 | 0.13 | [0.10-0.15] | — | — | — | — | — | — | | | |
| | | | VP15TF | M | ≤ 2.0 | 0.13 | [0.10-0.15] | — | — | — | — | — | — | | | |
| K | Gray cast iron |     | MC5020 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 2.0 | 0.13 | [0.10-0.15] | |
| | | | VP15TF | R | ≤ 3.0 | 0.16 | [0.10-0.20] | R | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — | | |
| | | | MC5020 | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 2.0 | 0.13 | [0.10-0.15] | |
| | | | VP15TF | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 2.0 | 0.13 | [0.10-0.15] | |
| | Ductile cast iron | ≤800MPa |     | MC5020 | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 3.0 | 0.13 | [0.10-0.15] | M | ≤ 2.0 | 0.13 | [0.10-0.15] |
| | | | | VP15TF | R | ≤ 3.0 | 0.16 | [0.10-0.20] | R | ≤ 3.0 | 0.16 | [0.10-0.20] | — | — | — | |
| | | | | MC5020 | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 2.0 | 0.13 | [0.10-0.15] |
| | | | | VP15TF | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 3.0 | 0.13 | [0.10-0.15] | R | ≤ 2.0 | 0.13 | [0.10-0.15] |
| S | Titanium alloy |    | MP9120 | M | ≤ 2.0 | 0.10 | [0.05-0.13] | — | — | — | — | — | — | | | |
| | | | MP9130 | M | ≤ 2.0 | 0.10 | [0.05-0.13] | — | — | — | — | — | — | | | |
| | Heat resistant alloy |    | MP9120 | M | ≤ 2.0 | 0.10 | [0.05-0.13] | — | — | — | — | — | — | | | |
| | | | MP9130 | M | ≤ 2.0 | 0.10 | [0.05-0.13] | — | — | — | — | — | — | | | |
| H | Hardened steel |    | VP15TF | M | ≤ 2.0 | 0.05 | [0.05-0.10] | — | — | — | — | — | — | | | |
| | | | VP15TF | R | ≤ 2.0 | 0.05 | [0.05-0.10] | — | — | — | — | — | — | | | |
| | | | MP6120 | R | ≤ 2.0 | 0.05 | [0.05-0.10] | — | — | — | — | — | — | | | |