











TuffCut® X-AL

138CE Recommended Cutting Data - Profile Milling Inch

| Workpiece Material Group | ISO | Coolant Preferred | Profile Milling (ae) | | | | End Mill Diameter | | | | | | | | |
|---|----------|---|---|---|---|---|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | | |  |  |  |  | 1/8* | 3/16* | 1/4* | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| | |  | 10% | 20% | 30% | 50% | ae > .30D use < 1D ap ae < .20D use < 2D ap *Profile Milling at > 25% ap is not recommended for Diameters 1/4" and below. | | | | | | | | |
| | | | 3.8 | 3.1 | 2 | 1 | ← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. | | | | | | | | |
| Max. | vc - SFM | | | | fz - in/tooth | | | | | | | | | | |
| Non-Ferrous - Aluminum / Aluminum Alloys < 10% Si | N | • | 2000 | 1800 | 1200 | 900 | .0025 | .0037 | .0050 | .0062 | .0075 | .0100 | .0125 | .0150 | .0200 |
| Non-Ferrous - Aluminum / Aluminum Alloys > 10% Si | N | • | 1500 | 1200 | 1000 | 800 | .0025 | .0037 | .0050 | .0062 | .0075 | .0100 | .0125 | .0150 | .0200 |
| Non-Ferrous - Brass | N | • | 900 | 800 | 600 | 500 | .0025 | .0037 | .0050 | .0062 | .0075 | .0100 | .0125 | .0150 | .0200 |
| Non-Ferrous - Cu/Cu Alloys / Magnesium | N | • | 1000 | 800 | 600 | 500 | .0025 | .0037 | .0050 | .0062 | .0075 | .0100 | .0125 | .0150 | .0200 |
| Non-Ferrous - Plastics | N | • | 900 | 800 | 600 | 500 | .0025 | .0037 | .0050 | .0062 | .0075 | .0100 | .0125 | .0150 | .0200 |

Above 20,000 RPM, Tool Balancing Required

138CE Recommended Cutting Data - Profile Milling Metric

| Workpiece Material Group | ISO | Coolant Preferred | Profile Milling (ae) | | | | End Mill Diameter (mm) | | | | |
|---|------------|---|---|---|---|---|--|-------|-------|-------|-------|
| | | |  |  |  |  | 6* | 8 | 10 | 14 | 16 |
| | |  | 10% | 20% | 30% | 50% | ae > .30D use < 1D ap ae < .20D use < 2D ap *Profile milling at > 25% ap is not recommended for Diameters 6mm and below. | | | | |
| | | | 3.8 | 3.1 | 2 | 1 | ← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. | | | | |
| Max. | vc - m/min | | | | fz - mm/tooth | | | | | | |
| Non-Ferrous - Aluminum / Aluminum Alloys < 10% Si | N | • | 600 | 550 | 365 | 275 | .1200 | .1600 | .2000 | .2800 | .3200 |
| Non-Ferrous - Aluminum / Aluminum Alloys > 10% Si | N | • | 450 | 365 | 305 | 250 | .1200 | .1600 | .2000 | .2800 | .3200 |
| Non-Ferrous - Brass | N | • | 275 | 250 | 180 | 150 | .1200 | .1600 | .2000 | .2800 | .3200 |
| Non-Ferrous - Cu/Cu Alloys / Magnesium | N | • | 300 | 250 | 180 | 150 | .1200 | .1600 | .2000 | .2800 | .3200 |
| Non-Ferrous - Plastics | N | • | 275 | 250 | 180 | 150 | .1200 | .1600 | .2000 | .2800 | .3200 |





Above 20,000 RPM, Tool Balancing Required

Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:

$$\frac{\text{Calculated Feed} \times \text{Spindle Maximum}}{\text{Calculated Speed}}$$



TuffCut® X-AL

138CE Recommended Cutting Data - Slotting Inch

| Workpiece Material Group | I S O | Coolant • Preferred  | Slotting | | | End Mill Diameter | | | | | | | | |
|---|-------------|---|---|---|---|--|---------------|-------|-------|-------|-------|-------|-------|-------|
| | | |  |  |  | 1/8* | 3/16* | 1/4* | 5/16 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
| | | | 25% | 50% | 100% | *Slotting at > 25% ap is not recommended for diameters 1/4" and below. | | | | | | | | |
| | | | Max. | vc - SFM | | | fz - in/tooth | | | | | | | |
| Non-Ferrous - Aluminum / Aluminum Alloys < 10% Si | N | • | 2000 | 1500 | 1000 | .0012 | .0018 | .0025 | .0031 | .0037 | .0050 | .0065 | .0075 | .0100 |
| Non-Ferrous - Aluminum / Aluminum Alloys > 10% Si | N | • | 1500 | 1200 | 800 | .0012 | .0018 | .0025 | .0031 | .0037 | .0050 | .0065 | .0075 | .0100 |
| Non-Ferrous - Brass | N | • | 600 | 500 | 400 | .0018 | .0025 | .0032 | .0040 | .0050 | .0065 | .0075 | .0100 | .0120 |
| Non-Ferrous - Cu/Cu Alloys / Magnesium | N | • | 500 | 400 | 300 | .0018 | .0025 | .0032 | .0040 | .0050 | .0065 | .0075 | .0100 | .0120 |
| Non-Ferrous - Plastics | N | • | 1200 | 1000 | 800 | .0018 | .0025 | .0032 | .0040 | .0050 | .0065 | .0075 | .0100 | .0120 |

Above 20,000 RPM, Tool Balancing Required

138CE Recommended Cutting Data - Slotting Metric

| Workpiece Material Group | I S O | Coolant • Preferred  | Slotting | | | End Mill Diameter (mm) | | | | | |
|---|-------------|---|---|---|---|---|---------------|-------|-------|-------|-------|
| | | |  |  |  | 6* | 8 | 10 | 14 | 16 | 20 |
| | | | 25% | 50% | 100% | *Slotting at > 25% ap is not recommended for diameters 6mm and below. | | | | | |
| | | | Max. | vc - m/min | | | fz - mm/tooth | | | | |
| Non-Ferrous - Aluminum / Aluminum Alloys < 10% Si | N | • | 600 | 450 | 300 | .0630 | .0780 | .0930 | .1270 | .1650 | .1900 |
| Non-Ferrous - Aluminum / Aluminum Alloys > 10% Si | N | • | 450 | 365 | 250 | .0630 | .0780 | .0930 | .1270 | .1650 | .1900 |
| Non-Ferrous - Brass | N | • | 180 | 150 | 120 | .0810 | .1010 | .1270 | .1650 | .1900 | .2540 |
| Non-Ferrous - Cu/Cu Alloys / Magnesium | N | • | 150 | 120 | 90 | .0810 | .1010 | .1270 | .1650 | .1900 | .2540 |
| Non-Ferrous - Plastics | N | • | 365 | 300 | 250 | .0810 | .1010 | .1270 | .1650 | .1900 | .2540 |

Above 20,000 RPM, Tool Balancing Required

Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:

$$\frac{\text{Calculated Feed} \times \text{Spindle Maximum}}{\text{Calculated Speed}}$$