Mil-Tec Freedom Insert Recommendation Speed and Feed Data for 304SS / 316SS

304 and 316 Stainless Steel are popular grades of stainless steel. Both are austenitic stainless and contain nickel and chromium. 304SS is the most popular grade and is more affordable and machinable. 316SS has more corrosion resistance and slightly more difficult to machine. Both grades can be gummy making it difficult to break the chip or produce a burr free edge. Work hardening while machining can also be a problem so correct speeds and feeds are critical.

Insert Recommendation: The flexibility of the Freedom Cutter allows for a wide selection of inserts to be used. Our recommendation lists the most common inserts that should work well in a variety of applications. Please consider available horsepower, spindle speed and overall rigidity of the work-holding. Visit the Tool Alliance YouTube channel, there are several videos demonstrating the Freedom cutter milling 304 stainless steel.

Octagon	Geometry	Grade	Coating	Application
O-SS-062-5-1-TA EDP 50051TA	SS Super Shear High Dish SmoothGrind®	5-1	TA	Light duty, finishing, knee mill or low HP machine
O-PS-062-5-1-TA EDP 60051TA	PS Power Shear Medium Dish SmoothGrind®	5-1	TA	Medium duty, general milling, 40 taper CNC
O-MS-062-5-2-TA EDP 80052TA	MS Mag-Na-Shear Pre-Formed Utility Ground	5-2	TA	General milling, roughing with chip-breakers for free cutting. Not recommended for finishing.
O-NP-062-5-2-TA EDP 70052TA	NP Negative / Positive Frustroconical Land SmoothGrind®	5-2	TA	General milling, aggressive roughing with strongest edge. Heat treated alloys.

Note: Effective cutter diameter is reduced .375” with the octagon.

Round	Geometry	Grade	Coating	
R-PS-312-5-1-TA EDP 61051TA	PS Power Shear Medium Dish SmoothGrind®	5-1	TA	Medium duty, general milling, 40 taper CNC
R-NP-312-5-2-TA EDP 71052TA	NP Negative / Positive Frustroconical Land SmoothGrind®	5-2	TA	General milling, aggressive roughing with strongest edge. Heat treated alloys.

Note: Effective cutter diameter is reduced .625” with the round.

Square	Geometry	Grade	Coating	
S-PS-032-5-1-TA EDP 62351TA (.032” Rad)	PS Power Shear Medium Dish SmoothGrind®	5-1	TA	Medium duty, general milling, 40 taper CNC
S-NP-032-5-2-TA EDP 72352TA (.032” Rad)	NP Negative / Positive Frustroconical Land SmoothGrind®	5-2	TA	General milling, aggressive roughing with strongest edge. Heat treated alloys.

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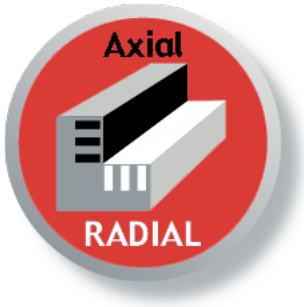
Mil-Tec Speed and Feed Data - 304SS / 316SS

Speed and feed recommendations based a radial DOC of 2/3 width of cutter and dry (no coolant) milling.

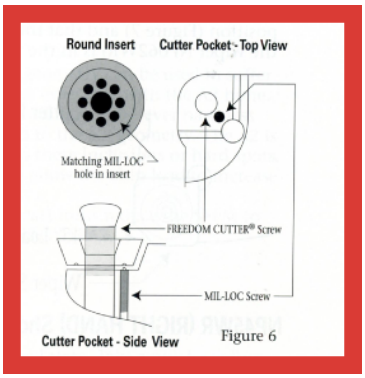
The **Octagon** shape is ideal for general facing in 304 and 316 stainless steel. The 45º lead provides chip thinning and overall stability by directing cutting forces into the spindle. The SS and PS geometry produces hi-shear cutting resulting in reduced cutting forces, heat generation, chip weld and material smearing. Ideal for lighter duty CNC's and finishing cuts. The MS Mag-Na-Shear is a medium duty geometry, free cutting similar to SS and PS but with additional edge strength for higher chip loads. The NP Geometry is high strength and ideal for heavy cuts and higher chip loads. Perfect for roughing cuts. Note: Dry machining is recommended.

Octagon	Speed / SFPM	Feed / CPT	Axial DOC
O-SS-062-5-1-TA EDP 50051TA	Start Point 900 Range 700 - 1000	Start Point .004" Range .003" - .008"	Start Point .050" .000" - .150"
O-PS-062-5-1-TA EDP 60051TA	Start Point 900 Range 700 - 1000	Start Point .006" Range .006" - .010"	Start Point .050" .000" - .150"
O-MS-062-5-2-TA EDP 80052TA	Start Point 900 Range 700 - 1000	Start Point .006" Range .006" - .012"	Start Point .075" .000" - .150"
O-NP-062-5-2-TA EDP 70052TA	Start Point 900 Range 700 - 1000	Start Point .008" Range .006" - .012"	Start Point .075" .000" - .150"



Round inserts provide maximum strength and chip thinning. A .090" axial DOC or less allows for eight insert indexes, greater than .090" results in four indexes. The PS Power Shear Geometry is ideal in lighter machines and the NP Negative / Positive is for more robust equipment and applications. Round Freedom cutter inserts include the Mil-Loc feature. Using the 1/16" hex key, raise the Mil-Tec screw .030" into the insert pocket. Locate the insert so the Ml-Loc screw matches the indents on the back of the insert. This feature keeps the insert from spinning under load and ensures eight even indexes. Note: Dry machining is recommended.

Round	Speed / SFPM	Feed / CPT	Axial DOC
R-PS-312-5-1-TA EDP 61051TA	Start Point 900 Range 700 - 1000	Start Point .005" Range .003" - .008"	Start Point .050"
R-NP-312-5-2-TA EDP 71052TA	Start Point 900 Range 700 - 1000	Start Point .009" Range .006" - .012"	Start Point .075"



Freedom Cutter **Square** inserts are available in 10 different corner radius configurations. From a square corner with zero radius to .250". Freedom cutter square inserts come in two configurations, standard square with four cutting edges and Square 90º with two. The PS Power Shear Geometry is ideal in lighter machines and the NP Negative / Positive is for more robust equipment and applications. Note: Dry machining is recommended.

Square	Speed / SFPM	Feed / CPT	Axial DOC	
S-PS-032-5-1-TA EDP 62351TA	Start Point 900 Range 700 - 1000	Start Point .004" Range .003" - .008"	Start Point .050" .000" - .100"	If axial DOC exceeds .100" use caution as side cutting forces my cause chatter.
S-NP-032-5-2-TA EDP 72352TA	Start Point 900 Range 700 - 1000	Start Point .008" Range .006" - .012"	Start Point .075" .000" - .100"	If axial DOC exceeds .100" use caution as side cutting forces my cause chatter.