

MILLING - SCFM

PRIMO LINE™

Cutter Series

P3N1F

Cylindrical shank

P3N2F

Cylindrical shank

Coolant thru

Geometry

3-flute, coolant thru (Ø .250" and larger), variable pitch, variable helix

Diameter Range

.125-1.000"

Depth of Cut

4x, 5x, 6x, and 7xD APMX

Grade

IN05S

Lead Angle

90°

Corner Radius

.008", .015", .030", .060", .090", .125"

Materials

■ Aluminum alloys

PRIMOALUF™

NEW

Premium 3-Flute, Solid Carbide 90° End Mills, Ideal for Finishing Aluminum Alloys

- » Unique geometry with variable pitch and variable helix disrupts vibrations in long reach applications
- » 4x, 5x, 6x, and 7xD APMX "depth-of-cut" maximum provides a deep reach capability
- » No vibration when milling into corners with same radius as the tool
- » Coolant thru to assist with chip control and evacuation, and reduce heat



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Overview

PrimoLine, Ingersoll's new, premium, solid carbide end mill product line features **PrimoAluF**, the robust 3-flute end mills for aluminum pre-finishing and finishing applications.

FEATURES & BENEFITS:

- Unique geometry disrupts vibrations in long reach applications
- Variable pitch and variable helix to assist with vibration control
- No vibration when milling into corners with the same radius as the tool
- 4x, 5x, 6x, and 7xD depth-of-cut (APMX)
- Coolant thru to assist with chip control and evacuation



Coolant Thru*

Coolant helps with temperature control in the cutting area. It assists with chip evacuation resulting in a cleaner work area too.

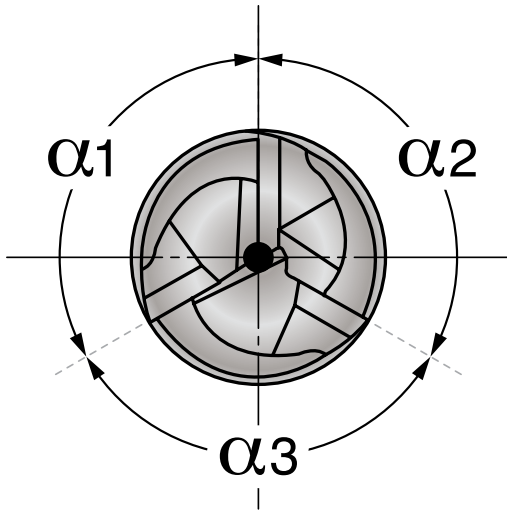
*Available on .250" DC or larger.

Unique Geometry

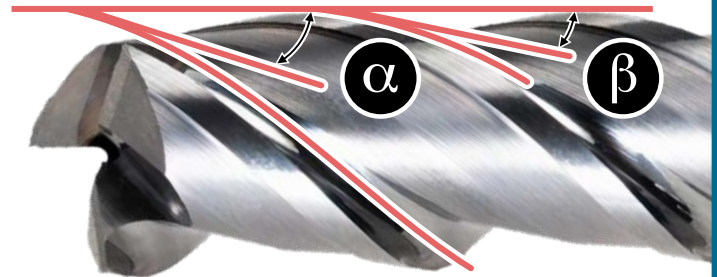
Disrupts harmonic vibrations, enabling incredible finishing results at deep depths-of-cut (APMX).



Variable Pitch and Variable Helix

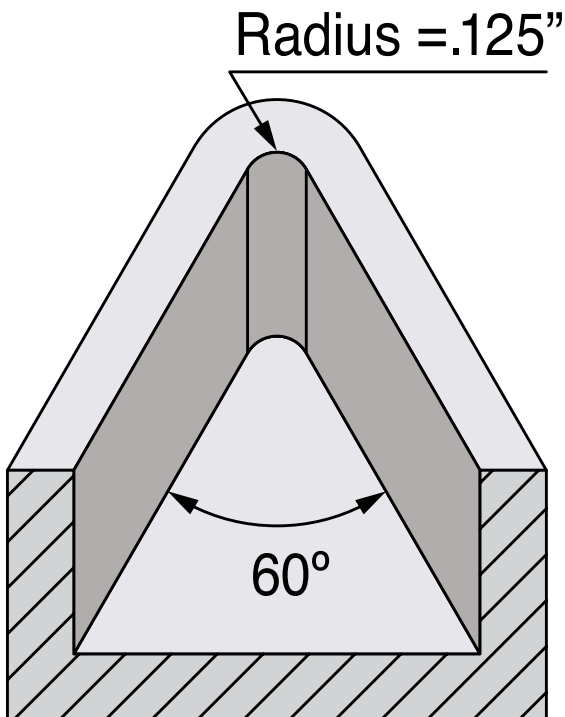


$$\alpha 1 \neq \alpha 2 \neq \alpha 3$$



$$\alpha \neq \beta$$

No Feed Reduction Needed in Extreme Cutting Conditions



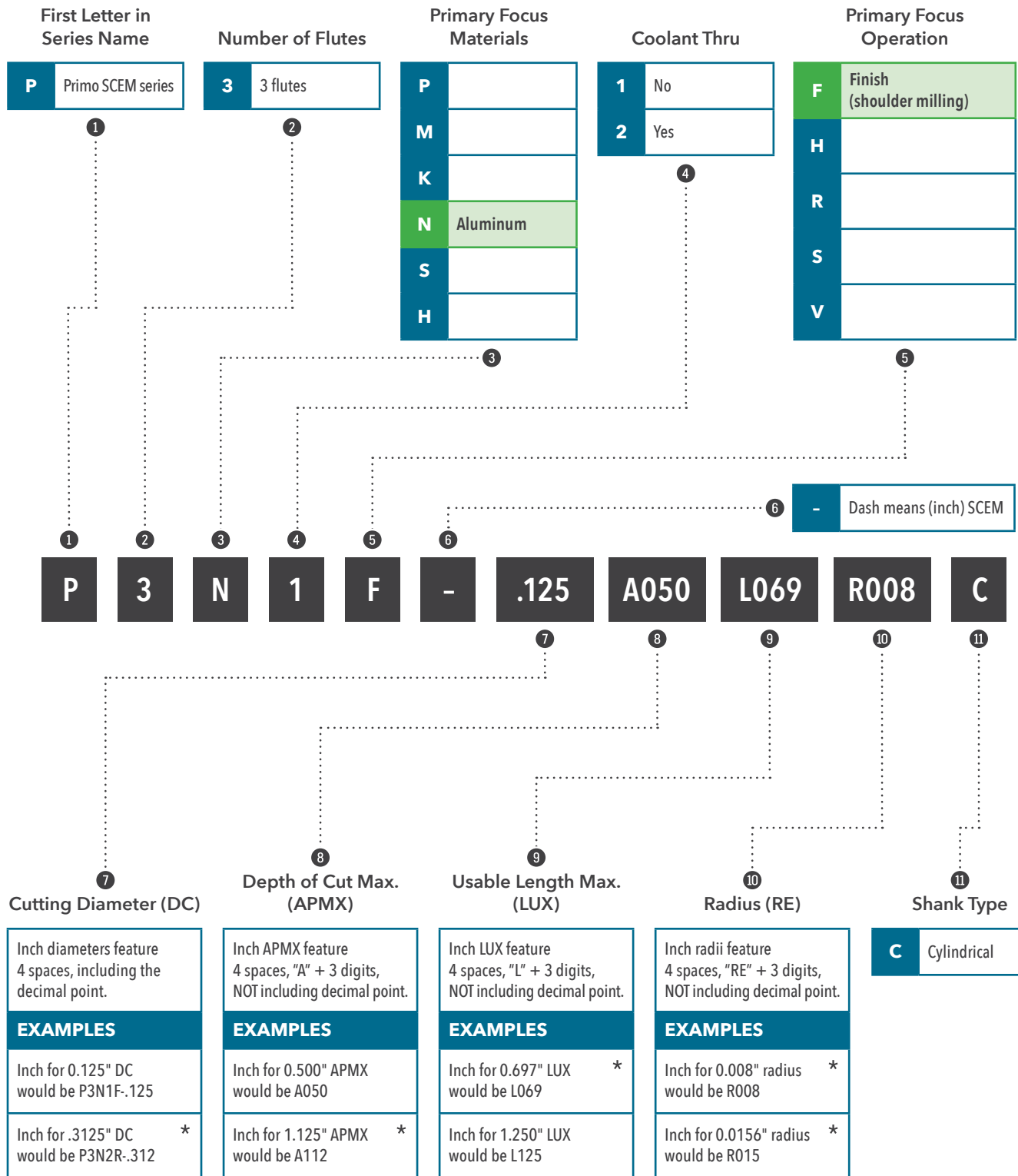
EXAMPLE

- Workpiece corner profile: Radius = .125"
- Diameter of SCEM tool: .250"

SUMMARY

In this case, the workpiece corner profile has the same radius as the tool. There is no need to reduce the feed rate when programming movements are $\leq 90^\circ$ with **PrimoAlu SCEM**. Programming tricks that slow down the tool are not needed. **PrimoAlu's** unique design disrupts harmonic vibrations and prevents the tool from being drawn into part during full-radius engagement. Therefore, **"higher productivity"** can be achieved while providing a straight and true finish without vibration or chatter marks.

Solid Carbide End Mill (SCEM) Part Number Nomenclature

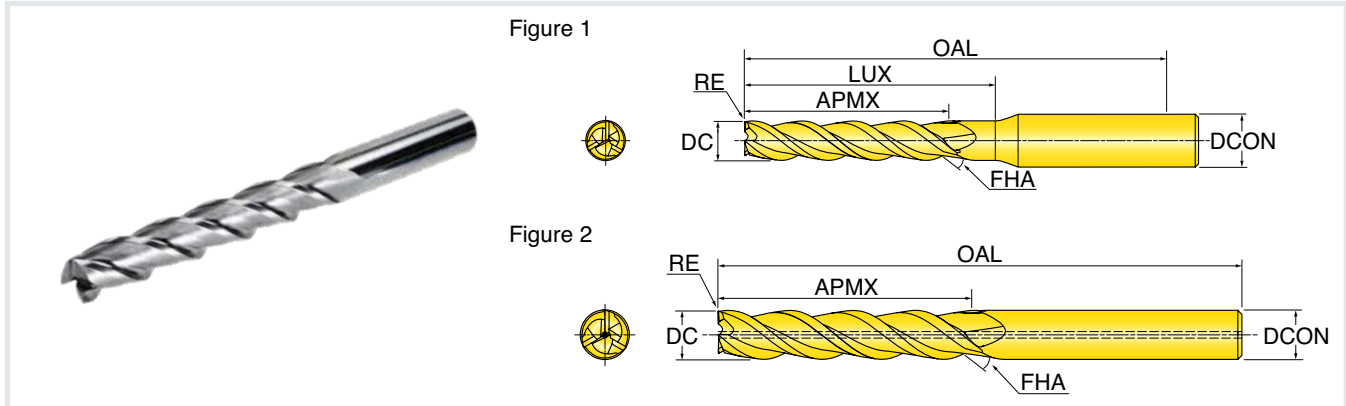


*Measurement is truncated, predicting the fractional equivalent.



Series P3N1F- & P3N2F- (Primo-Alu_F)

3-FLUTE SCEM 90°

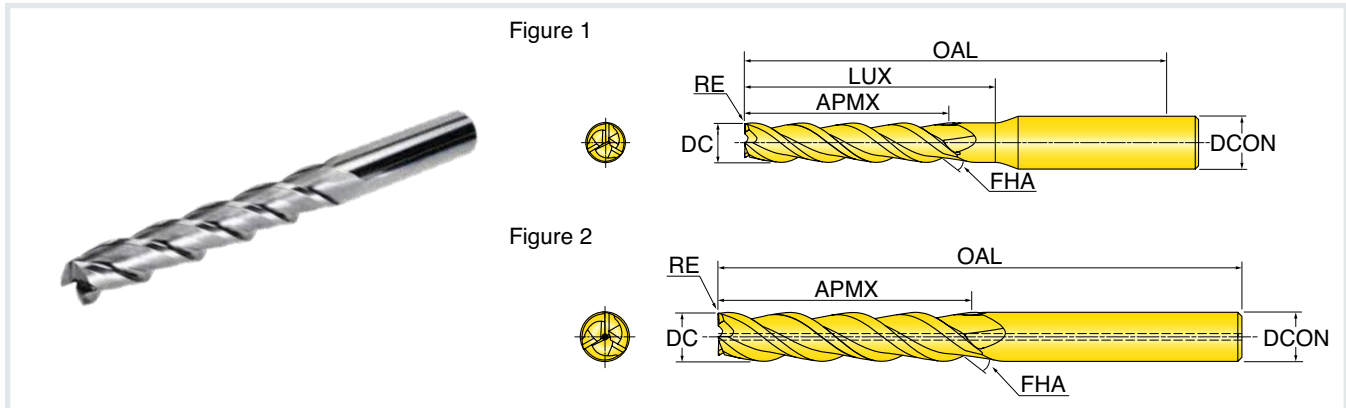


Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZE Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N1F-.125A050L069R008C	0.1250	0.008	0.500	0.697	4×	2.50	3	0.250	No	1
P3N1F-.125A062L082R008C	0.1250	0.008	0.625	0.827	5×	2.63	3	0.250	No	1
P3N1F-.125A075L094R008C	0.1250	0.008	0.750	0.945	6×	2.75	3	0.250	No	1
P3N1F-.125A087L106R008C	0.1250	0.008	0.875	1.063	7×	2.88	3	0.250	No	1
P3N1F-.156A062L084R008C	0.1562	0.008	0.625	0.846	4×	2.63	3	0.250	No	1
P3N1F-.156A078L100R008C	0.1562	0.008	0.781	1.004	5×	2.75	3	0.250	No	1
P3N1F-.156A093L116R008C	0.1562	0.008	0.938	1.161	6×	2.88	3	0.250	No	1
P3N1F-.156A109L131R008C	0.1562	0.008	1.094	1.311	7×	3.00	3	0.250	No	1
P3N1F-.187A075L102R008C	0.1875	0.008	0.750	1.024	4×	2.75	3	0.250	No	1
P3N1F-.187A093L121R008C	0.1875	0.008	0.938	1.213	5×	2.88	3	0.250	No	1
P3N1F-.187A112L140R008C	0.1875	0.008	1.125	1.402	6×	3.13	3	0.250	No	1
P3N1F-.187A131L159R008C	0.1875	0.008	1.312	1.594	7×	3.25	3	0.250	No	1
P3N2F-.250A100R008C	0.2500	0.008	1.000	-	4×	2.75	3	0.250	Yes	2
P3N2F-.250A125R008C	0.2500	0.008	1.250	-	5×	3.00	3	0.250	Yes	2
P3N2F-.250A150R008C	0.2500	0.008	1.500	-	6×	3.25	3	0.250	Yes	2
P3N2F-.250A175R008C	0.2500	0.008	1.750	-	7×	3.50	3	0.250	Yes	2
P3N2F-.250A100R015C	0.2500	0.015	1.000	-	4×	2.75	3	0.250	Yes	2
P3N2F-.250A125R015C	0.2500	0.015	1.250	-	5×	3.00	3	0.250	Yes	2
P3N2F-.250A150R015C	0.2500	0.015	1.500	-	6×	3.25	3	0.250	Yes	2
P3N2F-.250A175R015C	0.2500	0.015	1.750	-	7×	3.50	3	0.250	Yes	2



Series P3N1F- & P3N2F- (Primo-Alu_F) *continued*

3-FLUTE SCEM 90°

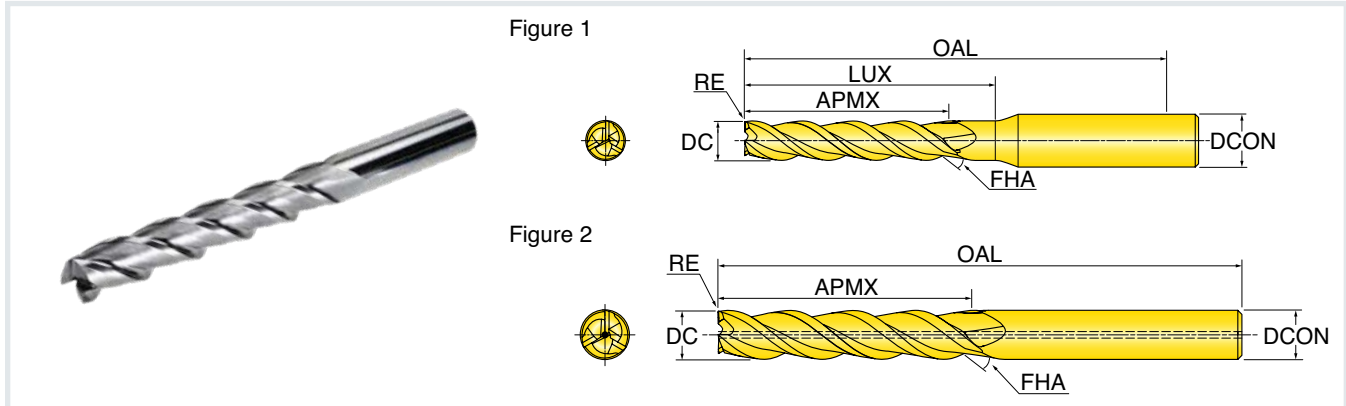


Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZEFF Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N2F-.312A125R008C	0.3125	0.008	1.250	-	4×	3.25	3	0.313	Yes	2
P3N2F-.312A156R008C	0.3125	0.008	1.562	-	5×	3.75	3	0.313	Yes	2
P3N2F-.312A187R008C	0.3125	0.008	1.875	-	6×	4.00	3	0.313	Yes	2
P3N2F-.312A218R008C	0.3125	0.008	2.188	-	7×	4.25	3	0.313	Yes	2
P3N2F-.312A125R015C	0.3125	0.015	1.250	-	4×	3.25	3	0.313	Yes	2
P3N2F-.312A156R015C	0.3125	0.015	1.562	-	5×	3.75	3	0.313	Yes	2
P3N2F-.312A187R015C	0.3125	0.015	1.875	-	6×	4.00	3	0.313	Yes	2
P3N2F-.312A218R015C	0.3125	0.015	2.188	-	7×	4.25	3	0.313	Yes	2
P3N2F-.375A150R008C	0.3750	0.008	1.500	-	4×	3.50	3	0.375	Yes	2
P3N2F-.375A187R008C	0.3750	0.008	1.875	-	5×	4.00	3	0.375	Yes	2
P3N2F-.375A225R008C	0.3750	0.008	2.250	-	6×	4.25	3	0.375	Yes	2
P3N2F-.375A262R008C	0.3750	0.008	2.625	-	7×	4.75	3	0.375	Yes	2
P3N2F-.375A150R015C	0.3750	0.015	1.500	-	4×	3.50	3	0.375	Yes	2
P3N2F-.375A187R015C	0.3750	0.015	1.875	-	5×	4.00	3	0.375	Yes	2
P3N2F-.375A225R015C	0.3750	0.015	2.250	-	6×	4.25	3	0.375	Yes	2
P3N2F-.375A262R015C	0.3750	0.015	2.625	-	7×	4.75	3	0.375	Yes	2



Series P3N1F- & P3N2F- (Primo-Alu_F) *continued*

3-FLUTE SCEM 90°

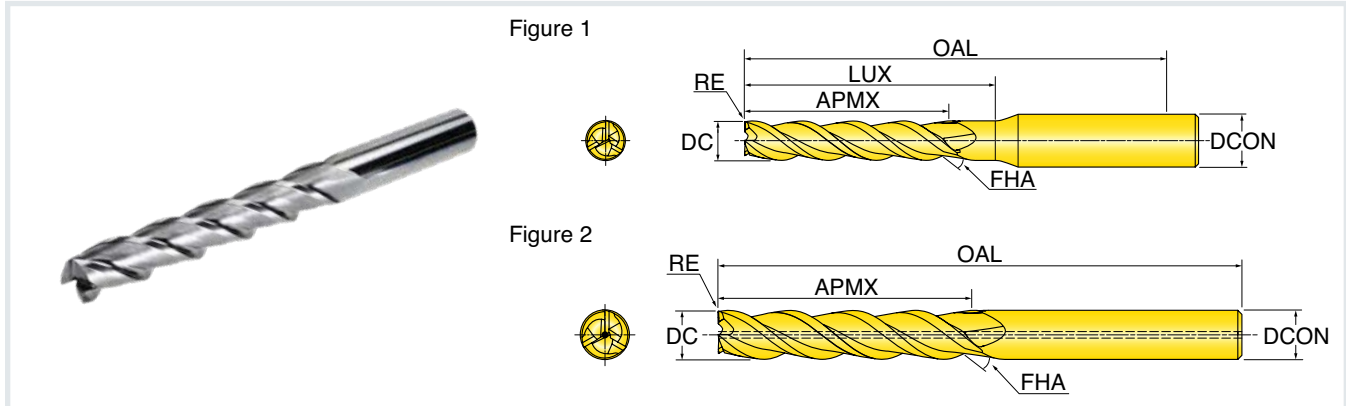


Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZEFF Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N2F-.500A200R008C	0.5000	0.008	2.000	-	4×	4.25	3	0.500	Yes	2
P3N2F-.500A250R008C	0.5000	0.008	2.500	-	5×	4.75	3	0.500	Yes	2
P3N2F-.500A300R008C	0.5000	0.008	3.000	-	6×	5.25	3	0.500	Yes	2
P3N2F-.500A350R008C	0.5000	0.008	3.500	-	7×	5.75	3	0.500	Yes	2
P3N2F-.500A200R015C	0.5000	0.015	2.000	-	4×	4.25	3	0.500	Yes	2
P3N2F-.500A250R015C	0.5000	0.015	2.500	-	5×	4.75	3	0.500	Yes	2
P3N2F-.500A300R015C	0.5000	0.015	3.000	-	6×	5.25	3	0.500	Yes	2
P3N2F-.500A350R015C	0.5000	0.015	3.500	-	7×	5.75	3	0.500	Yes	2
P3N2F-.500A200R030C	0.5000	0.030	2.000	-	4×	4.25	3	0.500	Yes	2
P3N2F-.500A250R030C	0.5000	0.030	2.500	-	5×	4.75	3	0.500	Yes	2
P3N2F-.500A300R030C	0.5000	0.030	3.000	-	6×	5.25	3	0.500	Yes	2
P3N2F-.500A350R030C	0.5000	0.030	3.500	-	7×	5.75	3	0.500	Yes	2
P3N2F-.500A200R060C	0.5000	0.060	2.000	-	4×	4.25	3	0.500	Yes	2
P3N2F-.500A250R060C	0.5000	0.060	2.500	-	5×	4.75	3	0.500	Yes	2
P3N2F-.500A300R060C	0.5000	0.060	3.000	-	6×	5.25	3	0.500	Yes	2
P3N2F-.500A350R060C	0.5000	0.060	3.500	-	7×	5.75	3	0.500	Yes	2
P3N2F-.500A200R125C	0.5000	0.125	2.000	-	4×	4.25	3	0.500	Yes	2
P3N2F-.500A250R125C	0.5000	0.125	2.500	-	5×	4.75	3	0.500	Yes	2
P3N2F-.500A300R125C	0.5000	0.125	3.000	-	6×	5.25	3	0.500	Yes	2
P3N2F-.500A350R125C	0.5000	0.125	3.500	-	7×	5.75	3	0.500	Yes	2



Series P3N1F- & P3N2F- (Primo-Alu_F) *continued*

3-FLUTE SCEM 90°

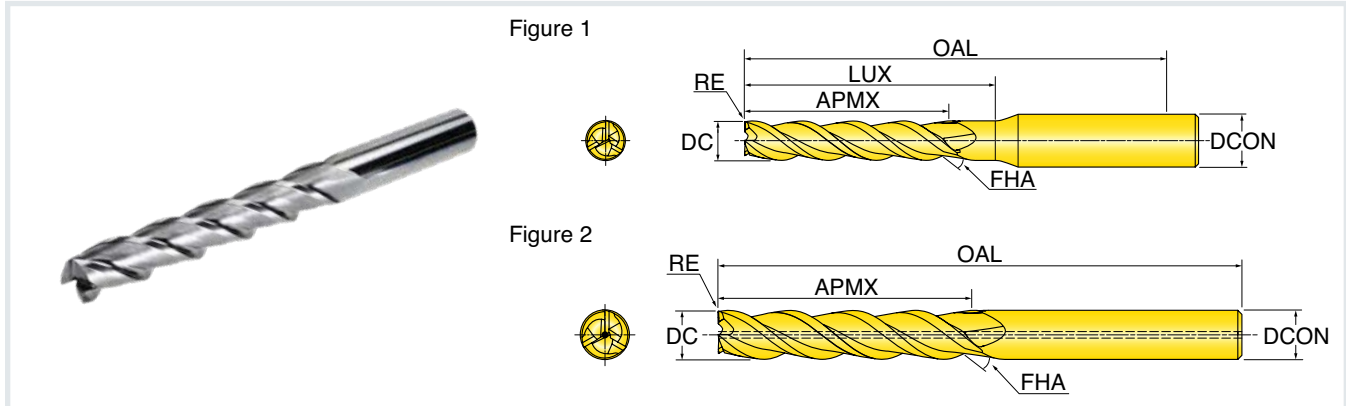


Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZEFF Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N2F-.625A250R008C	0.6250	0.008	2.500	-	4×	5.25	3	0.625	Yes	2
P3N2F-.625A312R008C	0.6250	0.008	3.125	-	5×	6.00	3	0.625	Yes	2
P3N2F-.625A375R008C	0.6250	0.008	3.750	-	6×	6.50	3	0.625	Yes	2
P3N2F-.625A437R008C	0.6250	0.008	4.375	-	7×	7.25	3	0.625	Yes	2
P3N2F-.625A250R015C	0.6250	0.015	2.500	-	4×	5.25	3	0.625	Yes	2
P3N2F-.625A312R015C	0.6250	0.015	3.125	-	5×	6.00	3	0.625	Yes	2
P3N2F-.625A375R015C	0.6250	0.015	3.750	-	6×	6.50	3	0.625	Yes	2
P3N2F-.625A437R015C	0.6250	0.015	4.375	-	7×	7.25	3	0.625	Yes	2
P3N2F-.625A250R030C	0.6250	0.030	2.500	-	4×	5.25	3	0.625	Yes	2
P3N2F-.625A312R030C	0.6250	0.030	3.125	-	5×	6.00	3	0.625	Yes	2
P3N2F-.625A375R030C	0.6250	0.030	3.750	-	6×	6.50	3	0.625	Yes	2
P3N2F-.625A437R030C	0.6250	0.030	4.375	-	7×	7.25	3	0.625	Yes	2
P3N2F-.625A250R060C	0.6250	0.060	2.500	-	4×	5.25	3	0.625	Yes	2
P3N2F-.625A312R060C	0.6250	0.060	3.125	-	5×	6.00	3	0.625	Yes	2
P3N2F-.625A375R060C	0.6250	0.060	3.750	-	6×	6.50	3	0.625	Yes	2
P3N2F-.625A437R060C	0.6250	0.060	4.375	-	7×	7.25	3	0.625	Yes	2
P3N2F-.625A250R125C	0.6250	0.125	2.500	-	4×	5.25	3	0.625	Yes	2
P3N2F-.625A312R125C	0.6250	0.125	3.125	-	5×	6.00	3	0.625	Yes	2
P3N2F-.625A375R125C	0.6250	0.125	3.750	-	6×	6.50	3	0.625	Yes	2
P3N2F-.625A437R125C	0.6250	0.125	4.375	-	7×	7.25	3	0.625	Yes	2



Series P3N1F- & P3N2F- (Primo-Alu_F) *continued*

3-FLUTE SCEM 90°

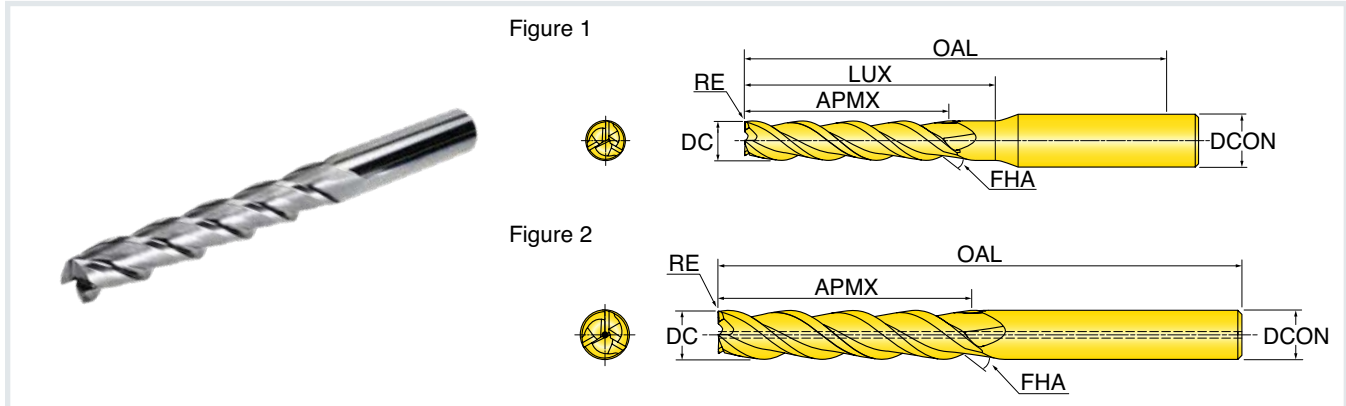


Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZEFF Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N2F-.750A300R008C	0.7500	0.008	3.000	-	4×	6.00	3	0.750	Yes	2
P3N2F-.750A375R008C	0.7500	0.008	3.750	-	5×	6.75	3	0.750	Yes	2
P3N2F-.750A450R008C	0.7500	0.008	4.500	-	6×	7.50	3	0.750	Yes	2
P3N2F-.750A525R008C	0.7500	0.008	5.250	-	7×	8.25	3	0.750	Yes	2
P3N2F-.750A300R030C	0.7500	0.030	3.000	-	4×	6.00	3	0.750	Yes	2
P3N2F-.750A375R030C	0.7500	0.030	3.750	-	5×	6.75	3	0.750	Yes	2
P3N2F-.750A450R030C	0.7500	0.030	4.500	-	6×	7.50	3	0.750	Yes	2
P3N2F-.750A525R030C	0.7500	0.030	5.250	-	7×	8.25	3	0.750	Yes	2
P3N2F-.750A300R060C	0.7500	0.060	3.000	-	4×	6.00	3	0.750	Yes	2
P3N2F-.750A375R060C	0.7500	0.060	3.750	-	5×	6.75	3	0.750	Yes	2
P3N2F-.750A450R060C	0.7500	0.060	4.500	-	6×	7.50	3	0.750	Yes	2
P3N2F-.750A525R060C	0.7500	0.060	5.250	-	7×	8.25	3	0.750	Yes	2
P3N2F-.750A300R090C	0.7500	0.090	3.000	-	4×	6.00	3	0.750	Yes	2
P3N2F-.750A375R090C	0.7500	0.090	3.750	-	5×	6.75	3	0.750	Yes	2
P3N2F-.750A450R090C	0.7500	0.090	4.500	-	6×	7.50	3	0.750	Yes	2
P3N2F-.750A525R090C	0.7500	0.090	5.250	-	7×	8.25	3	0.750	Yes	2
P3N2F-.750A300R125C	0.7500	0.125	3.000	-	4×	6.00	3	0.750	Yes	2
P3N2F-.750A375R125C	0.7500	0.125	3.750	-	5×	6.75	3	0.750	Yes	2
P3N2F-.750A450R125C	0.7500	0.125	4.500	-	6×	7.50	3	0.750	Yes	2
P3N2F-.750A525R125C	0.7500	0.125	5.250	-	7×	8.25	3	0.750	Yes	2



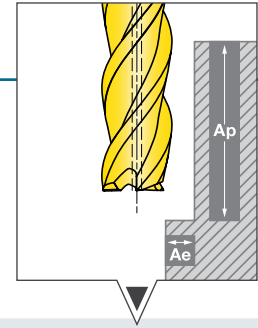
Series P3N1F- & P3N2F- (Primo-Alu_F) *continued*

3-FLUTE SCEM 90°



Part Number	DC Cutting Diameter	RE Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	ULDR Usable Length Diameter Ratio	OAL Overall Length	ZEFF Eff. Teeth	DCON Shank Diameter	CSP Coolant	Figure
INCH										
P3N2F-1.00A400R008C	1.0000	0.008	4.000	-	4×	7.25	3	1.000	Yes	2
P3N2F-1.00A500R008C	1.0000	0.008	5.000	-	5×	8.25	3	1.000	Yes	2
P3N2F-1.00A600R008C	1.0000	0.008	6.000	-	6×	9.25	3	1.000	Yes	2
P3N2F-1.00A700R008C	1.0000	0.008	7.000	-	7×	10.25	3	1.000	Yes	2
P3N2F-1.00A400R030C	1.0000	0.030	4.000	-	4×	7.25	3	1.000	Yes	2
P3N2F-1.00A500R030C	1.0000	0.030	5.000	-	5×	8.25	3	1.000	Yes	2
P3N2F-1.00A600R030C	1.0000	0.030	6.000	-	6×	9.25	3	1.000	Yes	2
P3N2F-1.00A700R030C	1.0000	0.030	7.000	-	7×	10.25	3	1.000	Yes	2
P3N2F-1.00A400R060C	1.0000	0.060	4.000	-	4×	7.25	3	1.000	Yes	2
P3N2F-1.00A500R060C	1.0000	0.060	5.000	-	5×	8.25	3	1.000	Yes	2
P3N2F-1.00A600R060C	1.0000	0.060	6.000	-	6×	9.25	3	1.000	Yes	2
P3N2F-1.00A700R060C	1.0000	0.060	7.000	-	7×	10.25	3	1.000	Yes	2
P3N2F-1.00A400R090C	1.0000	0.090	4.000	-	4×	7.25	3	1.000	Yes	2
P3N2F-1.00A500R090C	1.0000	0.090	5.000	-	5×	8.25	3	1.000	Yes	2
P3N2F-1.00A600R090C	1.0000	0.090	6.000	-	6×	9.25	3	1.000	Yes	2
P3N2F-1.00A700R090C	1.0000	0.090	7.000	-	7×	10.25	3	1.000	Yes	2
P3N2F-1.00A400R125C	1.0000	0.125	4.000	-	4×	7.25	3	1.000	Yes	2
P3N2F-1.00A500R125C	1.0000	0.125	5.000	-	5×	8.25	3	1.000	Yes	2
P3N2F-1.00A600R125C	1.0000	0.125	6.000	-	6×	9.25	3	1.000	Yes	2
P3N2F-1.00A700R125C	1.0000	0.125	7.000	-	7×	10.25	3	1.000	Yes	2

Operating Guidelines



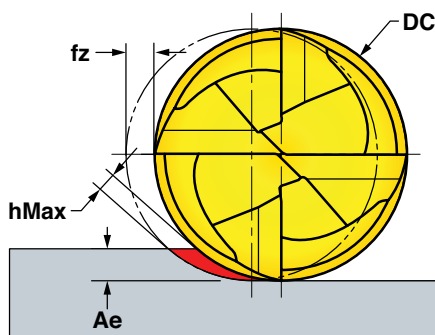
Materials				Vc Cutting Speed SFM	DC Cutting Diameter (inch)	Finish Shoulder Milling *fz Feed Per Tooth (ipt)
ISO	Material Group #VDI 3323	Type	Examples			Ap ≤ 7xD Ae ≤ 0.02xD
N	21-30	Aluminum alloys	7075, 6061	490-3300	.125	.0012-.0024
					.156	.0012-.0024
					.187	.0012-.0024
					.250	.0016-.0031
					.312	.0016-.0031
					.375	.0020-.0039
					.500	.0020-.0047
					.625	.0020-.0047
					.750	.0024-.0059
					1.00	.0024-.0059

*fz = chip thinning calculations are included in the chip load above, especially when $Ae \leq .25xD$.

- High pressure coolant is highly recommended, as it will provide optimal chip evacuation and performance.
- A coolant thru (CX series) shrink fit holder is recommended for clamping and ideal coolant flow. Using a inferior holder could impact performance.

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may necessitate adjustments in speed or feed. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

Chip Thinning



- Due to the lower radial engagement, *chip thinning* is accentuated, and a much higher feed-per-tooth (fz) can be applied in order to arrive at the true chip thickness (hMax).
- When $Ae \leq .25xD$, recommend use of **Chip Thinning Calculator** to ensure hMax is within fz range.
- If needed, Chip Thinning Calculator can be found on our website Machining App.

