sutton®

ALUMINIUM MACHINING

Dynamic & Trochoidal Milling

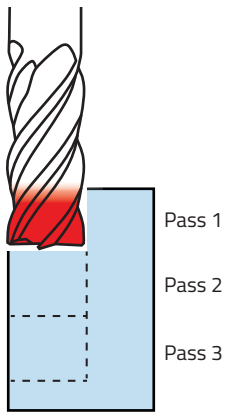
Dynamic & Trochoidal Milling strategies provide a tool engagement angle with the workpiece that utilises more of the cutting edge of the tool, ensuring a stable process, shorter machining times & longer tool life.

They also apply a lower radial step-over (ae) and a higher depth of cut (ap), spreading the wear, loads and heat across the entire cutting edge.

This method of milling adjusts the parameters to maintain a constant load on the tool, providing more aggressive metal removal rates (MRR).

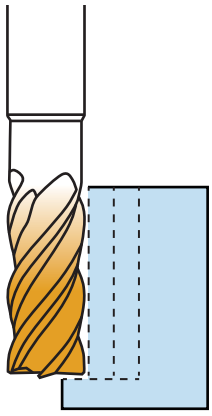
To use this technique, it requires a CAM package to generate the tool path on virtually any CNC machine.

Traditional



Traditional methods are typically higher step-over & lower depth of cut.

Trochoidal



Dynamic & Trochoidal is mostly based on the theory of radial chip thinning that occurs with varying ae which relates to chip thickness and feed per tooth.

Advantages of Dynamic & Trochoidal Milling

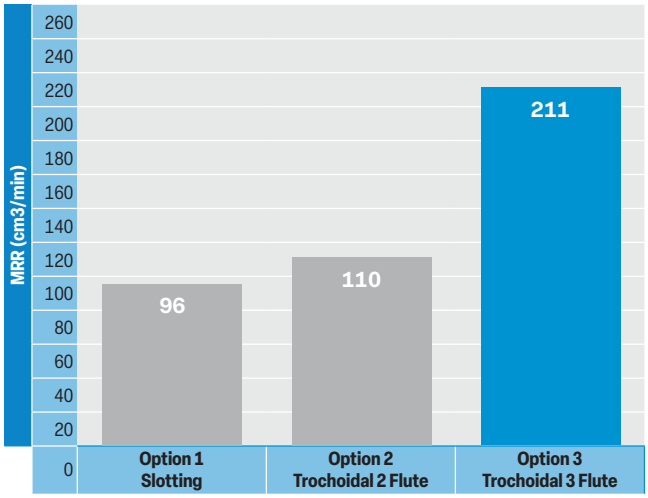
- Decreased cutting forces
- Reduced heat
- Reduced tool wear
- Suitable for lower powered machines
- Greater machining accuracy
- Spindle & machine friendly
- Improved tool life
- Faster cycle time
- One tool for multiple slot sizes (trochoidal)
- Thin wall applications

Producing 20mm Slots in Aluminium

Option 1 Using a **20mm 2-flute endmill** results in high vibration with an under-utilised cutting edge with two passes to get to the full depth. It is a more expensive option due to the larger tool size.

Option 2 Using a **12mm 2-flute endmill in trochoidal milling** provides a much higher metal removal rate with a smoother cut, resulting in an all-round stable cutting environment as well as a lower tool cost.

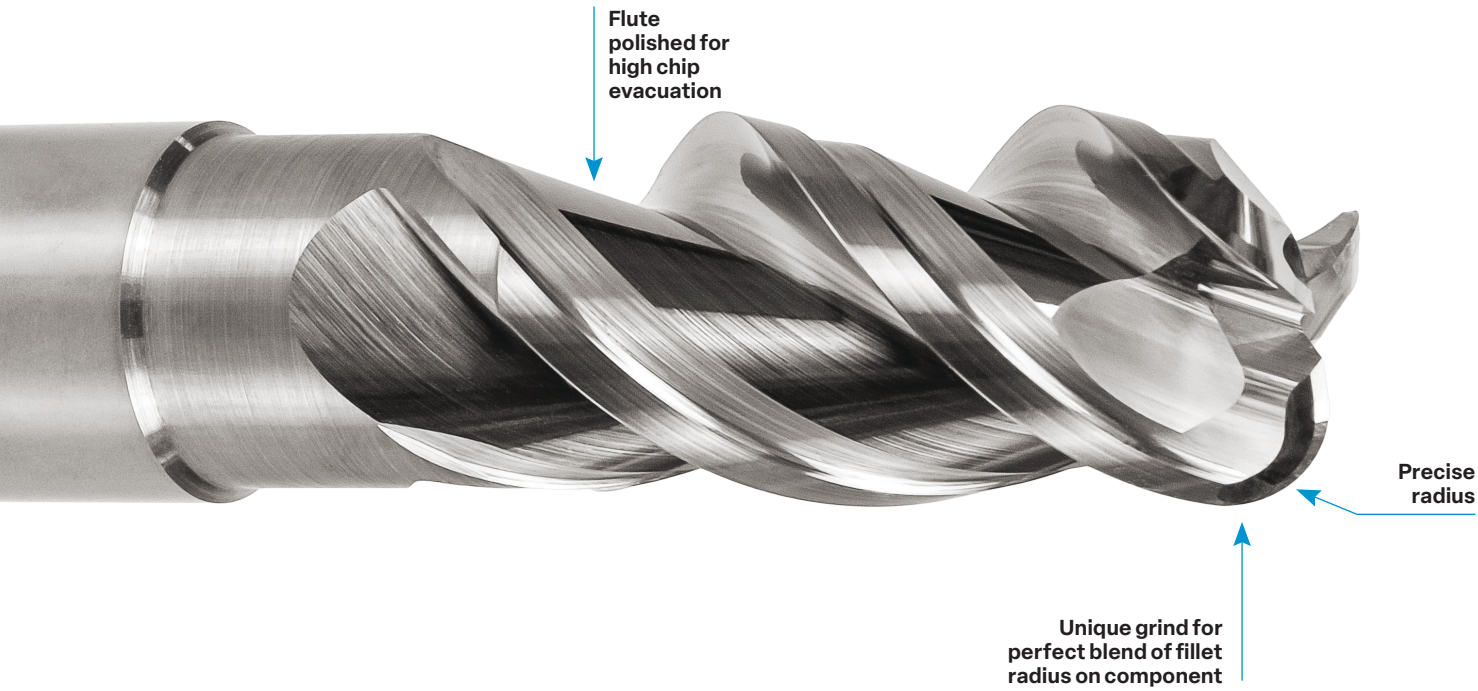
Option 3 Using a **12mm 3-flute endmill in trochoidal milling** similar to Option 2. The design of this tool has a variable helix and when used with trochoidal methods, at least two of the cutting edges are always engaged in the depth of cut (in this case ap=24mm). The variable helix design also suppresses the vibration caused from the interrupted cutting action of milling. This means that greater speeds are possible, increasing the volume of material removed (MRR) dramatically.



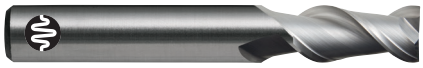
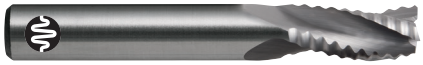
Test Data	Option 1 Slotting	Option 2 Trochoidal 2 Flute	Option 3 Trochoidal 3 Flute
Tool	R40 Al	R40 Al	R42/43/44 HARMONY Al
Part No. / Reference	E3102000	E3101200	E4001200
Tool Diameter (mm)	20	12	12
Z (teeth number)	2	2	3
ae (mm)	20	2	2
ap (mm) / depth	12 + 12 (2 passes)	24 (single pass)	24 (single pass)
RPM	1600	5300	6600
Feed Rate (mm/min)	200	2300	4400

At Sutton Tools, we often talk about 'Good, Better, Best' when diagnosing the right cutting tool for an application. The above example illustrates this concept well.
Our R&D Team are continuously running tests to determine the Good, Better or Best tooling solution for our customers' unique requirements.

E478 Corner Radius Series



Contents

Page	Item Code	Tool	Diameter range	Type	DIN6535	No. of Flutes	Geometry	Surface Finish	Standard	Non-Ferrous Metals
5	E444		3-12mm	Square End	HA	1	R30	Brt	Sutton Std	●
6	E310		2-20mm	Square End	HA	2	R40	Brt	DIN6527 L	●
7	E660		1-25mm	Square End	HA	2	R55	Brt	DIN6527 L	●
8	E670		6-20mm	Square End	HA	2	R45	ASX	DIN6527 L	●
9	E671		3-20mm	Square End	HA	2	R55	ASX	DIN6527 L	●
10	E672		6-20mm	Square End	HA	2	R55	ASX	DIN6527 L	●
11	E673		6-20mm	Corner Radius	HA	2	R55	ASX	DIN6527 L	●
13	E661		3-20mm	Ball Nose	HA	2	R55	Brt	DIN6527 L	●
14	E480		3-20mm	Square End	HA	3	R45/46/44	Brt	DIN6527 L	●
15	E400 E401		6-25mm	Square End	HA HB	3	R45/46/44	CrN	DIN6527 L	●
16	E402 E403		6-25mm	Square End	HA HB	3	R45/46/44	CrN	Sutton Std	●
17	E668		6-20mm	Square End	HA	3	R40	HCR	DIN6527 L	●
18	E478		12-20mm	Corner Radius	HA	3	R45/46/44	Brt	DIN6527 L	●
19	E669		6-20mm	Corner Radius	HA	3	R40	ASX	DIN6527 L	●
21	E408 E409		6-25mm	Corner Radius	HA HB	3	R45/46/44	CrN	Sutton Std	●
22	E446 E447		6-20mm	Square End	HA HB	3	R25	Brt	DIN6527 L	●
23	E674		6-20mm	Corner Radius	HA	3	R45/46/44	HCR	DIN 6535	●
23	E675		6-20mm	Corner Radius	HA	3	R45/46/44	HCR	DIN6527 L	●
25	E662		12-20mm	Corner Radius Int. Coolant	HA	3	R45	Brt	DIN6527 L	●
26	E663 E664		6-20mm	Square End Chip Breaker	HA HB	4	R45	HCR	DIN6527 L	●
27	E665 E666		6-20mm	Square End	HA HB	4	R45	HCR	DIN6527 L	●
28	E667		12-20mm	Corner Radius	HA	4	R45	HCR	DIN6527 L	●

Optimal ● Effective ○

Endmills Carbide, 1 Flute, R30 Al, Short

- For non ferrous aluminium alloys such as aluminium sheet & extrusions, brass & bronze
- Large single flute provides maximum chip evacuation when ran at high RPM & feed rates
- Centre cutting for straight plunging or ramping
- Suitable for use in hi speed routers & air tools for trimming plastics and similar materials

Fraise 1 dent carbure, R30° AL, courte

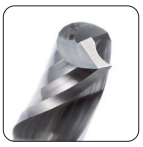
- Recommandé pour l'aluminum en feuille et extrusion, les bronzes et plastiques
- Grosse goujure pour une évacuation maximale pendant les utilisations à haute vitesses
- Coupe au centre pour les opérations de plongées ou ramping, utilisation sous AIR recommandée pour les plastiques

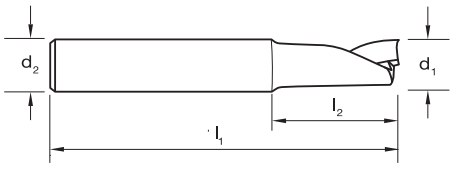
Frese metallo duro, 1 Taglienti, R30 Al, Corte

- Ideale per material non ferrosi, leghe di alluminio, lamiere di alluminio & fusioni, ottone e bronzo
- Ampio vano truciolo in un unico tagliente consentendo al massimo l'evaquoazione truciolo riferito ad alti avanzanzameneti
- Tagliente al centro per consentire applicazione forante
- Ideale per essere applicate su utensili pneumatici utili per taglio di aterie plastiche e similari

Fresas de MD, 1 ranura, R30 Al, Corta

- Para aleaciones de aluminio no ferrosos, como láminas y perfiles de aluminio, latón y bronce
- La ranura única y grande proporciona la máxima evacuación de viruta cuando se trabaja a altas RPM y velocidades de avance
- Corte central para perforaciones o rampas rectas
- Adecuado para usar en husillos de alta velocidad y husillos neumáticos, para recortar plásticos y materiales similares





Catalogue Code	E444
Product Group	B0208
Material	VHM
Surface Finish	Brt
Sutton Designation	Al
Geometry	R30
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	z	Item #
0300	3.0	50	8	6	1	E444 0300
0400	4.0	54	11	6	1	E444 0400
0500	5.0	54	13	6	1	E444 0500
0600	6.0	54	13	6	1	E444 0600
0800	8.0	58	19	8	1	E444 0800
1000	10.0	66	22	10	1	E444 1000
1200	12.0	73	26	12	1	E444 1200

ISO	P													M			K							N									S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E444																							●	●	●	●	○	○		○																				

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

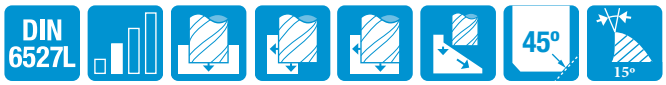
Slot Drills Carbide, 2 Flute, R40 Al, Regular

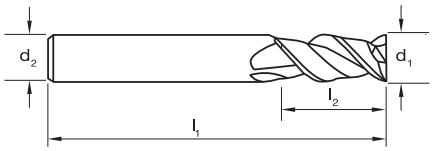
- For precision milling of slots & cavities
- Optimised geometry for aluminiums & non-ferrous materials
- High speed & high feed rates can be achieved
- Highly efficient chip disposal

Fraise 2 dents carbure, R40 Al, courte
- Pour le fraisage de rainures, de poches dans les aluminiums et non-ferreux
- Utilisable en haute vitesse
- Evacuation copeaux optimale

Frese metallo duro, 2 Taglienti, R40 AlCarb, DIN6527L
- Fresa universale per cave e lavorazioni di finitura
- Geometria tagliente ottimizzata per materiali non ferrosi & alluminio
- Supporta alti avanzamenti e alte velocità di taglio
- Elevata evaquazione truciolo

Fresas de MD, 2 ranuras, R40 Al, DIN6527L
- Para fresado de precisión de ranuras y cavidades
- Geometría optimizada para aluminio y materiales no ferrosos
- Se pueden lograr altas velocidades de corte y altas velocidades de avance
- Eliminación de virutas altamente eficiente





Catalogue Code	E310
Product Group	B0208
Material	VHM
Surface Finish	*Brt*
Sutton Designation	Al
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (h10)	l_1	l_2	l_3	d_2	z	chamf	Item #
0200	**2.0**	57	7	10	6	2	0.05	E310 0200
0300	**3.0**	57	8	10	6	2	0.05	E310 0300
0350	**3.5**	57	10	10	6	2	0.05	•
0400	**4.0**	57	11	10	6	2	0.05	E310 0400
0450	**4.5**	57	11	10	6	2	0.05	•
0500	**5.0**	57	13	8	6	2	0.05	E310 0500
0600	**6.0**	57	13	-	6	2	0.06	E310 0600
0700	**7.0**	63	16	-	8	2	0.07	•
0800	**8.0**	63	19	-	8	2	0.08	E310 0800
0900	**9.0**	72	19	-	10	2	0.09	•
1000	**10.0**	72	22	-	10	2	0.10	E310 1000
1200	**12.0**	83	26	-	12	2	0.12	E310 1200
1400	**14.0**	83	26	-	14	2	0.14	•
1600	**16.0**	92	32	-	16	2	0.16	E310 1600
1800	**18.0**	92	32	-	18	2	0.18	•
2000	**20.0**	104	38	-	20	2	0.20	E310 2000

ISO	P												M			K						N									S													H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E310																							●	●	●	●	●	●	●	●																				

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

• Available on request as special manufacture. Subject to lead time.

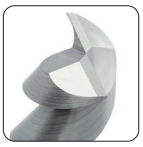
- 55° Helix, Centre Cutting, HSM
- Uniquely designed flute geometry for high chip evacuations
- Improves surface finishes at higher feed rates

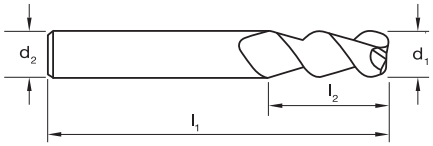
Fraise 2 dents carbure AL
- Hélice 55° coupe au centre
- Design special pour une meilleure evacuation copeaux
- Etat de surface poli pour grande avance

Fresa metallo duro, 2 taglienti, Al
- 55° Elica, Tagliente al centro, HSM
- Geometria unica del tagliente per un alta evacuazione truciolo
- Finiture migliori ad avanzamento elevato

Fresas de MD, 2 ranuras, R40 AL
- Hélice de 55°, corte frontal, HSM
- Geometría de ranura de diseño único para evacuaciones de virutas elevadas
- Mejora los acabados superficiales a velocidades de avance más altas

DIN 6527L | MICRO





Catalogue Code	E660
Product Group	B0208
Material	VHM-ULTRA
Surface Finish	Brt
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	z	Item #
0100	1.0	50	3	-	4.0	2	E660 0100
0150	1.5	50	4	-	4.0	2	E660 0150
0200	2.0	50	6	-	4.0	2	E660 0200
0250	2.5	50	7	-	4.0	2	E660 0250
0300	3.0	50	12	-	3.0	2	E660 0300
0400	4.0	50	15	-	4.0	2	E660 0400
0500	5.0	50	20	-	5.0	2	E660 0500
0600	6.0	57	20	-	6.0	2	E660 0600
0700	7.0	60	20	-	7.0	2	E660 0700
0800	8.0	63	20	-	8.0	2	E660 0800
1000	10.0	73	25	-	10.0	2	E660 1000
1200	12.0	83	25	-	12.0	2	E660 1200
1400	14.0	92	30	-	14.0	2	E660 1400
1600	16.0	92	30	-	26.0	2	E660 1600
2000	20.0	102	38	-	20.0	2	E660 2000
2500	25.0	104	38	-	25.0	2	E660 2500

ISO	P													M			K							N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E660																							●	●	●	●	●	●	●	●																				

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

- 55° Helix, Centre Cutting
- Unique flute geometry offers excellent copy milling capabilities
- High helix angle and short flutes for improved surface finish at higher feed rates

Fraise 2 dents carbure AL

- Hélise 55° coupe au centre
- Design special pour une meilleure évacuation copeaux
- Faible hauteur de coupe pour une meilleures stabilité

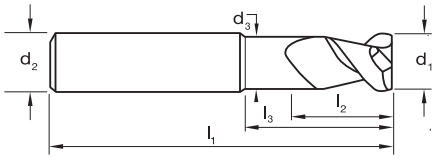
Fresa metallo duro, 2 taglienti, Al

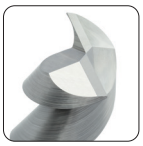
- 55° Elica, Tagliente al centro
- Geometria unica per eccellenti prestazioni in copiatura
- Elevato angolo Elica e tagliente corto per una migliore finitura ad alti avanzamenti

Fresas de MD, 2 ranuras, R40 AL

- Hélice de 55°, corte frontal
- La geometría única de la ranura ofrece excelentes capacidades de fresado en copiado
- Alto ángulo de hélice y ranuras cortas para mejorar el acabado superficial

DIN 6527L | MICRO





Catalogue Code	E670
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R45
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #
0600	6.0	57	6	30	6.0	5.70	2	E670 0600
0800	8.0	63	8	30	8.0	7.70	2	E670 0800
1000	10.0	73	10	35	10.0	9.50	2	E670 1000
1200	12.0	83	12	35	12.0	11.50	2	E670 1200
1600	16.0	92	16	40	16.0	15.30	2	E670 1600
2000	20.0	104	20	40	20.0	19.30	2	E670 2000

ISO	P												M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E670																							●	●	●	●	●	●	●	●																		

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 2 Flute, R55 Al, Long Reach

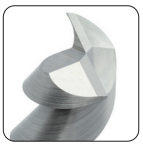
- 55° Helix, Centre Cutting
- Unique flute geometry offers excellent copy milling capabilities
- High helix angle and short flutes for improved surface finish

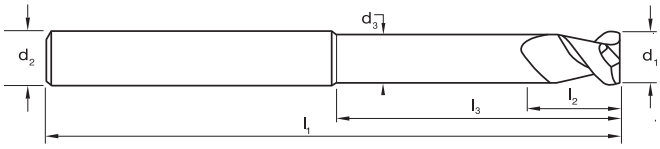
Fraise 2 dents carbure AL longue
- Hélise 55° coupe au centre
- Géométrie speciale pour une bonne évacuation copeaux
- Faible hauteur de coupe pour une meilleures stabilité

Fresa metallo duro, 2 taglienti, Al, Serie lunga
- 55° Elica, Tagliente al centro
- Geometria unica per eccellenti prestazioni in copiatura
- Elevato angolo Elica e tagliente corto per una migliore finitura

Fresas de MD, 2 ranuras, R40 AL, larga
- Hélice de 55°, corte frontal
- La geometría única de la ranura ofrece excelentes capacidades de fresado en copiado
- Alto ángulo de hélice y ranuras cortas para mejorar el acabado superficial

DIN 6527L





Catalogue Code	E671
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #
0300	**3.0**	75	3	12	6.0	2.80	2	E671 0300
0400	**4.0**	75	4	15	6.0	3.60	2	E671 0400
0500	**5.0**	75	5	20	6.0	4.70	2	E671 0500
0600	**6.0**	100	6	50	6.0	5.70	2	E671 0600
0800	**8.0**	100	8	50	8.0	7.70	2	E671 0800
1000	**10.0**	100	10	50	10.0	9.50	2	E671 1000
1200	**12.0**	100	12	50	12.0	11.50	2	E671 1200
1600	**16.0**	125	16	75	16.0	15.30	2	E671 1600
2000	**20.0**	125	20	75	20.0	19.30	2	E671 2000

ISO	P													M			K							N									S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E671																							●	●	●	●	●	●	●	●																					

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 2 Flute, R55 Al, Extra Long Series

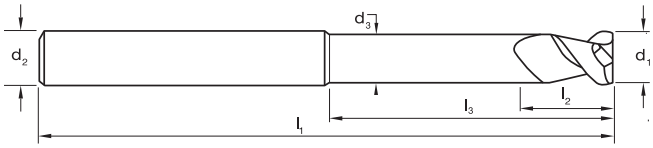
- 55° Helix, Centre Cutting
- Unique flute geometry offers excellent copy milling capabilities
- High helix angle and short flutes for improved surface finish

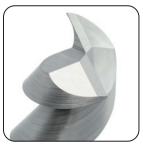
Fraise 2 dents carbure AL extra longue
- Hélise 55° coupe au centre
- Design special pour une meilleure évacuation copeaux dans les grandes profondeurs
- Faible hauteur de coupe pour une meilleures stabilité

Fresa metallo duro, 2 taglienti, Al, Serie Extra lunga
- 55° Elica, Tagliente al centro
- Geometria unica per eccellenti prestazioni in copiatura
- Elevato angolo Elica e tagliente corto per una migliore finitura

Fresas de MD, 2 ranuras, R40 AL, extra larga
- Hélice de 55°, corte frontal
- La geometría única de la ranura ofrece excelentes capacidades de fresado en copiado
- Alto ángulo de hélice y ranuras cortas para mejorar el acabado superficial

DIN 6527L | MICRO





Catalogue Code	E672
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #
0600	6.0	150	6	100	6.0	5.70	2	E672 0600
0800	8.0	150	8	100	8.0	7.70	2	E672 0800
1000	10.0	150	10	100	10.0	9.50	2	E672 1000
1200	12.0	150	12	100	12.0	11.50	2	E672 1200
1600	16.0	150	16	100	16.0	15.30	2	E672 1600
2000	20.0	150	20	100	20.0	19.30	2	E672 2000

ISO	P												M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E672																							●	●	●	●	●	●	●	●																			

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

sutton

- 55° Helix, Centre Cutting
- Unique flute geometry offers excellent copy milling capabilities
- High helix angle and short flutes for improved surface finish

Fraise 2 dents carbure AL longue avec rayons

- Hélise 55° coupe au centre
- Design special pour une meilleure évacuation copeaux dans les grandes profondeurs
- Faible hauteur de coupe pour une meilleures stabilité

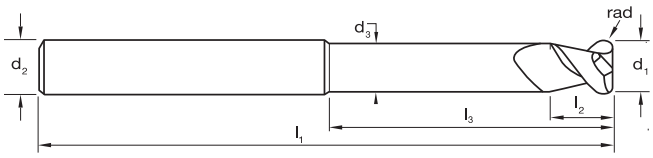
Fresa metallo duro, 2 taglienti, Al, Serie lunga, Torica

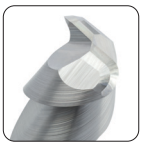
- 55° Elica, Tagliente al centro
- Geometria unica per eccellenti prestazioni in copiatura
- Elevato angolo Elica e tagliente corto per una migliore finitura

Fresas de MD, 2 ranuras, R40 AL, larga, Torica

- Hélice de 55°, corte frontal
- La geometría única de la ranura ofrece excelentes capacidades de fresado en copiado
- Alto ángulo de hélice y ranuras cortas para mejorar el acabado superficial

DIN 6527L | MICRO





Catalogue Code	E673
Product Group	B0208
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
0605	6.0	100	6	50	6.0	5.70	0.50	2	E673 0605
0610	6.0	100	6	50	6.0	5.70	1.00	2	E673 0610
0615	6.0	100	6	50	6.0	5.70	1.50	2	E673 0615
0620	6.0	100	6	50	6.0	5.70	2.00	2	E673 0620
0805	8.0	100	8	50	8.0	7.70	0.50	2	E673 0805
0810	8.0	100	8	50	8.0	7.70	1.00	2	E673 0810
0815	8.0	100	8	50	8.0	7.70	1.50	2	E673 0815
0820	8.0	100	8	50	8.0	7.70	2.00	2	E673 0820
0825	8.0	100	8	50	8.0	7.70	2.50	2	E673 0825
0830	8.0	100	8	50	8.0	7.70	3.00	2	E673 0830
1005	10.0	100	10	50	10.0	9.50	0.50	2	E673 1005
1010	10.0	100	10	50	10.0	9.50	1.00	2	E673 1010
1015	10.0	100	10	50	10.0	9.50	1.50	2	E673 1015
1020	10.0	100	10	50	10.0	9.50	2.00	2	E673 1020
1025	10.0	100	10	50	10.0	9.50	2.50	2	E673 1025
1030	10.0	100	10	50	10.0	9.50	3.00	2	E673 1030
1205	12.0	100	12	50	12.0	11.50	0.50	2	E673 1205
1210	12.0	100	12	50	12.0	11.50	1.00	2	E673 1210
1215	12.0	100	12	50	12.0	11.50	1.50	2	E673 1215
1220	12.0	100	12	50	12.0	11.50	2.00	2	E673 1220
1225	12.0	100	12	50	12.0	11.50	2.50	2	E673 1225
1230	12.0	100	12	50	12.0	11.50	3.00	2	E673 1230
1605	16.0	125	16	75	16.0	15.30	0.50	2	E673 1605
1610	16.0	125	16	75	16.0	15.30	1.00	2	E673 1610
1615	16.0	125	16	75	16.0	15.30	1.50	2	E673 1615
1620	16.0	125	16	75	16.0	15.30	2.00	2	E673 1620
1625	16.0	125	16	75	16.0	15.30	2.50	2	E673 1625
1630	16.0	125	16	75	16.0	15.30	3.00	2	E673 1630

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E673																							●	●	●	●	●	●	●	●																			

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

- 55° Helix, Centre Cutting
- Unique flute geometry offers excellent copy milling capabilities
- High helix angle and short flutes for improved surface finish

Fraise 2 dents carbure AL longue avec rayons

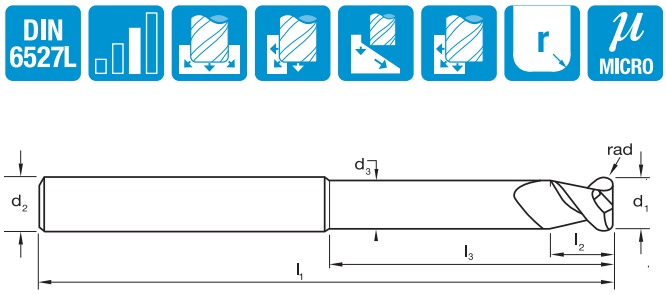
- Hélise 55° coupe au centre
- Design special pour une meilleure évacuation copeaux dans les grandes profondeurs
- Faible hauteur de coupe pour une meilleures stabilité

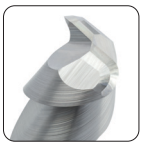
Fresa metallo duro, 2 taglienti, Al, Serie lunga, Torica

- 55° Elica, Tagliente al centro
- Geometria unica per eccellenti prestazioni in copiatura
- Elevato angolo Elica e tagliente corto per una migliore finitura

Fresas de MD, 2 ranuras, R40 AL, larga, Torica

- Hélice de 55°, corte frontal
- La geometría única de la ranura ofrece excelentes capacidades de fresado en copiado
- Alto ángulo de hélice y ranuras cortas para mejorar el acabado superficial





Catalogue Code	E673
Product Group	B0208
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
1640	**16.0**	125	16	75	16.0	15.30	4.00	2	E673 1640
2005	**20.0**	125	20	75	20.0	15.30	0.50	2	E673 2005
2010	**20.0**	125	20	75	20.0	19.30	1.00	2	E673 2010
2015	**20.0**	125	20	75	20.0	19.30	1.50	2	E673 2015
2020	**20.0**	125	20	75	20.0	19.30	2.00	2	E673 2020
2025	**20.0**	125	20	75	20.0	19.30	2.50	2	E673 2025
2030	**20.0**	125	20	75	20.0	19.30	3.00	2	E673 2030
2040	**20.0**	125	20	75	20.0	19.30	4.00	2	E673 2040

ISO	P												M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E673																							●	●	●	●	●	●	●	●																			

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

sutton

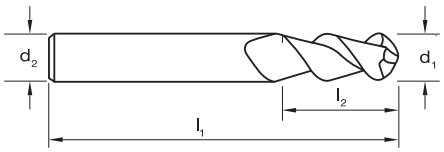
- 55° Helix, Centre Cutting, HSM
- Uniquely designed flute geometry for high chip evacuations
- Improves surface finishes at higher feed rates especially when copy milling

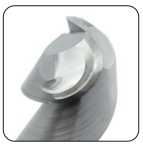
Fraise 2 dents carbure AL hemisphérique, coupe au centre
- Hélice 55° coupe au centre
- Design special pour une meilleure evacuation copeaux
- Etat de surface poli pour grande avance ane copiage

Fresa metallo duro, 2 taglienti, Semisferica, Al, Tagliente al centro
- 55° Elica, Tagliente al centro, HSM
- Geometria unica del tagliente per un alta evacuazione truciolo
- Finiture migliori ad avanzamento elevato specialmente in copiatura

Fresas de MD, Esferica, 2 ranuras, R40 AL
- Hélice de 55°, corte frontal, HSM
- Geometría de ranura de diseño único para evacuaciones de virutas elevadas
- Mejora los acabados superficiales a velocidades de avance más altas, especialmente cuando se fresa en copiado

DIN 6527L | MICRO





Catalogue Code	E661
Product Group	B0208
Material	VHM-ULTRA
Surface Finish	*Brt*
Sutton Designation	Al
Geometry	R55
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	z	Item #
0300	**3.0**	50	12	-	3.0	2	E661 0300
0400	**4.0**	50	15	-	4.0	2	E661 0400
0500	**5.0**	50	20	-	5.0	2	E661 0500
0600	**6.0**	57	20	-	6.0	2	E661 0600
0800	**8.0**	63	20	-	8.0	2	E661 0800
1000	**10.0**	72	25	-	10.0	2	E661 1000
1200	**12.0**	83	25	-	12.0	2	E661 1200
1400	**14.0**	83	30	-	14.0	2	E661 1400
1600	**16.0**	92	30	-	26.0	2	E661 1600
2000	**20.0**	104	38	-	20.0	2	E661 2000

ISO	P													M			K							N								S														H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E661																							●	●	●	●	●	●	●	●																						

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 3 Flute, R45/46/44 Al, DIN6527L, *Harmony*

sutton

- VHM-ULTRA grade of carbide for high performance
- Variable flute helix for chatter free milling
- Optimised geometry for soft materials

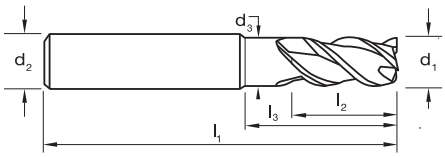
Fraise 3 dents carbure, R45/46/44 Al, Longue Harmony
- Carbure VHM-ULTRA pour une meilleure performance
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée les non-ferreux et cuivres

Frese metallo duro, 3 Taglienti, R45/46/44 Al, Lunga Portata, Harmony
- VHM-ULTRA, grado di metallo duro per alte prestazione
- Elica tagliente variabile per lavorazioni senza vibrazioni
- Geometria ottimizzata per materiali morbidi

Fresas de MD, 3 ranuras, R45/46/44 Al, Larga, Harmony
- Grado de MD, VHM-ULTRA para alto rendimiento
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos

AUSTRALIAN MADE

DIN 6527L | 45° | MICRO | 15°



Catalogue Code	E480
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	*Brt*
Sutton Designation	Al
Geometry	R45/46/44
Shank Form (DIN 6535)	HA
Shank Tolerance	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Chamfer	Item #
0300	3.0	57	8	19	6	2.8	0.08/0.12x45°	E480 0300
0400	4.0	57	11	19	6	3.7	0.08/0.12x45°	E480 0400
0500	5.0	57	13	20	6	4.6	0.08/0.12x45°	E480 0500
0600	6.0	57	13	21	6	5.1	0.08/0.12x45°	E480 0600
0800	8.0	63	19	27	8	7.1	0.08/0.12x45°	E480 0800
1000	10.0	72	22	32	10	9.1	0.15/0.25x45°	E480 1000
1200	12.0	83	26	40	12	11.1	0.15/0.25x45°	E480 1200
1600	16.0	92	32	50	16	14.8	0.25/0.35x45°	E480 1600
2000	20.0	104	38	60	20	18.5	0.25/0.35x45°	E480 2000

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E480																							●	●	●	●	●	●	●	●																				

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

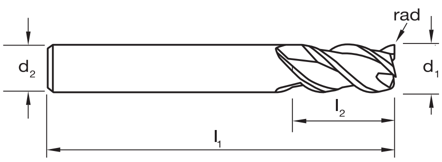
● Optimal ○ Effective

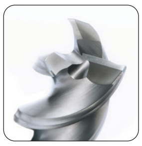
- VHM-ULTRA grade of carbide for high performance
- Variable flute helix for chatter free milling
- Optimised geometry for soft materials
- CrN for copper and non-ferrous materials

Fraise 3 dents carbure, R45/46/44 Al, DIN6527L Harmony
- Carbure VHM Ultra pour une meilleure performance
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée pour les matériaux légers
- Revêtement CrN pour les cuivres et non-ferreux

Frese metallo duro, 3 Taglienti, R45/46/44 Al, DIN6527L, Harmony
- VHM-ULTRA, grado di metallo duro per alte prestazione
- Elica tagliente variabile per lavorazioni senza vibrazioni
- Geometria ottimizzata per materiali morbidi
- CrN specifico per le lavorazioni di rame e materiali non ferrosi

Fresas de MD, 3 ranuras, R45/46/44 Al, DIN6527L, Harmony
- Grado de MD, VHM-ULTRA para alto rendimiento
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos
- CrN para cobres y materiales no ferrosos





							E400	E401
						Catalogue Code	E400	E401
						Product Group	B0210	B0210
						Material	VHM-ULTRA	VHM-ULTRA
						Surface Finish	CrN	CrN
						Sutton Designation	Al	Al
						Geometry	R45/46/44	R45/46/44
						Shank Form (DIN 6535)	HA	HB
						Shank Tolerance	h5	h5
Size Ref.	**d_1 (e8)**	**l_1**	**l_2**	**d_2**	**z**	**rad**	**Item #**	**Item #**
0600	**6.0**	57	13	6	3	0.2	E400 0600	E401 0600
0800	**8.0**	63	19	8	3	0.2	E400 0800	E401 0800
1000	**10.0**	72	24	10	3	0.3	E400 1000	E401 1000
1200	**12.0**	83	28	12	3	0.4	E400 1200	E401 1200
1400	**14.0**	83	30	14	3	0.4	E400 1400	E401 1400
1600	**16.0**	92	35	16	3	0.5	E400 1600	E401 1600
1800	**18.0**	92	38	18	3	0.5	E400 1800	E401 1800
2000	**20.0**	104	42	20	3	0.6	E400 2000	E401 2000
2500	**25.0**	120	50	25	3	0.6	E400 2500	E401 2500

ISO	P													M			K					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20
E400																						
E401																						

ISO	N										S											H					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E400	●	●	●	●	●	●	●	●																			
E401	●	●	●	●	●	●	●	●																			

P Steel **M** Stainless Steel **K** Cast Iron **N** Non-Ferrous Metals **S** Titanium & Super Alloys **H** Hard Materials

● Optimal ○ Effective

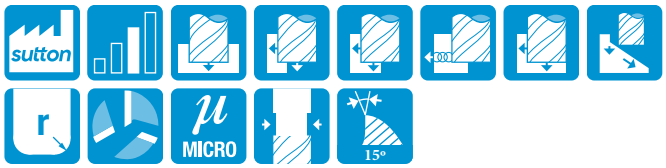
Endmills Carbide, 3 Flute, R45/46/44 Al, Long Reach, *Harmony*

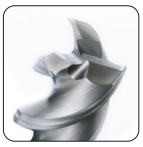
- VHM-ULTRA grade of carbide for high performance
- Variable flute helix for chatter free milling
- Optimised geometry for soft materials
- CrN for copper and non-ferrous materials

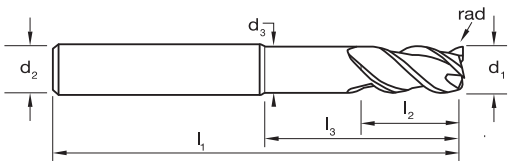
Fraise 3 dents carbure, R45/46/44 Al, Longue Harmony
- Carbure VHM-ULTRA pour une meilleure performance
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée et revêtement CrN pour les non-ferreux et cuivres

Frese metallo duro, 3 Taglienti, R45/46/44 Al, Lunga Portata, Harmony
- VHM-ULTRA, grado di metallo duro per alte prestazione
- Elica tagliente variabile per lavorazioni senza vibrazioni
- Geometria ottimizzata per materiali morbidi
- CrN specifico per le lavorazioni di rame e materiali non ferrosi

Fresas de MD, 3 ranuras, R45/46/44 Al, Larga, Harmony
- Grado de MD, VHM-ULTRA para alto rendimiento
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos
- CrN para cobres y materiales no ferrosos







	E402	E403
Catalogue Code	E402	E403
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	CrN	CrN
Sutton Designation	Al	Al
Geometry	R45/46/44	R45/46/44
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h5	h5

Size Ref.	d_1 (k10)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #
0600	6.0	62	7	24	6	5.0	3	0.2	E402 0600	
0800	8.0	68	9	30	8	7.0	3	0.2	E402 0800	
1000	10.0	80	12	38	10	9.0	3	0.3	E402 1000	E403 1000
1200	12.0	93	14	46	12	11.0	3	0.4	E402 1200	E403 1200
1400	14.0	93	16	46	14	13.0	3	0.4	E402 1400	E403 1400
1600	16.0	108	18	58	16	15.0	3	0.5	E402 1600	E403 1600
1800	18.0	108	20	58	18	17.0	3	0.5	E402 1800	E403 1800
2000	20.0	126	22	74	20	19.0	3	0.6	E402 2000	E403 2000
2500	25.0	150	27	92	25	24.0	3	0.6	E402 2500	E403 2500

ISO	P												M			K						N									S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E402																							●	●	●	●	●	●	●	●																			
E403																							●	●	●	●	●	●	●	●																			

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Available on request as special manufacture. Subject to lead time.

sutton

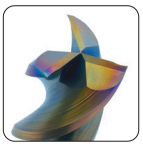
- 40° Helix, Centre cutting
- Extra reach with wide gullets to enable higher feed rates
- HCR coating allows for roughing and finishing using the same tool

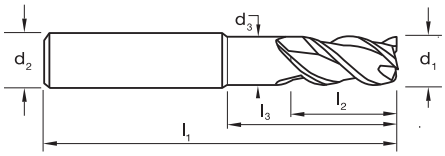
Fraise 3 dents carbure AL longue
- Hélice 40°, coupe au centre
- Série longue avec d'importantes goujures pour des avances plus élevées
- Revetement HCR pour l'ébaushe et la finition avec le meme outil

Fresa metallo duro, 3 taglienti, Al, Lavorazioni profonde
- 40° Elica, Tagliente al centro
- Lunghezza extra con scarico dopo tagliente per avanzamenti elevati
- Rivestimento HCR adatto per sgrossare e finire con lo stesso utensile

Fresas de MD, 3 ranuras, R40 AL, larga
- Hélice de 40°, corte frontal
- Alcance adicional facetas anchas para permitir mayores velocidades de corte
- El recubrimiento HCR permite desbaste y acabado con la misma herramienta

DIN 6527L | MICRO





Catalogue Code	E668
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	HCR
Sutton Designation	Al
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #
0600	6.0	100	24	50	6.0	5.70	3	E668 0600
0800	8.0	100	25	50	8.0	7.70	3	E668 0800
1000	10.0	100	27	50	10.0	9.50	3	E668 1000
1200	12.0	100	32	60	12.0	11.50	3	E668 1200
1600	16.0	125	39	80	16.0	15.30	3	E668 1600
2000	20.0	150	42	100	20.0	19.30	3	E668 2000

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E668																							●	●	●	●	●	●	●	●																			

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 3 Flute, R45/46/44 Al, Rad, DIN6527L, *Harmony*

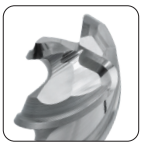
- VHM-ULTRA grade of carbide for high performance
- Variable flute helix for chatter free milling
- Optimised geometry for soft materials

Fraise 3 dents carbure, R45/46/44 Al, Longue Harmony
- Carbure VHM-ULTRA pour une meilleure performance
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée les non-ferreux et cuivres

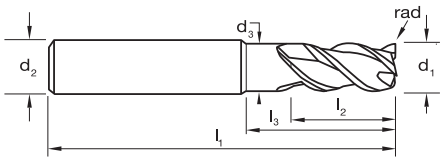
Frese metallo duro, 3 Taglienti, R45/46/44 Al, Lunga Portata, Harmony
- VHM-ULTRA, grado di metallo duro per alte prestazione
- Elica tagliente variabile per lavorazioni senza vibrazioni
- Geometria ottimizzata per materiali morbidi

Fresas de MD, 3 ranuras, R45/46/44 Al, Larga, Harmony
- Grado de MD, VHM-ULTRA para alto rendimiento
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos

AUSTRALIAN MADE



DIN 6527L | MICRO | 15°



Catalogue Code	**E478**
Product Group	B0210
Material	**VHM-ULTRA**
Surface Finish	***Brt***
Sutton Designation	**Al**
Geometry	R45/46/44
Shank Form (DIN 6535)	HA
Shank Tolerance	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	rad	Item #
1210	**12.0**	83	26	40	12	11.1	1	E478 1210
1225	**12.0**	83	26	40	12	11.1	2.5	E478 1225
1230	**12.0**	83	26	40	12	11.1	3	E478 1230
1240	**12.0**	83	26	40	12	11.1	4	E478 1240
1610	**16.0**	92	32	50	16	14.8	1	E478 1610
1625	**16.0**	92	32	50	16	14.8	2.5	E478 1625
1630	**16.0**	92	32	50	16	14.8	3	E478 1630
1640	**16.0**	92	32	50	16	14.8	4	E478 1640
2010	**20.0**	104	38	60	20	18.5	1	E478 2010
2025	**20.0**	104	38	60	20	18.5	2.5	E478 2025
2030	**20.0**	104	38	60	20	18.5	3	E478 2030
2040	**20.0**	104	38	60	20	18.5	4	E478 2040

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E478																							●	●	●	●	●	●	●	●																				

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 3 Flute, Long Reach, Al, Corner Rad

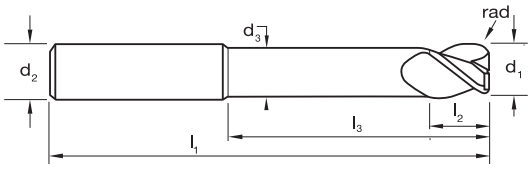
- 40° Helix, 3 Teeth to Centre
- Extra reach with wide gullets to enable higher feed rates
- ASX coating allows for roughing and finishing using the same tool

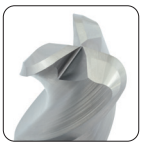
Fraise 3 dents carbure AL longue avec rayons
- Hélice 40°, 3 dents, coupe au centre avec rayons
- Série longue avec d'importantes goujures pour des avances plus élevées
- Revetement ASX pour l'ébaushe et la finition avec le meme outil

Fresa metallo duro, 3 taglienti, Lavorazioni profonde, Al, Torica
- 40° Elica, 3 Taglienti al centro
- Lunghezza extra con scarico dopo tagliente per avanzamenti elevati
- Rivestimento ASX adatto per sgrossare e finire con lo stesso utensile

Fresas de MD, 3 ranuras, R40 AL, larga, Torica
- Hélice de 40°, 3 dientes, corte frontal
- Alcance adicional facetas anchas para permitir mayores velocidades de corte
- El recubrimiento HCR permite desbaste y acabado con la misma herramienta

DIN 6527L | MICRO





Catalogue Code	E669
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
0605	6.0	100	6	30	6.0	5.70	0.50	3	E669 0605
0610	6.0	100	6	30	6.0	5.70	1.00	3	E669 0610
0615	6.0	100	6	30	6.0	5.70	1.50	3	E669 0615
0620	6.0	100	6	30	6.0	5.70	2.00	3	E669 0620
0805	8.0	100	8	30	8.0	7.70	0.50	3	E669 0805
0810	8.0	100	8	30	8.0	7.70	1.00	3	E669 0810
0815	8.0	100	8	30	8.0	7.70	1.50	3	E669 0815
0820	8.0	100	8	30	8.0	7.70	2.00	3	E669 0820
0825	8.0	100	8	30	8.0	7.70	2.50	3	E669 0825
0830	8.0	100	8	30	8.0	7.70	3.00	3	E669 0830
1005	10.0	100	10	35	10.0	9.50	0.50	3	E669 1005
1010	10.0	100	10	35	10.0	9.50	1.00	3	E669 1010
1015	10.0	100	10	35	10.0	9.50	1.50	3	E669 1015
1020	10.0	100	10	35	10.0	9.50	2.00	3	E669 1020
1025	10.0	100	10	35	10.0	9.50	2.50	3	E669 1025
1030	10.0	100	10	35	10.0	9.50	3.00	3	E669 1030
1205	12.0	100	12	35	12.0	11.50	0.50	3	E669 1205
1210	12.0	100	12	35	12.0	11.50	1.00	3	E669 1210
1215	12.0	100	12	35	12.0	11.50	1.50	3	E669 1215
1220	12.0	100	12	35	12.0	11.50	2.00	3	E669 1220
1225	12.0	100	12	35	12.0	11.50	2.50	3	E669 1225
1230	12.0	100	12	35	12.0	11.50	3.00	3	E669 1230
1605	16.0	125	16	40	16.0	15.30	0.50	3	E669 1605
1610	16.0	125	16	40	16.0	15.30	1.00	3	E669 1610
1615	16.0	125	16	40	16.0	15.30	1.50	3	E669 1615
1620	16.0	125	16	40	16.0	15.30	2.00	3	E669 1620
1625	16.0	125	16	40	16.0	15.30	2.50	3	E669 1625
1630	16.0	125	16	40	16.0	15.30	3.00	3	E669 1630

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E669																							●	●	●	●	●	●	●	●																			

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

- 40° Helix, 3 Teeth to Centre
- Extra reach with wide gullets to enable higher feed rates
- ASX coating allows for roughing and finishing using the same tool

Fraise 3 dents carbure AL longue avec rayons

- Hélice 40°, 3 dents, coupe au centre avec rayons
- Série longue avec d'importantes goujures pour des avances plus élevées
- Revetement ASX pour l'ébaushe et la finition avec le meme outil

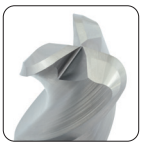
Fresa metallo duro, 3 taglienti, Lavorazioni profonde, Al, Torica

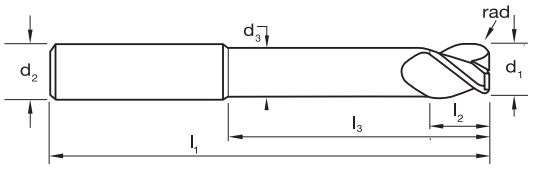
- 40° Elica, 3 Taglienti al centro
- Lunghezza extra con scarico dopo tagliente per avanzamenti elevati
- Rivestimento ASX adatto per sgrossare e finire con lo stesso utensile

Fresas de MD, 3 ranuras, R40 AL, larga, Torica

- Hélice de 40°, 3 dientes, corte frontal
- Alcance adicional facetas anchas para permitir mayores velocidades de corte
- El recubrimiento HCR permite desbaste y acabado con la misma herramienta

DIN 6527L · MICRO





Catalogue Code	E669
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	ASX
Sutton Designation	Al
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
1640	**16.0**	125	16	40	16.0	15.30	4.00	3	E669 1640
2005	**20.0**	125	20	40	20.0	15.30	0.50	3	E669 2005
2010	**20.0**	125	20	40	20.0	19.30	1.00	3	E669 2010
2015	**20.0**	125	20	40	20.0	19.30	1.50	3	E669 2015
2020	**20.0**	125	20	40	20.0	19.30	2.00	3	E669 2020
2025	**20.0**	125	20	40	20.0	19.30	2.50	3	E669 2025
2030	**20.0**	125	20	40	20.0	19.30	3.00	3	E669 2030
2040	**20.0**	125	20	40	20.0	19.30	4.00	3	E669 2040

ISO	P												M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E669																							●	●	●	●	●	●	●	●																			

P Steel · M Stainless Steel · K Cast Iron · N Non-Ferrous Metals · S Titanium & Super Alloys · H Hard Materials

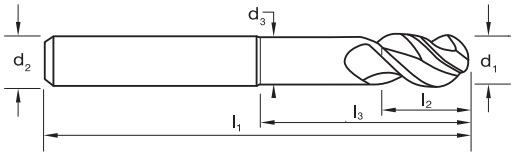
● Optimal ○ Effective

- VHM-ULTRA grade of carbide for high performance
- Variable flute helix for chatter free milling
- Optimised geometry for soft materials
- CrN for copper and non-ferrous materials

Fraise 3 dents carbure, Hémisphérique, R45/46/44 Longue, Harmony
- Carbure VHM-ULTRA pour une meilleure performance
- Pour le fraisage de formes et de poches profondes
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée et revêtement CrN pour les non-ferreux et cuivres

Frese metallo duro, Sferiche, 3 Taglienti, R45/46/44 Al, Lunga Portata, Harmony
- VHM-ULTRA, grado di metallo duro per alte prestazione
- Elica tagliente variabile per lavorazioni senza vibrazioni
- Geometria ottimizzata per materiali morbidi
- CrN specifico per le lavorazioni di rame e materiali non ferrosi

Fresas de MD, Esférica, 3 ranuras, R45/46/44 Al, Larga, Harmony
- Grado de MD, VHM-ULTRA para alto rendimiento
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos
- CrN para cobres y materiales no ferrosos



Catalogue Code	E408	E409
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	CrN	CrN
Sutton Designation	Al	Al
Geometry	R45/46/44	R45/46/44
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h5	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	z	Item #	Item #
0600	6.0	62	9	24	6	3	E408 0600	E409 0600
0800	8.0	68	12	30	8	3	E408 0800	E409 0800
1000	10.0	80	15	38	10	3	E408 1000	E409 1000
1200	12.0	93	18	46	12	3	E408 1200	E409 1200
1400	14.0	93	21	46	14	3	E408 1400	E409 1400
1600	16.0	108	24	58	16	3	E408 1600	E409 1600
1800	18.0	108	27	58	18	3	E408 1800	E409 1800
2000	20.0	126	30	74	20	3	E408 2000	E409 2000
2500	25.0	150	38	92	25	3	E408 2500	E409 2500

ISO	P													M			K										N												S														H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E408																							●	●	●	●	●	●	●	●																						
E409																							●	●	●	●	●	●	●	●																						

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

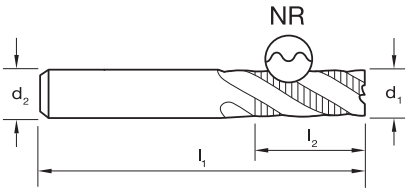
Roughers Carbide, NR (normal), R25 Al, DIN 6527L

- For roughing applications
- NR geometry allows for heavy cuts
- For soft non ferrous aluminium alloys
- High rake angle for long chipping materials

Fraise d'ébauche, Profil NR, R25° AL, DIN 6527L
- Carbure VHM-ULTRA pour une meilleure performance
- Hélice variable 45°/46°/44° pour la suppression des vibrations
- Géométrie optimisée et revêtement CrN pour les non-ferreux et cuivres

Frese metallo duro rompitruciolo, NR (normal), R25 Al, DIN 6527L
- Fresa ideale per lavorazioni di sgrossatura
- Geometria NR permette lavorazioni gravose
- Ideale per materiali morbidi o non ferrosi
- Elevato angolo di spoglia per lavorazione di meteriale con difficile truciolabilità

Fresas Desbaste, NR (normal), R25 Al, DIN6527L
- Para aplicaciones de desbaste
- La geometría NR permite grandes pasadas
- Adecuado para materiales no ferrosos y aluminio aleado
- Ángulo de corte positivo, para materiales de viruta larga



Catalogue Code	E446	E447
Product Group	B0208	B0208
Material	VHM	VHM
Surface Finish	*Brt*	*Brt*
Sutton Designation	Al	Al
Geometry	R25 NR	R25 NR
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h5	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	z	Item #	Item #
0600	6.0	57	13	6	3	E446 0600	E447 0600
0800	8.0	63	19	8	3	E446 0800	E447 0800
1000	10.0	72	22	10	3	E446 1000	E447 1000
1200	12.0	83	26	12	3	E446 1200	E447 1200
1400	14.0	83	26	14	3	•	•
1600	16.0	92	32	16	3	E446 1600	E447 1600
1800	18.0	92	32	18	3	•	•
2000	20.0	104	38	20	3	E446 2000	E447 2000

ISO	P												M			K						N									S														H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E446																							●	●	●	●	○	○		○																				
E447																							●	●	●	●	○	○		○																				

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

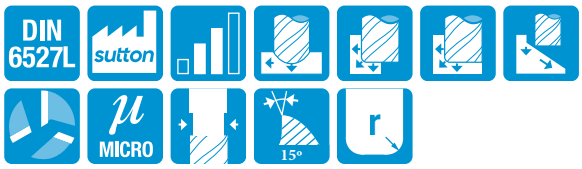
• Available on request as special manufacture. Subject to lead time.

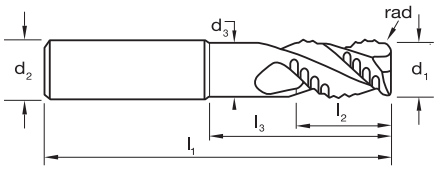
- V45/46/44° variable flute helix for chatter free milling
- Optimised geometry for soft materials

Fraise carbure, profil ébauche, 3 dents R45/46/44, Al
- Hélice variable pour la suppression des vibrations
- Géométrie optimisée les non-ferreux et cuivres

Fresa metallo duro, 3 taglienti, R45/46/44, Al
- Rompitruciolo evaquano velocemente i trucioli
- Aumento della produttività della macchina
- Progettato per strategie di lavorazione trocoidali/dinamiche per materiali fino a 1300N/mm², TiSiNos per una maggiore durata dell'utensile

Fresas de MD, 3 ranuras, R45/46/44, Al
- Hélice de ranura variable para fresado sin vibraciones
- Geometría optimizada para materiales blandos





	E674	E675
Catalogue Code	E674	E675
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	HCR	HCR
Sutton Designation	Al	Al
Geometry	R45/46/44	R45/46/44
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h5	h5

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #
	DIN6527L									
0610	**6.0**	60.0	13.0	23.0	6.0	5.7	3	1.0	E674 0610	
0810	**8.0**	64.0	18.0	28.0	8.0	7.7	3	1.0	E674 0810	
1010	**10.0**	73.0	21.0	31.0	10.0	9.5	3	1.0	E674 1010	
1210	**12.0**	84.0	25.0	35.0	12.0	11.5	3	1.0	E674 1210	
1610	**16.0**	93.0	32.0	50.0	16.0	15.3	3	1.0	E674 1610	
2010	**20.0**	104.0	40.0	60.0	20.0	19.3	3	1.0	E674 2010	
	SUTTON STD									
1210	**12.0**	100.0	31.0	60.0	12.0	11.5	3	1.0		E675 1210
1610	**16.0**	130.0	41.0	80.0	16.0	15.3	3	1.0		E675 1610
2010	**20.0**	150.0	52.0	100.0	20.0	19.3	3	1.0		E675 2010

ISO	P													M			K							N												S															H						
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E674																							●	●	●	●	●	●	●	●																						
E675																							●	●	●	●	●	●	●	●																						

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 3 Flute, Al, Through Coolant Rougher

- 45° Helix, Centre Cutting, Sinusoidal Form
- Uniquely designed for high material removal rates
- Enhanced with through coolant and wide flute form for maximum swarf removal

Fraise 3 dents carbure AL arrosage central profil ebauche

- Hélice 45° sinusoïdale, coupe au centre, serie longue
- Idéale pour le fraisage trochoidal et la finition
- Revetement HCR

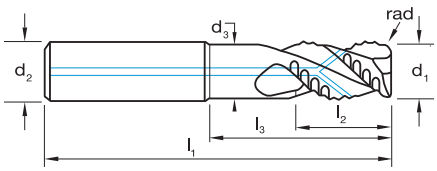
Fresa metallo duro, 3 taglienti, Al, Refrigerazione interna con rompitruciolo

- 45° Elica, Tagliente al centro, Forma Sinusoidale
- Geometria unica per alti avanzamenti
- Refrigerazione interna centrale e tagliente adatto a massima evacuazione trucioli

Fresas Debaste, NR, R45 AL, Refrigerante

- Hélice de 45°, corte frontal, forma sinusoidal
- Diseñado exclusivamente para altos arranques de material
- Mejorado con refrigerante interior y forma de ranura ancha para la máxima evacuación de virutas

DIN 6527L | MICRO



Catalogue Code	E662
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	Brt
Sutton Designation	Al - IK
Geometry	R45
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
1210	12.0	83	18	40	12.0	-	1.00	3	E662 1210
1220	12.0	83	18	40	12.0	-	2.00	3	E662 1220
1225	12.0	83	18	40	12.0	-	2.50	3	E662 1225
1230	12.0	83	18	40	12.0	-	3.00	3	E662 1230
1240	12.0	83	18	40	12.0	-	4.00	3	E662 1240
1610	16.0	92	18	40	12.0	-	1.00	3	E662 1610
1620	16.0	92	25	50	16.0	-	2.00	3	E662 1620
1625	16.0	92	25	50	16.0	-	2.50	3	E662 1625
1630	16.0	92	25	50	16.0	-	3.00	3	E662 1630
1640	16.0	92	25	50	16.0	-	4.00	3	E662 1640
1650	16.0	92	25	50	16.0	-	5.00	3	E662 1650
2010	20.0	104	36	64	20.0	-	1.00	3	E662 2010
2020	20.0	104	36	64	20.0	-	2.00	3	E662 2020
2025	20.0	104	36	64	20.0	-	2.50	3	E662 2025
2030	20.0	104	36	64	20.0	-	3.00	3	E662 2030
2040	20.0	104	36	64	20.0	-	4.00	3	E662 2040
2050	20.0	104	36	64	20.0	-	5.00	3	E662 2050

ISO	P													M			K						N									S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E662																							●	●	●	●	●	●	●	●																				

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

● Optimal ○ Effective

- 45° Helix, Centre cutting
- Extended flute length and added chip breakers for excellent sward removal
- Ideal for trochoidal milling
- HCR coating enables excellent feed rates

Fraise 4 dents carbure AL extra longue, brise copeaux

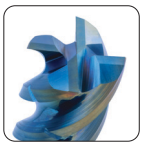
- Hélice 45°, coupe au centre
- serie longue avec brises copeaux
- Idéale pour le fraisage trochoidal
- Revetement HCR

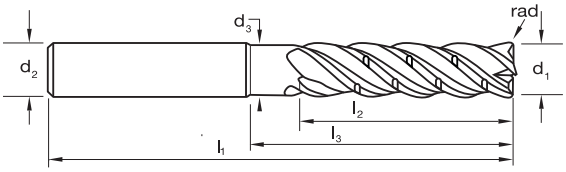
Fresa metallo duro, 4 taglienti, Extra Lunga, Al, Rompitruciolo

- 45° Elica, Tagliente al centro
- Lunghezza tagliente esteso con rompitruciolo per un eccellente lavorazione del materiale
- Ideale per lavorazioni in trocoidale
- Rivestimento HCR per supportare alte velocità di taglio

Fresas de MD, 4 ranuras, R40 AL, extra larga, Torica

- Hélice de 45°, corte frontal
- Longitud de ranura extendida y rompevirutas para un excelente ratio de avance
- Ideal para molienda trocoidal
- El recubrimiento HCR permite excelentes velocidades de alimentación"





Catalogue Code	E663	E664
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*HCR*	*HCR*
Sutton Designation	**Al - CB**	**Al - CB**
Geometry	R45	R45
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #	Item #
0600	**6.0**	100	24	50	6.0	5.70	0.20	4	E663 0600	E664 0600
0800	**8.0**	100	32	50	8.0	7.70	0.20	4	E663 0800	E664 0800
1000	**10.0**	100	40	50	10.0	9.50	0.20	4	E663 1000	E664 1000
1200	**12.0**	100	48	60	12.0	11.50	0.20	4	E663 1200	E664 1200
1600	**16.0**	125	65	80	16.0	15.30	0.20	4	E663 1600	E664 1600
2000	**20.0**	150	80	100	20.0	19.30	0.20	4	E663 2000	E664 2000

ISO	P													M			K							N												S															H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E663																							●	●	●	●	●	●	●	●																						
E664																							●	●	●	●	●	●	●	●																						

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 4 Flute, Extra Long, Al, Finishing

- 45° Helix, Centre cutting, extended flute length
- Excellent for trochoidal milling
- HCR coating enables excellent feed rates

Fraise 4 dents carbure AL extra longue, pour finition

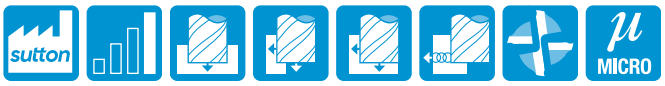
- Hélice 45°, coupe au centre, serie longue
- Idéale pour le fraisage trochoidal et la finition
- Revetement HCR

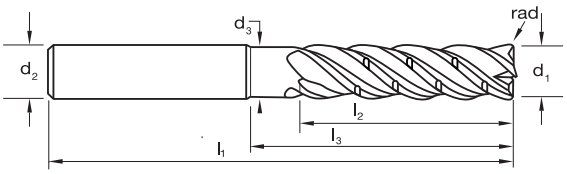
Fresa metallo duro, 4 taglienti, Extra lunga, Al, Finitura

- 45° Elica, Tagliente al centro, Lunghezza tagliente esteso
- Eccellente per lavorazioni in trocoidale
- Rivestimento HCR per supportare alte velocità di taglio

Fresas de MD, 4 ranuras, R40 AL, extra larga

- Hélice de 45°, corte frontal, longitud de ranura ancha
- Excelente para fresado trocoidal
- El recubrimiento HCR permite excelentes velocidades de corte





	E665	E666
Catalogue Code	E665	E666
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*HCR*	*HCR*
Sutton Designation	**Al**	**Al**
Geometry	R45	R45
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #	Item #
0600	**6.0**	100	24	50	6.0	5.70	0.20	4	E665 0600	E666 0600
0800	**8.0**	100	32	50	8.0	7.70	0.20	4	E665 0800	E666 0800
1000	**10.0**	100	40	50	10.0	9.50	0.20	4	E665 1000	E666 1000
1200	**12.0**	100	48	60	12.0	11.50	0.20	4	E665 1200	E666 1200
1600	**16.0**	125	65	80	16.0	15.30	0.20	4	E665 1600	E666 1600
2000	**20.0**	150	80	100	20.0	19.30	0.20	4	E665 2000	E666 2000

ISO	P													M			K						N										S														H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E665																							●	●	●	●	●	●	●	●																						
E666																							●	●	●	●	●	●	●	●																						

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Endmills Carbide, 4 Flute, Extra Long, Finishing, Al, Corner Rad

- 45° Helix, Centre cutting, extended flute length
- Excellent for trochoidal milling
- HCR coating enables excellent feed rates

Fraise 4 dents carbure AL extra longue, pour finition avec rayons

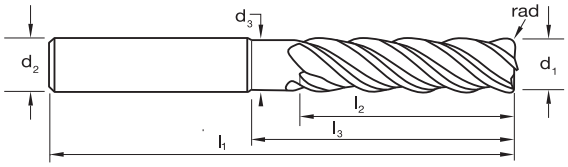
- Hélice 45°, coupe au centre, serie longue
- Idéale pour le fraisage trochoidal
- Revetement HCR

Fresa metallo duro, 4 taglienti, Extra lunga, Finitura, Al, Torica

- 45° Elica, Tagliente al centro, Lunghezza tagliente esteso
- Eccellente per lavorazioni in trocoidale
- Rivestimento HCR per supportare alte velocità di taglio

Fresas de MD, 4 ranuras, R40 AL, extra larga, Torica

- Hélice de 45°, corte frontal, longitud de ranura ancha
- Excelente para fresado trocoidal
- El recubrimiento HCR permite excelentes velocidades de corte



Catalogue Code	E667
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	HCR
Sutton Designation	Al
Geometry	R45
Shank Form (DIN 6535)	HA
Shank Tolerance	h6

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	Rad	z	Item #
1210	**12.0**	100	48	60	12.0	11.50	1.00	4	E667 1210
1220	**12.0**	100	48	60	12.0	11.50	2.00	4	E667 1220
1225	**12.0**	100	48	60	12.0	11.50	2.50	4	E667 1225
1230	**12.0**	100	48	60	12.0	11.50	3.00	4	E667 1230
1240	**12.0**	100	48	60	12.0	11.50	4.00	4	E667 1240
1610	**16.0**	125	65	80	16.0	15.30	1.00	4	E667 1610
1620	**16.0**	125	65	80	16.0	15.30	2.00	4	E667 1620
1625	**16.0**	125	65	80	16.0	15.30	2.50	4	E667 1625
1630	**16.0**	125	65	80	16.0	15.30	3.00	4	E667 1630
1640	**16.0**	125	65	80	16.0	15.30	4.00	4	E667 1640
2010	**20.0**	150	80	100	20.0	19.30	1.00	4	E667 2010
2020	**20.0**	150	80	100	20.0	19.30	2.00	4	E667 2020
2025	**20.0**	150	80	100	20.0	19.30	2.50	4	E667 2025
2030	**20.0**	150	80	100	20.0	19.30	3.00	4	E667 2030
2040	**20.0**	150	80	100	20.0	19.30	4.00	4	E667 2040

ISO	P													M			K						N								S												H					
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14.1	14.2	14.3	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37.1	37.2	37.3	37.4	37.5	38.1	38.2	39.1	39.2	40	41
E667																							●	●	●	●	●	●	●	●																			

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

● Optimal ○ Effective

Regrinding and Recoating Services

Regrinding

The relationship with you does not end after the delivery of our products. Sutton Tools supports you by reducing your production costs through our regrinding service of carbide tools available at our state-of-the-art facility.

Using our regrinding service means:

- ✓ Reground with original geometry
- ✓ Quality assured
- ✓ Handled by highly experienced personnel
- ✓ Lower tooling cost

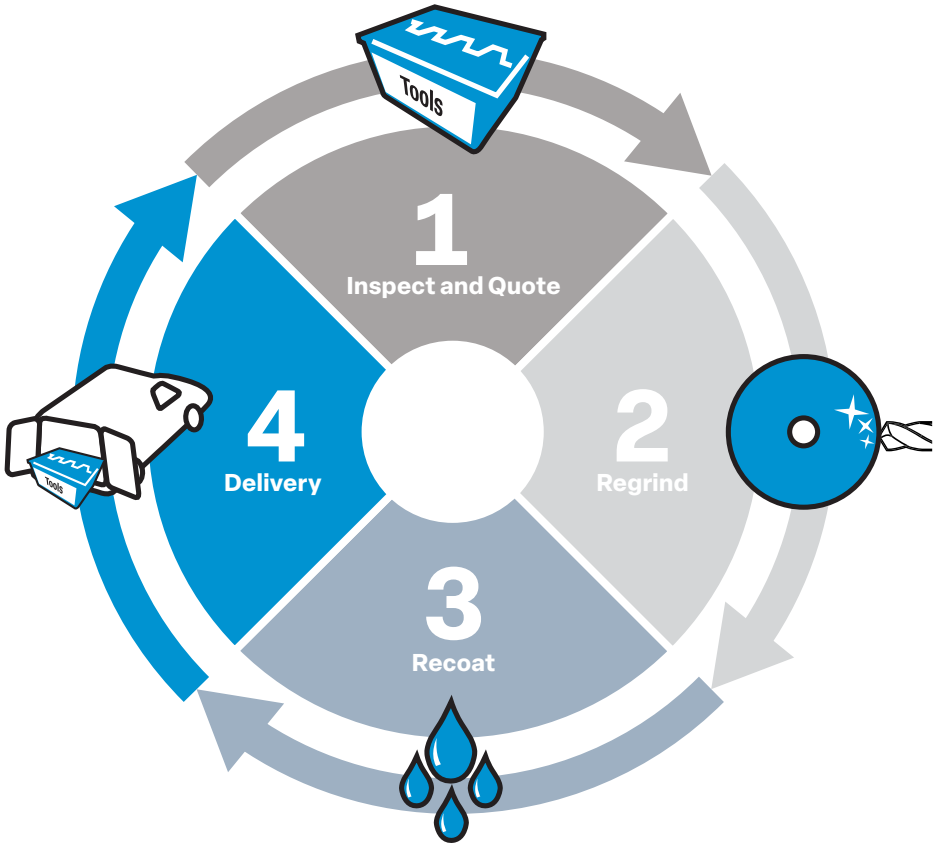
Recoating

As a total solution provider, Sutton Tools uses world leading heat treatment PVD coating (Physical Vapour Deposition) based on Oerlikon Balzers technology on their latest INNOVA coating machine to add life to our products.

The benefits of PVD coatings include:

- ✓ 300%–1000% increase in tool life
- ✓ Increased productivity
- ✓ Uniform thickness
- ✓ Corrosion resistant
- ✓ Less tool changes due to less wear
- ✓ Better wear condition for regrinds

Tool Regrinding and Recoating Process



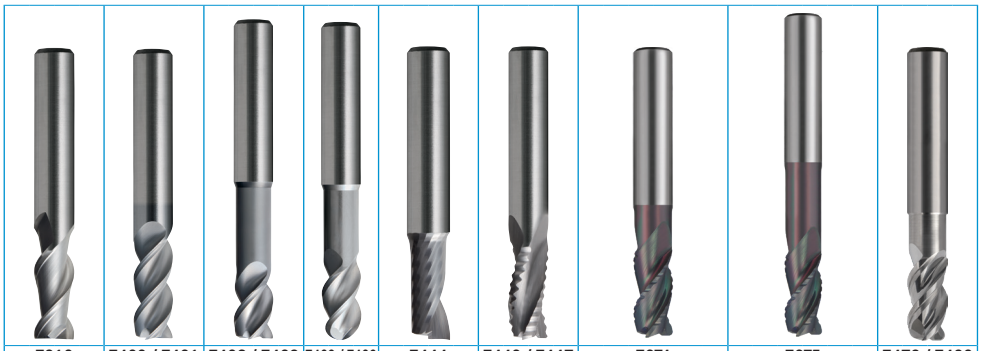
Custom Tools and Modifications

With the synergy of facility and services, Sutton Tools are able to manufacture custom tools to your exact requirements. Simply provide your details via our enquiry form and our team of engineers will be able to design a custom solution for your tooling needs in no time.

ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al | W	
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to main index of this section.

For expert tooling recommendations, go to:
www.suttontools.com/expert-tool-selector



Catalogue Code	E310	E400 / E401	E402 / E403	E408 / E409	E444	E446 / E447	E674	E675	E478 / E480
Material	VHM	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA	VHM	VHM	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA
Surface Finish	*Brt*	*CrN*	*CrN*	*CrN*	*Brt*	*Brt*	*HCR*	*HCR*	*Brt*
Sutton Designation	Al	Al	Al	Al	Al	Al	Al	Al	Al
Type of Cut: *Slotting*	●	●	●		●	●	●	●	●
Finishing									
Universal	●	●	●		●	●		●	●
Roughing	●	●	●	●	●	●	●		●
Profiling				●				●	
↕ ap × Ø	1.0 1.5 1.5	1.5 1.5 1.5	1.0 1.5 1.5	0.1 0.1	1.0 1.5 1.5	1.25 2.0 2.0	1.0 1.0 1.0	1.0 1.0 1.0	0.25 1.5 1.5
↔ ae × Ø	1.0 0.25 0.4	1.0 0.25 0.4	1.0 0.25 0.4	0.1 0.05	1.0 0.2 0.2	1.0 0.4 0.4	1.0 0.6 0.3	1.0 0.6 0.3	1.0 0.25 0.4

ISO	VDI^ 3323	Material		Condition	HB	Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	F #	Vc	F #	Vc	F #	Vc	F #	Vc	F #	Vc	Feed #			
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	220	8	18	14	200	8	17	13	200	9	18	13	200	18	15	220	3	11	16	220	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	22		Heat Treatable	AH	100	220	8	18	14	200	8	17	13	200	9	18	13	200	18	15	220	3	11	16	220	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	220	8	18	14	200	8	17	13	200	9	18	13	200	18	15	220	3	11	16	220	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	24		Heat Treatable	AH	90	220	8	18	14	200	8	17	13	200	9	18	13	200	18	15	220	3	11	16	220	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	220	8	18	14	200	8	17	13	200	9	18	13	200	18	15	220	3	11	16	220	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	26	Copper & Cu alloys (Brass/ Bronze)	Free cutting, Pb >1%		110	160	8	18	14	350	8	17	13	350	9	18	13	350	18	15	160	3	11	16	160	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	27		Brass (CuZn, CuSnZn)		90	160	8	18	14	350	8	17	13	350	9	18	13	350	18	15	160	3	11	16	160	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	28		Bronze (CuSn)		100	160	8	18	14	350	8	17	13	350	9	18	13	350	18	15	160	3	11	16	160	14	17	19	500	11	500	18	500	20	350	11	350	18	350	20	200	9	18	13
	29	Non-metallic - Thermosetting & fiber-reinforced plastics				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Ø = nominal tool diameter (mm)
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v_c = Cutting speed (m/min)
f_z = Feed rate per tooth (mm/tooth)
v_f = Feed rate (mm/min)
z = No. cutting edges
Q = Metal removal rate (cm^3/min)
a_p = Cutting depth (mm)
a_e = Cutting width (mm)

$$n = \frac{v_c \times 1000}{Ø \times \pi} \simeq \frac{v_c}{Ø} \times 318$$

$$v_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$f_z = \frac{V_f}{z \times n} \qquad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

Feed Table (fz) (mm/tooth)																				
Ø	Feed #																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

Application Guide Speeds & Feeds - Carbide Endmills

ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	UNI
K	F	Cast Iron	GG	UNI
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al	W
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to main index of this section.

For expert tooling recommendations, go to:
www.suttontools.com/expert-tool-selector





	E660	E661	E662	E663	E665
Material	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA
Surface Finish	*Brt*	*Brt*	*Brt*	*HCR*	*HCR*
Sutton Designation	Al	Al	Al - IK	Al	Al
Type of Cut: *Slotting*	●	●	●	●	●
Finishing					
Universal	●	●		●	●
Roughing	●		●	●	●
Profiling		●			
↕ ap × Ø	1.0 1.5 1.5	0.5 1.5 0.1	1.0 1.5	0.5 4.0 2.0	0.5 4.0 2.0
↔ ae × Ø	1.0 0.25 0.4	1.0 0.25 0.5	1.0 1.0	1.0 0.25 0.4	1.0 0.25 0.4

ISO	VDI^ 3323	Material		Condition	HB	Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	Feed #		
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	400-500	16	18	17	400-500	16	18	17	*Up to 2500	15	16		400-500	16	18	17	400-500	16	18	17
	22		Heat Treatable	AH	100	400-530	16	18	17	400-530	16	18	17		15	16		400-530	16	18	17	400-530	16	18	17
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	230-360	15	17	16	230-360	15	17	16		14	15		230-360	15	17	16	230-360	15	17	16
	24		Heat Treatable	AH	90	230-360	15	17	16	230-360	15	17	16		14	15		230-360	15	17	16	230-360	15	17	16
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	230-360	15	17	16	230-360	15	17	16		14	15		230-360	15	17	16	230-360	15	17	16
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	100-210	14	16	15	100-210	14	16	15		14	15		100-210	14	16	15	100-210	14	16	15
	27		Brass (CuZn, CuSnZn)		90	100-210	14	16	15	100-210	14	16	15		14	15		100-210	14	16	15	100-210	14	16	15
	28		Bronze (CuSn)		100	100-210	14	16	15	100-210	14	16	15		14	15		100-210	14	16	15	100-210	14	16	15
	29	Non-metallic - Thermosetting & fiber-reinforced plastics				490-600	18	20	19	490-600	18	20	19		15	16		490-600	18	20	19	490-600	18	20	19
	30	Non-metallic - Hard rubber, wood etc.				-	-	-	-	-	-	-	-		-	-		-	-	-	-	-	-	-	-

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)
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v_f = Feed rate (mm/min)
z = No. cutting edges
Q = Metal removal rate (cm^3/min)
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$$n = \frac{v_c \times 1000}{Ø \times \pi} \simeq \frac{v_c}{Ø} \times 318$$

$$v_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$f_z = \frac{V_f}{z \times n} \qquad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

Feed Table (fz) (mm/tooth)																				
Ø	Feed #																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

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E667				E668				E669				E670				E671				E672				E673			
VHM-ULTRA				VHM-ULTRA				VHM-ULTRA				VHM-ULTRA				VHM-ULTRA				VHM-ULTRA				VHM-ULTRA			
HCR				***HCR***				***ASX***				***ASX***				***ASX***				***ASX***				***ASX***			
Al				Al				Al				Al				Al				Al				Al			
	●				●				●				●				●				●				●		
		●				●				●				●				●				●				●	
			●				●				●				●				●				●				●
	0.5	4.0	2.0		1.0	1.5	1.5		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0
	1.0	0.25	0.4		1.0	0.25	0.4		1.0	0.25	0.4		1.0	0.25	0.4		1.0	0.25	0.4		1.0	0.25	0.4		1.0	0.25	0.4
Vc	**Feed #**			**Vc**	**Feed #**			**Vc**	**Feed #**			**Vc**	**Feed #**			**Vc**	**Feed #**			**Vc**	**Feed #**			**Vc**	**Feed #**		
400-500	16	18	17	400-500	16	18	17	400-500	16	18	17	400-500	16	18	17	400-500	16	18	17	400-500	16	18	17	400-500	16	18	17
400-530	16	18	17	400-530	16	18	17	400-530	16	18	17	400-530	16	18	17	400-530	16	18	17	400-530	16	18	17	400-530	16	18	17
230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16
230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16
230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16	230-360	15	17	16
100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15
100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15
100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15	100-210	14	16	15
490-600	18	20	19	490-600	18	20	19	490-600	18	20	19	490-600	18	20	19	490-600	18	20	19	490-600	18	20	19	490-600	18	20	19
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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$$v_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$f_z = \frac{V_f}{z \times n} \qquad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

Feed Table (fz) (mm/tooth)

Ø	**Feed #**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
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16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
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25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

Sutton Tools Pty Ltd ABN 12 004 175 731

Australia (Head Office)
378 Settlement Road, Thomastown 3074, Victoria Australia
T +61 3 9280 0800 **F** +61 3 9464 0015

Customer Service
T 1800 335 350 **F** 1800 333 127 **E** cservice@sutton.com.au

Special Sales
T 1800 035 010 **F** 1800 804 084 **E** specsales@sutton.com.au

Regrinds
382 Settlement Road, Thomastown 3074, Victoria Australia
T (03) 9466 3315 **F** (03) 9464 4871 **E** regrind@sutton.com.au

The Netherlands Bruijellestraat 4, 5048 Ae Tilburg, Nederland
T+31 13 220 1480 E steurope@sutton.com.au

Global Offices
Australasia Australia (Head Office) • New Zealand
Europe France • The Netherlands

www.suttontools.com

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