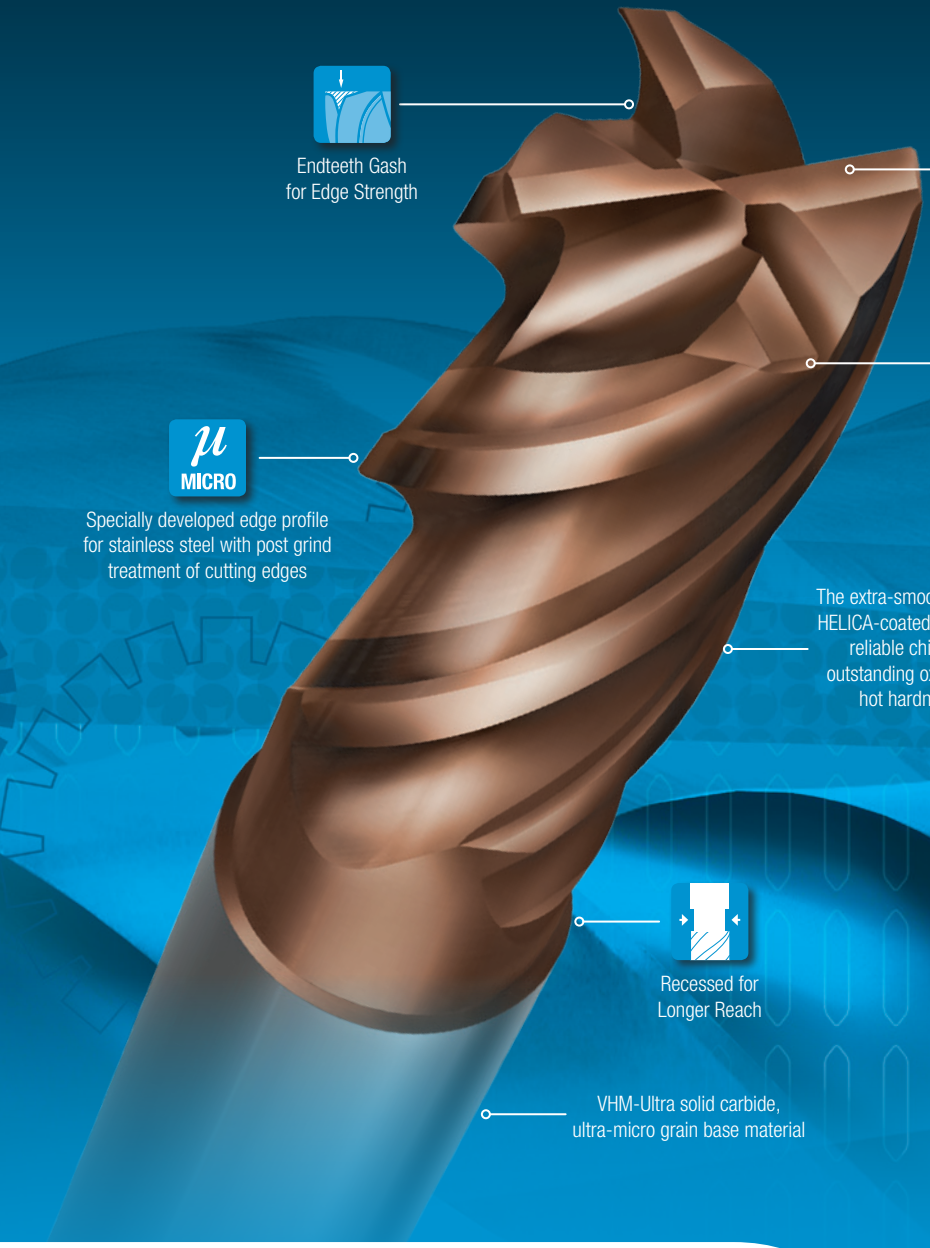
Performance Unequalled...

In Stainless Steel & Super Alloys



Endteeth Gash
for Edge Strength

40/42º Unequal
Flute Helix

45º

45º Corner
Chamfering

μ MICRO

Specially developed edge profile
for stainless steel with post grind
treatment of cutting edges

The extra-smooth surfaces of BALINIT® HELICA-coated endmills mean smooth, reliable chip evacuation due to outstanding oxidation resistance and hot hardness of the coating.

Recessed for
Longer Reach

VHM-Ultra solid carbide,
ultra-micro grain base material

Sutton Tools VA-Harmony Endmill provides the ideal solution for high-quality milling of stainless steels and super alloys—such as austenitic grades 304 & 316, duplex grades, as well as inconels 718 & 725.

The VA-Harmony Endmill is a versatile tool that offers an industry-leading performance—suppressing chattering, and facilitating higher feed-rates, longer tool-life and increased productivity compared with conventional endmills. The VA-Harmony Endmill will give you an outstanding edge in the market.

HARMONY

VA ENDMILLS

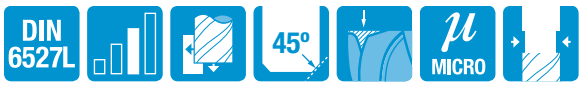
suttontools

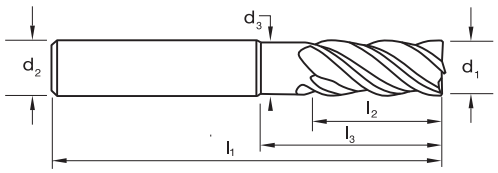
world class cutting tools

HARMONY DIN6527L, 4 Flute, R40/42-VA

suttontools

- Excellent solution for stainless steels & difficult super alloy type materials
- Optimised geometry with variable helix design ensures high productivity
- Suitable for slotting, side cutting and finishing applications with the one tool
- HELICA for outstanding oxidation resistance and hot hardness
- VHM-ULTRA grade of carbide for high performance





Catalogue Code	E459
Discount Group	B0210
Material	VHM-ULTRA
Surface Finish	HELICA
Colour Ring & Application	VA
Geometry	R40/42
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 #	Item #
0300	3.0	57	8	14	6	2.8	4		E459 0300
0400	4.0	57	11	16	6	3.8	4		E459 0400
0500	5.0	57	13	18	6	4.8	4		E459 0500
0600	6.0	57	13	19	6	5.7	4		E459 0600
0800	8.0	63	19	25	8	7.6	4		E459 0800
1000	10.0	72	22	30	10	9.5	4		E459 1000
1200	12.0	83	26	36	12	11.5	4		E459 1200
1400	14.0	83	26	36	14	13.5	4		E459 1400
1600	16.0	92	32	42	16	15.5	4		E459 1600
1800	18.0	92	32	42	18	17.5	4		E459 1800
2000	20.0	104	38	52	20	19.5	4		E459 2000

Type of Cut:			
Slotting		•	
Finishing			
Universal			•
Roughing			
Profiling			
↕ ap × Ø		1.0	1.0
↔ ae × Ø		1.0	0.3

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	

ISO	VDI 3323	Material		Condition	HB	N/mm²	Vc	Feed #	
P	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	120	9	12
	13		Martensitic	QT	240	810	100	9	12
M	14.1	Stainless Steel	Austenitic	AH	180	610	**120**	**9**	**12**
	14.2		Duplex		250	840	**120**	**9**	**12**
	14.3		Precipitation Hardening		250	840	**100**	**9**	**12**
S	31	High temp. alloys	Fe based	A	200	680	70	8	11
	32			AH	280	950	**70**	8	11
	33		Ni / Co based	A	250	840	70	8	11
	34			AH	350	1180	**70**	8	11
	35			C	320	1080	**70**	8	11
	36	Titanium & Ti alloys	CP Titanium		400 MPa		90	8	11
	37.1		Alpha alloys		860 MPa		**90**	8	11
	37.2		Alpha / Beta alloys	A	960 MPa		**90**	8	11
	37.4		Beta alloys	A	830 MPa		**90**	8	11
	37.5			AH	1400 MPa		90	8	11

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)
Bold = Optimal | Regular = Effective

Notes on Milling

1. Above values are guidelines for the size and type of cut nominated.
2. For long series tools, reduce speed by 40% and feed by 20%.

Feed Table (f_z) (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

METRIC ENDMILLS (mm size)

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

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

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

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