

Phantom

HP2 SC VARI FLUTE END MILLS

> THE NEW GENERATION

Innovative on many fronts, developed by Phantom

Lengths linked to diameter (2xD, etc.)

Tangential transition

Micro geometry for reliability and continuity

Macro geometry, specially for a super universal flute end mill

Plunges into the material at an angle of 45°

Radius from R = 0.25 to R = 5 mm inclusive, also with phase

Wear-resistant and fracture-resistant solid carbide

Micro geometry for reliability and continuity

Chip splitters with transition radii

Macro geometry, specially for trochoidal milling

AlCrN coated for high cutting speeds, long applicability and for dry and wet machining

Why PHANTOM HP2 SC VARI FLUTE END MILLS?

- > Drilling, milling, full slotting and 45-degree plunging
- > Expressed in logical lengths (xD); no book of tables required
- > Visible work area icon for best performance
- > Maximum performance in trochoidal milling

THERE'S NO END TO WHAT YOU CAN DO.

PHANTOM HP2 UNI SC VARI FLUTE END MILLS

HP2 UNI

Universal flute end mills for all your milling work



HP2 TROCHOIDAL

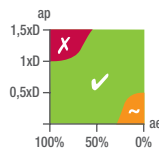
High-performance trochoidal milling



Deployment area: for HP2 UNI
From 1xD full slotting to 2xD contours

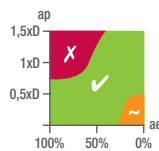
34.302

1.5xD for 1xD full slotting and up to 1.5xD shells. Below 0.5xD, performance is better with an ae value from 25%.



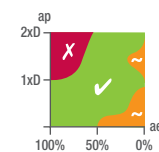
34.318

1.5xD with 5xD neck for 0.75xD full slotting. Below 0.5xD performance is better with an ae value from 25%.



34.314 - 34.316

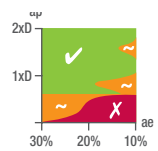
Sweet spot at 1xD and at 2xD for working with low ae values. Below 0.5xD, performance is better with an ae value from 50%.



Deployment area: for HP2 trochoidal

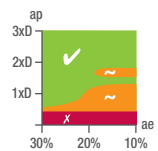
34.330

The 2xD trochoidal flute end mill is optimised for the maximum cutting length of 2xD. Sweet spot at 1.5xD possibly with low ae values. Select an ap value from 0.5xD.



34.331

The 3xD trochoidal flute end mill works perfectly between 1.75xD and 3xD. Sweet spot at 1.25xD. Select an ap value from 0.5xD.



In the graphs, green is used as the colour to indicate the ap/ae ratios for each flute end mill with which optimum results can be achieved. It is also easy to see how ratios need to be adjusted in order to stay out of the red zone. Deployment area: percentage in diameter (ae) with the cutting depth (ap).

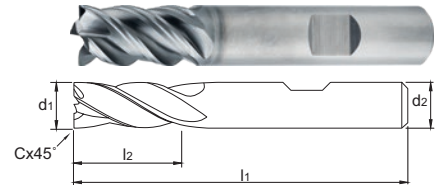
- ✔ The optimum work area
- ~ Slightly increased risk of vibration
- ✘ Unsuitable, high risk of flute end mill fracture

HP2 UNI SC VARI FLUTE END MILLS

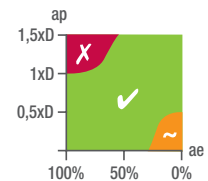
HP2 UNI flute end mills are true universal flute end mills and are designed to be used on steel, stainless steel and exotic materials. The flute end mills are also extremely versatile, cutting right through the material with a depth of 1xD and shell flute end mills with the full cutting length. The plunge geometry at the tip also enables drilling or plunging into the material at an angle of up to 45 degrees.

> 34.302 Phantom

EN HP2 UNI SC Vari flute end mill, 4-flute 1.5xD, AlCrN



≤800 N/mm ²	≤850 N/mm ²	≤1000 N/mm ²	≤1400 N/mm ²	INOX ≤850N/mm ²	INOX >850N/mm ²	GG	GGG GTS-GTW	Ni/Co	Ti
180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I



Ref.	d1	d2	l1	l2	c	z	€
34.302.0300	3	6	50	5	0.05	4	€ 18,38
34.302.0400	4	6	54	8	0.05	4	€ 18,38
34.302.0500	5	6	54	9	0.1	4	€ 18,38
34.302.0600	6	6	54	10	0.1	4	€ 18,38
34.302.0800	8	8	58	12	0.2	4	€ 23,63

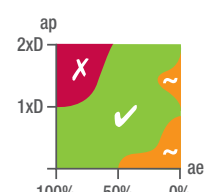
Ref.	d1	d2	l1	l2	c	z	€
34.302.1000	10	10	66	17	0.25	4	€ 32,55
34.302.1200	12	12	73	20	0.3	4	€ 43,58
34.302.1600	16	16	82	26	0.4	4	€ 78,23
34.302.2000	20	20	92	32	0.5	4	€ 117,60

> 34.314 Phantom

EN HP2 UNI SC Vari flute end mill, 4-flute 2xD/3xD, AlCrN



≤800 N/mm ²	≤850 N/mm ²	≤1000 N/mm ²	≤1400 N/mm ²	INOX ≤850N/mm ²	INOX >850N/mm ²	GG	GGG GTS-GTW	Ni/Co	Ti
180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I



Ref.	d1	d2	d3	l1	l2	l3	c	z	€
34.314.0300	3	6	2.9	57	6	9	0.03	4	€ 18,90
34.314.0400	4	6	3.8	57	8	12	0.04	4	€ 18,90
34.314.0500	5	6	4.8	57	10	15	0.05	4	€ 18,90
34.314.0600	6	6	5.6	57	12	18	0.06	4	€ 18,90
34.314.0800	8	8	7.6	63	16	24	0.08	4	€ 26,25
34.314.1000	10	10	9.5	72	20	30	0.1	4	€ 40,95

Ref.	d1	d2	d3	l1	l2	l3	c	z	€
34.314.1200	12	12	11.5	83	24	36	0.12	4	€ 50,40
34.314.1400	14	14	19.3	126	40	60	0.2	4	€ 83,48
34.314.1600	16	16	15.3	108	32	48	0.16	4	€ 92,40
34.314.1800	18	18	17.5	108	36	54	0.2	4	€ 123,90
34.314.2000	20	20	19.3	126	40	60	0.2	4	€ 151,73

ORDER QUICKLY AND EASILY AT PHANTOM.EU

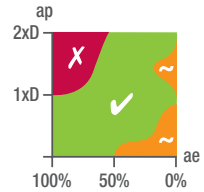
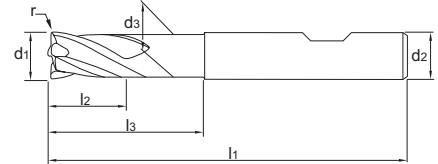


All orders placed before 7 pm [local time] are shipped the same day.

www.phantom.eu

▶ **34.316 Phantom**

EN HP2 UNI SC Vari flute end mill, 4-flute 2xD/3xD, AlCrN, flute radius



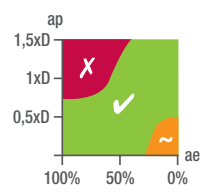
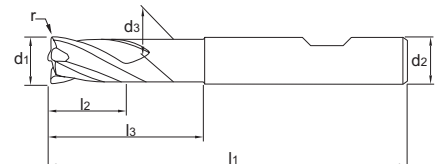
P 11	P 12	P 13	P 14	M 21	M 22	K 31	K 32	S 71	S 72
≤800 N/mm ²	≤850 N/mm ²	≤1000 N/mm ²	≤1400 N/mm ²	INOX ≤850 N/mm ²	INOX >850 N/mm ²	GG	GGG GTS-GTW	NiCo	Ti
180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I

Ref.	d1	d2	d3	l1	l2	l3	r	z	€
34.316.0303	3	6	2.9	57	6	9	0.25	4	€ 19,95
34.316.0305	3	6	2.9	57	6	9	0.5	4	€ 19,95
34.316.0310	3	6	2.9	57	6	9	1	4	€ 19,95
34.316.0403	4	6	3.8	57	8	12	0.25	4	€ 20,48
34.316.0405	4	6	3.8	57	8	12	0.5	4	€ 20,48
34.316.0410	4	6	3.8	57	8	12	1	4	€ 20,48
34.316.0415	4	6	3.8	57	8	12	1.5	4	€ 20,48
34.316.0503	5	6	4.8	57	10	15	0.25	4	€ 20,48
34.316.0505	5	6	4.8	57	10	15	0.5	4	€ 20,48
34.316.0510	5	6	4.8	57	10	15	1	4	€ 20,48
34.316.0603	6	6	5.6	57	12	18	0.25	4	€ 20,48
34.316.0605	6	6	5.6	57	12	18	0.5	4	€ 20,48
34.316.0608	6	6	5.6	57	12	18	0.8	4	€ 20,48
34.316.0610	6	6	5.6	57	12	18	1	4	€ 20,48
34.316.0615	6	6	5.6	57	12	18	1.5	4	€ 20,48
34.316.0620	6	6	5.6	57	12	18	2	4	€ 22,05
34.316.0803	8	8	7.6	63	16	24	0.25	4	€ 28,35
34.316.0805	8	8	7.6	63	16	24	0.5	4	€ 28,35
34.316.0808	8	8	7.6	63	16	24	0.8	4	€ 28,35
34.316.0810	8	8	7.6	63	16	24	1	4	€ 28,35
34.316.0815	8	8	7.6	63	16	24	1.5	4	€ 28,35
34.316.0820	8	8	7.6	63	16	24	2	4	€ 29,40
34.316.0830	8	8	7.6	63	16	24	3	4	€ 30,98
34.316.1003	10	10	9.5	72	20	30	0.25	4	€ 42,53
34.316.1005	10	10	9.5	72	20	30	0.5	4	€ 42,53
34.316.1008	10	10	9.5	72	20	30	0.8	4	€ 42,53
34.316.1010	10	10	9.5	72	20	30	1	4	€ 42,53
34.316.1013	10	10	9.5	72	20	30	1.25	4	€ 42,53
34.316.1015	10	10	9.5	72	20	30	1.5	4	€ 42,53
34.316.1020	10	10	9.5	72	20	30	2	4	€ 45,15
34.316.1025	10	10	9.5	72	20	30	2.5	4	€ 45,15
34.316.1030	10	10	9.5	72	20	30	3	4	€ 45,15

Ref.	d1	d2	d3	l1	l2	l3	r	z	€
34.316.1203	12	12	11.5	83	24	36	0.25	4	€ 52,50
34.316.1205	12	12	11.5	83	24	36	0.5	4	€ 52,50
34.316.1208	12	12	11.5	83	24	36	0.8	4	€ 52,50
34.316.1210	12	12	11.5	83	24	36	1	4	€ 52,50
34.316.1213	12	12	11.5	83	24	36	1.25	4	€ 52,50
34.316.1215	12	12	11.5	83	24	36	1.5	4	€ 52,50
34.316.1220	12	12	11.5	83	24	36	2	4	€ 54,60
34.316.1225	12	12	11.5	83	24	36	2.5	4	€ 54,60
34.316.1230	12	12	11.5	83	24	36	3	4	€ 56,70
34.316.1235	12	12	11.5	83	24	36	3.5	4	€ 56,70
34.316.1240	12	12	11.5	83	24	36	4	4	€ 58,28
34.316.1250	12	12	11.5	83	24	36	5	4	€ 59,85
34.316.1605	16	16	15.3	108	32	48	0.5	4	€ 94,50
34.316.1608	16	16	15.3	108	32	48	0.8	4	€ 94,50
34.316.1610	16	16	15.3	108	32	48	1	4	€ 94,50
34.316.1615	16	16	15.3	108	32	48	1.5	4	€ 94,50
34.316.1620	16	16	15.3	108	32	48	2	4	€ 97,13
34.316.1625	16	16	15.3	108	32	48	2.5	4	€ 97,13
34.316.1630	16	16	15.3	108	32	48	3	4	€ 99,75
34.316.1635	16	16	15.3	108	32	48	3.5	4	€ 99,75
34.316.1640	16	16	15.3	108	32	48	4	4	€ 102,38
34.316.1645	16	16	15.3	108	32	48	4.5	4	€ 102,38
34.316.1650	16	16	15.3	108	32	48	5	4	€ 105,00
34.316.2005	20	20	19.3	126	40	60	0.5	4	€ 153,30
34.316.2008	20	20	19.3	126	40	60	0.8	4	€ 153,30
34.316.2010	20	20	19.3	126	40	60	1	4	€ 153,30
34.316.2015	20	20	19.3	126	40	60	1.5	4	€ 153,30
34.316.2020	20	20	19.3	126	40	60	2	4	€ 156,45
34.316.2025	20	20	19.3	126	40	60	2.5	4	€ 156,45
34.316.2030	20	20	19.3	126	40	60	3	4	€ 158,55
34.316.2035	20	20	19.3	126	40	60	3.5	4	€ 158,55
34.316.2040	20	20	19.3	126	40	60	4	4	€ 161,70
34.316.2045	20	20	19.3	126	40	60	4.5	4	€ 161,70
34.316.2050	20	20	19.3	126	40	60	5	4	€ 163,80

▶ **34.318 Phantom**

EN HP2 UNI SC Vari flute end mill, 4-flute 1.5xD/5xD, AlCrN



P 11	P 12	P 13	P 14	M 21	M 22	K 31	K 32	S 71	S 72
≤800 N/mm ²	≤850 N/mm ²	≤1000 N/mm ²	≤1400 N/mm ²	INOX ≤850 N/mm ²	INOX >850 N/mm ²	GG	GGG GTS-GTW	NiCo	Ti
180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I

Ref.	d1	d2	d3	l1	l2	l3	r	z	€
34.318.0300	3	6	2.8	57	5	15	0,1	4	€ 23,63
34.318.0400	4	6	3,8	62	8	20	0,1	4	€ 25,73
34.318.0500	5	6	4,8	70	9	25	0,1	4	€ 27,30
34.318.0600	6	6	5,7	70	10	30	0,1	4	€ 28,35

Ref.	d1	d2	d3	l1	l2	l3	c	z	€
34.318.0800	8	8	7,6	80	12	40	0,2	4	€ 37,28
34.318.1000	10	10	9,5	90	17	50	0,2	4	€ 51,98
34.318.1200	12	12	11,5	110	20	60	0,25	4	€ 75,08
34.318.1600	16	16	15,5	130	26	80	0,5	4	€ 121,80

TECHNICAL INFORMATION: HP2 UNI SOLID CARBIDE VARI FLUTE END MILLS

FEED TABLE FOR 45° PLUNGING

	Dimensions in mm								
	3	4	5	6	8	10	12	16	20
	fz (mm/z)								
P 11 ≤500 N/mm ²	0,008	0,012	0,018	0,025	0,038	0,045	0,050	0,070	0,090
P 12 ≤350 N/mm ²	0,007	0,012	0,018	0,025	0,036	0,042	0,048	0,068	0,080
P 13 ≤1900 N/mm ²	0,007	0,012	0,018	0,025	0,035	0,040	0,045	0,065	0,075
P 14 ≤1400 N/mm ²	0,005	0,008	0,012	0,020	0,030	0,035	0,040	0,055	0,070
M 21 INCOX ≤850N/mm ²	0,004	0,006	0,010	0,015	0,023	0,034	0,045	0,050	0,055
M 22 INCOX >850N/mm ²	0,004	0,006	0,010	0,015	0,020	0,030	0,035	0,045	0,050
K 31 GG	0,005	0,008	0,012	0,018	0,025	0,038	0,045	0,060	0,075
K 32 GGG GTS-GTW	0,005	0,008	0,012	0,018	0,025	0,038	0,045	0,060	0,075
S 71 NiCo	0,003	0,006	0,010	0,015	0,020	0,035	0,045	0,050	0,055
S 72 Ti	0,003	0,006	0,010	0,015	0,020	0,030	0,035	0,045	0,050

ISO M and ISO S maximum plunging angle of 10°.

FEED VALUE TABLE

d1 (mm)	FRC					
	G	H	I	J	K	L
3	0,004	0,007	0,010	0,010	0,010	0,011
4	0,004	0,007	0,010	0,010	0,010	0,011
5	0,010	0,014	0,020	0,020	0,022	0,027
6	0,013	0,017	0,024	0,025	0,027	0,035
8	0,019	0,024	0,032	0,032	0,035	0,044
10	0,025	0,030	0,038	0,039	0,044	0,055
12	0,030	0,036	0,046	0,048	0,052	0,065
16	0,038	0,045	0,054	0,058	0,063	0,085
20	0,045	0,057	0,066	0,073	0,080	0,100

CORRECTION FACTOR FOR HIGHER FEED WITH AE VALUE ≤ 40%

% Ae of d1	5%	7%	10%	15%	20%	25%	30%	40%
fz x	2,8	2,4	2	1,7	1,5	1,3	1,2	1,1

At lower ae values, a higher feed can be selected. If the ae value is below 40%, you can take the correction factor from the table above and apply it to the feed from the feed value table for maximum applicability and the best production time.

FEED TABLE FOR DRILLING OPERATIONS

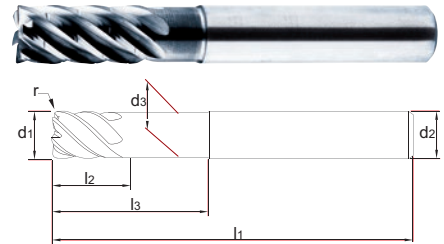
	Dimensions in mm								
	3	4	5	6	8	10	12	16	20
	fz (mm/z)								
P 11 ≤500 N/mm ²	0,004	0,008	0,012	0,018	0,025	0,030	0,035	0,048	0,060
P 12 ≤350 N/mm ²	0,003	0,006	0,010	0,016	0,024	0,028	0,032	0,045	0,055
P 13 ≤1900 N/mm ²	0,002	0,005	0,008	0,015	0,023	0,028	0,030	0,043	0,050
P 14 ≤1400 N/mm ²	0,002	0,004	0,006	0,013	0,020	0,025	0,025	0,038	0,045
K 31 GG	0,002	0,004	0,006	0,013	0,018	0,025	0,030	0,040	0,050
K 32 GGG GTS-GTW	0,002	0,004	0,006	0,013	0,018	0,025	0,030	0,040	0,050

HP2 SOLID CARBIDE TROCHOIDAL VARI FLUTE END MILLS

Phantom HP2 trochoidal flute end mills have a sophisticated geometry as well as the lowest fluctuations in cutting force at the maximum cutting lengths. Phantom HP2 flute end mills consume less power and produce very little noise during machining. The chip splitter produces short chips which are easy to remove with air or emulsion. The transition radii used prevent the chipping of the flute. The graphs for the deployment area shown here are also useful, with green indicating a reliable process with minimal wear.

> 34.330 Phantom

EN 34.330 EN HP2 UNI SC Trochoidal flute end mill 2xD, AlCrN



180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I

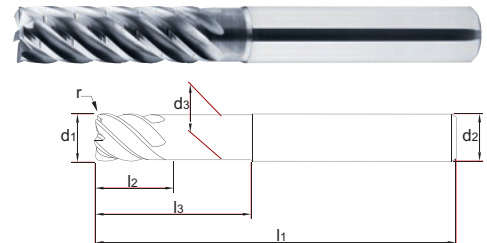
Réf.	d1	d2	d3	l1	l2	l3	r	z	€
34.330.0301	3	6	2,8	57	6	14		6	€ 31,50
34.330.0401	4	6	3,8	57	8	16		6	€ 31,50
34.330.0501	5	6	4,8	57	10	18		6	€ 31,50
34.330.0601	6	6	5,7	57	12	19	0,1	6	€ 31,50



Réf.	d1	d2	d3	l1	l2	l3	r	z	€
34.330.0802	8	8	7,6	63	16	25	0,2	6	€ 42,00
34.330.1002	10	10	9,5	72	20	30	0,2	6	€ 55,13
34.330.1203	12	12	11,5	83	24	36	0,25	6	€ 70,88
34.330.1605	16	16	15,5	92	32	42	0,5	6	€ 128,63

> 34.331 Phantom

EN HP2 UNI SC Trochoidal flute end mill 3xD, AlCrN



180-240 L	160-220 L	150-200 K	100-140 K	80-140 I	60-120 H	120-180 J	80-130 J	40-60 J	60-80 I

Réf.	d1	d2	d3	l1	l2	l3	r	z	€
34.331.0301	3	6	2,8	62	9	14		6	€ 33,60
34.331.0401	4	6	3,8	62	12	18		6	€ 33,60
34.331.0501	5	6	4,8	62	15	21		6	€ 33,60
34.331.0601	6	6	5,7	62	18	24	0,1	6	€ 33,60



Réf.	d1	d2	d3	l1	l2	l3	r	z	€
34.331.0802	8	8	7,6	68	24	30	0,2	6	€ 44,63
34.331.1002	10	10	9,5	80	30	38	0,2	6	€ 61,95
34.331.1203	12	12	11,5	93	36	46	0,25	6	€ 77,70
34.331.1605	16	16	15,5	108	48	58	0,5	6	€ 149,63

TECHNICAL INFORMATION: HP2 SOLID CARBIDE TROCHOIDAL VARI FLUTE END MILLS

FEED VALUE TABLE

d1(mm)	FRC					
	G	H	I	J	K	L
3	0,004	0,007	0,010	0,010	0,010	0,011
4	0,004	0,007	0,010	0,010	0,010	0,011
5	0,010	0,014	0,020	0,020	0,022	0,027
6	0,013	0,017	0,024	0,025	0,027	0,035
8	0,019	0,024	0,032	0,032	0,035	0,044
10	0,025	0,030	0,038	0,039	0,044	0,055
12	0,030	0,036	0,046	0,048	0,052	0,065
16	0,038	0,045	0,054	0,058	0,063	0,085

CORRECTION FACTOR FOR HIGHER FEED WITH AE VALUE ≤ 40%

% Ae of d1	5%	7%	10%	15%	20%	25%	30%	40%
fz x	2,8	2,4	2	1,7	1,5	1,3	1,2	1,1

At lower ae values, a higher feed can be selected. If the ae value is below 40%, you can take the correction factor from the table above and apply it to the feed from the feed value table for maximum applicability and the best production time.

ONLINE CALCULATOR FOR OPTIMUM DEPLOYMENT OF YOUR TOOLS

On the phantom.eu website, you'll find an online calculator which works out the correct (associated) rpm and feed based on your chosen tool, material and diameter to help you achieve optimum deployment of your tool.

Watch now by going to phantom.eu

Phantom HP2 UNI SC Vari Flute End Mill
2xD/3xD AlCrN, corner radius 10x20x30mm R1

Article number: 343161010

Description
Weldon shank (DIN 6535-HB)

In stock | 26 pieces available

- ✓ Ordered before 19:00, shipped today
- ✓ High quality, best advise
- ✓ Lifetime Warranty

To machining materials ([download legend](#))

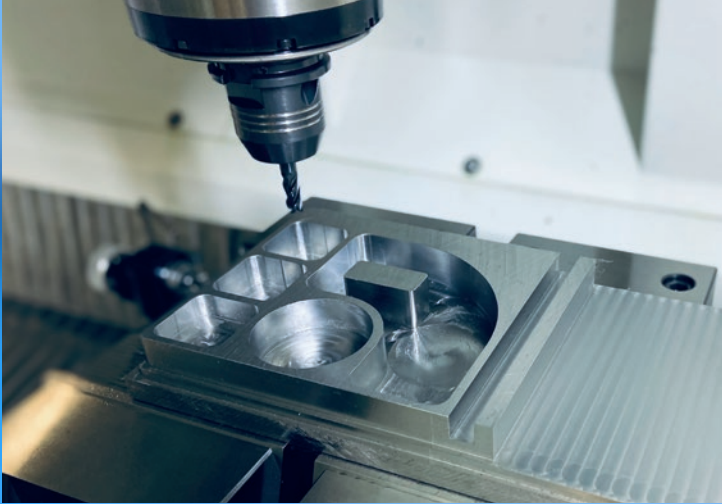
P 11 500 Körner 180-240 L	P 12 500 Körner 160-220 L	P 13 500 Körner 150-200 K	P 14 500 Körner 100-140 K	M 21 500 Körner 80-140 I	M 22 500 Körner 80-120 H	K 31 500 Körner 120-180 J	K 32 500 Körner 80-130 J	S 71 500 Körner 40-60 J
S 72 500 Körner 60-80 I								

180 240

VC: 210 M/min, Spindle speed n: 6688 RPM
Feed/Tooth: 0.055 mm Feed f: 1471 mm/min

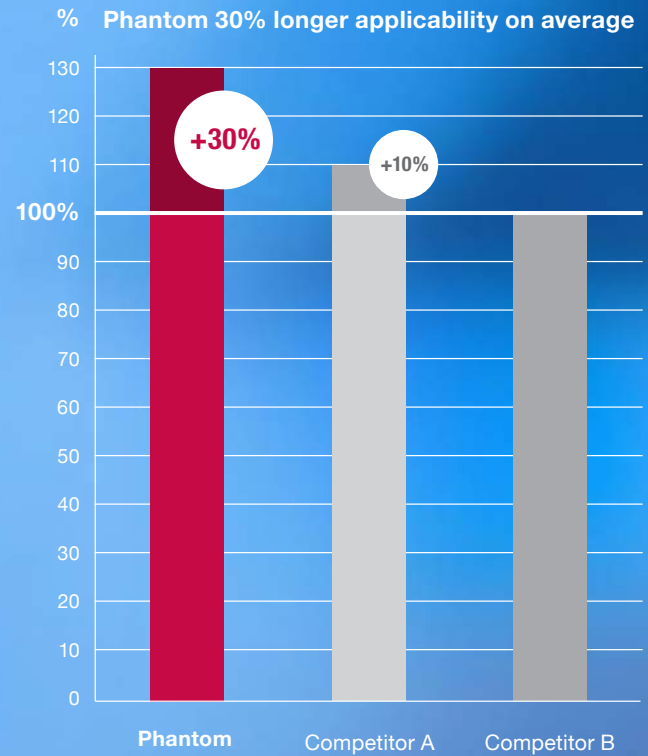
HP2 UNI SC VARI FLUTE END MILLS

THE BEST UNIVERSAL FLUTE END MILL ON THE MARKET



- > the universal flute end mill for the most common materials
- > suitable for ISO P, M, K and S material groups
- > suitable for shells/contours, slotting/slot milling, plunging and drilling
- > easy to use for milling machine operators and CAM programmers in logical lengths:
 - 1xD slotting/slot milling
 - 2xD shells/drilling
 - 3xD neck extension

In conjunction with extra length for regrinding.



Vc = 225 m/min on m material 1.7225/42CrMo4

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