Phantom

HP2 SC VARI FLUTE END MILLS

› THE NEW GENERATION

Innovative on many fronts, developed by Phantom

Why

PHANTOM HP2 SC VARI FLUTE END MILLS?

- Visible work area icon for best performance
- Micro geometry for reliable/predictable tool life
- Expressed in logical lengths (xD); no book of tables required
- Durable modern AlCrN coating for mass production and environmentally friendly dry machining

THERE'S NO END TO WHAT YOU CAN DO.

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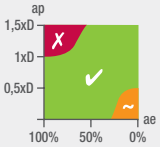
HP2 SC VARI FLUTE END MILLS

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.

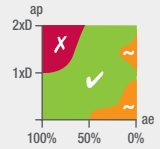
34.302

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



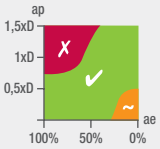
34.314 - 34.316

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%.



34.318

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

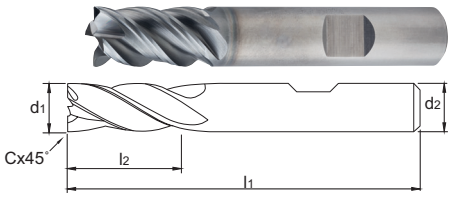


✔ The optimum work area
~ Slightly increased risk of vibration
✗ Unsuitable, high risk of fl ute end mill fracture

In the graphs, green is used as the colour to indicate the ap/ae ratios for each fl ute 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).

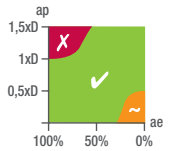
› 34.302 Phantom

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



P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 <1000 N/mm² | P 14 <1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | S 71 Ni/Co | S 72 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

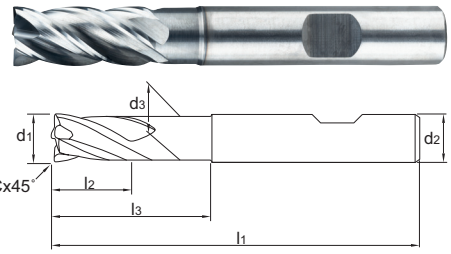


Ref.	d1	d2	l1	l2	C	z
34.302.0300	3	6	50	5	0,05	4
34.302.0400	4	6	54	8	0,05	4
34.302.0500	5	6	54	9	0,1	4
34.302.0600	6	6	54	10	0,1	4
34.302.0800	8	8	58	12	0,2	4

Ref.	d1	d2	l1	l2	C	z
34.302.1000	10	10	66	17	0,25	4
34.302.1200	12	12	73	20	0,3	4
34.302.1600	16	16	82	26	0,4	4
34.302.2000	20	20	92	32	0,5	4

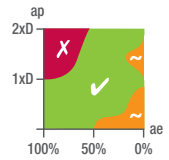
› 34.314 Phantom

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



P 11 ≤600 N/mm² | P 12 ≤850 N/mm² | P 13 <1000 N/mm² | P 14 <1400 N/mm² | M 21 INOX ≤850N/mm² | M 22 INOX >850N/mm² | K 31 GG | K 32 GGG GTS-GTW | S 71 Ni/Co | S 72 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
34.314.0400	4	6	3.8	57	8	12	0,04	4
34.314.0500	5	6	4.8	57	10	15	0,05	4
34.314.0600	6	6	5.6	57	12	18	0,06	4
34.314.0800	8	8	7.6	63	16	24	0,08	4
34.314.1000	10	10	9.5	72	20	30	0,1	4

Ref.	d1	d2	d3	l1	l2	l3	C	z
34.314.1200	12	12	11.5	83	24	36	0,12	4
34.314.1400	14	14	13.5	93	28	42	0,15	4
34.314.1600	16	16	15.3	108	32	48	0,16	4
34.314.1800	18	18	17.5	108	36	54	0,2	4
34.314.2000	20	20	19.3	126	40	60	0,2	4

NL HP2 vari-frees met werkgebiedicoon in werking
FR Fraises carbure HP2 universelles. 4 dents, denture décalée et hélice variable, revêtement AlCrN
ES ¡La fresa Vari HP2 Phantom con icono de área de trabajo en funcionamiento!
DE Phantom-Fräser HP2 mit ungleicher Teilung im Betrieb mit Arbeitsbereichsdiagramm!
EN Phantom HP2 vari flute end mill in operation with work area icon!

Watch me

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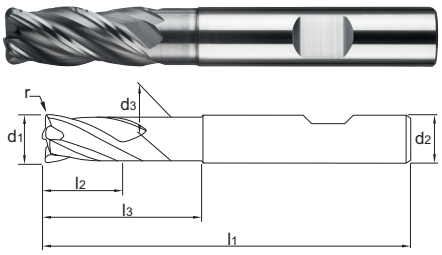
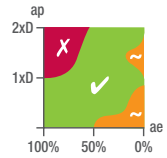
› 34.316 Phantom

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



MG HM | VARI | AlCrN | NORM | 2xD 3xD | r | DIN 6535-HB | d1 h10 | HP2 UNI

P 11	P 12	P 13	P 14	M 21	M 22	K 31	K 32	S 71	S 72
≤600 N/mm²	≤850 N/mm²	<1000 N/mm²	<1400 N/mm²	INOX ≤850N/mm²	INOX >850N/mm²	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

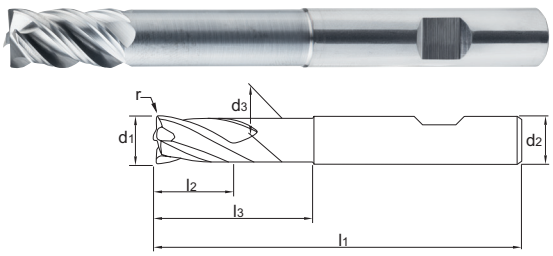


Ref.	d1	d2	d3	l1	l2	l3	r	z
34.316.0303	3	6	2.9	57	6	9	0.25	4
34.316.0305	3	6	2.9	57	6	9	0.5	4
34.316.0310	3	6	2.9	57	6	9	1	4
34.316.0403	4	6	3.8	57	8	12	0.25	4
34.316.0405	4	6	3.8	57	8	12	0.5	4
34.316.0410	4	6	3.8	57	8	12	1	4
34.316.0415	4	6	3.8	57	8	12	1.5	4
34.316.0503	5	6	4.8	57	10	15	0.25	4
34.316.0505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

Ref.	d1	d2	d3	l1	l2	l3	r	z
34.316.1203	12	12	11.5	83	24	36	0.25	4
34.316.1205	12	12	11.5	83	24	36	0.5	4
34.316.1208	12	12	11.5	83	24	36	0.8	4
34.316.1210	12	12	11.5	83	24	36	1	4
34.316.1213	12	12	11.5	83	24	36	1.25	4
34.316.1215	12	12	11.5	83	24	36	1.5	4
34.316.1220	12	12	11.5	83	24	36	2	4
34.316.1225	12	12	11.5	83	24	36	2.5	4
34.316.1230	12	12	11.5	83	24	36	3	4
34.316.1235	12	12	11.5	83	24	36	3.5	4
34.316.1240	12	12	11.5	83	24	36	4	4
34.316.1250	12	12	11.5	83	24	36	5	4
34.316.1605	16	16	15.3	108	32	48	0.5	4
34.316.1608	16	16	15.3	108	32	48	0.8	4
34.316.1610	16	16	15.3	108	32	48	1	4
34.316.1615	16	16	15.3	108	32	48	1.5	4
34.316.1620	16	16	15.3	108	32	48	2	4
34.316.1625	16	16	15.3	108	32	48	2.5	4
34.316.1630	16	16	15.3	108	32	48	3	4
34.316.1635	16	16	15.3	108	32	48	3.5	4
34.316.1640	16	16	15.3	108	32	48	4	4
34.316.1645	16	16	15.3	108	32	48	4.5	4
34.316.1650	16	16	15.3	108	32	48	5	4
34.316.2005	20	20	19.3	126	40	60	0.5	4
34.316.2008	20	20	19.3	126	40	60	0.8	4
34.316.2010	20	20	19.3	126	40	60	1	4
34.316.2015	20	20	19.3	126	40	60	1.5	4
34.316.2020	20	20	19.3	126	40	60	2	4
34.316.2025	20	20	19.3	126	40	60	2.5	4
34.316.2030	20	20	19.3	126	40	60	3	4
34.316.2035	20	20	19.3	126	40	60	3.5	4
34.316.2040	20	20	19.3	126	40	60	4	4
34.316.2045	20	20	19.3	126	40	60	4.5	4
34.316.2050	20	20	19.3	126	40	60	5	4

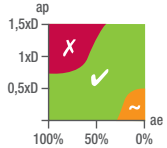
› 34.318 Phantom

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



MG HM | VARI | AlCrN | NORM | 1,5xD 5xD | r | DIN 6535-HB | d1 h10 | HP2 UNI

P 11	P 12	P 13	P 14	M 21	M 22	K 31	K 32	S 71	S 72
≤600 N/mm²	≤850 N/mm²	<1000 N/mm²	<1400 N/mm²	INOX ≤850N/mm²	INOX >850N/mm²	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	r	z
34.318.0300	3	6	2.8	57	5	15	0.1	4
34.318.0400	4	6	3.8	62	8	20	0.1	4
34.318.0500	5	6	4.8	70	9	25	0.1	4
34.318.0600	6	6	5.7	70	10	30	0.1	4

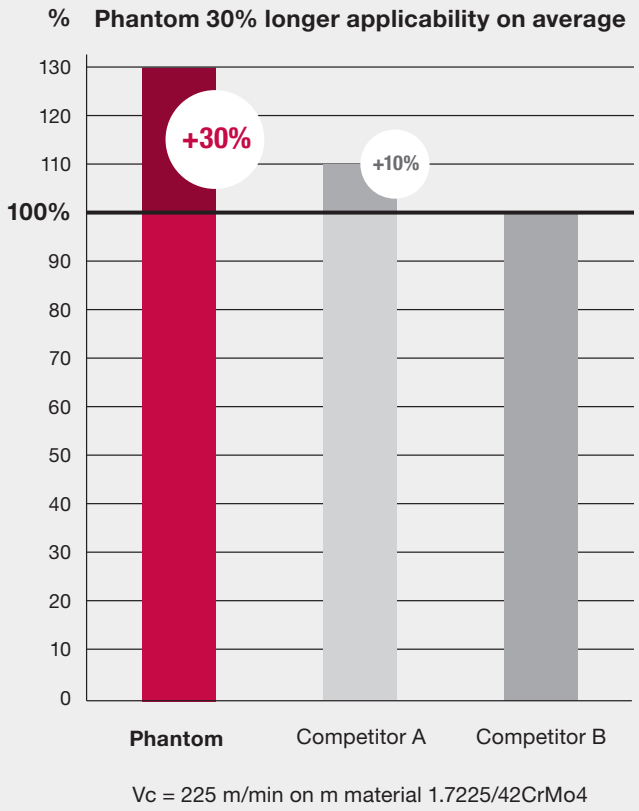
Ref.	d1	d2	d3	l1	l2	l3	r	z
34.318.0800	8	8	7.6	80	12	40	0.2	4
34.318.1000	10	10	9.5	90	17	50	0.2	4
34.318.1200	12	12	11.5	110	20	60	0.25	4
34.318.1600	16	16	15.5	130	26	80	0.5	4

HP2 UNI SC VARI FLUTE END MILLS

THE BEST UNIVERSAL FLUTE END MILL ON THE MARKET

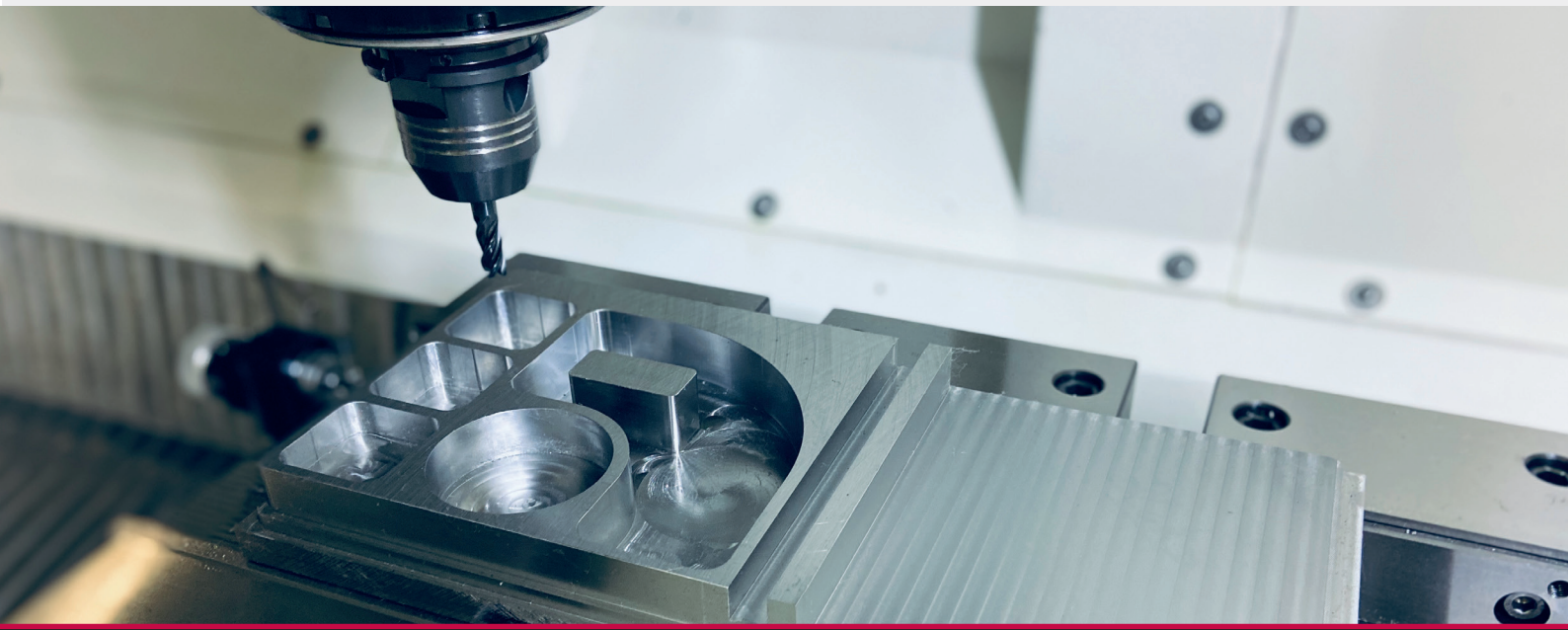
- **the universal flute end mill for the most common materials**
- **suitable for shells/contours, slotting/slot milling, plunging and drilling**
- **easy to use for milling machine operators and CAM programmers in logical lengths:**
  - 1xD slotting/slot milling
  - 2xD shells/drilling
  - 3xD neck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

  In conjunction with extra length for regrinding.



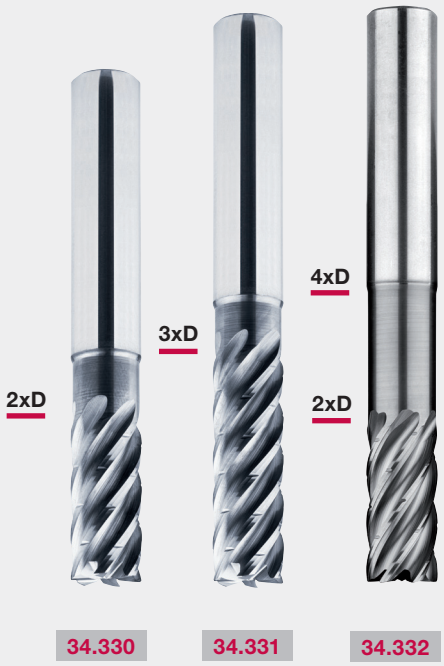
Vc = 225 m/min on m material 1.7225/42CrMo4

PHANTOM: INNOVATIVE IN MANY WAYS



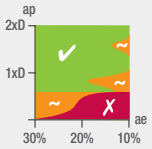
HP2 SOLID CARBIDE TROCHOIDAL VARI FLUTE END MILLS

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.



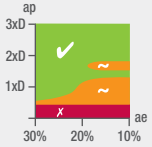
34.330

The 2xD trochoidal fl ute 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



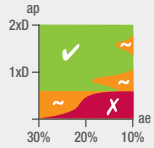
34.331

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



34.332

The 2xD/4xD trochoidal end mill has the same properties as the 2xD milling cutter. Beats the competing 4xD trochoidal end mills on chipped volume

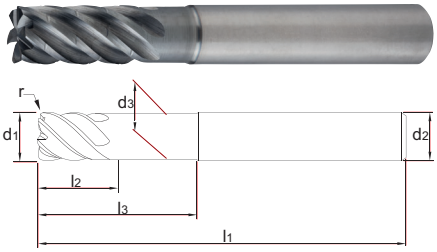


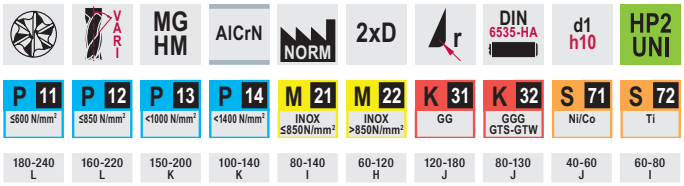
✔ The optimum work area
~ Slightly increased risk of vibration
✗ Unsuitable, high risk of fl ute end mill fracture

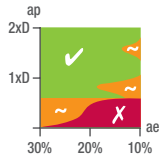
In the graphs, green is used as the colour to indicate the ap/ae ratios for each fl ute end mill with which optimum results can be achieved. It is also easy to see how ratios need to be adjusted in order to stay out of the red zone.
Deployment area: percentage in diameter (ae) with the cutting depth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

› 34.330 Phantom

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





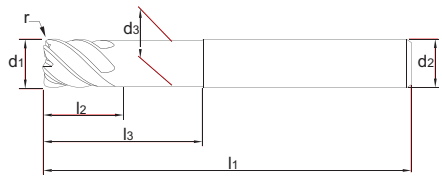


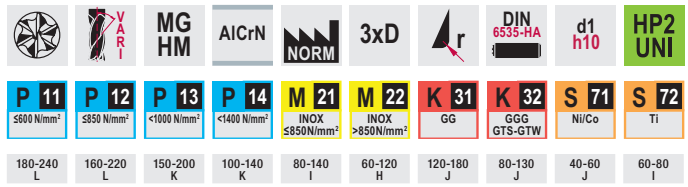
Ref.	d1	d2	d3	l1	l2	l3	r	z
34.330.0301	3	6	2.8	57	6	14		6
34.330.0401	4	6	3.8	57	8	16		6
34.330.0501	5	6	4.8	57	10	18		6
34.330.0601	6	6	5.7	57	12	19	0.1	6
34.330.0802	8	8	7.6	63	16	25	0.2	6

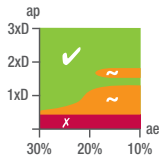
Ref.	d1	d2	d3	l1	l2	l3	r	z
34.330.1002	10	10	9.5	72	20	30	0.2	6
34.330.1203	12	12	11.5	83	24	36	0.25	6
34.330.1605	16	16	15.5	92	32	42	0.5	6
34.330.2005	20	20	19.5	104	40	54	0.5	6

› 34.331 Phantom

HP2 UNI SC Trochoidal flute end mill 3xD, AlCrN







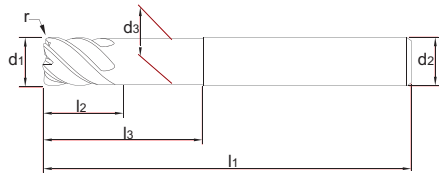
Ref.	d1	d2	d3	l1	l2	l3	r	z
34.331.0301	3	6	2.8	62	9	14		6
34.331.0401	4	6	3.8	62	12	18		6
34.331.0501	5	6	4.8	62	15	21		6
34.331.0601	6	6	5.7	62	18	24	0.1	6
34.331.0802	8	8	7.6	68	24	30	0.2	6

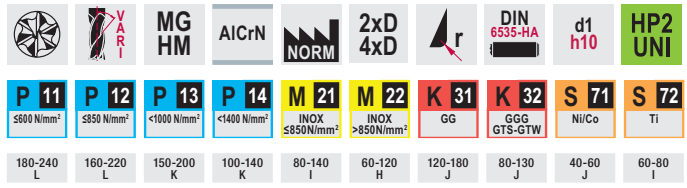
Ref.	d1	d2	d3	l1	l2	l3	r	z
34.331.1002	10	10	9.5	80	30	38	0.2	6
34.331.1203	12	12	11.5	93	36	46	0.25	6
34.331.1605	16	16	15.5	108	48	58	0.5	6
34.331.2005	20	20	19.5	126	60	74	0.5	6

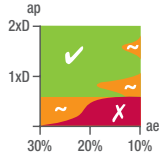
› 34.332 Phantom

NEW

HP2 UNI SC Trochoidal-end mill 2xD/4xD AlCrN





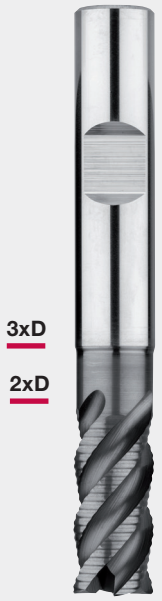


Ref.	d1	d2	d3	l1	l2	l3	r	z
34.332.0301	3	6	2.8	62	6	12		6
34.332.0401	4	6	3.8	62	8	16		6
34.332.0501	5	6	4.8	62	10	20		6
34.332.0601	6	6	5.7	62	12	24	0.1	6
34.332.0802	8	8	7.6	70	16	32	0.2	6

Ref.	d1	d2	d3	l1	l2	l3	r	z
34.332.1002	10	10	9.5	80	20	40	0.2	6
34.332.1203	12	12	11.5	95	24	48	0.25	6
34.332.1605	16	16	15.5	115	32	64	0.5	6
34.332.2005	20	20	19.5	132	40	80	0.5	6

HP2 UNI SC ROUGHING MILLS

The Phantom HP2 UNI sc roughing cutter is the high-performance roughing cutter for both steel and stainless steel. The Micro geometry ensures a higher and constant tool life. These cutters are also expressed in logical lengths in relation to diameter(xD) eliminating the need for tables.
On phantom.eu, the cutters have the working area icon for clear insight into the optimum working area.
The durable, modern AlCrN coating is suitable for wet and dry machining in most common materials.

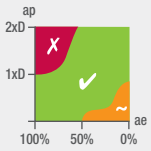


35.254

Application: for HP2 UNI sc roughing cutter

35.254

2xD circumferential milling and up to 1xD slot milling.
Below 0.5xD there is a better performance with an ae value from 50%.



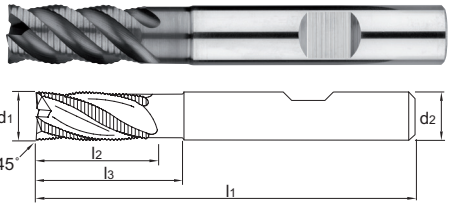
✔ The optimum work area
~ Slightly increased risk of vibration
✗ Unsuitable, high risk of fl ute end mill fracture

In the graphs, green is used as the colour to indicate the ap/ae ratios for each fl ute 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)

› 35.254 Phantom

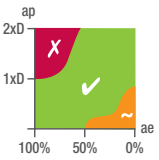
HP2 UNI SC Roughing and Finishing Cutter 2xD/3xD AlCrN, fine pitch

NEW



45° | MG HM | AlCrN | HR | 2xD 3xD | Cx45 | DIN 6535-HB | d1 h10 | HP2 UNI

P 14	P 13	P 12	P 11	M 22	M 21	K 32	K 31	S 72	S 71
<1400 N/mm²	<1000 N/mm²	≤850 N/mm²	≤600 N/mm²	INOX >850N/mm²	INOX ≤850N/mm²	GGG GTS-GTW	GG	Ti	Ni/Co
70-100 H	80-100 I	70-80 H	90-110 I	40-60 I	50-80 J	100-130 I	130-140 I	50-65 I	35-40 I

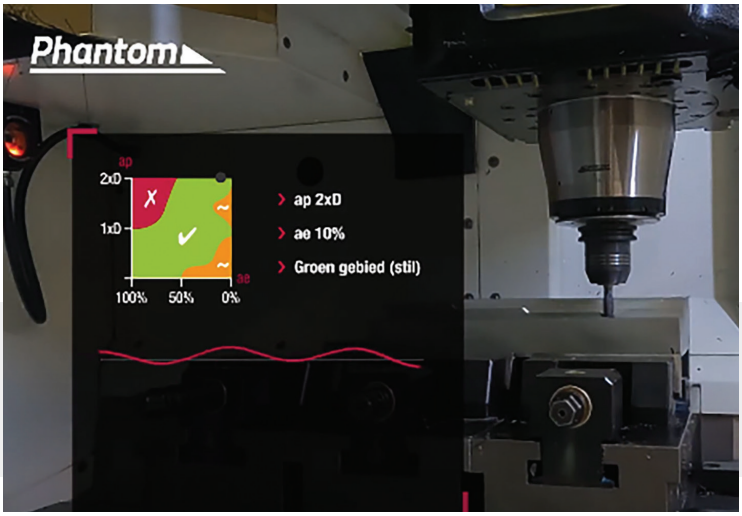


Ref.	d1	d2	d3	l1	l2	l3	C	z
35.254.0400	4	6	3.8	57	8	12	0,04	3
35.254.0500	5	6	4.8	57	10	15	0,05	4
35.254.0600	6	6	5.6	57	12	18	0,06	4

Ref.	d1	d2	d3	l1	l2	l3	C	z
35.254.0800	8	8	7.6	63	16	24	0,08	4
35.254.1000	10	10	9.5	72	20	30	0,1	4
35.254.1200	12	12	11.5	83	24	36	0,12	4

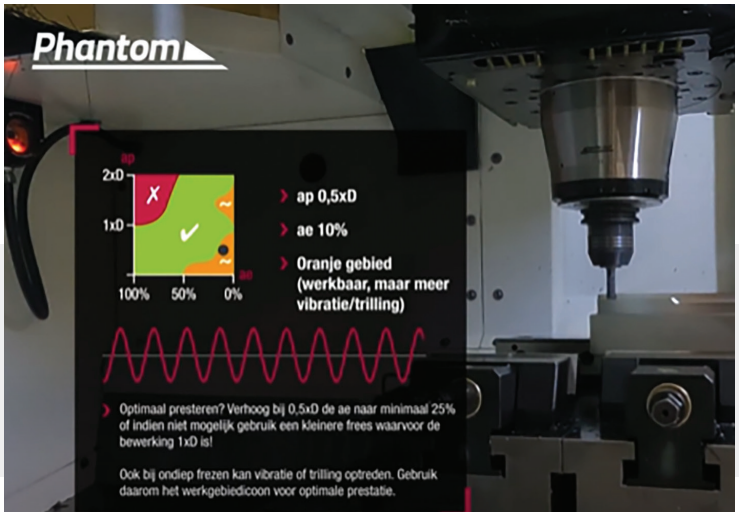
Ref.	d1	d2	d3	l1	l2	l3	C	z
35.254.1400	14	14	13.5	93	28	42	0,15	4
35.254.1600	16	16	15.3	108	32	48	0,16	5
35.254.2000	20	20	19.3	126	40	60	0,2	6

USE OF THE PHANTOM HP2 VARI END MILL IN THE DIFFERENT WORKING AREAS



Want to know how it works? Then scan the QR code and watch the video.

It is easy to hear that with the correct application of the mill in a green area, the mill operates more quietly and therefore has a longer tool life.



When applying the mill in orange areas, clearly more vibrations occur.

Red areas should be avoided entirely.

SEE THE WORK AREA ICON FOR EACH END MILL ON PHANTOM.EU

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 ≤600 N/mm²	0,008	0,012	0,018	0,025	0,038	0,045	0,050	0,070	0,090
P 12 ≤850 N/mm²	0,007	0,012	0,018	0,025	0,036	0,042	0,048	0,068	0,080
P 13 ≤1000 N/mm²	0,007	0,012	0,018	0,025	0,035	0,040	0,045	0,065	0,075
P 14 ≤1400 N/mm²	0,005	0,008	0,012	0,020	0,030	0,035	0,040	0,055	0,070
M 21 INOX ≤850N/mm²	0,004	0,006	0,010	0,015	0,023	0,034	0,045	0,050	0,055
M 22 INOX >850N/mm²	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 Ni/Co	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 TABLE FOR DRILLING OPERATIONS

	Dimensions in mm								
	3	4	5	6	8	10	12	16	20
	fz (mm/z)								
P 11 ≤600 N/mm²	0,004	0,008	0,012	0,018	0,025	0,030	0,035	0,048	0,060
P 12 ≤850 N/mm²	0,003	0,006	0,010	0,016	0,024	0,028	0,032	0,045	0,055
P 13 ≤1000 N/mm²	0,002	0,005	0,008	0,015	0,023	0,028	0,030	0,043	0,050
P 14 ≤1400 N/mm²	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

FEED VALUE TABLE

	FRC					
	G	H	I	J	K	L
d1(mm)						
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

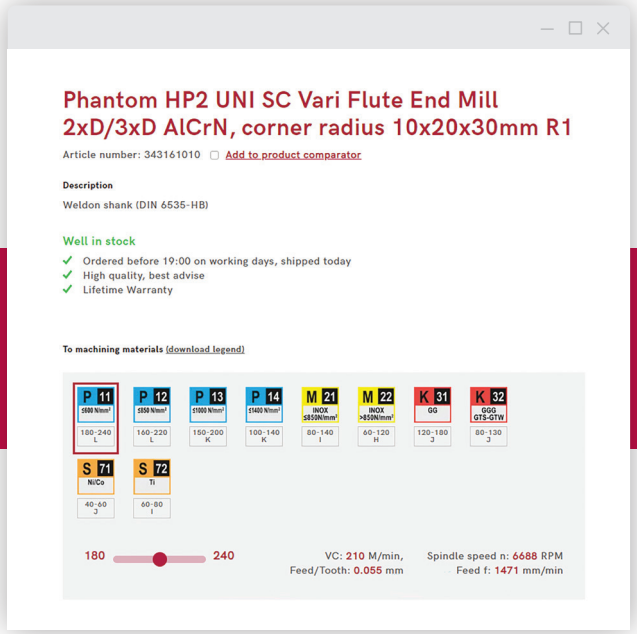
CORRECTION FACTOR FOR HIGHER FEED WITH AE VALUE ≤ 40%

% 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.

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.



Want to know how it works?
Then scan the QR code and watch the short instructional video

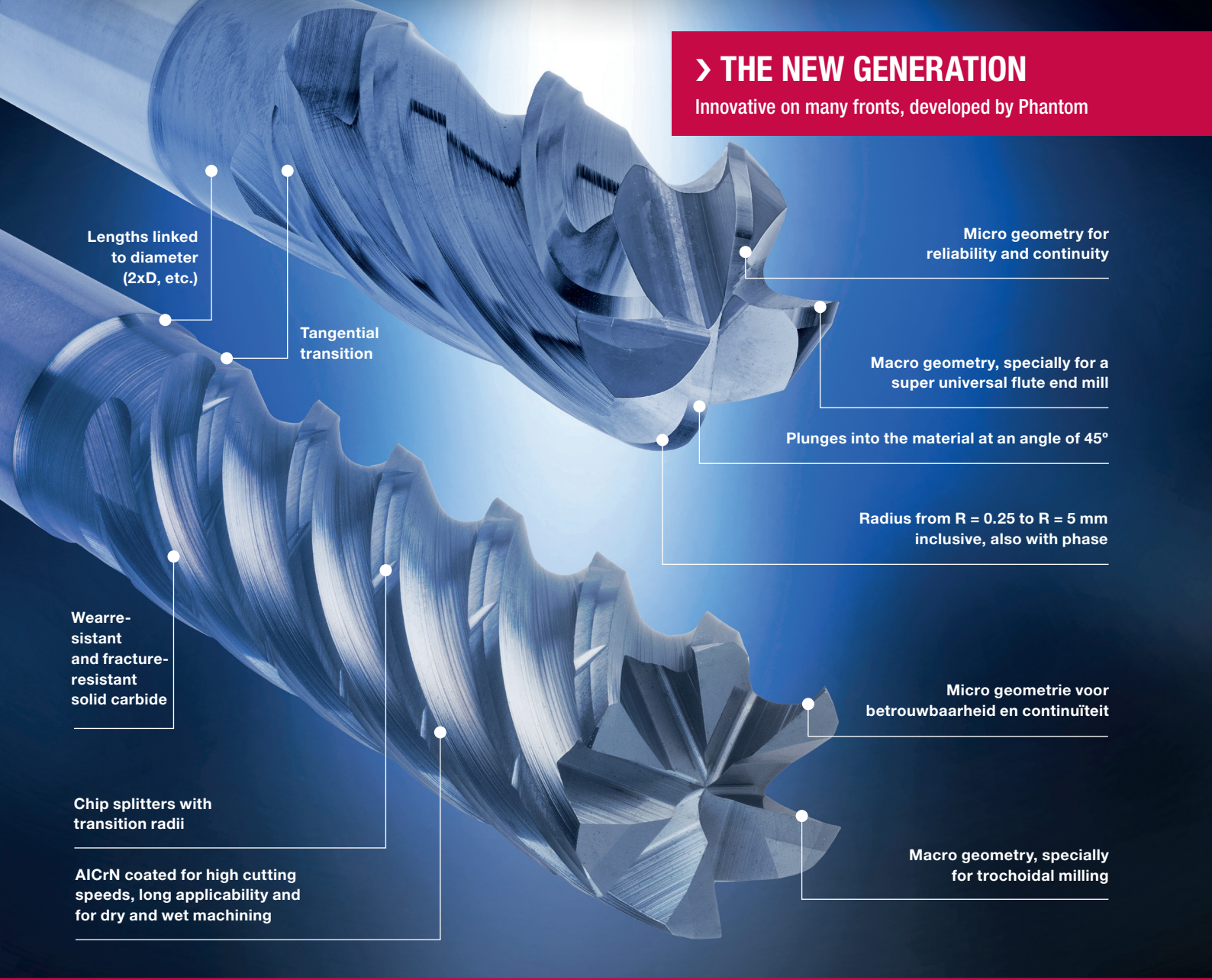
Phantom

Phantom

HP2 SC VARI FLUTE END MILLS

› THE NEW GENERATION

Innovative on many fronts, developed by Phantom



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