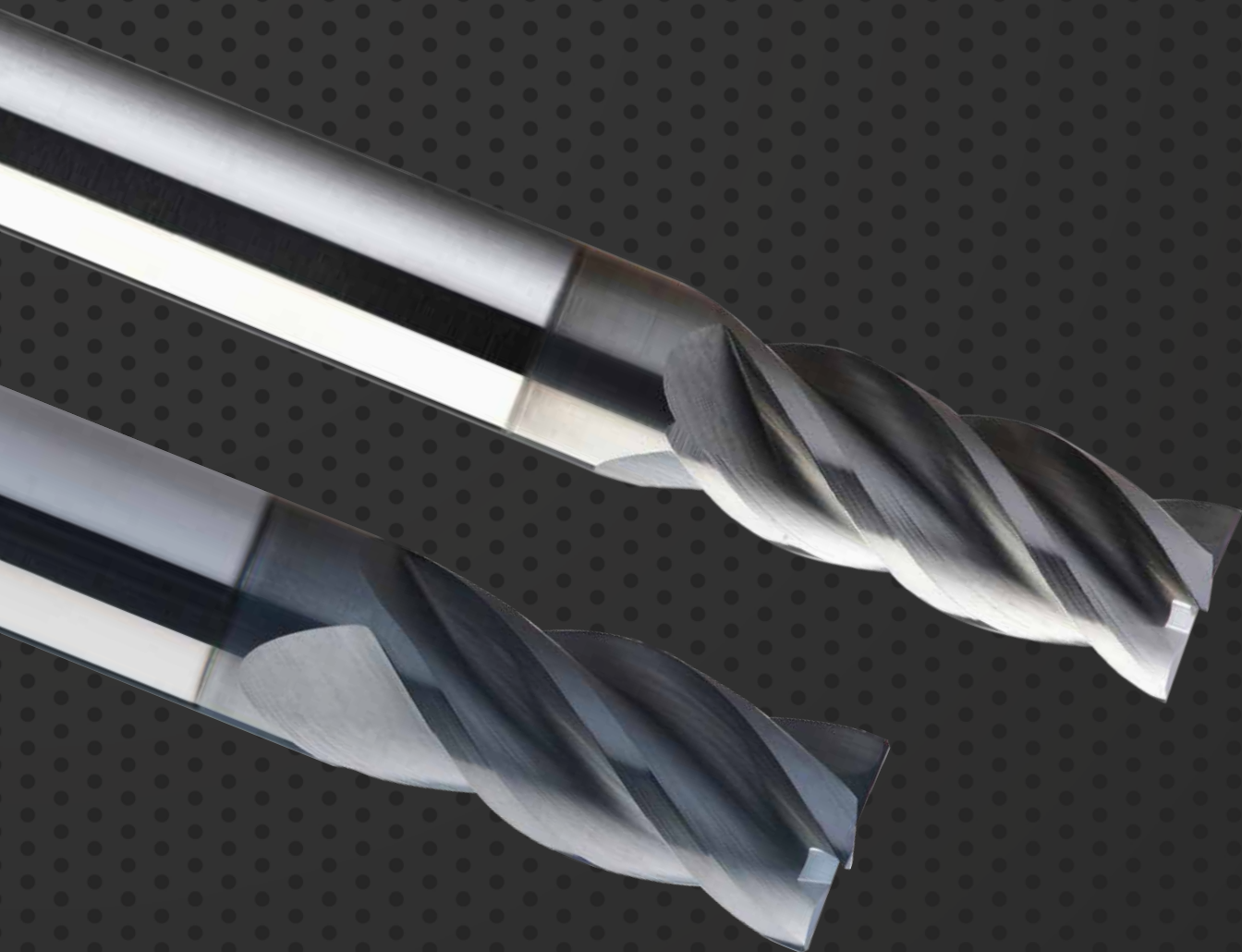




ENDMILLS

OPTIMUM

The most versatile program for multiple materials and applications
For material application ≤ 45 HRC

Index - Optimum, For ≤ 45 HRC

 Suitable for Material Groups
  Adapté pour les matériaux
  适用于材料
 Geeignet für die Materialgruppen
  Adatto per il materiale

P	M	K
N	S	

	EDP Number		Type	No. Z	Helix Angle	Coating	Performance	Page Number
	918		OPTIMUM DP	4	40°	G6110	G	165
NEW	981		OPTIMUM DP, Recess	4	40°	G6110	G	165
	K38		OPTIMUM R-LIKE DP	4	40°	G6110	G	166
	K52		OPTIMUM R-LIKE DP, Recess	4	40°	G6110	G	166
	K47		OPTIMUM R-LIKE DP, Weldon	4	40°	G6110	G	166
	K53		OPTIMUM R-LIKE DP, Weldon, Recess	4	40°	G6110	G	166
NEW	919		OPTIMUM DP Torus	4	40°	G6110	G	169
NEW	991		OPTIMUM DP Torus, Recess	4	40°	G6110	G	169

G - General P - Performance

FEATURES & BENEFITS

Optimum



Top View

1 Differential Pitch (DP)



Provides excellent surface finishing while eliminating chatter

2 Superior Coating

Reduce tool wear to achieve cost-effective machining

3 Ideal Cutting Edge



Provide edge protection to prolong tool life

4 Suitable for Material Groups





1. Ungleiche Teilung (DP)
Per una lavorazione senza vibrazione e finiture superficiali eccellenti
 2. Ausgezeichnete Beschichtung
Reduziert den Werkzeugverschleiß und das bedeutet eine kostengünstige Bearbeitung
 3. Perfekte Schneide
Bietet Schneidkantenschutz, um die Lebensdauer des Werkzeugs zu verlängern
 4. Geeignet für Materialgruppen P, M, K, N, S
-



1. 不等分割設計 (DP)
有效降低加工時的振動從而, 達到更好的工件表面光潔度。
 2. 優質塗層
減少刀具磨損, 實現經濟高效的加工。
 3. 理想的切削刃
提供邊緣保護延長刀具壽命。
 4. 適用於材料 P、M、K、N、S
-



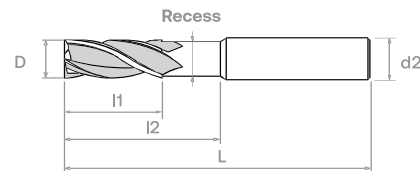
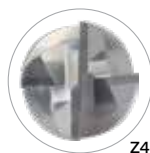
1. Design del passo differenziale (DP)
Design del passo differenziale (DP) Riduce le vibrazioni, massimizza la produttività e la durata dell'utensile.
 2. Rivestimento superiore
Riduce l'usura dello strumento per raggiungere una lavorazione efficace in termini di costi
 3. Angolo di taglio ideale
Offre una protezione degli angoli per prolungare la durata dello strumento
 4. Adatto per Materiale P, M, K, N, S
-



1. Conception à pas différentiel (DP)
Pour un usinage sans vibrations et un très bon état de surface
2. Revêtement supérieur
Réduit l'usure de l'outil pour parvenir à un usinage économique
3. Arête tranchante idéale
Protège les arêtes pour prolonger la durée de vie de l'outil
4. Adapté aux matériaux P, M, K, N, S

OPTIMUM DP ENDMILLS / WITH RECESS, 4 FLUTES

-  VHM Optimum DP Fräser, 4 Zähne
-  Frese Optimum, con passo differenziale, 4 taglienti
-  Fraises Optimum DP à pas décalés, 4 dents
-  整体硬质合金 Optimum DP 系列 4刃平底铣刀



Order Number	Dimension (mm)					G6110	Order Number	DIN 6535	Dimension (mm)					G6110		
	D	I 1	I 2	L	d2 (h6)				D	I 1	I 2	L	d2 (h6)			
918 0100 050 03	1	3		50	3	•	981 0100 050 03		1	3		50	3			
918 0100 050 04				50	4	•	981 0100 050 04					50	4			
918 0150 050 03	1.5	4.5		50	3	•	981 0150 050 03		1.5	4.5		50	3			
918 0150 050 04				50	4	•	981 0150 050 04					50	4			
918 0200 050 03	2	6.5		50	3	•	981 0200 050 03		2	6.5		50	3			
918 0200 050 04				50	4	•	981 0200 050 04					50	4			
918 0250 050 03	2.5			50	3	•	981 0250 050 03				2.5		50	3		
918 0250 050 04				50	4	•	981 0250 050 04						50	4		
918 0300 050 03	3	9		50	3	•	981 0300 050 03		3	9	14	50	3		◦	
918 0300 050 04				50	4	•	981 0300 050 04				14	50	4		◦	
918 0300 050 06				50	6	•	981 0300 050 06				14	50	6		•	
918 0400	4	12		50	4	•	981 0400	*	4	12	20	50	4		•	
918 0400 050 06				50	6	•	981 0400 050 06					50	6			
918 0500	5	15		50	5	•	981 0500	*	5	15	22	50	5		•	
918 0500 050 06 15				50	6	•	981 0500 050 06 15					50	6			
918 0600 050 16	6	16		50	6	•	981 0600 050 16		6	16		50	6			
918 0600 060		20		60	6	•	981 0600 060	*		20	24	60	6		•	
918 0800 22	8	22		64	8	•	981 0800 22	*	8	22	28	64	8		•	
918 1000 070 27	10	27		70	10	•	981 1000 070 27		10	27		70	10			
918 1000 075		22		75	10	•	981 1000 075			22	30	75	10		•	
918 1200 075 32	12	32		75	12	•	981 1200 075 32		12	32		75	12			
918 1200 075 24		24		75	12	◦	981 1200 075 24	*		24	30	75	12		•	
918 1400	14	32		90	14	•	981 1400		14	32	42	90	14		◦	
918 1600	16			90	16	•	981 1600	*	16		42	90	16		•	
918 1800	18	38		100	18	•	981 1800	*	18	38	50	100	18		◦	
918 2000	20			100	20	•	981 2000	*	20		50	100	20		•	

* - DIN 6535

Ø mm	Tol. µm
3.0 ~ 6.0	-0 / -20
6.0 ~ 30.0	-0 / -25

Material Group | Material-Gruppe | Groupe Matiere | Gruppo Materiali | 材质主类

Cutting Parameter

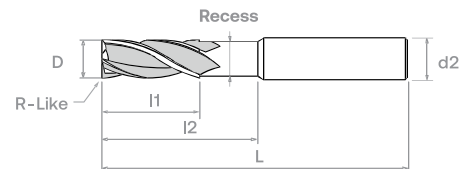
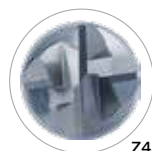
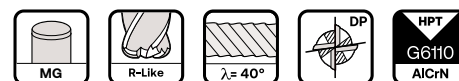
N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02	170 - 174
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K38 / K52 / K47 / K53



OPTIMUM DP R-LIKE ENDMILLS / WITH RECESS, 4 FLUTES

- VHM Optimum DP R-Like Fräser, 4 Zähne
- Frese Optimum, con passo differenziale, raggio di protezione, 4 taglienti
- Fraises Optimum DP R-Like à pas décalés, 4 dents
- 整体硬质合金 Optimum DP 系列 微小R角4刃平底铣刀



Order Number	Dimension (mm)						HA
	D	I1	I2	L	d2 (h6)	R-Like	G6110
K47 0100 050 03	1	3		50	3	0.02	°
K47 0150 050 03	1.5	4.5		50	3	0.05	°
K47 0200 050 03	2	6.5		50	3	0.05	°
K47 0250 050 03	2.5			50	3	0.05	°
K47 0300 050 03	3	9		50	3	0.1	°
K47 0300 050 06				50	6	0.1	°
K47 0400	4	12		50	4	0.1	°
K47 0400 057 06 11		11		57	6	0.1	°
K47 0500	5	15		50	5	0.1	°
K47 0500 057 06 13				57	6	0.1	°
K47 0600 057 13	6	13		57	6	0.1	°
K47 0600 060				60	6	0.1	•
K47 0800	8	20		64	8	0.2	°
K47 1000 072	10	22		72	10	0.2	°
K47 1000 070 27		27		70	10	0.2	•
K47 1200 083 26	12	26		83	12	0.2	°
K47 1400 083 26	14			83	14	0.2	°
K47 1600 092	16	32		92	16	0.2	°
K47 1800 092 32	18			92	18	0.2	°
K47 2000 104	20	38		104	20	0.2	°

Order Number	Dimension (mm)						HA
	D	I1	I2	L	d2 (h6)	R-Like	G6110
K52 0100 050 03	1	3		50	3	0.02	
K52 0150 050 03	1.5	4.5		50	3	0.05	
K52 0200 050 03	2	6.5		50	3	0.05	
K52 0250 050 03	2.5			50	3	0.05	
K52 0300 050 03	3	9	15	50	3	0.1	°
K52 0300 050 06			15	50	6	0.1	°
K52 0400	4	12	20	50	4	0.1	°
K52 0400 057 06 11		11	20	57	6	0.1	°
K52 0500	5	15	20	50	5	0.1	°
K52 0500 057 06 13			20	57	6	0.1	°
K52 0600 057 13	6	13	20	57	6	0.1	°
K52 0600 060			25	60	6	0.1	°
K52 0800	8	20	26	64	8	0.2	°
K52 1000 072	10	22	32	72	10	0.2	°
K52 1000 070 27		27	32	70	10	0.2	°
K52 1200 083 26	12	26	37	83	12	0.2	°
K52 1400 083 26	14		37	83	14	0.2	°
K52 1600 092	16	32	42	92	16	0.2	°
K52 1800 092 32	18		42	92	18	0.2	°
K52 2000 104	20	38	50	104	20	0.2	°

Order Number	Dimension (mm)						HB
	D	I1	I2	L	d2 (h6)	R-Like	G6110
K38 0100 050 03	1	3		50	3	0.02	
K38 0150 050 03	1.5	4.5		50	3	0.05	
K38 0200 050 03	2	6.5		50	3	0.05	
K38 0250 050 03	2.5			50	3	0.05	
K38 0300 050 03	3	9		50	3	0.1	°
K38 0300 050 06				50	6	0.1	°
K38 0400	4	12		50	4	0.1	°
K38 0400 057 06 11		11		57	6	0.1	•
K38 0500	5	15		50	5	0.1	°
K38 0500 057 06 13				57	6	0.1	•
K38 0600 057 13	6	13		57	6	0.1	•
K38 0600 060				60	6	0.1	•
K38 0800	8	20		64	8	0.2	•
K38 1000 072	10	22		72	10	0.2	•
K38 1000 070 27		27		70	10	0.2	•
K38 1200 083 26	12	26		83	12	0.2	•
K38 1400 083 26	14			83	14	0.2	•
K38 1600 092	16	32		92	16	0.2	•
K38 1800 092 32	18			92	18	0.2	•
K38 2000 104	20	38		104	20	0.2	°

Order Number	Dimension (mm)						HB
	D	I1	I2	L	d2 (h6)	R-Like	G6110
K53 0100 050 03	1	3		50	3	0.02	
K53 0150 050 03	1.5	4.5		50	3	0.05	
K53 0200 050 03	2	6.5		50	3	0.05	
K53 0250 050 03	2.5			50	3	0.05	
K53 0300 050 03	3	9	15	50	3	0.1	°
K53 0300 050 06			15	50	6	0.1	°
K53 0400	4	12	20	50	4	0.1	°
K53 0400 057 06 11		11	20	57	6	0.1	•
K53 0500	5	15	20	50	5	0.1	°
K53 0500 057 06 13			20	57	6	0.1	•
K53 0600 057 13	6	13	20	57	6	0.1	°
K53 0600 060			25	60	6	0.1	•
K53 0800	8	20	26	64	8	0.2	•
K53 1000 072	10	22	32	72	10	0.2	•
K53 1000 070 27		27	32	70	10	0.2	•
K53 1200 083 26	12	26	37	83	12	0.2	•
K53 1400 083 26	14		37	83	14	0.2	°
K53 1600 092	16	32	42	92	16	0.2	•
K53 1800 092 32	18		42	92	18	0.2	°
K53 2000 104	20	38	50	104	20	0.2	•



R - Like is an enhanced edge protection.

Material Group | Material-Gruppe | Groupe Matière | Gruppo Materiali | 材质主类

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Cutting Parameter

170 - 174

FEATURES & BENEFITS

Optimum Torus



Top View

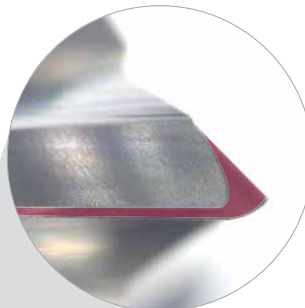
1 Differential Pitch (DP)



Provides excellent surface finishing while eliminating chatter

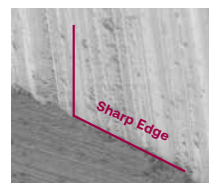
2 Improved Corner Radius Design

Enhance durability on the radius area

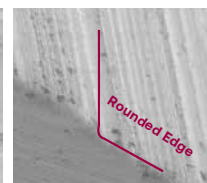


3 Cutting Edge Preparation

- Enhances tool life
- Less material adhere on the cutting edge for stable machining
- Improves wear resistance and reduces excessive friction



Before



After

4 Suitable for Material Groups





1. Ungleiche Teilung (DP)
Per una lavorazione senza vibrazione e finiture superficiali eccellenti
 2. Verbessertes Eckradius-Design
Verbessern Sie die Haltbarkeit im Radiusbereich
 3. Schneidkantenbehandlung
Verbessert die Werkzeuglebensdauer
Weniger Materialanhaftungen an der Schneide Für stabile Bearbeitung
 4. Geeignet für Materialgruppen P, M, K, N, S
-



1. 不等分割設計 (DP)
有效降低加工時的振動從而, 達到更好的工件表面光潔度。
 2. 改进的拐角半径设计
增强半径区域的耐用性。
 3. 切削刃设置提高刀具寿命
提高刀具寿命。
切削刃上的材料附着少, 加工稳定。
提高耐磨性并减少过度摩擦。
 4. 适用于材料 P、M、K、N、S
-



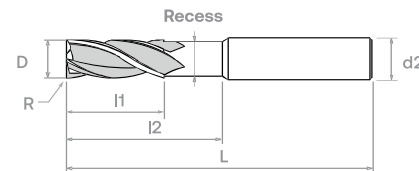
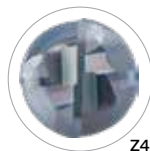
1. Design del passo differenziale (DP)
Design del passo differenziale (DP) Riduce le vibrazioni, massimizza la produttività e la durata dell'utensile.
 2. Design del raggio d'angolo migliorato
Migliora la durata nell'area del raggio
 3. Preparazione dell'angolo di taglio
Migliora la durata dello strumento
Meno materiale che aderisce sull'angolo di taglio per una lavorazione stabile
Migliora la resistenza all'usura e riduce l'attrito eccessivo
 4. Adatto per Materiale P, M, K, N, S
-



1. Conception à pas différentiel (DP)
Pour un usinage sans vibrations et un très bon état de surface
 2. Conception améliorée du rayon d'angle
Améliorer la durabilité sur la zone du rayon
 3. Préparation des arêtes de coupes
Améliore la durée de vie de l'outil
Moins de matériau adhère à l'arête tranchante pour un usinage stable
Améliore la résistance à l'usure et réduit les frottements excessifs
 4. Adapté aux matériaux P, M, K, N, S
-

OPTIMUM DP TORUS ENDMILLS / WITH RECESS, 4 FLUTES

-  VHM Optimum Torusfräser , 4 Zähne
-  Frese toriche Optimum, con passo differenziale, 4 taglienti
-  Fraises Optimum toriques à pas décalés, 4 dents
-  整体硬质合金 Optimum DP 系列 4刃圆鼻铣刀



Order Number	Dimension (mm)						G6110	Order Number	DIN 6535	Dimension (mm)						G6110														
	D	I1	I2	L	d2 (h6)	R				D	I1	I2	L	d2 (h6)	R															
919 0100 050 0300 010	1	3		50	3	0.1	°	991 0100 050 0300 010		1	3		50	3	0.1		991 0100 050 0300 010		1	3		50	3	0.1						
919 0150 050 0300 020	1.5	4.5		50	3	0.2	°	991 0150 050 0300 020		1.5	4.5		50	3	0.2		991 0150 050 0300 020		1.5	4.5		50	3	0.2						
919 0200 050 0300 020	2	6.5		50	3	0.2	°	991 0200 050 0300 020		2	6.5		50	3	0.2		991 0200 050 0300 020		2	6.5		50	3	0.2						
919 0250 050 0300 030	2.5			50	3	0.3	°	991 0250 050 0300 030		2.5				50	3	0.3		991 0250 050 0300 030			2.5			50	3	0.3				
919 0300 050 0300 030				50	3	0.3	°	991 0300 050 0300 030 *				15	50	3	0.3	°	991 0300 050 0300 030 *				15	50	3	0.3	°					
919 0300 050 0300 050		3	9		50	3	0.5	•	991 0300 050 0300 050 *			3	9		15	50	3	0.5	°	991 0300 050 0300 050 *			3	9		15	50	3	0.5	°
919 0300 057 0600 030				57	6	0.3	•	991 0300 057 0600 030					15	57	6	0.3	°	991 0300 057 0600 030				15	57	6	0.3	°				
919 0300 057 0600 050				57	6	0.5	•	991 0300 057 0600 050					15	57	6	0.5	°	991 0300 057 0600 050				15	57	6	0.5	°				
919 0400 050 0400 030		4	12		50	4	0.3	•	991 0400 050 0400 030 *		4	12		20	50	4	0.3	°	991 0400 050 0400 030 *		4	12		20	50	4	0.3	°		
919 0400 050 0400 050					50	4	0.5	•	991 0400 050 0400 050 *						20	50	4	0.5	•	991 0400 050 0400 050 *						20	50	4	0.5	•
919 0400 057 0600 030					57	6	0.3	°	991 0400 057 0600 030						20	57	6	0.3	°	991 0400 057 0600 030						20	57	6	0.3	°
919 0400 057 0600 050					57	6	0.5	°	991 0400 057 0600 050						20	57	6	0.5	°	991 0400 057 0600 050						20	57	6	0.5	°
919 0500 050 0500 030		5	15		50	5	0.3	°	991 0500 050 0500 030 *		5	15		22	50	5	0.3	°	991 0500 050 0500 030 *		5	15		22	50	5	0.3	°		
919 0500 050 0500 050					50	5	0.5	°	991 0500 050 0500 050 *						22	50	5	0.5	°	991 0500 050 0500 050 *						22	50	5	0.5	°
919 0500 057 0600 030					57	6	0.3	°	991 0500 057 0600 030						22	57	6	0.3	°	991 0500 057 0600 030						22	57	6	0.3	°
919 0500 057 0600 050				57	6	0.5	•	991 0500 057 0600 050					22	57	6	0.5	°	991 0500 057 0600 050				22	57	6	0.5	°				
919 0600 057 0600 030		6	16		57	6	0.3	•	991 0600 057 0600 030		6	16		22	57	6	0.3	°	991 0600 057 0600 030		6	16		22	57	6	0.3	°		
919 0600 057 0600 050					57	6	0.5	•	991 0600 057 0600 050						22	57	6	0.5	•	991 0600 057 0600 050						22	57	6	0.5	•
919 0600 057 0600 100					57	6	1	•	991 0600 057 0600 100						22	57	6	1	°	991 0600 057 0600 100						22	57	6	1	°
919 0800 064 0800 030		8	20		64	8	0.3	•	991 0800 064 0800 030 *		8	20		26	64	8	0.3	°	991 0800 064 0800 030 *		8	20		26	64	8	0.3	°		
919 0800 064 0800 050					64	8	0.5	•	991 0800 064 0800 050 *						26	64	8	0.5	•	991 0800 064 0800 050 *						26	64	8	0.5	•
919 0800 064 0800 100					64	8	1	•	991 0800 064 0800 100 *						26	64	8	1	°	991 0800 064 0800 100 *						26	64	8	1	°
919 0800 064 0800 200					64	8	2	•	991 0800 064 0800 200 *						26	64	8	2	°	991 0800 064 0800 200 *						26	64	8	2	°
919 1000 070 1000 050		10	22		70	10	0.5	•	991 1000 070 1000 050 *		10	22		30	70	10	0.5	°	991 1000 070 1000 050 *		10	22		30	70	10	0.5	°		
919 1000 070 1000 100					70	10	1	•	991 1000 070 1000 100 *						30	70	10	1	°	991 1000 070 1000 100 *						30	70	10	1	°
919 1000 070 1000 200					70	10	2	•	991 1000 070 1000 200 *						30	70	10	2	°	991 1000 070 1000 200 *						30	70	10	2	°
919 1200 083 1200 050		12	25		83	12	0.5	•	991 1200 083 1200 050		12	25		35	83	12	0.5	°	991 1200 083 1200 050		12	25		35	83	12	0.5	°		
919 1200 083 1200 100					83	12	1	•	991 1200 083 1200 100						35	83	12	1	°	991 1200 083 1200 100						35	83	12	1	°
919 1200 083 1200 200					83	12	2	•	991 1200 083 1200 200						35	83	12	2	°	991 1200 083 1200 200						35	83	12	2	°
919 1600 090 1600 050		16	32		90	16	0.5	°	991 1600 090 1600 050 *		16	32		42	90	16	0.5	°	991 1600 090 1600 050 *		16	32		42	90	16	0.5	°		
919 1600 090 1600 100					90	16	1	°	991 1600 090 1600 100 *						42	90	16	1	°	991 1600 090 1600 100 *						42	90	16	1	°
919 1600 090 1600 200					90	16	2	°	991 1600 090 1600 200 *						42	90	16	2	°	991 1600 090 1600 200 *						42	90	16	2	°
919 1600 090 1600 300					90	16	3	°	991 1600 090 1600 300 *						42	90	16	3	°	991 1600 090 1600 300 *						42	90	16	3	°
919 2000 100 2000 050		20	38		100	20	0.5	°	991 2000 100 2000 050 *		20	38		50	100	20	0.5	°	991 2000 100 2000 050 *		20	38		50	100	20	0.5	°		
919 2000 100 2000 100					100	20	1	°	991 2000 100 2000 100 *						50	100	20	1	°	991 2000 100 2000 100 *						50	100	20	1	°
919 2000 100 2000 200					100	20	2	°	991 2000 100 2000 200 *						50	100	20	2	°	991 2000 100 2000 200 *						50	100	20	2	°
919 2000 100 2000 300					100	20	3	°	991 2000 100 2000 300 *						50	100	20	3	°	991 2000 100 2000 300 *						50	100	20	3	°

* - DIN 6535

Material Group | Material-Gruppe | Groupe Matiere | Gruppo Materiali | 材质主类

Cutting Parameter

N01	N02	N03	K01	K02	P01	P02	P03	M01	M02	S01	S02	S03	H01	H02	O01	O02	170 - 174
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

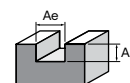
Recommended Cutting Data



Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

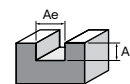


Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53



Slotting	N						K				S	
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Grey Cast Iron		Ductile Cast Iron		Titanium alloy	
Properties	Si < 9%		Si ≥ 9%		-		-		-		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		0.80 × D		0.40 × D	
Cutting Width, ae	1.00 × D		1.00 × D				1.00 × D		1.00 × D		1.00 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	330	0.005	300	0.004	280	0.004	170	0.003	110	0.003	60	0.004
2		0.007		0.006		0.006		0.006		0.006		0.009
3		0.011		0.010		0.010		0.009		0.009		0.014
4		0.016		0.015		0.015		0.012		0.013		0.019
5		0.021		0.020		0.020		0.016		0.017		0.024
6		0.026		0.026		0.026		0.019		0.021		0.030
8		0.037		0.036		0.038		0.026		0.028		0.040
10		0.048		0.047		0.050		0.033		0.035		0.051
12		0.060		0.061		0.062		0.041		0.043		0.063
14		0.068		0.070		0.071		0.047		0.049		0.072
16		0.075		0.078		0.080		0.054		0.055		0.080
18		0.083		0.080		0.088		0.060		0.061		0.088
20		0.090		0.086		0.096		0.066		0.067		0.096

Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53

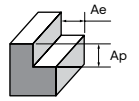


Slotting	P						M				S	
Working Material	Carbon steel		Alloy steel		Prehardened steel		Stainless steel		Stainless steel		Nickel Alloy	
Properties	-		520 < Rm < 1200		35 ≤ HRC < 45		High Machinability		Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × D		0.80 × D		0.80 × D		0.40 × D		0.30 × D	
Cutting Width, ae	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	200	0.003	160	0.003	150	0.003	120	0.003	80	0.003	30	0.004
2		0.006		0.006		0.006		0.006		0.007		0.009
3		0.009		0.009		0.009		0.010		0.011		0.014
4		0.012		0.012		0.012		0.014		0.016		0.019
5		0.016		0.016		0.016		0.018		0.020		0.024
6		0.019		0.019		0.019		0.022		0.025		0.030
8		0.026		0.026		0.026		0.030		0.034		0.040
10		0.033		0.034		0.033		0.038		0.044		0.051
12		0.041		0.041		0.041		0.047		0.054		0.063
14		0.047		0.047		0.047		0.054		0.062		0.072
16		0.054		0.053		0.054		0.061		0.069		0.080
18		0.060		0.058		0.060		0.067		0.076		0.088
20		0.066		0.064		0.066		0.073		0.082		0.096

Recommended Cutting Data



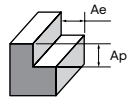
Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53

Side Milling	N						K				S	
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Grey Cast Iron		Ductile Cast Iron		Titanium alloy	
Properties	Si < 9%		Si ≥ 9%		-		-		-		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Cutting Width, ae	0.30 × D		0.30 × D		0.30 × D		0.25 × D		0.18 × D		0.15 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	400	0.006	380	0.005	360	0.004	250	0.007	140	0.004	70	0.005
2		0.009		0.008		0.009		0.010		0.009		0.011
3		0.014		0.014		0.014		0.016		0.014		0.018
4		0.020		0.019		0.021		0.022		0.019		0.024
5		0.027		0.026		0.027		0.029		0.025		0.031
6		0.034		0.034		0.035		0.036		0.030		0.039
8		0.046		0.046		0.050		0.049		0.041		0.053
10		0.060		0.059		0.062		0.063		0.052		0.066
12		0.076		0.074		0.076		0.075		0.069		0.080
14		0.087		0.085		0.086		0.085		0.075		0.090
16		0.097		0.095		0.091		0.095		0.082		0.101
18		0.106		0.102		0.099		0.103		0.089		0.111
20		0.115		0.110		0.106		0.112		0.094		0.122

Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53



Side Milling	P						M				S	
Working Material	Carbon steel		Alloy steel		Prehardened steel		Stainless steel		Stainless steel		Nickel Alloy	
Properties	-		520 < Rm < 1200		35 ≤ HRC < 45		High Machinability		Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Cutting Width, ae	0.25 × D		0.20 × D		0.18 × D		0.18 × D		0.15 × D		0.10 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	280	0.005	230	0.006	190	0.005	160	0.004	100	0.005	40	0.004
2		0.009		0.009		0.009		0.009		0.011		0.008
3		0.017		0.014		0.014		0.014		0.017		0.013
4		0.023		0.020		0.019		0.020		0.024		0.018
5		0.030		0.025		0.024		0.025		0.030		0.025
6		0.036		0.031		0.031		0.031		0.037		0.033
8		0.049		0.043		0.042		0.043		0.049		0.046
10		0.062		0.056		0.056		0.056		0.062		0.061
12		0.075		0.070		0.070		0.070		0.076		0.075
14		0.086		0.079		0.080		0.078		0.085		0.081
16		0.094		0.087		0.090		0.086		0.093		0.089
18		0.103		0.092		0.098		0.092		0.102		0.094
20		0.113		0.098		0.104		0.099		0.107		0.102

Recommended Cutting Data



Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

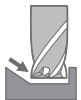


Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53



Ramp/Helical	N						K				S	
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Grey Cast Iron		Ductile Cast Iron		Titanium alloy	
Properties	Si < 9%		Si ≥ 9%		-		-		-		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Ramping Angle	10°		10°		8°		5°		3°		2°	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	250	0.004	220	0.003	210	0.003	130	0.002	80	0.002	45	0.003
2		0.005		0.005		0.005		0.005		0.005		0.007
3		0.010		0.008		0.008		0.007		0.007		0.011
4		0.013		0.012		0.012		0.010		0.010		0.015
5		0.017		0.016		0.016		0.013		0.014		0.019
6		0.021		0.021		0.021		0.015		0.017		0.024
8		0.030		0.029		0.030		0.021		0.022		0.032
10		0.038		0.038		0.040		0.026		0.028		0.041
12		0.048		0.049		0.050		0.033		0.034		0.050
14		0.054		0.056		0.057		0.038		0.039		0.058
16		0.060		0.062		0.064		0.043		0.044		0.064
18		0.066		0.064		0.070		0.048		0.049		0.070
20		0.072		0.069		0.077		0.053		0.054		0.077

Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53



Ramp/Helical	P						M				S	
Working Material	Carbon steel		Alloy steel		Prehardened steel		Stainless steel		Stainless steel		Nickel Alloy	
Properties	-		520 < Rm < 1200		35 ≤ HRC < 45		High Machinability		Low Machinability		-	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Ramping Angle	5°		5°		3°		3°		2°		1°	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	150	0.002	120	0.002	110	0.002	90	0.002	60	0.002	20	0.003
2		0.005		0.005		0.005		0.005		0.006		0.007
3		0.007		0.007		0.007		0.008		0.009		0.011
4		0.010		0.010		0.010		0.011		0.013		0.015
5		0.013		0.013		0.013		0.014		0.016		0.019
6		0.015		0.015		0.015		0.018		0.020		0.024
8		0.021		0.021		0.021		0.024		0.027		0.032
10		0.026		0.027		0.026		0.030		0.035		0.041
12		0.033		0.033		0.033		0.038		0.043		0.050
14		0.038		0.038		0.038		0.043		0.050		0.058
16		0.043		0.042		0.043		0.049		0.055		0.064
18		0.048		0.046		0.048		0.054		0.061		0.070
20		0.053		0.051		0.053		0.058		0.066		0.077

ALU LINE
 EZ LINE -
 ENDMILL
 SE 30
 NITCO 30
 OPTIMUM
 SE 45
 SE 45X
 NITCO 45
 SE 60
 SE 60X
 DM70 -
 SE 70
 SE GR
 TE 45
 PLUNGE
 -MILL
 THREAD
 MILL

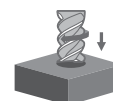
Recommended Cutting Data



Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition

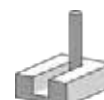


Optimum Endmills, 4 Flutes - 918, 981, 919, 991, K38, K47, K52, K53



Plunging	N						K		P			
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Grey Cast Iron		Carbon steel		Alloy steel	
Properties	Si < 9%		Si ≥ 9%		-		-		-		520 < Rm < 1200	
Cutting depth, ap	1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D		1.00 × D	
Cutting Width, ae	-		-		-		-		-		-	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	150	0.009	140	0.009	130	0.008	120	0.007	120	0.007	110	0.008
2		0.018		0.018		0.017		0.018		0.018		0.016
3		0.028		0.028		0.027		0.028		0.028		0.024
4		0.038		0.037		0.036		0.038		0.038		0.033
5		0.048		0.047		0.046		0.048		0.048		0.042
6		0.058		0.057		0.056		0.059		0.059		0.052
8		0.078		0.077		0.075		0.080		0.080		0.070
10		0.099		0.098		0.097		0.101		0.101		0.090
12		0.121		0.121		0.120		0.126		0.126		0.113
14		0.140		0.139		0.138		0.144		0.144		0.129
16		0.158		0.157		0.156		0.162		0.162		0.144
18		0.176		0.174		0.173		0.179		0.179		0.158
20		0.193		0.191		0.189		0.196		0.196		0.170

Optimum Endmills, 4 Flutes - 918, 981, 919, 991



Trochoidal Milling	P						M				S	
Working Material	Carbon steel		Alloy steel		Prehardened steel		Stainless steel		Stainless steel		Titanium alloy	
Properties	-		520 < Rm < 1200		35 ≤ HRC < 45		High Machinability		Low Machinability		-	
Maximum Slot Width	1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D	
Cutting depth, ap	1.50 × D		1.50 × D		1.50 × D		1.50 × D		1.50 × D		1.50 × D	
Cutting Width, ae	0.10 × D		0.10 × D		0.08 × D		0.10 × D		0.08 × D		0.10 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	350	0.017	290	0.013	250	0.012	200	0.010	120	0.008	100	0.006
2		0.018		0.015		0.016		0.017		0.017		0.014
3		0.026		0.024		0.025		0.027		0.027		0.024
4		0.035		0.033		0.035		0.037		0.038		0.034
5		0.044		0.043		0.045		0.048		0.050		0.045
6		0.054		0.053		0.055		0.060		0.063		0.057
8		0.075		0.073		0.078		0.084		0.091		0.084
10		0.098		0.096		0.102		0.112		0.122		0.116
12		0.121		0.120		0.128		0.142		0.157		0.151
14		0.138		0.136		0.144		0.158		0.174		0.165
16		0.153		0.149		0.158		0.173		0.188		0.176
18		0.167		0.162		0.171		0.186		0.200		0.184
20		0.180		0.174		0.182		0.197		0.209		0.189

Recommended Cutting Data



Note: These recommended cutting data indicators are just for reference. They should be adjusted according to the different cutting condition



Optimum Endmills, 4 Flutes - 918, 981, 919, 991



Trochoidal Milling	N						K				S	
Working Material	Wrought Aluminium		Cast Aluminium		Copper alloy		Grey Cast Iron		Ductile Cast Iron		Nickel Alloy	
Properties	Si < 9%		Si ≥ 9%		-		-		-		-	
Maximum Slot Width	1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D		1.25 × D	
Cutting depth, ap	1.50 × D		1.50 × D		1.50 × D		1.50 × D		1.50 × D		1.50 × D	
Cutting Width, ae	0.12 × D		0.12 × D		0.12 × D		0.10 × D		0.10 × D		0.08 × D	
D	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz	Vc	Fz
1	450	0.020	420	0.019	380	0.018	320	0.015	170	0.010	45	0.003
2		0.021		0.020		0.019		0.016		0.018		0.008
3		0.024		0.024		0.025		0.025		0.029		0.013
4		0.032		0.032		0.034		0.034		0.040		0.020
5		0.041		0.041		0.043		0.043		0.052		0.027
6		0.050		0.050		0.053		0.053		0.065		0.036
8		0.070		0.070		0.074		0.073		0.092		0.054
10		0.091		0.092		0.096		0.095		0.122		0.079
12		0.113		0.114		0.119		0.118		0.155		0.105
14		0.128		0.130		0.135		0.133		0.174		0.110
16		0.142		0.144		0.149		0.147		0.189		0.111
18		0.155		0.156		0.162		0.160		0.202		0.109
20		0.168		0.168		0.174		0.172		0.212		0.104

ALU LINE
 EZ LINE -
 ENDMILL
 SE 30
 NITCo 30
 OPTIMUM
 SE 45
 SE 45X
 NITCo 45
 SE 60
 SE 60X
 DM70 -
 SE 70
 SE GR
 TE 45
 PLUNGE
 -MILL
 THREAD
 MILL