

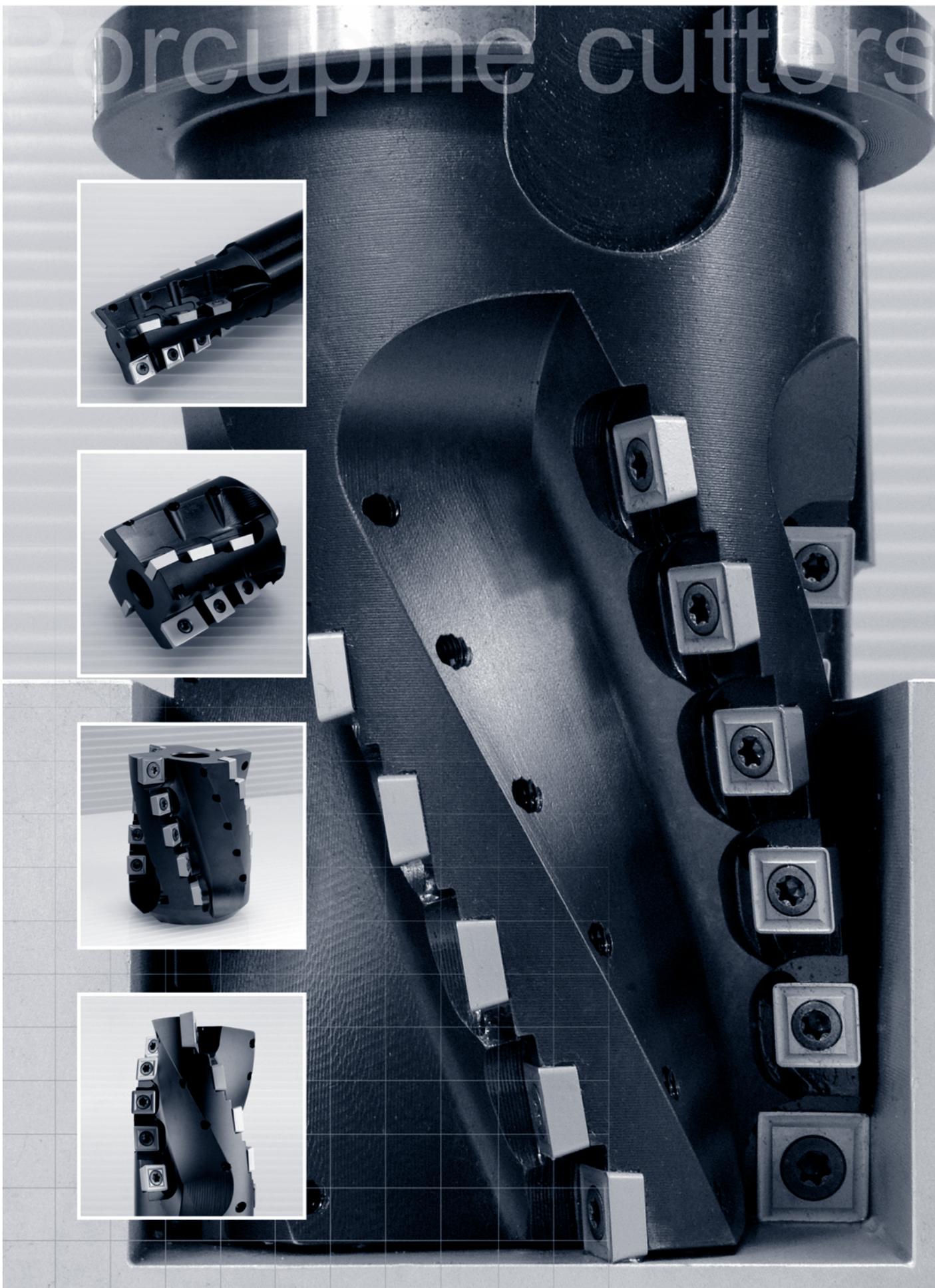
Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters



# Porcupine cutters

Technical information	E.02
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Inserts

Face milling cutters

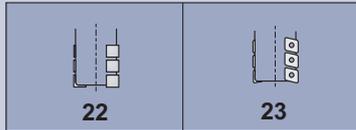
Square shoulder cutters

Slot cutters

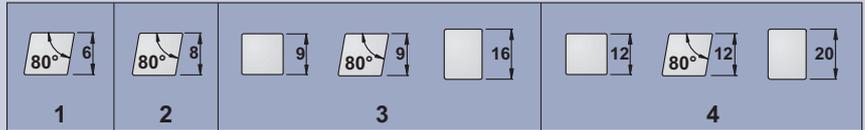
Porcupine cutters

<b>2</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>90</b>	<b>050</b>	<b>90</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	

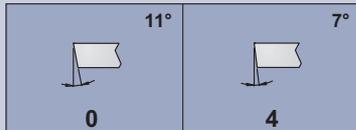
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**2**



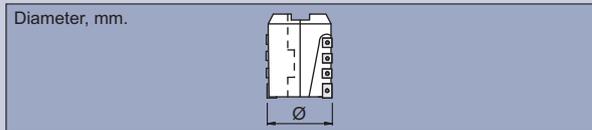
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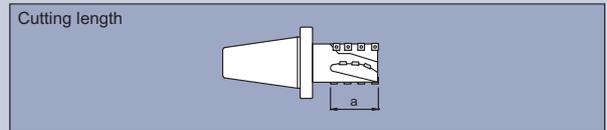
**4**

Short Weldon Ø12 Ø16 Ø20 Ø25 Ø32 Ø40 <b>07</b>	ISO ISO 30 <b>43</b>	DIN 2080 ISO 40 <b>44</b>	ISO 50 <b>45</b>	ISO 7388 7388 40 <b>47</b>	DIN 69871 A 7388 50 <b>48</b>	ISO BT System BT 40 <b>49</b>	BT 50 <b>50</b>	Direct spindle mounting <b>90</b>
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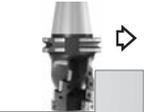
**5**



**6**



Porcupine milling cutters

<p><b>2240.90</b> Slot and side milling 90°</p>  <p>Page E.04 AP.. 1504.. SPM.. 1204..</p>	<p><b>2234.90</b> Slot and side milling 90°</p>  <p>Page E.05 SC.. 09T3.. SC.. 1204..</p>	<p><b>2234.<sup>44</sup>/<sub>45</sub></b> Slot and side milling 90°</p>  <p>Page E.06 SC.. 09T3.. SC.. 1204..</p>	<p><b>2234.<sup>47</sup>/<sub>48</sub></b> Slot and side milling 90°</p>  <p>Page E.07 SC.. 09T3.. SC.. 1204..</p>	<p><b>2234.<sup>49</sup>/<sub>50</sub></b> Slot and side milling 90°</p>  <p>Page E.08 SC.. 09T3.. SC.. 1204..</p>	<p><b>23<sup>1</sup>/<sub>3</sub>4.07</b> Slot and side milling 90°</p>  <p>Page E.09 CC.. 0602.. CC.. 0803.. CC.. 09T3..</p>
<p><b>2330.<sup>47</sup>/<sub>48</sub></b> Slot and side milling 90°</p>  <p>Page E.10 AP.. 1604...</p>	<p><b>2330.<sup>49</sup>/<sub>50</sub></b> Slot and side milling 90°</p>  <p>Page E.11 AP.. 1604..</p>	<p><b>23<sup>2</sup>/<sub>3</sub>0.07</b> Slot and side milling 90°</p>  <p>Page E.12 AP.. 1003.. AP.. 1604..</p>			

Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters

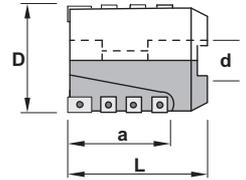
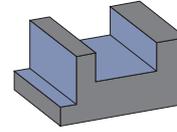
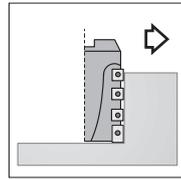


### Characteristics:

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use.

### Applications:

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centres.



## 2240.90

Ref.			D	L	d	a	Insert size	
2240.90.050.48	1+2		50	70	22	48	1 AP.. 2004.. + 11 SPM.. 1204..	0,600
2240.90.063.58	2+2		63	70	27	58	2 AP.. 2004.. + 10 SPM.. 1204..	0,850
2240.90.080.68	3+2		80	80	32	68	2 AP.. 2004.. + 16 SPM.. 1204..	1,900
2240.90.100.78	3+3		100	90	40	78	3 AP.. 2004.. + 21 SPM.. 1204..	2,600
2240.90.125.88	4+4		125	100	40	88	4 AP.. 2004.. + 32 SPM.. 1204..	5,850

Ref.			
2240.90.050.48	1550	5620	912,10
2240.90.063.58	1550	5620	912,12
2240.90.080.68	1550	5620	912,16
2240.90.100.78	1550	5620	912,20
2240.90.125.88	1550	5620	-

Ref.	AP.. / SPM..	l	s	d	AP.. Positive 11° clearance - Rectangular inserts.  SPM.. Positive 11° clearance - Square insert.
	AP.. 2004..	20,00	4,76	12,70	
SPM.. 1204..	12,70	4,76	12,70		
	APMT	APMW	SPMT	SPMW	

For more information see page: A.12 / A.19

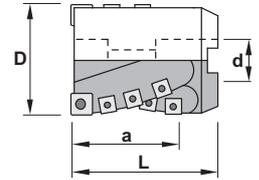
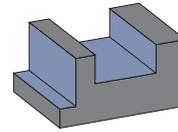
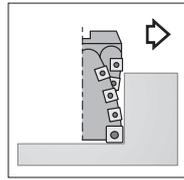


**Characteristics:**

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use.

**Applications:**

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines.



# 2234.90

		D	L	d	a	Insert size		
Ref.	2234.90.063.65	2+2	63	80	27	65	2 SC.. 1204.. + 18 SC.. 09T3..	1,050
	2234.90.080.75	2+3	80	90	32	75	2 SC.. 1204.. + 22 SC.. 09T3..	1,900
	2234.90.100.85	3+3	100	100	40	85	3 SC.. 1204.. + 36 SC.. 09T3..	3,800
	2234.90.125.95	4+4	125	110	40	95	4 SC.. 1204.. + 52 SC.. 09T3..	4,500

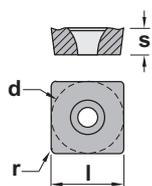
Ref.					
2234.90.063.65	1250	5620	1240	5615	912,12
2234.90.080.75	1250	5620	1240	5615	912,16
2234.90.100.85	1250	5620	1240	5615	912,20
2234.90.125.95	1250	5620	1240	5615	-
	SC.. 1204..		SC.. 09T3..		

Ref.	SC..	l	s	d	Positive 7° clearance - Square inserts.
	SC.. 09T3..	9,52	3,97	9,52	
SC.. 1204..	12,70	4,76	12,70		

SCGT-AL	SCMT-39	SCMW			

For more information see page: A.16



Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters

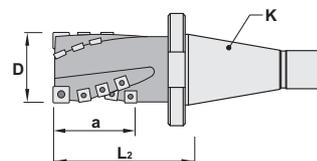
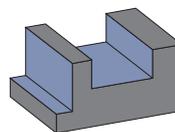
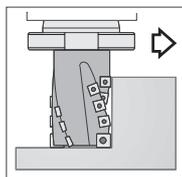


### Characteristics:

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with DIN-2080 shank.

### Applications:

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



## 2234.44 2234.45

Ref.	✳	D	L <sub>2</sub>	K	a	Insert size	⚖ kg
2234.44.040.60	1+2	40	105	40	60	1 SC.. 1204.. + 13 SC.. 09T3..	1,300
2234.44.050.65	1+2	50	105	40	65	1 SC.. 1204.. + 14 SC.. 09T3..	1,700
2234.45.040.70	1+2	40	123	50	70	1 SC.. 1204.. + 14 SC.. 09T3..	3,250
2234.45.050.75	1+2	50	128	50	75	1 SC.. 1204.. + 16 SC.. 09T3..	3,650
2234.45.063.80	2+2	63	133	50	80	2 SC.. 1204.. + 22 SC.. 09T3..	4,700
2234.45.080.85	2+3	80	138	50	85	2 SC.. 1204.. + 28 SC.. 09T3..	6,200
2234.45.100.95	3+3	100	148	50	95	3 SC.. 1204.. + 39 SC.. 09T3..	8,850

Ref.	1250	5620	1240	5615
2234.44.040.60	1250	5620	1240	5615
2234.44.050.65	1250	5620	1240	5615
2234.45.040.70	1250	5620	1240	5615
2234.45.050.75	1250	5620	1240	5615
2234.45.063.80	1250	5620	1240	5615
2234.45.080.85	1250	5620	1240	5615
2234.45.100.95	1250	5620	1240	5615
	SC.. 1204..		SC.. 09T3..	

Ref.	SC..			Positive 7° clearance - Square inserts.
	l	s	d	
SC.. 09T3..	9,52	3,97	9,52	For more information see page: A.16
SC.. 1204..	12,70	4,76	12,70	
SCGT-AL	SCMT-39	SCMW		

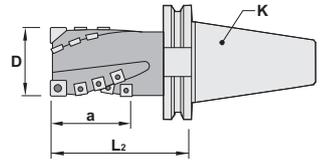
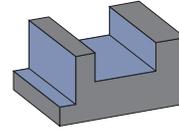
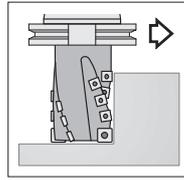


**Characteristics:**

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with DIN-69871 shank.

**Applications:**

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



**2234.47**  
**2234.48**

Ref.	Flutes	D	L2	K	a	Insert size	Kg
2234.47.040.60	1+2	40	105	40	60	1 SC.. 1204.. + 13 SC.. 09T3..	1,300
2234.47.050.65	1+2	50	105	40	65	1 SC.. 1204.. + 14 SC.. 09T3..	1,650
2234.48.040.70	1+2	40	123	50	70	1 SC.. 1204.. + 14 SC.. 09T3..	3,200
2234.48.050.75	1+2	50	128	50	75	1 SC.. 1204.. + 16 SC.. 09T3..	3,700
2234.48.063.80	2+2	63	133	50	80	2 SC.. 1204.. + 22 SC.. 09T3..	4,450
2234.48.080.85	2+3	80	138	50	85	2 SC.. 1204.. + 28 SC.. 09T3..	5,950
2234.48.100.95	3+3	100	148	50	95	3 SC.. 1204.. + 39 SC.. 09T3..	8,450

Ref.	1250	5620	1240	5615
2234.47.040.60	1250	5620	1240	5615
2234.47.050.65	1250	5620	1240	5615
2234.48.040.70	1250	5620	1240	5615
2234.48.050.75	1250	5620	1240	5615
2234.48.063.80	1250	5620	1240	5615
2234.48.080.85	1250	5620	1240	5615
2234.48.100.95	1250	5620	1240	5615

SC.. 1204..

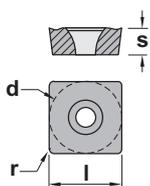
SC.. 09T3..

Ref.	SC..	l	s	d	Positive 7° clearance - Square inserts.
	SC.. 09T3..	9,52	3,97	9,52	
SC.. 1204..	12,70	4,76	12,70		

SCGT-AL	SCMT-39	SCMW			

For more information see page: A.16



Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters

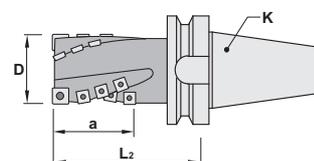
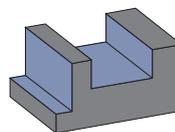
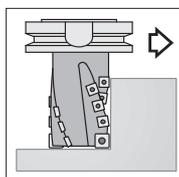


### Characteristics:

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with BT shank.

### Applications:

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



2234. <sup>49</sup> / <sub>50</sub>			D	L <sub>2</sub>	K	a	Insert size	
Ref.	2234.49.040.60	1+2	40	105	40	60	1 SC.. 1204.. + 13 SC.. 09T3..	1,400
	2234.49.050.65	1+2	50	105	40	65	1 SC.. 1204.. + 14 SC.. 09T3..	1,700
	2234.50.040.70	1+2	40	123	50	70	1 SC.. 1204.. + 14 SC.. 09T3..	3,300
	2234.50.050.75	1+2	50	128	50	75	1 SC.. 1204.. + 16 SC.. 09T3..	3,800
	2234.50.063.80	2+2	63	133	50	80	2 SC.. 1204.. + 22 SC.. 09T3..	5,100
	2234.50.080.85	2+3	80	138	50	85	2 SC.. 1204.. + 28 SC.. 09T3..	6,100
	2234.50.100.95	3+3	100	148	50	95	3 SC.. 1204.. + 39 SC.. 09T3..	8,400

Ref.				
2234.49.040.60	1250	5620	1240	5615
2234.49.050.65	1250	5620	1240	5615
2234.50.040.70	1250	5620	1240	5615
2234.50.050.75	1250	5620	1240	5615
2234.50.063.80	1250	5620	1240	5615
2234.50.080.85	1250	5620	1240	5615
2234.50.100.95	1250	5620	1240	5615
	SC.. 1204..		SC.. 09T3..	

Ref.	SC..	l	s	d	Positive 7° clearance - Square inserts.
	SC.. 09T3..		9,52	3,97	
SC.. 1204..		12,70	4,76	12,70	
	SCGT-AL	SCMT-39	SCMW		

For more information see page: A.16

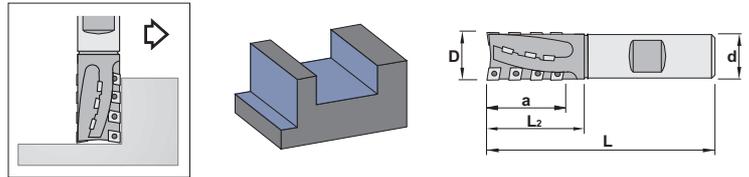


**Characteristics:**

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with Weldon shank.

**Applications:**

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



**23<sup>1</sup><sub>3</sub>4.07**

Ref.			D	L	L2	d	a	Insert size	
2314.07.025.30		2+2	25	125	60	25	30	CC.. 0602..	0,400
	2314.07.025.43	2+2	25	125	60	25	43	CC.. 0602..	0,400
2324.07.032.30		2+2	32	130	60	32	30	CC.. 0803..	0,700
	2324.07.032.43	2+2	32	130	60	32	43	CC.. 0803..	0,650
2334.07.040.30		2+2	40	130	60	32	30	CC.. 09T3..	0,800
	2334.07.040.43	2+2	40	130	60	32	43	CC.. 09T3..	0,800

Ref.		
2314.07.025.30	1225	5607
	2314.07.025.43	5607
2324.07.032.30	1230	5608
	2324.07.032.43	5608
2334.07.040.30	1240	5615
	2334.07.040.43	5615

	CC..				Positive 7° clearance - 80° rhombic insert.
	Ref.	l	s	d	
	CC.. 0602..	6,45	2,38	6,35	
	CC.. 0803..	8,05	3,18	7,94	
CC.. 09T3..	9,65	3,97	9,52		
	CCGT-AL	CCKT	CCMW		

For more information see page: A.16

Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters

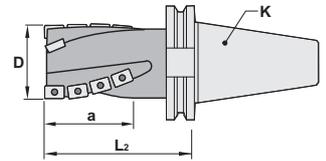
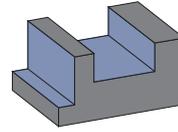
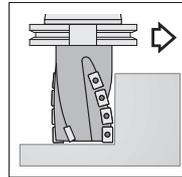


### Characteristics:

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with DIN-69871 shank.

### Applications:

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



2330. <sup>47</sup> / <sub>48</sub>			D	L2	K	a	Insert size	
Ref.								
	2330.47.050.65	3	50	105	40	65	AP.. 1604..	1,650
	2330.48.050.65	3	50	105	50	65	AP.. 1604..	3,700
	2330.48.063.65	3	63	130	50	65	AP.. 1604..	4,450
	2330.48.080.85	3	80	140	50	80	AP.. 1604..	5,950

Ref.	2330.47.050.65	1240	5615
	2330.48.050.65	1240	5615
	2330.48.063.65	1240	5615
	2330.48.080.85	1240	5615

	AP..				Positive 11° clearance - Rectangular insert.	
	Ref.	AP.. 1604..	l	s	d	
			16,00	4,76	9,52	
			For more information see page: A.11			
	APFT	APHT-AL	APKT	APKT-26	APMT	APMT-26

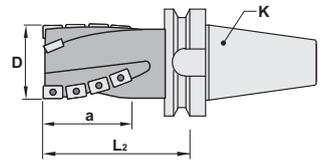
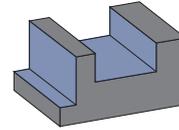
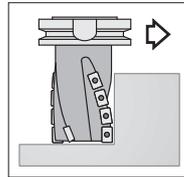


**Characteristics:**

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use.

**Applications:**

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.



**2330.49**  
**.50**

Ref.			D	L2	K	a	Insert size	
2330.49.050.65		3	50	105	40	65	AP.. 1604..	1,700
2330.50.050.65		3	50	105	50	65	AP.. 1604..	3,800
2330.50.063.65		3	63	130	50	65	AP.. 1604..	5,100
2330.50.080.85		3	80	140	50	80	AP.. 1604..	6,100

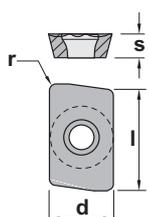
Ref.			
2330.49.050.65		1240	5615
2330.50.050.65		1240	5615
2330.50.063.65		1240	5615
2330.50.080.85		1240	5615

Ref.	AP..		l	s	d	Positive 11° clearance - Rectangular insert.
	AP.. 1604..		16,00	4,76	9,52	

APFT	APHT-AL	APKT	APKT-26	APMT	APMT-26

For more information see page: A.11



Porcupine cutters

Specific applications and sets

Profile milling

Solid carbide

Drills

Boring heads

Arbors and adaptors

Inserts

Face milling cutters

Square shoulder cutters

Slot cutters

Porcupine cutters

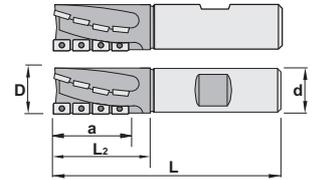
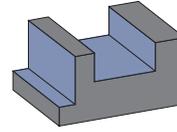
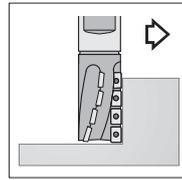


### Characteristics:

Heavy roughing milling cutter that uses very strong inserts allowing deep passes and high feed per teeth. The insert is fixed by Torx screw that allow a good chip evacuation and easy use. Milling cutter equipped with Weldon shank.

### Applications:

This heavy roughing cutter works well on steels, alloyed steels, stainless steels, refractory casts and aluminium alloys. This general milling cutter for diversified manufacture is recommended for conventional milling machines and machining centers.

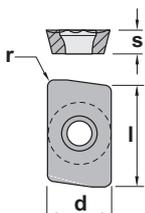


## 23<sup>2</sup>/<sub>3</sub>0.07

Ref.		D	L	L2	d	a	Insert size	
2320.07.025.37	2	25	110	50	25	37	AP.. 1003..	0,400
2330.07.032.45	2	32	125	55	32	45	AP.. 1604..	0,650
2330.07.040.50	3	40	125	65	32	50	AP.. 1604..	0,800



Ref.		
2320.07.025.37	1425	5507
2330.07.032.45	1440	5515
2330.07.040.50	1440	5515



### AP..

Ref.	AP..	l	s	d
AP.. 1003..		9,52	3,18	6,35
AP.. 1604..		16,00	4,76	9,52

Positive 11° clearance - Rectangular insert.

For more information see page: A.11

APFT	APHT-AL	APKT	APKT-26	APMT	APMT-26

## Cutting data for porcupine milling cutters

Material	P	HB	Condition	Tool diameter D mm.	Basic qualities				Feed/tooth complete slot $f_z$
					TIN25	TIN41	PM25	KM15	
					Cutting speed m/min.				
Unalloyed steel		110 170 250	C<0,25% C<0,8% C<1,4%	20-32 40-50	250-300 150-200 100-150		150-200 100-140 70-110		0,12-0,22 0,15-0,39
Low alloyed steel		125-225 220-450	Annealed Hardened	20-32 40-50	150-200 90-140	100-150 60-110	90-140 60-110		0,10-0,21 0,15-0,34
High alloyed steel		150-250 250-500	Annealed Hardened	20-32 40-50	130-170 90-120	80-120	80-120 50-80		0,10-0,21 0,15-0,34
Stainless steel		150-270	Martensitic/Ferritic	20-32 40-50	140-190	120-160	100-130		0,12-0,22 0,15-0,34
Steel castings		150 150-220 160-200	Unalloyed Low alloyed High alloyed	20-32 40-50	130-170 110-150 80-120		80-110 50-90 50-80		0,12-0,22 0,15-0,34
Stainless steel castings		200	Martensitic/Ferritic	20-32		50-80			0,10-0,21 0,15-0,34

Material	HB	Condition	Tool diameter D mm.	Basic qualities				Feed/tooth complete slot $f_z$
				TIN25	TIN41	PM25	KM15	
				Cutting speed m/min.				
Stainless steel	150-220	Austenitic	20-32 40-50		80-160	70-130		0,12-0,23 0,15-0,37
Stainless steel castings	200	Austenitic	20-32 40-50		40-70	40-60		0,10-0,21 0,15-0,34
Heat resistant alloys Nickel or cobalt base	140-300 300-475	Annealed or treated solution Aged	20-32 40-50				15-25 12-20	0,05-0,07 0,07-0,10
Titanium alloys	300-340 320-380	Annealed or treated solution	20-32 40-50				40-80 30-60	0,07-0,10 0,10-0,15

Material	K	HB	Condition	Tool diameter D mm.	Basic qualities				Feed/tooth complete slot $f_z$
					TIN25	TIN41	PM25	KM15	
					Cutting speed m/min.				
Malleable cast iron		110-145 200-230	Short chipping Long chipping	20-32 40-50				60-80 50-70	0,12-0,23 0,15-0,37
Grey cast iron		180 260	Low tensile strength High tensile strength, alloyed	20-32 40-50				70-100 50-80	0,12-0,23 0,15-0,37
Nodular cast iron Spheroidal graphite		160 250	Ferritic Pearlitic	20-32 40-50				40-60 30-50	0,10-0,21 0,15-0,34
Aluminium alloys		60-150 40-180	Forged Cast	20-32 40-50				300-500 250-450	0,23-0,39 0,31-0,60
Bronze-brass alloys		60-150		20-32 40-50				80-120	0,15-0,31 0,23-0,39



$D/a_r$	50	40	20	10	5	2,5	2	1,5	1
$f_1$	4,5	4	3	2	1,5	1	1	1	1

When you trace a contour (side peripheral milling), you must multiply the  $f_z$  value of a complete slot (see table) by the correction factor  $f_1$  corresponding to the relationship  $D/a_r$  (milling cutter diameter/radial cutting depth) in order to get a suitable feed.