INDEX

Milling evolution

Safe, high-tech line of milling cutters for new machines where reducing cycle times cannot be accomplished simply by increasing feed rates, but calls for introducing FIUDI's high speed concept.

High speed according to FIUDI:
In designing a milling operation, **FIUDI** has one clear idea in mind:
achieving the desired result in the shortest possible time.
To do so, **FIUDI** analyses an entire set of factors including
machine power, maximum spindle rpm and workpiece fixturing stability
together with the customer to meet cost goals.

Our experience in developing a high speed milling program has convinced us of the need for solutions that take five essential factors into account:

- Cutting material
- Cutter body material
- Cutting edge
- Production processes
- Active safety

Each of these factors problems contributes actively to reaching the objective.

Cutting material

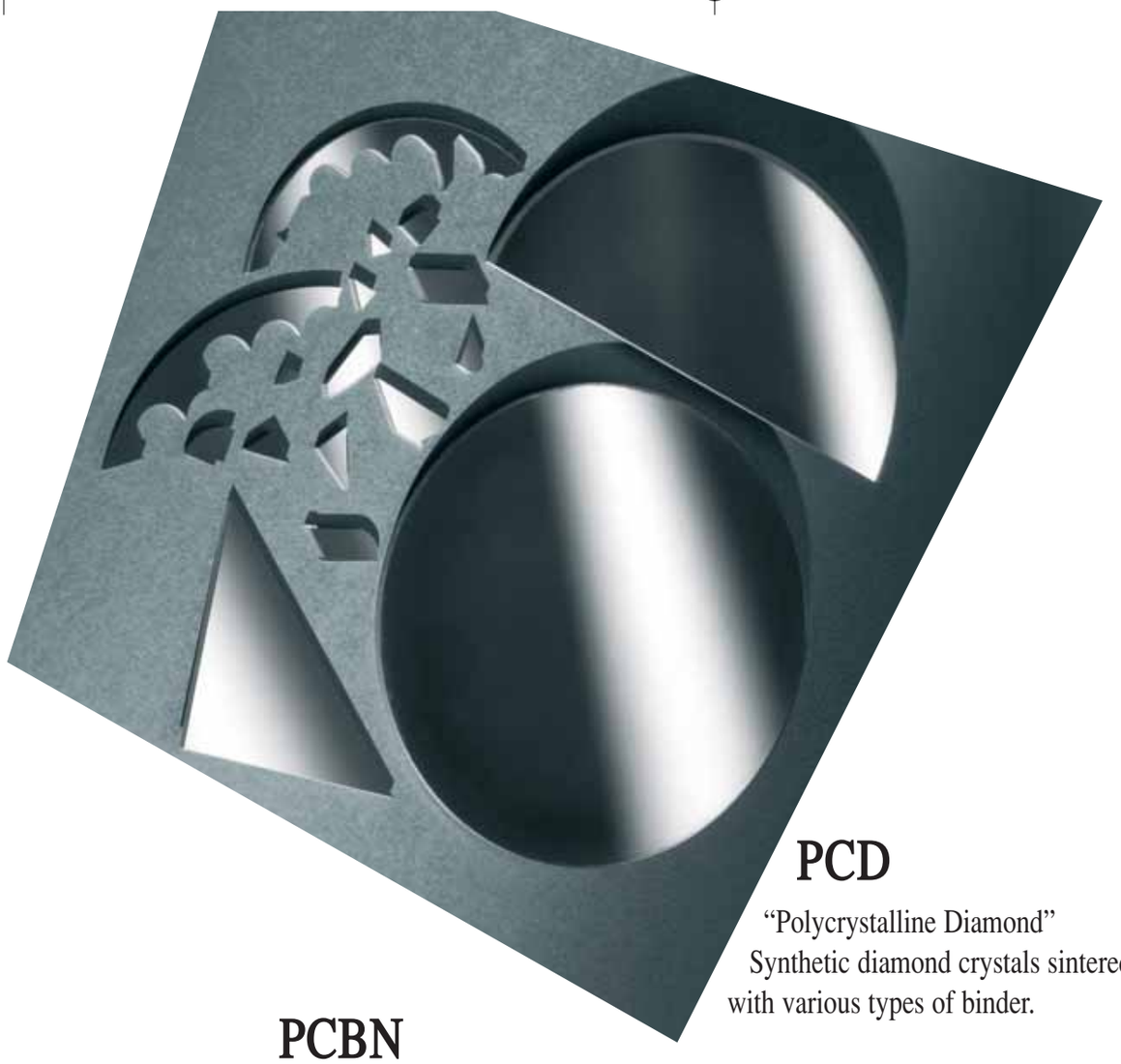
FIUDI has worked with superabrasives since 1959,
carrying out research and developing expertise
with each new material as it comes on the market.
Currently, FIUDI's materials of choice are: **MD**, **PCD** and **PCBN**.

MD

"Monocrystalline Diamond"
Natural or synthetic monocrystalline diamond.

Natural: quality NAT
Synthetic: quality SY

Through its extensive field experience, **FIUDI** will be able to evaluate
which of the two is best for a given application. Where it is necessary to use a natural diamond,
it will be cut in the most appropriate way for the processing operation involved.



PCD

"Polycrystalline Diamond"
Synthetic diamond crystals sintered with various types of binder.

PCBN

"Polycrystalline Cubic Boron Nitride"
Polycrystalline Cubic Boron Nitride sintered with various types of binder.

By themselves, the terms "**PCD**" and "**PCBN**" do not say much about the properties of these superabrasive materials, which depend on crystal size, the amount of abrasive present, and the type of binder used in sintering operations.
Consequently, different tools labeled PCD or PCBN are not necessarily comparable.
To prevent confusion, each **FIUDI** insert or tool is marked with the type (quality) of PCD used, which **FIUDI** selects on the basis of the know-how built up during 50 years of experience.

Standard **PCD** and **PCBN** inserts are limited to 3 or 4 qualities in order to rationalize off-the-shelf stock management.
Special inserts with high performance quality are available for specific applications.

Cutter body material

The type of material used for the cutter body is selected in order to meet the following requirements:

- ❑ light weight
- ❑ excellent mechanical properties
- ❑ resistance to chip abrasion
- ❑ corrosion resistance

Light weight is important for the following reasons:

- ❑ There is a maximum limit to the overall cutter-adapter weight that can be supported by the tool loader.
- ❑ Because of fixturing problems, cutters must often be positioned at a considerable distance from the spindle nose: if they are heavy, they become difficult to manage at high rpm.
- ❑ Total cutter-adapter weight must be limited to avoid spindle acceleration/deceleration problems.

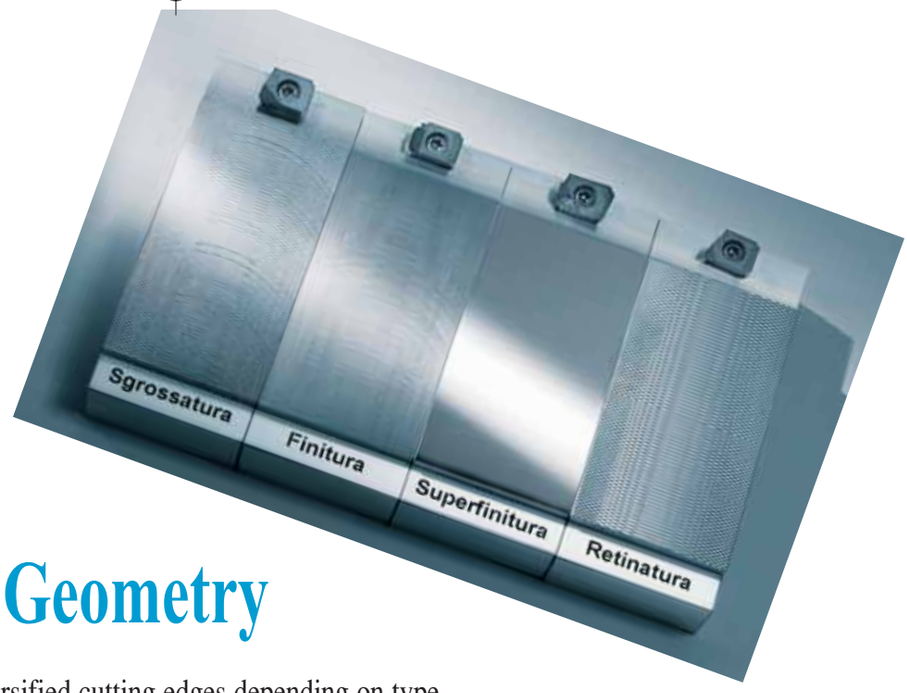
Mechanical properties are important in order to ensure:

- Tight threaded joints, a major priority in securing assembled components in their seats (aluminum cutter bodies with threaded inserts do not provide enough guarantees against thread stripping);
- High resistance to distortion resulting from impact, which can cause damage to the cartridge or critical conditions as the seat deteriorates;
- High resistance to the torsional stresses involved in securing cartridges, which ensures that close flatness tolerances for inserts are maintained.

Resistance to chip abrasion is extremely important because in addition to increasing cutter life, it ensures that chip management and cutter balancing remain stable (coatings or surface treatments on aluminum alloys are not sufficient for this purpose).

Corrosion resistance is equally important because these cutters normally remain on the machine for long periods (up to several months, in some cases), where they are continually exposed to cutting fluid. Should corrosion or oxidation begin as a result, the cutter would no longer be able to guarantee its original level of accuracy.

TITANIUM is the only material that satisfies all of the requirements demanded by the market and by **FIUDI's** quality standards.



Cutting Profile Geometry

FIUDI inserts are produced with diversified cutting edges depending on type of machining operation to be performed, thereby optimizing cutting parameters and tool life compatibly with workpiece requirements.
Available geometries are summarized in page 44, excluding specific applications requiring customized cutting edges.

Production Process

Cutter construction is based on five-axis, single center positioning, using a heat treated and ground blank. Insert seat tolerance repeatability is achieved by on-machine size monitoring during both semifinishing and finish operations. Moreover, a base code on each package permits identification of production lot and consequent certification of 100% inspection.

Active Safety

FIUDI cutters are conceived with active safety as a priority for all components involved, endeavoring to minimize the risk of ejection during processing.

To this end:

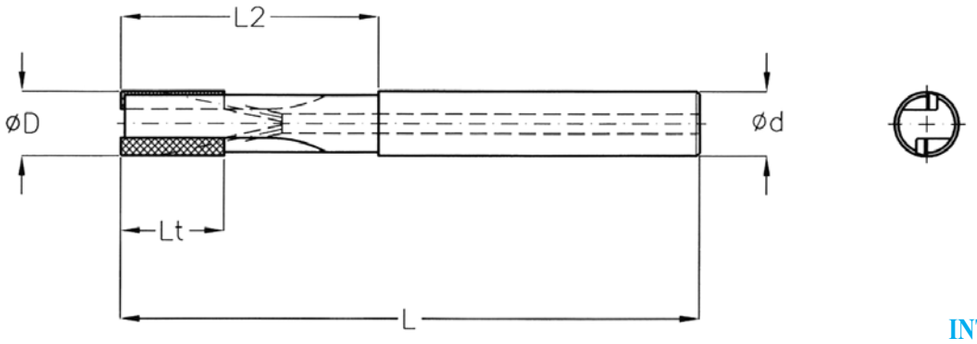
- Cartridge profile is designed to permit in-seat axial movement only, thereby preventing ejection even in case of accidental inadequate fastening.
- Where provided, lock-up and adjustment wedges incorporate a physical limit travel stop preven ting workout of cartridge in position.
- Balance weights are housed in special grooves to offset the effect of centrifugal forces.

FIUDI has a policy of utmost attention to details, with a view to ensuring maximum operating safety and best results in terms of productivity and quality.

PCD-tipped end-mill

F100

PCD - contouring end mill with straight carbide body as per DIN 6535 HA

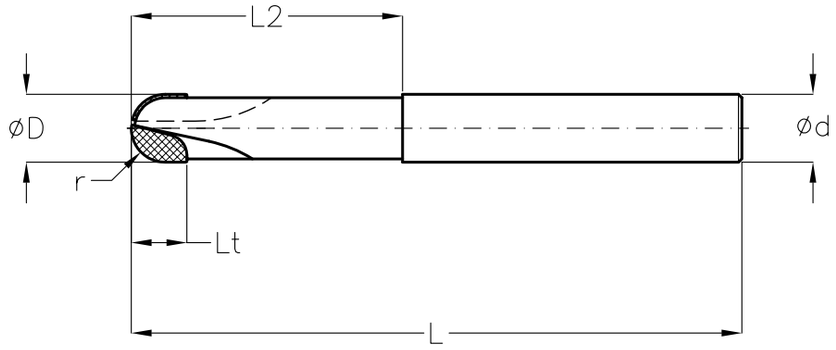


INTERNAL COOLANT

FIUDI CODE	øD	z	Lt	L2	L	ød
290 - 024958 - ..	6	2	8	18	50	6
290 - 024959 - ..	8	2	10	15	70	8
290 - 024151 - ..	10	2	10	16	80	10
290 - 024960 - ..	12	2	12	17	80	12
290 - 024963 - ..	16	4	16	26	90	16
290 - 024961 - ..	16	2	16	26	90	16
290 - 024962 - ..	20	2	16	26	100	20
290 - 024964 - ..	20	4	16	26	100	20

F106

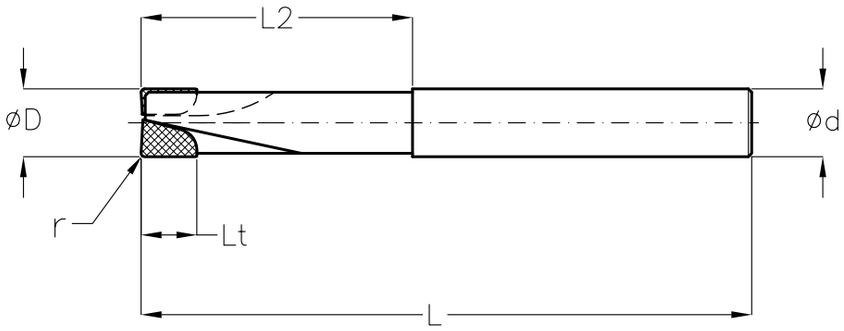
PCD - ballnose milling cutter with carbide body as per DIN 6535 HA



FIUDI CODE	øD	r	z	Lt	L2	L	ød
290 - 024636 - ..	6	3	2	6,5	18	100	6
290 - 024906 - ..	8	4	2	7,5	24	100	8
290 - 024912 - ..	10	5	2	8	30	150	10

F107

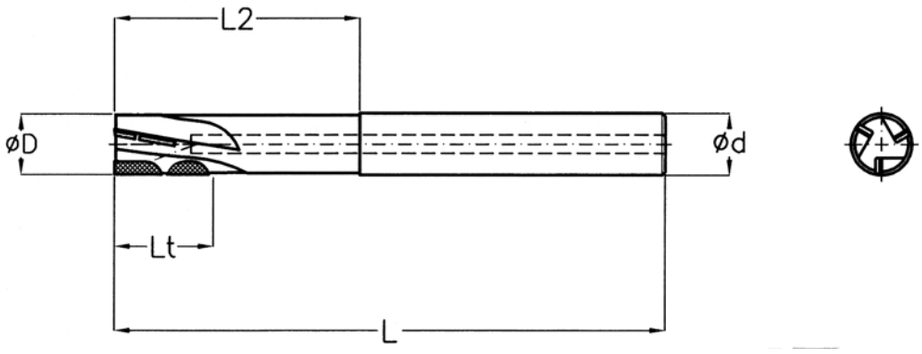
PCD- drilling milling cutter with carbide body as per DIN 6535 HA



FIUDI CODE	øD	z	r	Lt	L2	L	ød
290 - 024908 - ..	6	2	0,3	6	18	100	6
290 - 024909 - ..	8	2	0,25	7,5	24	100	8
290 - 024910 - ..	8	2	0,5	7,5	24	100	8
290 - 024911 - ..	10	2	0,5	8	30	100	10

F120

PCD- roughing helical milling cutter with carbide body as per DIN 6535 HA

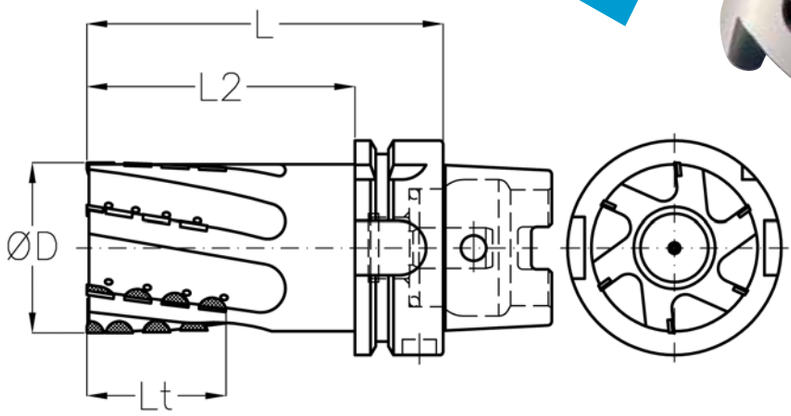


INTERNAL COOLANT

FIUDI CODE	øD	z	Lt	L2	L	ød
290 - 025469 - ..	12	2	26	34	80	12
290 - 025470 - ..	16	2	32	45	90	16
290 - 025471 - ..	20	3	38	49	100	20
290 - 025472 - ..	25	3	45	60	120	25

F121

PCD-roughing helical milling cutter monolith HSK 63A DIN 6973



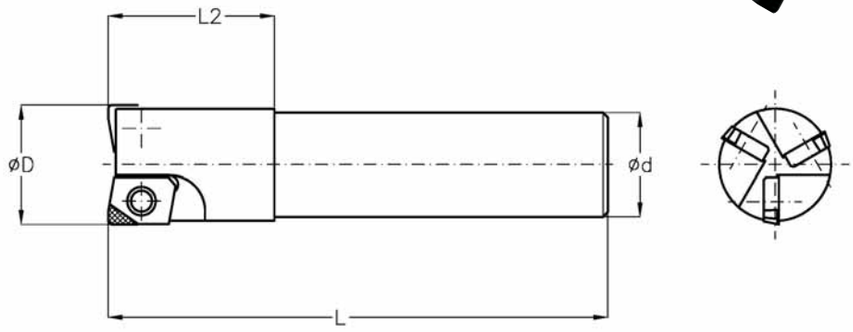
INTERNAL COOLANT

FIUDI CODE	øD	z	Lt	L2	L
392 - 026691 - ..	40	4	40	79	105
392 - 024693 - ..	50	6	40	79	105

Indexable milling cutter

F231

XP indexable milling cutter with steel body as per DIN 6535 HA



INTERNAL COOLANT

FIUDI CODE	øD	z	L2	L	ød	Weight Kg	Max rmp
394 - 026308FR	25	3	30	120	20	0,300	31.000
394 - 026829FR	32	3	30	120	25	0,450	28.000

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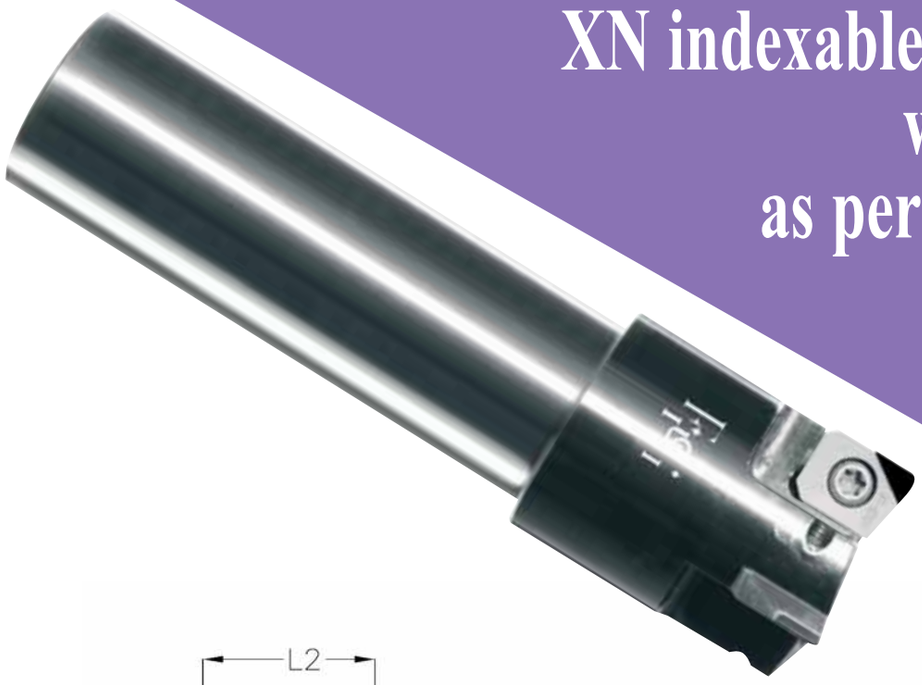
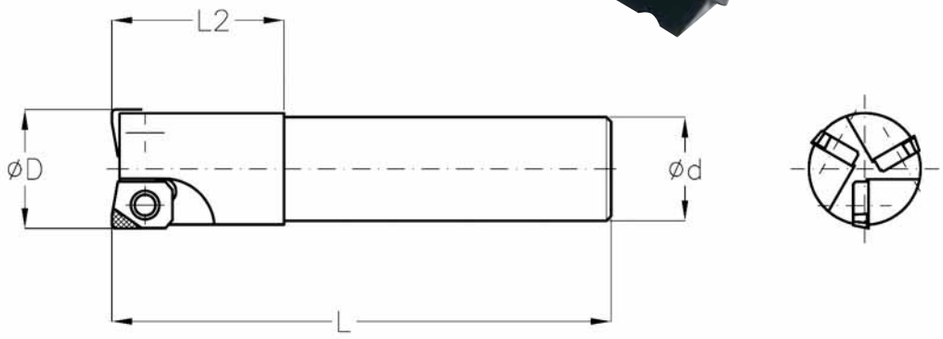
F232

XN indexable milling cutter with steel body as per DIN 6535 HA





INTERNAL COOLANT

FIUDI CODE	øD	z	L2	L	ød	Weight Kg	Max rmp
394 - 025473FR	25	3	30	120	20	0,300	31.000
394 - 025642FR	32	3	30	120	25	0,450	28.000

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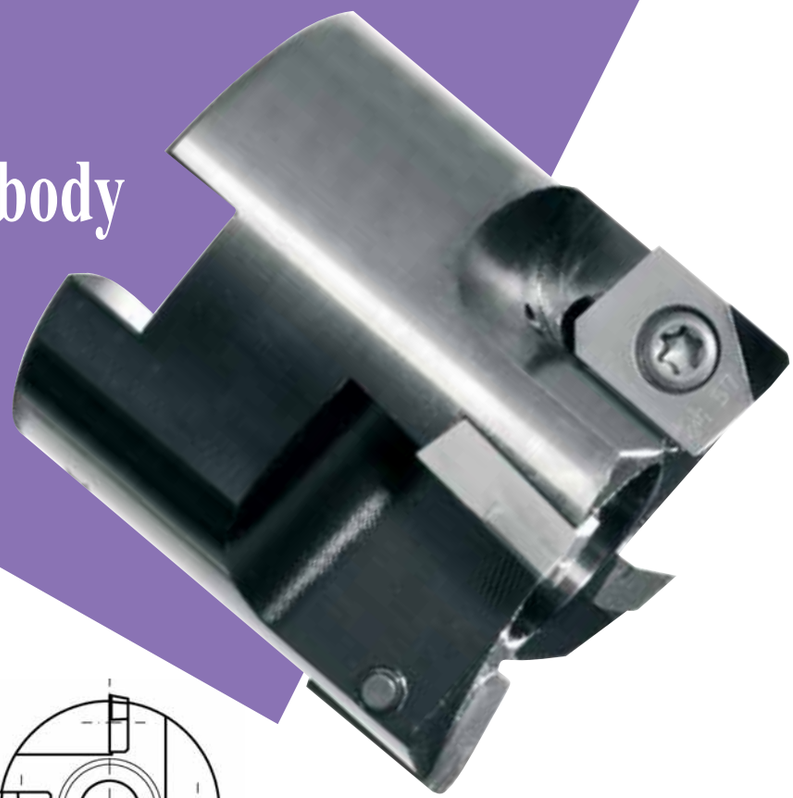
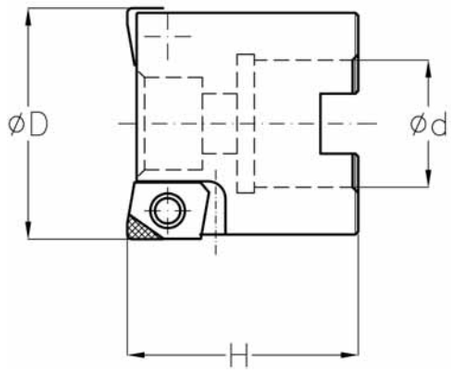
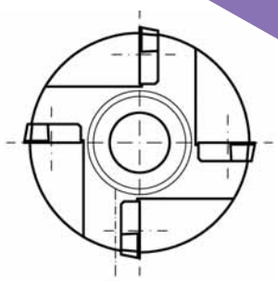
F241

XP indexable milling cutter steel body







INTERNAL COOLANT

	FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
	394 - 020690FR	40	4	40	22	0,186	25.000
new	394 - 025599FR	40	4 reg.	40	22	0,190	25.000
	394 - 020691FR	50	4	40	22	0,350	22.500
new	394 - 026683FR	50	4 reg.	40	22	0,355	22.500
new	394 - 026561FR	63	6	40	22	0,650	20.000
new	394 - 026684FR	63	6 reg.	40	22	0,660	20.000

Special central lock screw for coolant has not to be used on this milling cutter.

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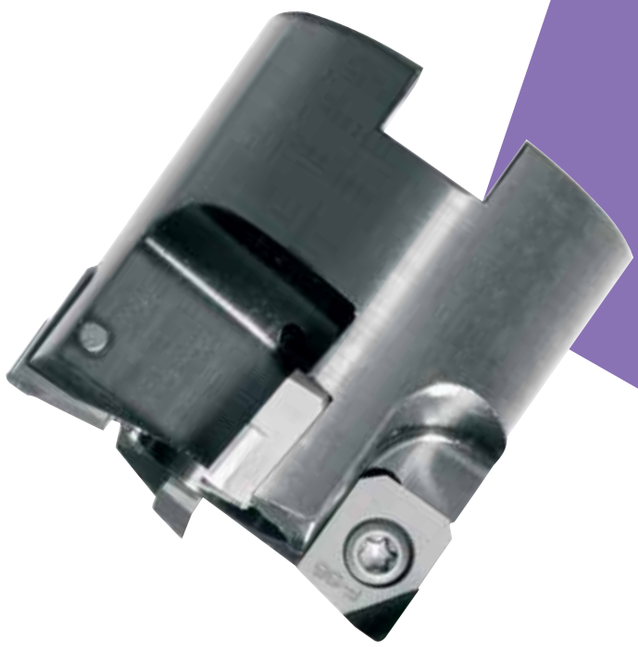
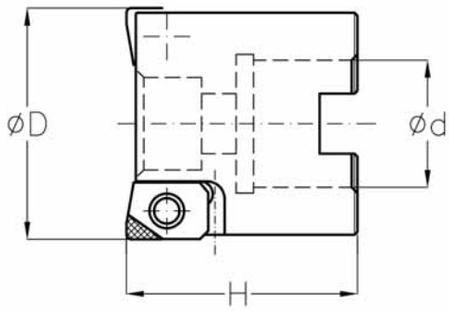
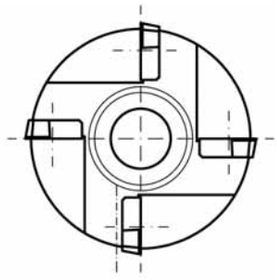
F242

XN indexable milling cutter... steel body







INTERNAL COOLANT

	FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
	394 - 025272FR	40	4	40	22	0,186	25.000
new	394 - 026715FR	40	4 reg.	40	22	0,190	25.000
	394 - 025273FR	50	4	40	22	0,350	22.500
new	394 - 026577FR	50	4 reg.	40	22	0,355	22.500
new	394 - 026686FR	63	6	40	22	0,650	20.000
new	394 - 026687FR	63	6 reg.	40	22	0,660	20.000

Special central lock screw for coolant has not to be used on this milling cutter.

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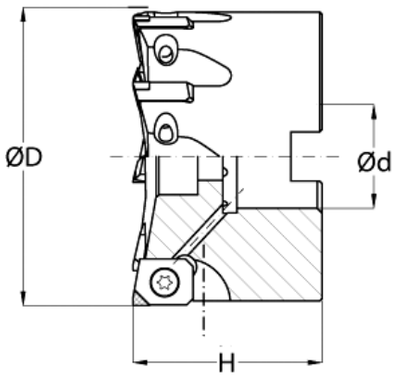
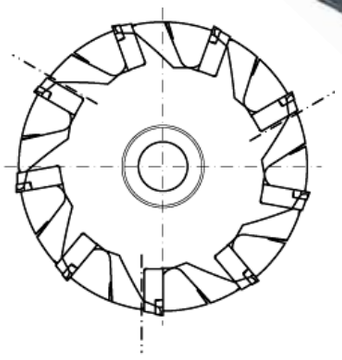
F252

XN indexable milling cutter "fine pitch", steel body





INTERNAL COOLANT

	FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
	394 - 025124FR	40	6	40	16	0,230	25.000
new	394 - 026688FR	40	6 reg.	40	16	0,250	25.000
	394 - 025125FR	50	7	40	22	0,340	22.500
new	394 - 026689FR	50	7 reg.	40	22	0,380	22.500
	394 - 025412FR	63	9	40	22	0,620	20.000
new	394 - 026690FR	63	9 reg.	40	22	0,680	20.000

Special central lock screw for coolant has not to be used on this milling cutter.

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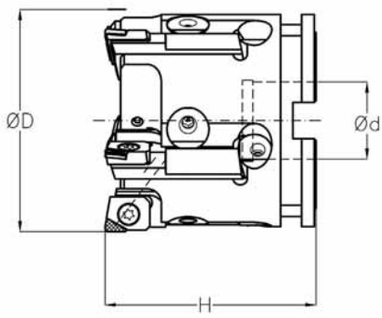
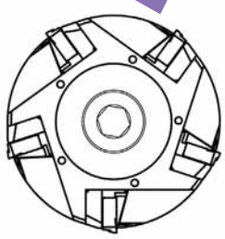
Micro adjustable mill with cartridges

F445
High speed micro-adjustable milling cutter with titanium body





INTERNAL COOLANT

FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
394 - 025226FR	63	4	60	22	0,510	23.000
394 - 025239FR	63	5	60	22	0,600	23.000
394 - 025228FR	80	5	60	27	0,856	20.000
394 - 025331FR	80	6	60	27	0,940	20.000
394 - 025230FR	100	6	60	32	1,520	18.000
394 - 025231FR	125	8	63	40	2,130	16.500

Mill bodies are shipped without cartridges. These should be ordered separately.

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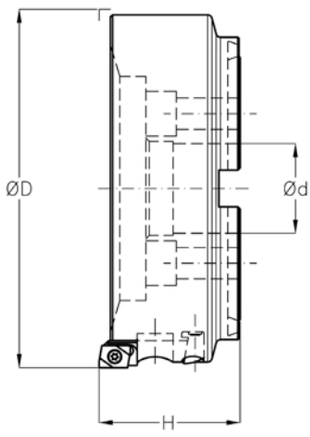
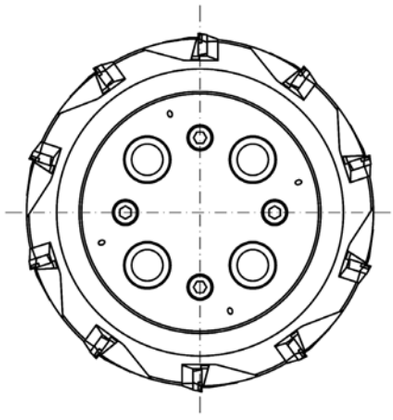
 Type A - Pages 30 - 31

F445
High speed micro-adjustable milling cutter with titanium body





INTERNAL COOLANT

FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
394 - 025232FR	160	10	63	40	3,940	14.500
394 - 025479FR	200	16	63	60	6,180	13.000
394 - 025480FR	250	24	63	60	9,600	11.500
394 - 025481FR	315	30	80	60	19,870	10.000

Mill bodies are shipped without cartridges. These should be ordered separately.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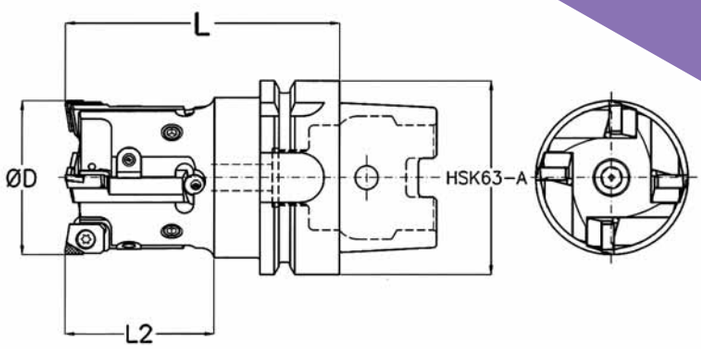
Type A - Pages 30 - 31

F308
High speed micro adjustable milling cutter steel body monolith HSK63A DIN 69873



INTERNAL COOLANT

FIUDI CODE	øD	z	L2	L	Weight Kg	Max rmp
394 - 025477FR	50	4	64	90	1,250	18.000
394 - 025478FR	63	6	74	100	1,750	16.000

Mill bodies are shipped without cartridges. These should be ordered separately.

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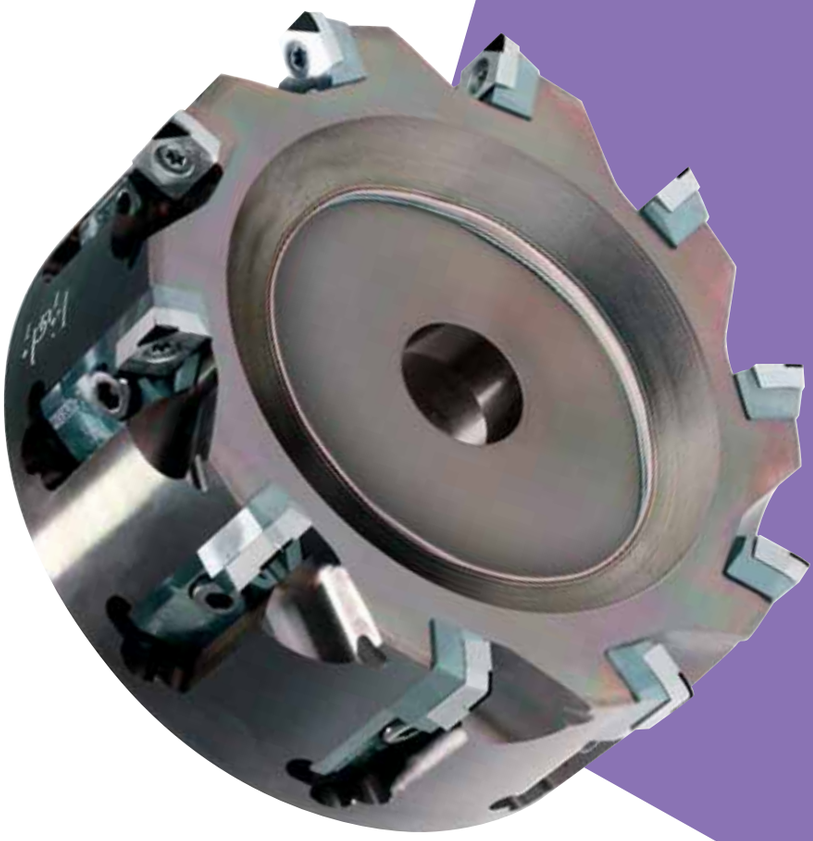
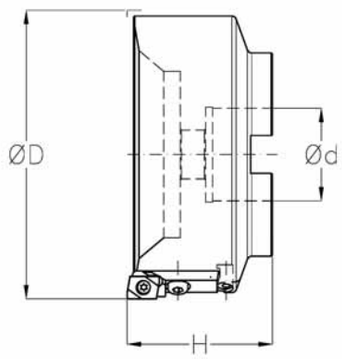
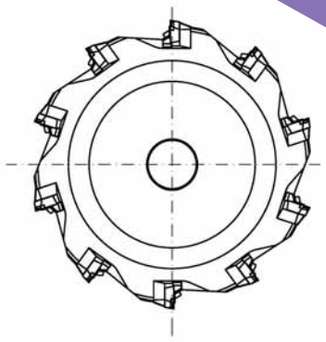
Type B - Pages 30 - 31



F555
Micro adjustable milling cutter steel body





	FIUDI CODE	øD	z	H	ød	Weight Kg	Max rmp
new	394 - 026580FR	63	6	60	22	0,750	8.000
new	394 - 026581FR	80	7	60	27	1,320	6.000
new	394 - 026582FR	100	8	60	32	2,120	5.000
new	394 - 026583FR	125	10	63	40	3,710	4.000
new	394 - 026584FR	160	12	63	40	6,510	3.000
new	394 - 026585FR	200	18	63	60	10,200	2.500
new	394 - 026586FR	250	24	63	60	15,870	2.000
new	394 - 026587FR	315	30	80	60	23,540	1.500

Mill bodies are shipped without cartridges. These should be ordered separately.

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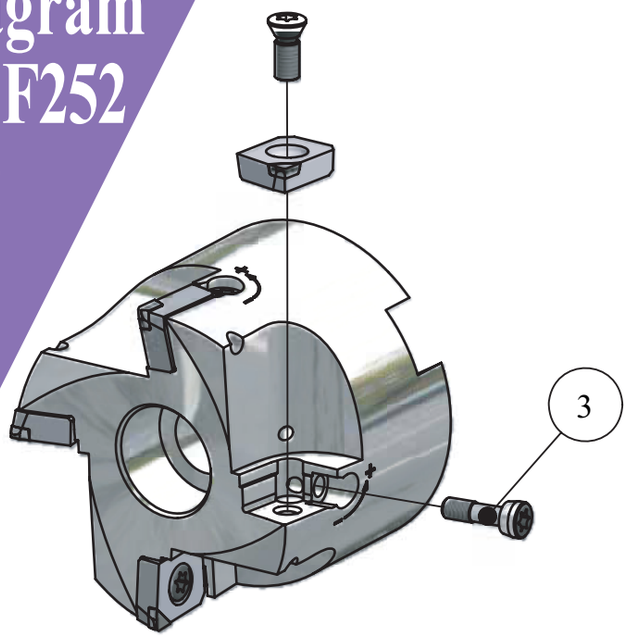
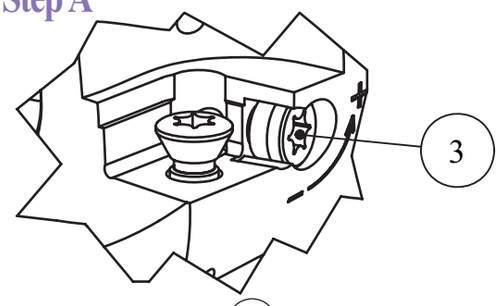
 Type C - Pages 30 - 31

Cutter Assembly Diagram types F241, F242 and F252 with axial adjustment

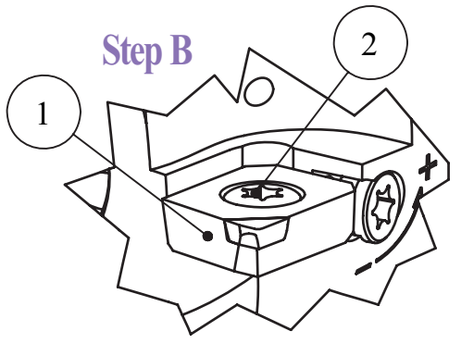


Step A



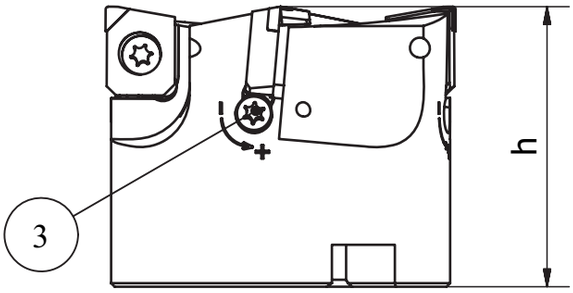
Tighten adjusting screw (3) (left)
using Torx wrench T15 until up against shoulder,
subsequently backing off by 1.5 - 2 turns.

Step B



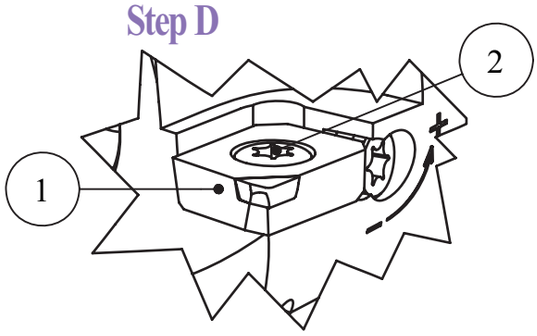
Install insert (1)
and tighten torx screw (2)
using Torx wrench T15.

Step C



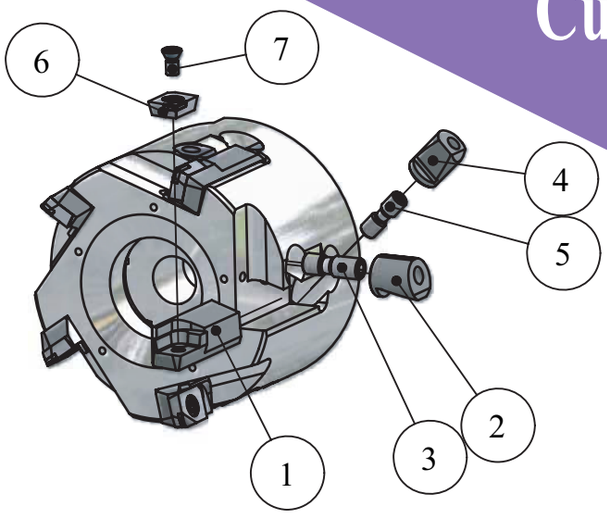
Preset to nominal size h using screw (3) (axial correction 0.05 max.).
Axial misalignment to be 0.002 max.

Step D

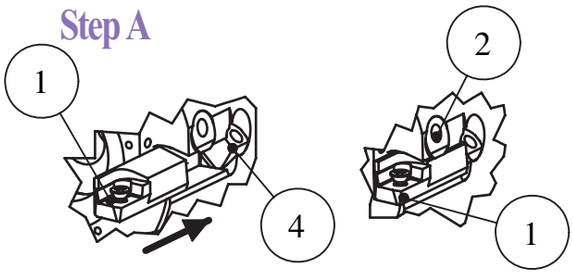


Finally tighten insert (1)
using torx screw (2)
and Torx wrench T15

Cutter Assembly Diagram types F445 and F308

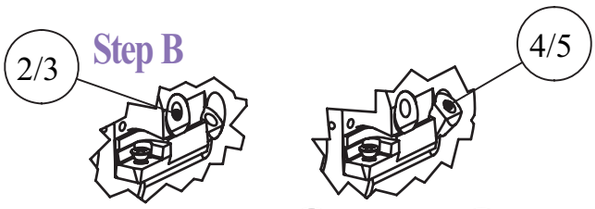


Step A



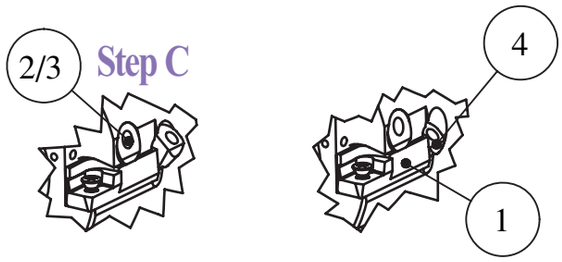
Insert cartridge (1)
home against wedge (4) (see arrow).
Push wedge (2)
as necessary to clear the passage.

Step B



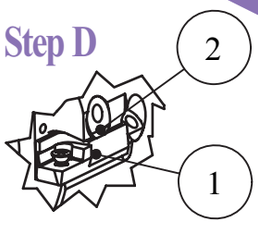
Hand tighten wedge (2) using screw (3).
Back off screw (5) causing wedge (4)
to protrude almost fully.

Step C



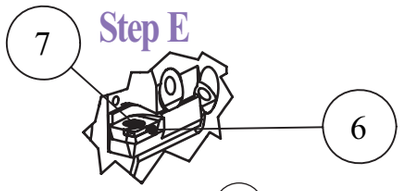
Slacken wedge (2) through screw (3)
and slide cartridge (1) up against wedge (4).

Step D



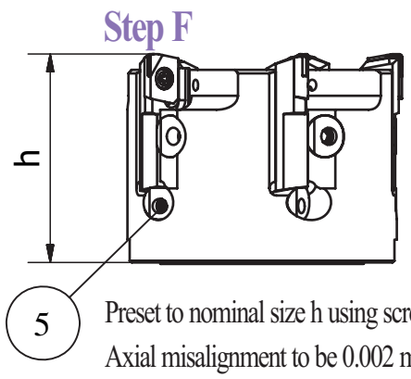
Clamp cartridge (1)
using wedge (2).

Step E



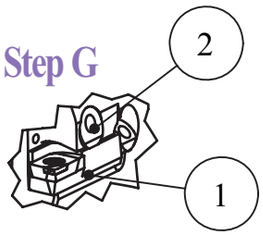
Install insert (6) and fasten using Torx screw (7)
and Torx wrench T15.

Step F



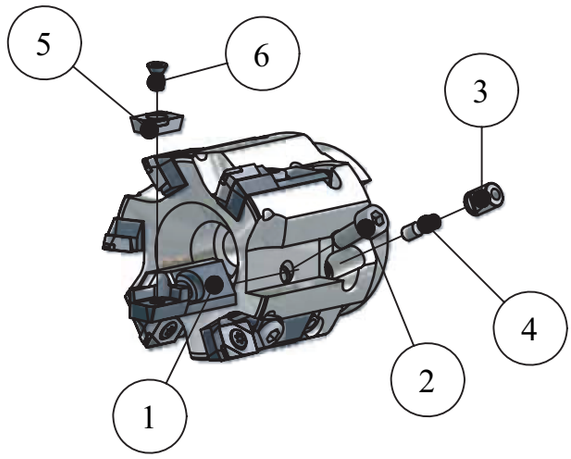
Preset to nominal size h using screw (5).
Axial misalignment to be 0.002 max.

Step G

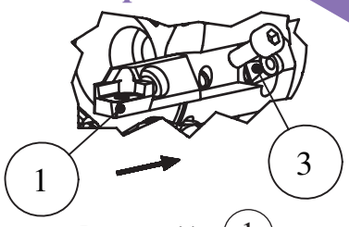


Clamp cartridge (1), using wedge (2),
and torque wrench.

Cutter Assembly Diagram type F555

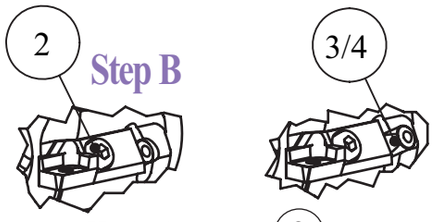


Step A



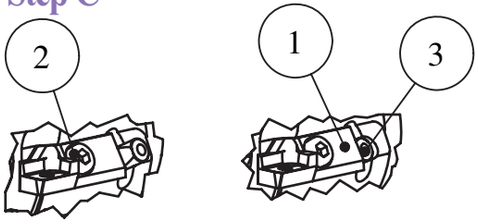
Insert cartridge (1)
home against wedge (3) (see arrow).

Step B



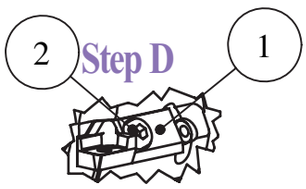
Hand tighten screw (2)
using 4 mm hex. Allen key, back off screw (4)
using 2 mm. Allen key causing wedge (3)
to protrude almost fully.

Step C



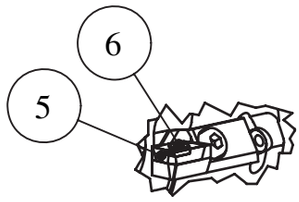
Back off screw (2) and slide cartridge (1)
up against wedge (3).

Step D



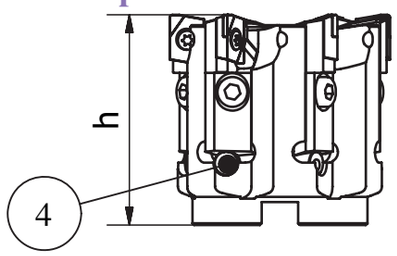
Clamp cartridge (1) using the screw (2).

Step E



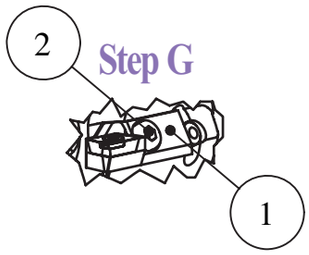
Install insert (5) and clamp using Torx screw (6)
and Torx wrench T15.

Step F



Preset to nominal size h through screw (4)
using 4 mm Allen key.
Axial misalignment to be 0.002 max.

Step G



Clamp cartridge (1) through screw (2),
using 4 mm Allen key.

Cartridges and inserts

Cartridge for insert XP..-12T3..

FIUDI CODE	For milling cutter ø	Ref. pages	Type	Weight Kg
052 - 021899UT	63 - 80 - 100 - 125	22 - 23	A	0,025
	160 - 200 - 250 - 315			
052 - 024935UT	50 - 63	24	B	0,025
052 - 026588UT	63 - 80 - 100 - 125	25	C	0,025
	160 - 200 - 250 - 315			

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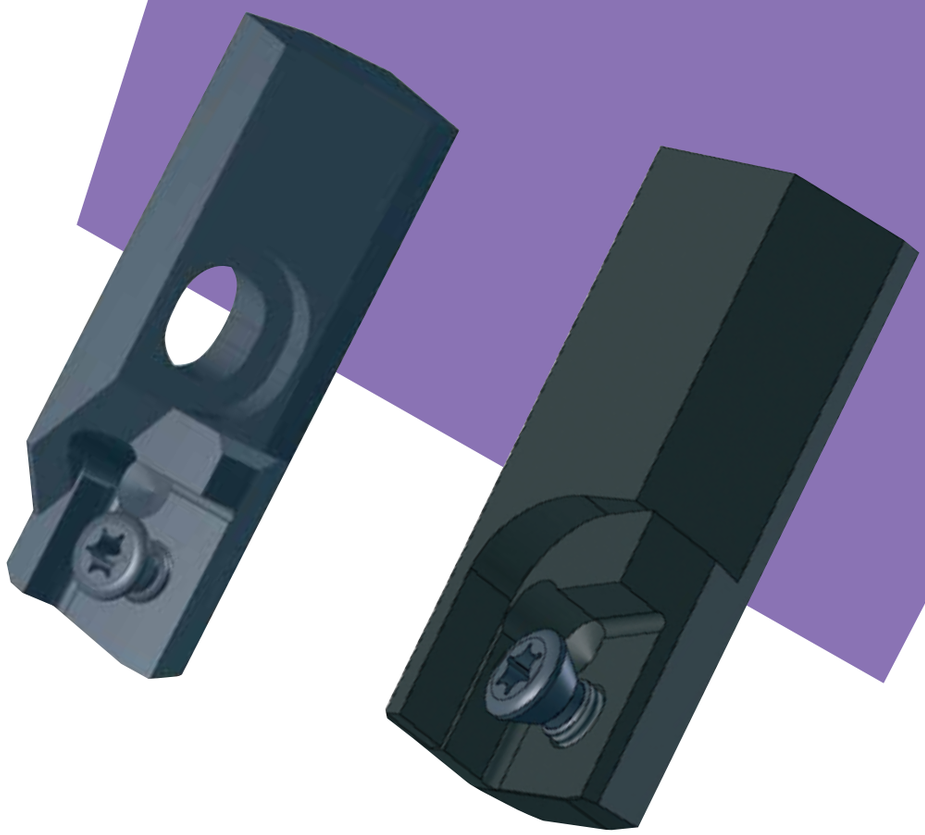
Cartridge for insert XN..-12T3..



FIUDI CODE	For milling cutter ø	Ref. pages	Type	Weight Kg
052 - 024555UT	63 - 80 - 100 - 125	22 - 23	A	0,025
	160 - 200 - 250 - 315			
052 - 021900UT**	63 - 80 - 100 - 125	22 - 23	A	0,025
	160 - 200 - 250 - 315			
052 - 024777UT	50 - 63	24	B	0,025
052 - 026593UT**	50 - 63	24	B	0,025
052 - 026589UT	63 - 80 - 100 - 125	25	C	0,025
	160 - 200 - 250 - 315			
052 - 026590UT**	63 - 80 - 100 - 125	25	C	0,025
	160 - 200 - 250 - 315			

**To be used only with inserts 260-020692.. and 260-021898..

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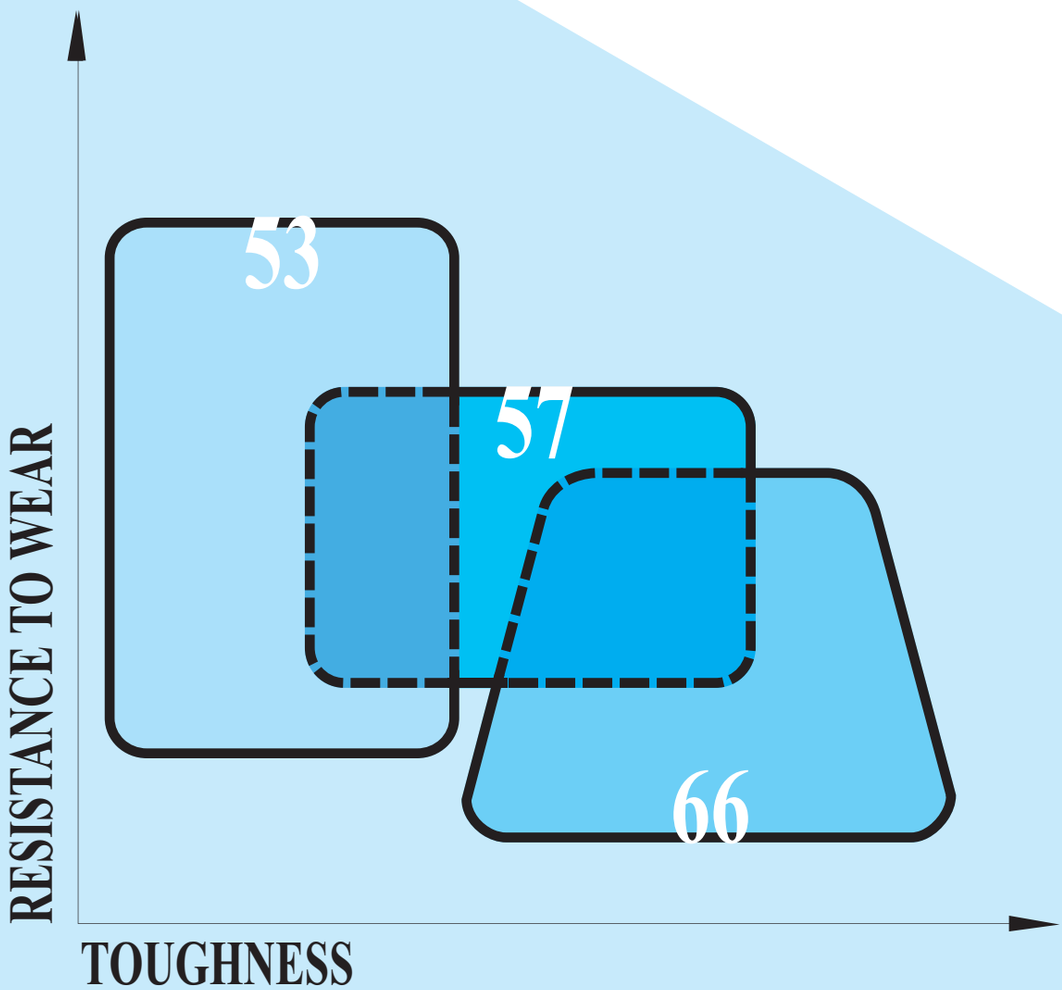
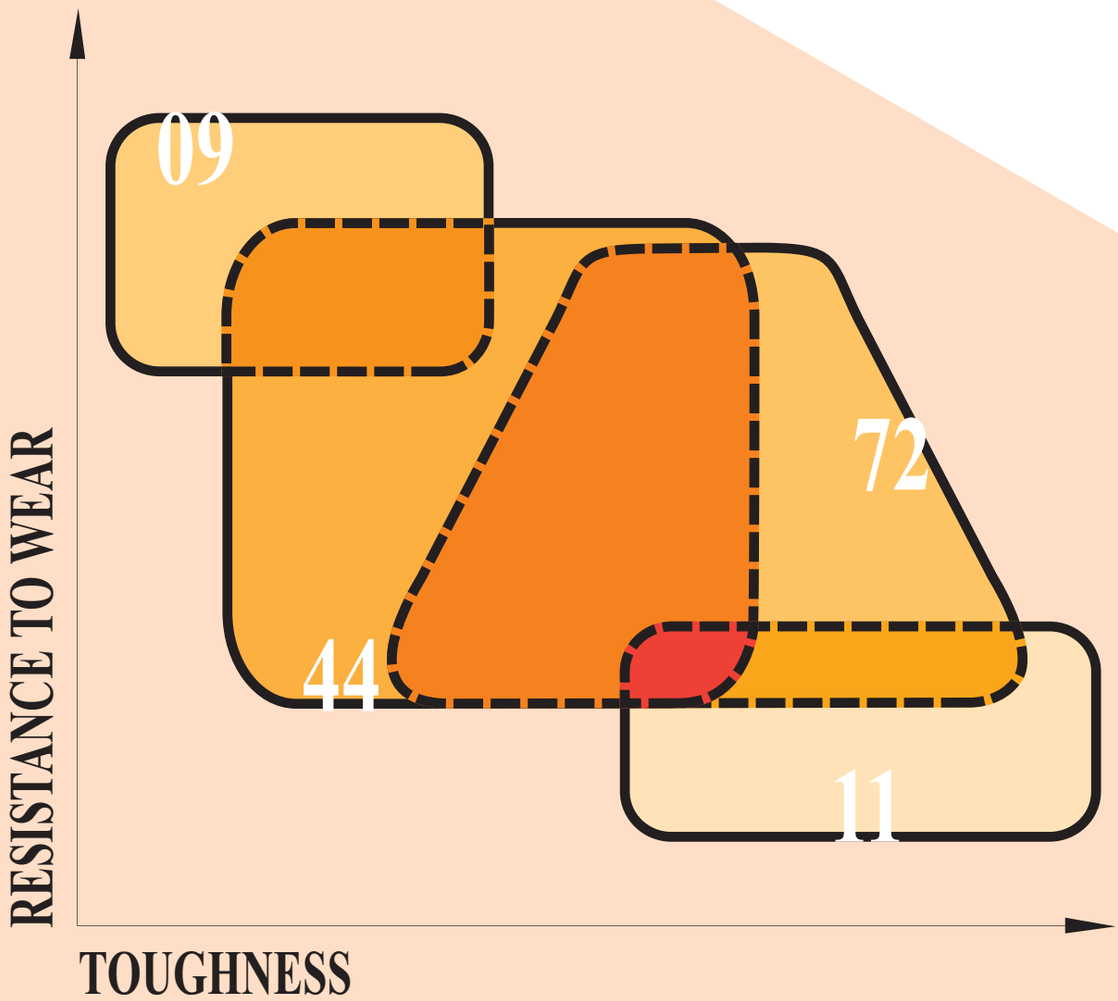
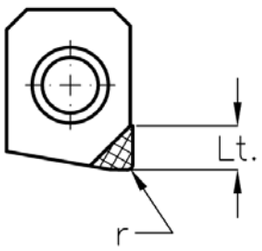
PCD Grades
Polycrystalline Diamond

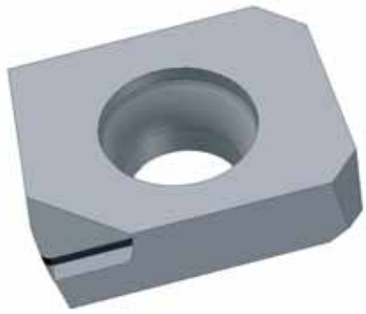


PCBN grades Polycrystalline Cubic Boron Nitride



XN..12T3.. PCD inserts for face milling

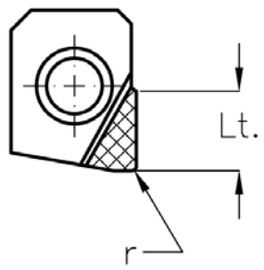




FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 025196 - ..	XNHW12T304FR1	1	3	0,4	S	57 66
260 - 025195 - ..	XNHW12T304TR1ML	1	3	0,4	SR	57 66
260 - 025483 - ..	XNHW12T308FR1	1	6	0,8	S	57 66
260 - 025484 - ..	XNHW12T308TR1ML	1	6	0,8	SR	57 66

Geometry: see page 44

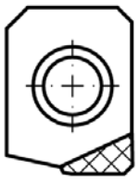
XN..12T3..PCD insert for 90° milling



FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 026660 - ..	XNHW12T304TR1ML	1	6	0,4	SLR 90°	— 66
260 - 024713 - ..	XNHT12T304TR1pos.ML	1	6	0,4	SLR 90°	57 66
260 - 025505 - ..	XNHW12T308TR1ML	1	6	0,8	SLR 90°	— 66
260 - 024535 - ..	XNHT12T308TR1pos.ML	1	6	0,8	SLR 90°	57 66
260 - 026562 - ..	XNHW12T304TR1ML	1	9	0,4	SLR 90°	— 66
260 - 025482 - ..	XNHT12T304TR1pos.ML	1	12	0,4	SLR 90°	57 66
Left hand inserts						
260 - 024704 - ..	XNHT-12T308TL1pos.ML	1	6	0,8	SLL 90°	— 66
260 - 025558 - ..	XNHW-12T308TL1ML	1	6	0,8	SLL 90°	— 66

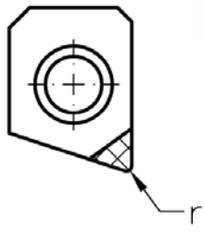
Geometry: see page 44

XN..12T3.. PCD insert wiper finishing



FIUDI CODE	Description	z	Geometry	Applications	Quality
260 - 024711 - ..	XNHT12T300TRXpos.	1	F	Face milling	53 -
260 - 024942 - ..	XNHW12T300TRXML	1	F	90° milling	53 -

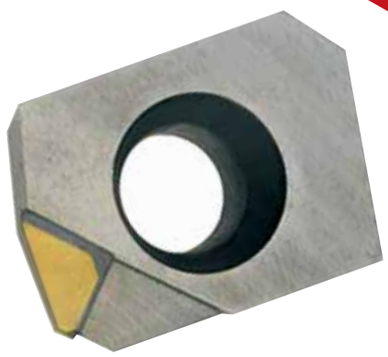
XN..12T3.. PCD insert reticulating finishing



FIUDI CODE	Description	z	r	Applications	Quality
260 - 025225 - ..	XNHW12T304FR1 ret	1	0,4	Reticulating finishing	53 -

Geometry: see page 44

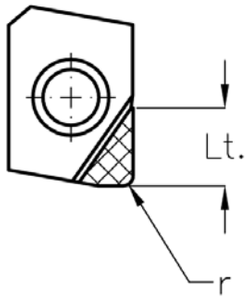
XN..12T3... Monocrystalline diamond high finishing insert

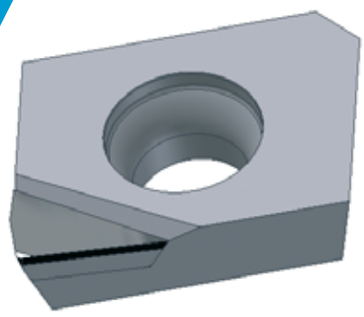


FIUDI CODE	Description	z	Geometry	Applications	Quality
555 - 025241 - ..	XNHW12T300 STAR	1	FE	Face milling	SY

Geometry: see page 44

XP..12T3.. PCD
insert for face milling

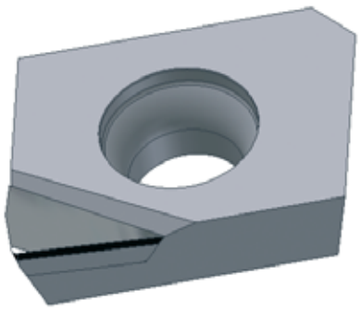


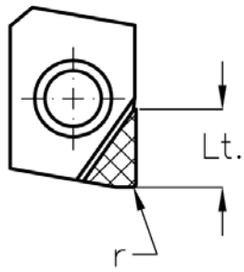


FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 024893 - ..	XPHW12T308FR1	1	6	0,8	S	57 66
260 - 024894 - ..	XPHW12T308TR1ML	1	6	0,8	SR	57 66
260 - 024895 - ..	XPHT12T308FR1pos.	1	6	0,8	SL	57 66
260 - 025021 - ..	XPHT12T308TR1pos.ML	1	6	0,8	SLR	57 66

Geometry: see page 44

XP..12T3.. PCD insert for 90° milling

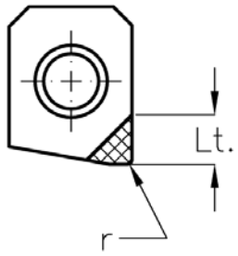




FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 024470 - ..	XPHT12T303TR1pos.ML	1	6	0,3	SLR 90°	57 66
260 - 024409 - ..	XPHT12T308TR1pos.ML	1	6	0,8	SLR 90°	57 66
260 - 024007 - ..	XPHT12T303TR1pos.ML	1	12	0,3	SLR 90°	57 66

Geometry: see page 44

XN..12T3.. CBN insert for 90° milling



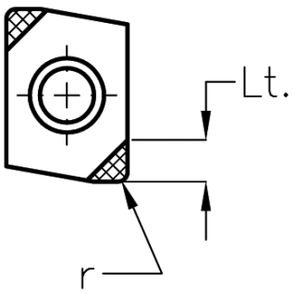
FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 024899 - ..	XNHW12T304SR1	1	3	0,4	SR 90°	09 11 44 72
260 - 026402 - ..	XNHW12T308SR1	1	6	0,8	SR 90°	09 - 44 72

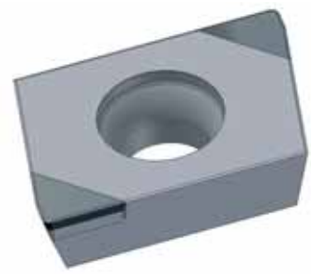
XN..12T3.. CBN insert wiper finishing

FIUDI CODE	Description	z	Geometry	Application	Quality
260 - 021898 - ..	XNHT12T300TRX pos.	1	F	Face milling	09 - 44 72
260 - 020692 - ..	XNHW12T300SRX	1	F	Face milling	09 - - 72

Geometry: see page 44

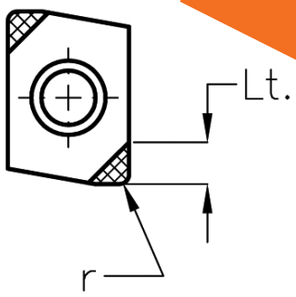
XP..12T3.. CBN insert for face milling





FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 024900 - ..	XPHW12T308SR2	2	3	0,8	SR	09 11 44 72
260 - 020688 - ..	XPHW12T308SR2	2	6	0,8	SR	09 11 44 72

XP..12T3.. CBN insert for 90° milling



FIUDI CODE	Description	z	Lt	r	Geometry	Quality
260 - 024881 - ..	XPHW12T304SR2	2	3	0,4	SR 90°	09 - 44 72
260 - 026401 - ..	XPHW12T308SR2	2	6	0,8	SR 90°	09 - 44 72

Geometry: see page 44

SPARE PARTS

F308

FIUDI CODE	Description	ø50	ø63
011-021569	Insert screw M3, 5x9 Torx T15	■	■
012-024778RIC	Clamping wedge 8x9,9x12,7	■	■
012-023446/4	Adjusting wedge Ø7x9	■	■
011-019872	Double threaded screw M5x16	■	■
011-023663	Double threaded screw M4x12	■	■

F445

FIUDI CODE	Description	ø63	ø63	ø80	ø80	ø100	ø125	ø160	ø200	ø250	ø315
011-021569	Insert screw M3, 5x9 Torx T15	■	■	■	■	■	■	■	■	■	■
012-020826RIC	Clamping wedge Ø12x14	■	■	■	■						
012-020802RIC	Clamping wedge Ø16x14					■	■	■	■	■	■
012-020450RIC	Adjusting wedge Ø10x14	■	■	■	■	■	■	■	■	■	■
011-020821	Double threaded screw M6x18	■	■	■	■	■					
011-020915	Double threaded screw M8x1x26						■	■	■	■	■
011-019872	Double threaded screw M5x16	■	■	■	■	■	■	■	■	■	■
012-020176RIC	Special central lock screw with coolant	■	■								
012-021112RIC	Special central lock screw with coolant			■	■						
012-020795RIC	Special central lock screw with coolant					■					
012-020786RIC	Special central lock screw with coolant						■				

F555

FIUDI CODE	Description	ø63	ø80	ø100	ø125	ø160	ø200	ø250	ø315
011-021741	Insert screw M3, 5x7,5 Torx T15	■	■	■	■	■	■	■	■
012-023446/4	Adjusting wedge Ø7x9	■	■	■	■	■	■	■	■
011-023663	Double threaded screw M4x12	■	■	■	■	■	■	■	■

F231 - 232

FIUDI CODE	Description	ø25	ø32
011-021741	Insert screw M3, 5x7,5 Torx T15	■	
011-021569	Insert screw M3,5x9 Torx T15		■

F241

FIUDI CODE	Description	ø40	ø40 reg.	ø50	ø50 reg.	ø63	ø63 reg.
011-021569	Insert screw M3,5x9 Torx T15	■	■	■	■	■	■
012-026578RIC	Torx 15 M3 adjusting screw		■		■		■
012-021110RIC	Special central lock screw with coolant	■	■	■	■	■	■

F242

FIUDI CODE	Description	ø40	ø40 reg.	ø50	ø50 reg.	ø63	ø63 reg.
011-021569	Insert screw M3,5x9 Torx T15	■	■	■	■	■	■
012-026578RIC	Torx 15 M3 adjusting screw		■		■		■
012-021110RIC	Mill clamp special screw with coolant	■	■	■	■	■	■

F252

FIUDI CODE	Description	ø40	ø40 reg.	ø50	ø50 reg.	ø63	ø63 reg.
011-021741	Insert screw M3,5x9 Torx T15	■	■	■	■	■	■
012-026578RIC	Torx 15 M3 adjusting screw		■		■		■
011-025248	Central lock screw TCEI M8x25	■	■				
012-021110RIC	Special central lock screw with coolant			■	■	■	■

Recommendations and suggestions on how to apply the correct cutting geometry

Initials	Instrucions for use
FE	Finishing without roughness of less than Ra 0,1. Mirror surface effect
F	Finishing with roughness less than Ra 0,4 combined with roughing inserts. Finishing without materials filling at the workpiece edge (burrs).
F 90°	Finishing with 90° shoulders combined with roughing inserts. Finishing without burrs.
S	General roughing Semi- finishing with roughness of more than Ra 0,4
SR	Type "S" roughing with reinforced cutting edge for: a) heavy-duty millings b) highly unstable work pieces c) highly interrupted cut d) high silicon content
SL	Roughing with very sharp cutting edge on long-chip materials. Roughing on low-power machines (30% less spindle power compared with geometry "s").
SLR	Type "SL" roughing with reinforced cutting edge for: a) heavy-duty millings b) highly unstable work pieces c) highly interrupted cut d) high silicon content
SL 90°	Roughing with very sharp cutting edge for 90° shoulders
SLR 90°	Type "SL90°" roughing with reinforced cutting edge for: a) heavy-duty removal b) highly unstable work pieces c) highly interrupted cut d) high silicon content
Ret.	To be used to carry out the screened finish on the sealing surfaces with synthetic or paper gaskets (e.g. engine carter parts).

MATERIALS

VDI 3323	Material	Rm N/mm²	Hardness	Examples
21 22	Aluminium forging alloys	60 100		Al 99,5 - AlMg 1 AlCuMg 1 - AlMgSiPb - AlMgSi 1
23 24 25	Aluminium casting alloys	75 90 130		G AlSi 10 Mg - G AlSi 12 G AlCu 5 Si 3 G AlSi 17 - G AlSi 23
26 27 28	Copper/copper alloys	110 90 100		Automatic bronze - CuNi18Zn19Pb Bronze - CuZn33 - CuSnZn Copper - Electrolytic Copper - CuNi3Si
29 30	Non-metals			Reinforced Plastic fiber Bakelite - Ebanite
31 32	Heat-resistant alloys		200 280	1.4864 - 1.4865 - 1.4876
33 34 35	Heat-resistant alloys		250 350 320	Inconel 718 - Nimonic 80 A Hastelloy - Udimet
36 37	Titanium, Ti alloys	400 1050		Titanium - Ti6Al4V
15 16	Grey cast iron		180 230	GG10 - GG15 - GG170 HB GG20 - GG25 - GG30 - GG25 Cr
17 18	Malleable cast iron		160 250	GGG35.3 - GGG40 - GGG50 - GGV30 GGG60 e > - GGV40
38.1	Hardened steel		45 HRC	90Mn V8 - Hardox 400
38.2	Hardened steel		55 HRC	Hardox 500
39.1 39.2	Hardened steel		60 HRC > 62 HRC	HSS - 90 Mn V8
40.1	Chill casting		400 > 440	GX 260Cr27 - GX260NiCr42 - GX 300CrNiSi9 5 2
40.2	Chill casting		400 > 440	GX 330Ni Cr 42
41.1 41.2	Hardened cast iron		55 HRC > 57 HRC	GX 300 - NiMo 3 Mg

Glossary and basic formulae

Symbol	Unit	Definition
n	rpm	Spindle revolution speed
ae	mm	Width of cut
ap	mm	Axial depth of cut
e	mm	Tool extra-stroke
ø	mm	Tool diameter
fn	mm / giro	Feed per revolution
fz	mm / z	Feed per blade
c	mm	Stroke
Q	cm^3 / min	Metal removal rate
tc	min	Single pass cutting time
tp	min	Single pass total time
vc	m / min	Cutting speed
f	mm / min	Feed

$$n = \frac{vc \cdot 1.000}{\pi \cdot ø}$$

$$vc = \frac{\pi \cdot n \cdot ø}{1.000}$$

$$f = n \cdot fz \cdot z$$

$$tc = \frac{c}{n \cdot z \cdot fz} = \frac{c}{f}$$

$$tp = \frac{c+e+ø}{n \cdot z \cdot fz} = \frac{c+e+ø}{f}$$

$$Q = \frac{ap \cdot ae \cdot f}{1.000}$$

Trial module request

Customer	Date
Code	Agent

Contact for technical details

Name	Tel.
e-mail	Fax

Machining center

MTB	Model				CNC	❑ Yes	❑ No
Coolant		Ext.	❑ Si	❑ No	Int.	❑ Yes	❑ No

Machining part

Part nr.	Material ref.	Roughness Ra	
Treatment	Hardness	Roughness Wt	
Machining op.	❑ Super-finish milling	❑ Face milling	❑ 90° milling

Tool

Tool builder		Tool ref.	
Diameter	Roughing inserts q.ty	Finishing inserts q.ty	
❑ Indexable mill	❑ Tipped tool	❑ Ajustable	❑ Not-ajustable
❑ Steel body	❑ Carbide body	❑ PCD/PCBN cutting edge	❑ Caride cutting edge

Tool-attachment

❑ Machine shank	❑ Special				
❑ Cylindrical DIN 6535 HA	❑ Whistle-Notch DIN 6535HE	❑ Weldon DIN 6535 HB	❑ Shell Mill	Dimension:	____

Inserts

Tool builder	TB rough inserts ref.
Tool builder	TB finish inserts ref.
Notes	

FIUDI code for trials

Item	Ref.	Description	Quality

Cutting parameters

Tool diameter	ø	mm
Spindle revolution speed	n	rpm
Feed per blade	fz	mm / z
Feed	f	mm / min
Width of cut	ap	mm
Axial depth of cut	ae	mm
Roughness	Ra	µm
Stroke	c	mm
Tool lifetime		n°

Machining issues ?	❑ Yes	❑ No	Which?	

Notes