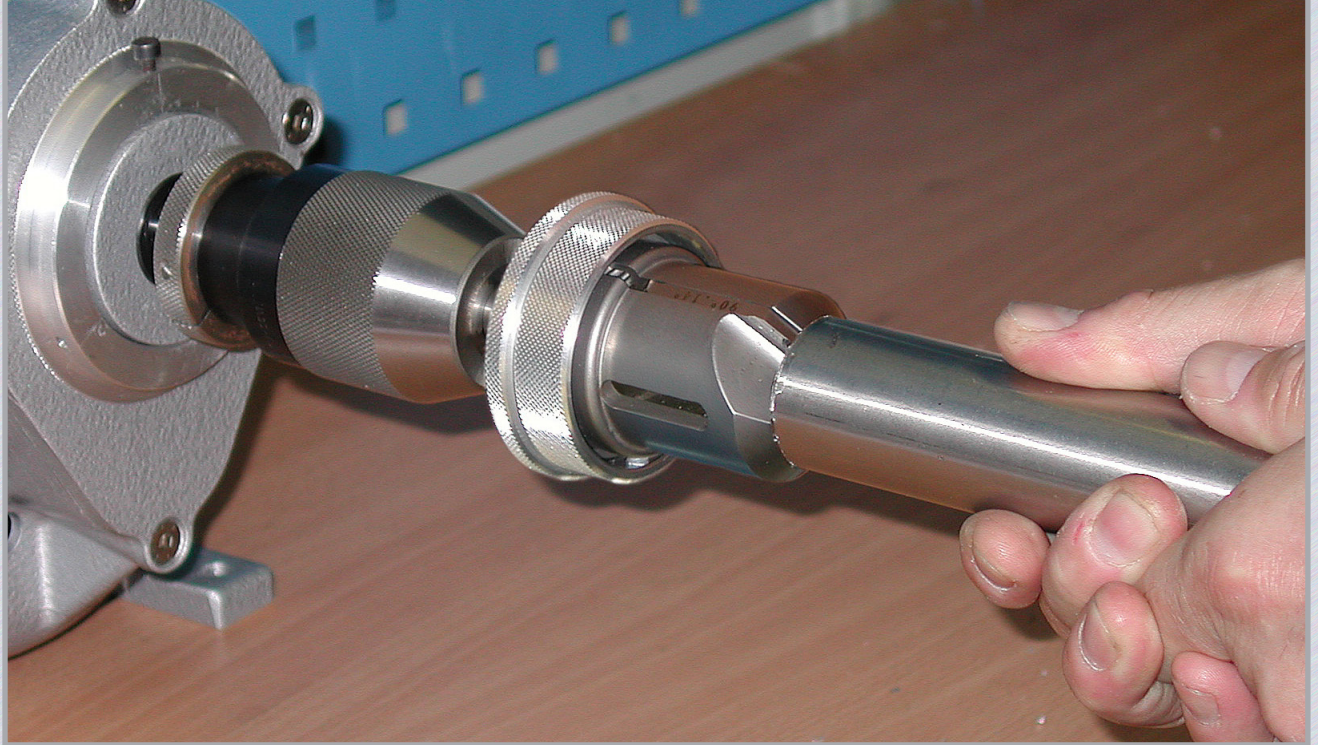
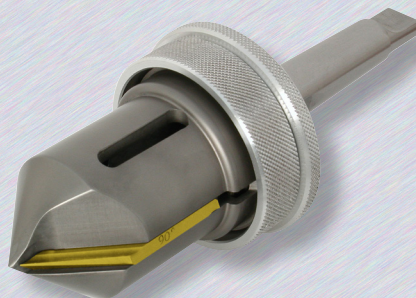
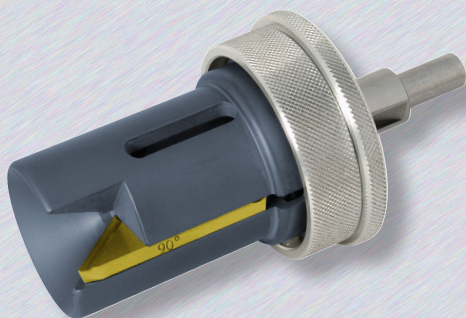




KOPAL[®]

Chamfering



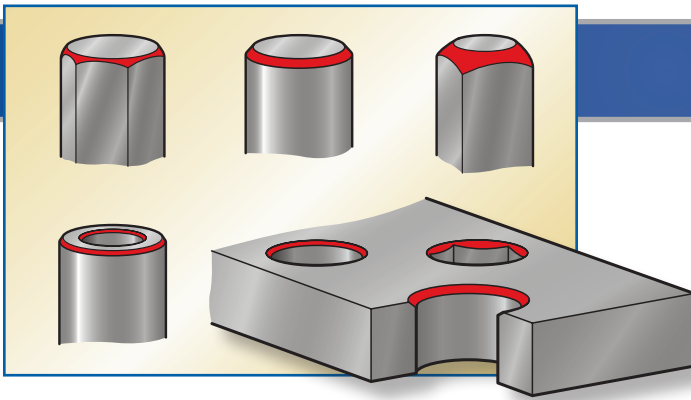
KOPAL DEVICES

Presentation
Inner devices
Inner devices Slim Line
Outer devices
Devices for Tubes (Inner and Outer)
Spare parts
Cutting blades

Principle

Chamfering devices mainly for drills

Système KOPAL ®

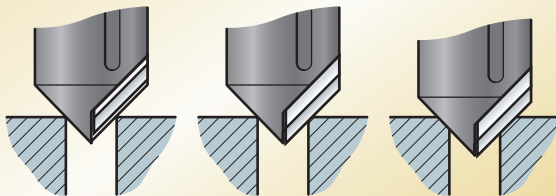


- Concentric chamfer
- Excellent surface quality
- No risk of cutting into the workpiece
- Controlled machining torque

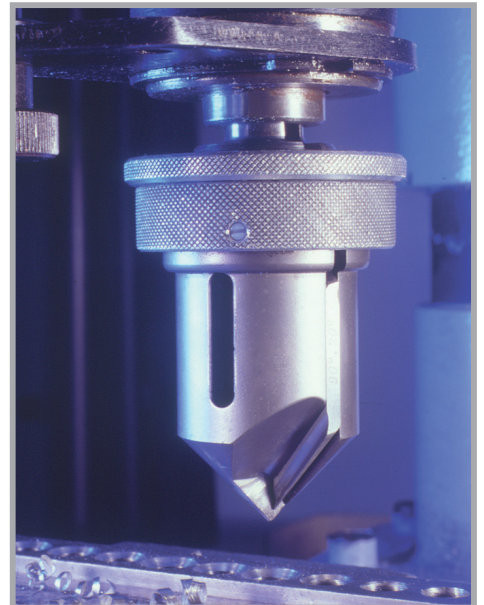
This device works as a carpenter's plane.

The output adjusting of the blade controls the thickness of the chip and not the value of the chamfer.

*Ex. : blade output of 0.1 mm
the device will make 10 turns
for cut 1 mm.*



When the spindle is lowered, the pilot cone centres the workpiece, retracts and allows the blade to come out.



- **Devices with standard treatment of pilot and HSS blade**

Suitable to most usual materials and small series.



- **Devices with standard treatment of pilot and TIN coating HSS blade**

Suitable to materials difficult to machine. Stainless steel, Inconel, Titanium and small series.



- **Devices with CRN treatment of pilot and TIN coating HSS blade**

Suitable to materials difficult to machine. Stainless steel, Inconel, Titanium and important series.

Recommended cutting speed

between 10 and 20 m/min.

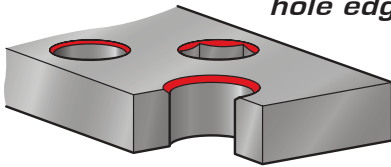
exemple : Ø 10 mm	320 to 640 rpm
Ø 15 mm	210 to 420 rpm
Ø 20 mm	160 to 320 rpm
Ø 30 mm	110 to 220 rpm
Ø 40 mm	80 to 160 rpm
Ø 60 mm	55 to 110 rpm

$$Rpm = \frac{\text{cutting speed} \times 1000}{\text{Diameter} \times 3.14}$$

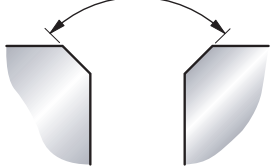
Lubricate with cutting fluid or soluble oil to ensure long life for the blade's cutting edge and slow down erosion of the pilot cone.

Inner Devices

Chamfers any cylindrical, polygonal, or interrupted hole edges at 90°.



60°, 82°, 90° and 120°



Inner Devices

Without cutting blade ⚠

Hole diameter to chamfer	Model	Attach.	A	B	C 60°/90°	Type of cone pilot					
						Standard	CRN		Standard		
						60° Ref.	90° Ref.	60° Ref.	90° Ref.	82° Ref.	120° Ref.
4 to 17	2 - 18	Ø 10 MK 1	Ø 18	Ø 26	64/55	01-030 01-035	01-010 01-015	1W030B 1W035B	1W010B 1W015B	01-050	01-080
5 to 41	2 - 42	Ø 10/16	Ø 42	Ø 65	108/85	01-120	01-095	1W120B	1W095B	01-150	01-191
		Ø 12.7				01-125	01-100	1W125B	1W100B		
		MK 1				01-115	01-090	1W115B	1W090B		
		MK 2				01-116	01-091	1W116B	1W091B		
		MK 3				01-117	01-092	1W117B	1W092B		
		weldon Ø19					01-093				
21 to 59	20 - 60	MK 2	Ø 60	Ø 70	106/94	01-215	01-210				
42 to 77	40 - 80	MK 2	Ø 80	Ø 90	114/100	01-230	01-225				
		MK 3				01-231	01-226				
62 to 97	60 - 100	MK 3	Ø 100	Ø 110	104		01-241				
82 to 117	80 - 120	MK 3	Ø 120	Ø 130	104		01-256				

HSS blades

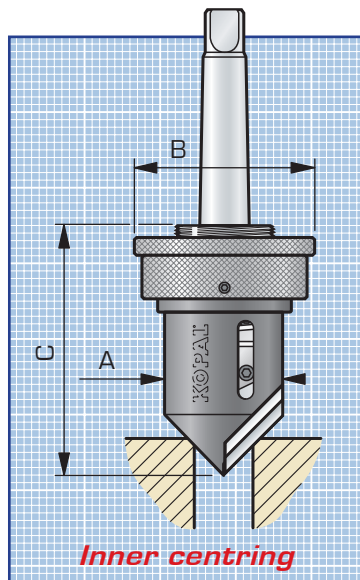
0°, 14°, 20° and 25° cutting angle

TIN coating HSS blades

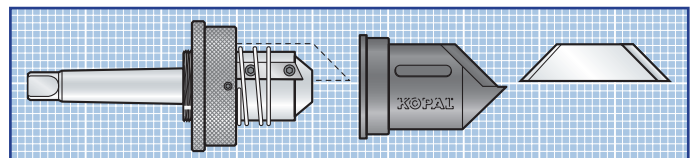
20° cutting angle

Carbide blade

0° cutting angle

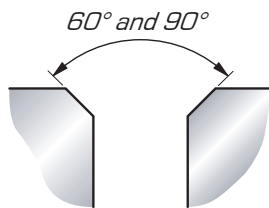
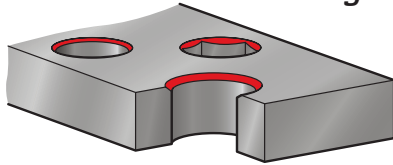


Inner compact devices available



Inner compact Devices

Chamfers any cylindrical, polygonal, or interrupted hole edges at 90°.



SLIM LINE
compact devices



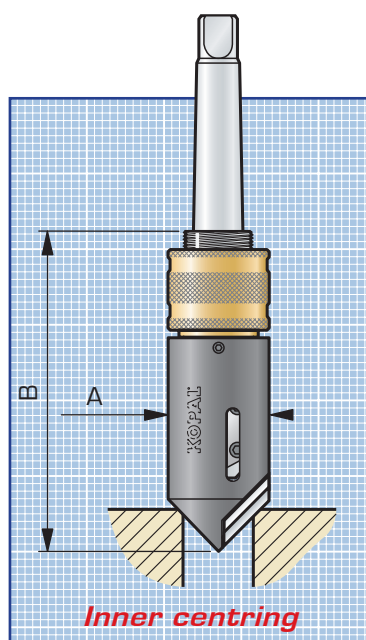
Inner Devices - SLIM LINE

Without cutting blade ⚠

Hole diameter to chamfer	Model	Attach.	A	B 60°/90°
4 to 17	2 - 18	Ø 10 6 WS 6.35	Ø 19.5	78/68
11 to 30	10 - 30	MK 1 MK 2 Ø 12	Ø 32	112/100
5 to 40	4 - 42	MK 2 Weldon Ø 20 Ø 12.7	Ø 44	135

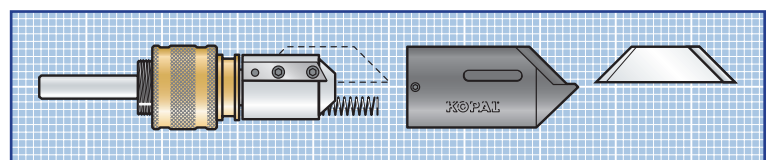
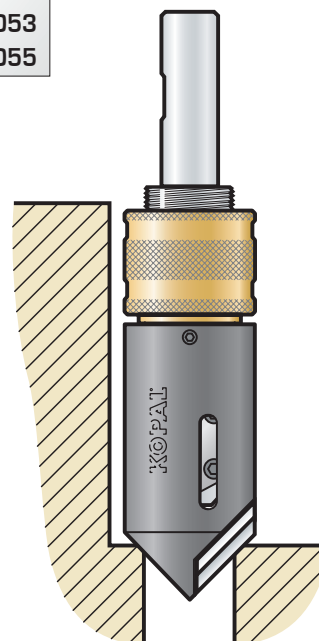
Standard

60° Ref.	90° Ref.
03-015	03-010 03-011
03-035	03-020
03-036	03-021
03-040	03-025
	03-051
	03-053
	03-055



HSS blades
0°, 14°, 20° and
25° cutting angle

Carbide blade
0° cutting angle

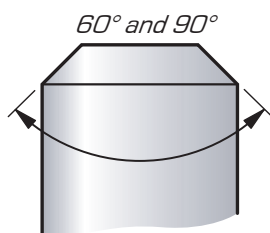
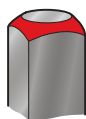
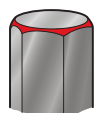


Outer Devices

Chanfreint toutes extrémités

de tubes et de barres cylindriques

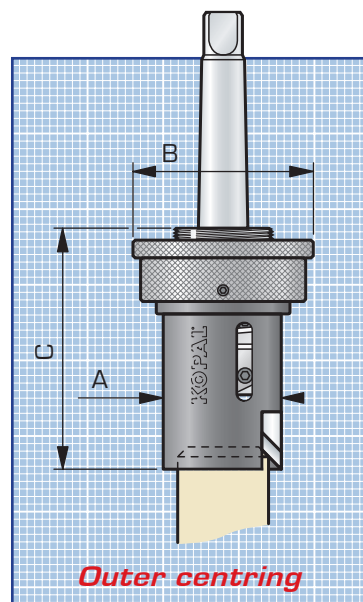
ou polygonales



Outer Devices

Without cutting blade ⚠

Diameter to chamfer	Model	Attach.	A	B	C 60°/90°	Type of cone pilot			
						Standard		CRN	
						60° Ref.	90° Ref.	60° Ref.	90° Ref.
4 to 17	2 - 18	Ø 10 MK 1	Ø 18	Ø 26	54	02-020	02-010	2W020B	2W010B
						02-025	02-015	2W025B	2W015B
4 to 37	2 - 36	Ø 10/16 MK 2	Ø 42	Ø 65	105/85	02-055	02-035	2W055B	2W035B
						02-050	02-030	2W050B	2W030B
10 to 45	10 - 46	Ø 10/16 MK 2	Ø 48	Ø 65	109/85	02-110	02-095		
						02-105	02-090		
21 to 57	20 - 60	MK 2	Ø 60	Ø 70	108/85	02-140	02-135		
41 to 77	40 - 80	MK 2 MK 3	Ø 80	Ø 90	118/95	02-155	02-150		
						02-156	02-151		
60 to 97	60 - 100	MK 3	Ø 100	Ø 110	107		02-166		
80 to 117	80 - 120	MK 3	Ø 120	Ø 130	110		02-181		



HSS blades

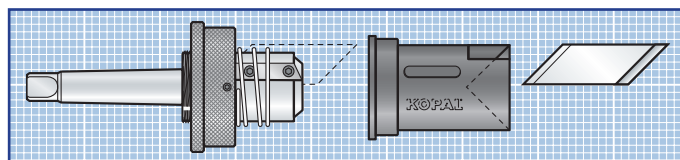
0°, 14°, 20° and 25° cutting angle

TIN coating HSS blades

20° cutting angle

Carbide blade

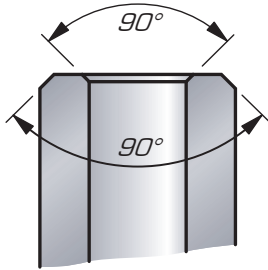
0° cutting angle



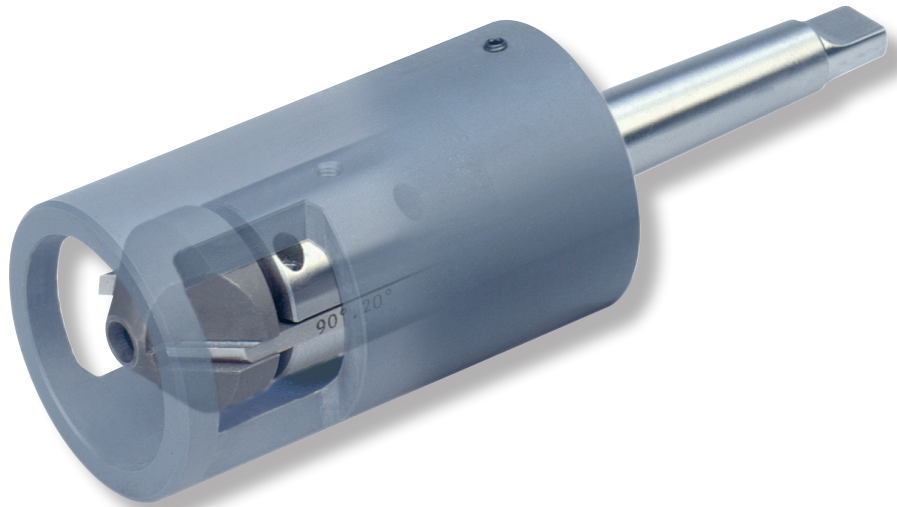
Inner / Outer Devices

Simultaneously chamfers

the **Inside and Outside**
of tube ends



KOPAL TUBE



KOPAL TUBE Devices

Without cutting blade ⚠

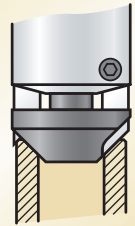
Standard pilot

Tube diameter Inner	Outer	Model	Attach.	A	B	90° Ref.
12 to 24	14 to 24	K 1	Ø 12.7 CM 2	Ø 46	90	04-060 04-050
15 to 27	18 to 30	K 2	Ø 12.7 CM 2	Ø 58	105	04-080 04-070
20 to 30	24 to 36	K 3	Ø 12.7 CM 2	Ø 61	110	04-100 04-090
29 to 40	34 to 45	K 4	Ø 12.7 CM 2	Ø 67	112	04-120 04-110
40 to 48	46 to 56	K 5	Ø 12.7 CM 2	Ø 82	120	04-140 04-130

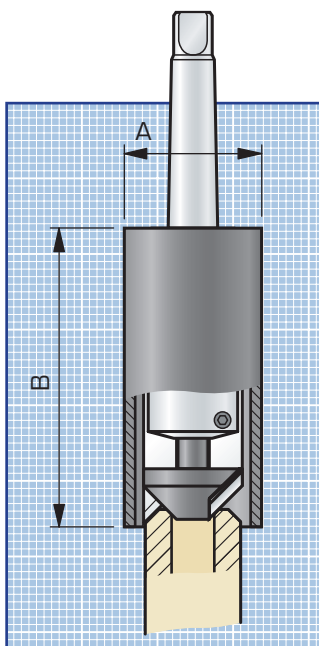
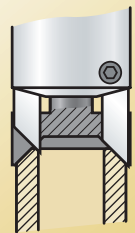
Use

These units are supplied with 2 removable pilot cones

Larger inner chamfer than outer chamfer.
Use the inner cone to centre the workpiece.



Larger outer chamfer than inner chamfer.
Use the outer cone to centre the workpiece.

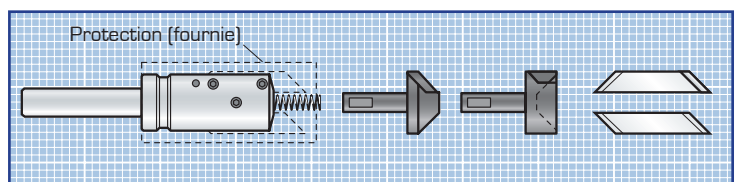


HSS Blades
14° and 20° cutting angles



The blades can be adjusted independently so **the chamfers can therefore have different values.**

The HSS blades are sharpened with cutting angles of: 14° and 20°, to be specified on ordering.



Spare Parts

Pilot for Inner device

	Ref.
2-18 90°	01-510
2-18 60°	01-520
2-18 82°	01-530
2-42 90°	01-550
2-42 60°	01-555
2-42 82°	01-560
2-42 120°	01-570
20-60 90°	01-575
20-60 60°	01-580
40-80 90°	01-590
40-80 60°	01-595
60-100 90°	01-605
80-120 90°	01-620

for Inner device Slim Line

3-19 90°	03-510
3-19 60°	03-515
10-30 90°	03-520
10-30 60°	03-525
4-42 90°	03-530

for Outer device

2-18 90°	02-510
2-18 60°	02-515
2-36 90°	02-520
2-36 60°	02-525
10-46 90°	02-535
10-46 60°	02-540
20-60 90°	02-550
20-60 60°	02-555
40-80 90°	02-565
40-80 60°	02-570
60-100 90°	02-580
80-120 90°	02-595

Nut for Inner and Outer device

	Ref.
2-18	01-750
2-42	01-760
20-60	01-770
40-80	01-775
60-100	01-780
80-120	01-785

for Inner Slim Line

3-19	03-610
10-30	03-615
4-42	03-620

Lock nut for Inner and Outer device

2-18	01-755
2-42	01-765
20-60	

for Inner Slim Line

3-19	03-611
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Spring for Inner and Outer device

2-18	01-820
2-42	01-825
20-60	01-830
40-80	01-835
60-100	01-837

for Inner Slim Line

4-42	03-645
10-30	03-640

Body for Inner device

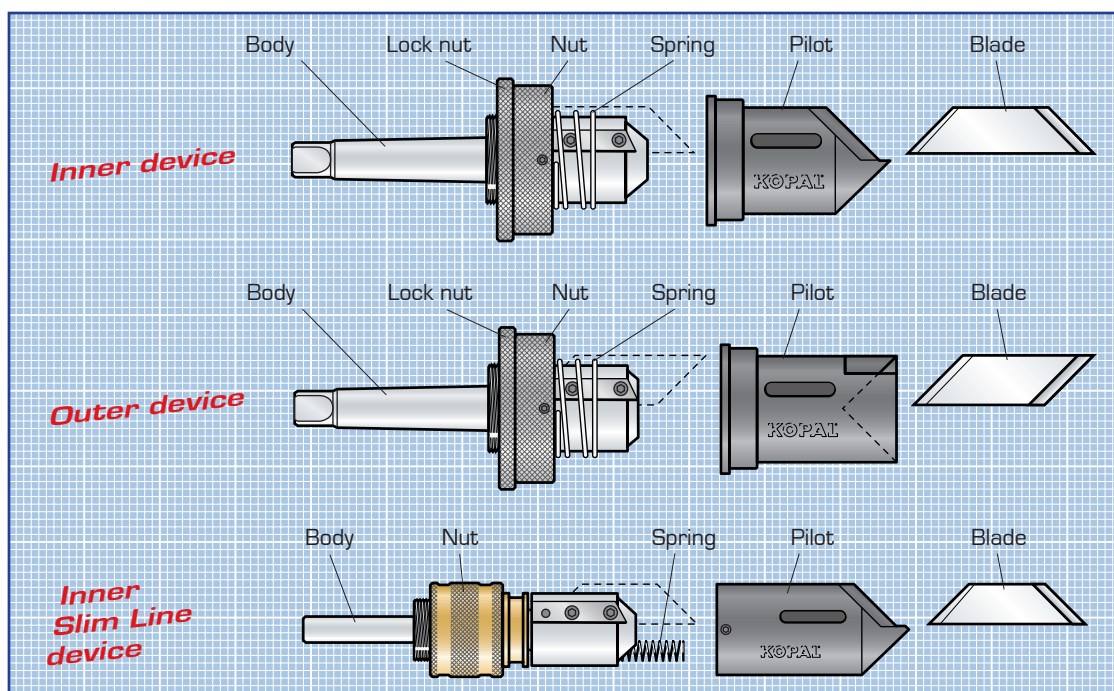
	Ref.
2-18 90° Attach. Cyl.	01-630
2-18 90° Attach. CM 1	01-635
2-18 60° Attach. Cyl.	01-640
2-18 60° Attach. CM 1	01-645
2-42 90° Attach. CM 1	01-650
2-42 90° Attach. CM 2	01-651
2-42 90° Attach. CM 3	01-652
2-42 90° Attach. Ø 10-16	01-655
2-42 90° Attach. Ø 12,7	01-660
2-42 60° Attach. CM 2	01-676
2-42 60° Attach. CM 3	01-677
2-42 60° Attach. Ø 12,7	01-685
20-60 90° Attach. CM 2	01-690
20-60 60° Attach. CM 2	01-695

for Inner device Slim Line

3-19 90°	
3-19 60° Attach. Ø 10	03-555
10-30 90°	
10-30 60° Attach. CM 2	03-561
4-42 90° Attach. CM 2	03-576

for Outer device

2-36 90° Attach. CM 2	02-610
2-36 90° Attach. Ø 10-16	02-615
10-46 90° Attach. CM 2	02-630
10-46 90° Attach. Ø 10-16	02-635
10-46 90° Attach. Ø 12,7	02-640
20-60 90° Attach. CM 2	02-645



Cutting blades

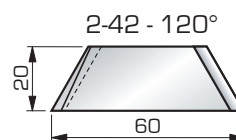
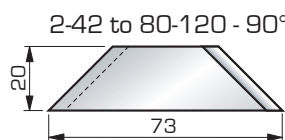
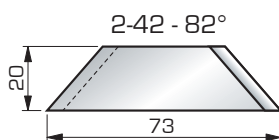
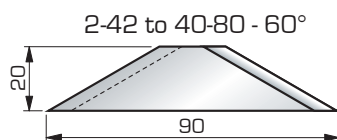
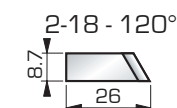
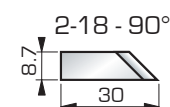
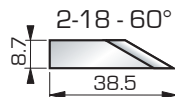
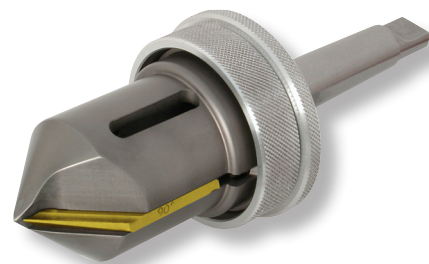
Blade for inner chamfering device

0° cutting angle for devices :	Ch.60°	Ch.90°	Ch.82°	Ch.120°	Ch.60°	Ch.90°
	HSS				Carbide	
2 - 18	01-303	01-323		01-334		
2 - 42	01-343	01-353	01-336	01-364		
20 - 60 to 80 - 120	01-363	01-373			01-341	01-351

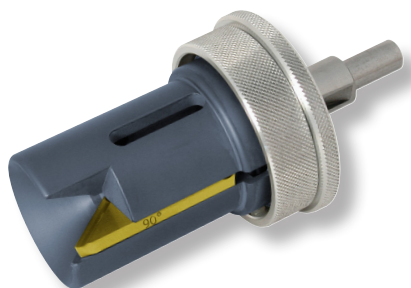
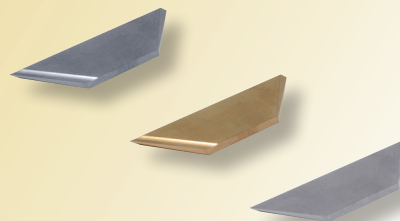
14° cutting angle for devices :	Ch.60°	Ch.90°	Ch.82°	Ch.120°
	HSS			
2 - 18	01-305	01-320		01-335
2 - 42	01-340	01-350	01-345	01-360
20 - 60 to 80 - 120	01-365	01-370		

20° cutting angle for devices :	Ch.60°	Ch.90°	Ch.82°	Ch.120°	Ch.60°	Ch.90°
	HSS				TIN	
2 - 18	01-308	01-328		01-338	1T305B	1T320B
2 - 42	01-348	01-358	01-342	01-368	1T340B	1T350B
20 - 60 to 80 - 120	01-368	01-378				

25° cutting angle for devices :	Ch.60°	Ch.90°	Ch.82°	Ch.120°
	HSS			
2 - 18	01-309	01-329		01-339
2 - 42	01-349	01-359	01-344	01-369
20 - 60 to 80 - 120	01-369	01-379		



- **HSS blade - 0° to 25°**
for most usual materials
- **TIN coating HSS blade - 20°**
for materials difficult to machine :
Stainless steel, Inconel, Titanium
- **Carbide blade - 0°**
for hard materials



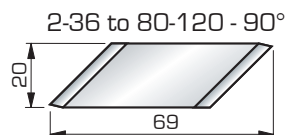
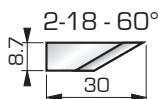
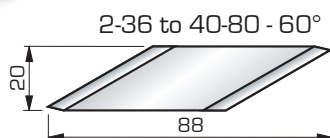
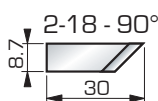
Blade for outer chamfering device

0° cutting angle for devices :	Ch.60°	Ch.90°
	HSS	
2 - 18	02-303	02-304
2 - 36 to 20 - 120	02-317	02-312

14° cutting angle for devices :	Ch.60°	Ch.90°
	HSS	
2 - 18	02-305	02-300
2 - 36 to 20 - 120	02-315	02-310

20° cutting angle for devices :	Ch.60°	Ch.90°	Ch.60°	Ch.90°
	HSS		TIN	
2 - 18	02-308	02-302	2T305B	2T300B
2 - 36 to 20 - 120	02-318	02-313	2T315B	2T310B

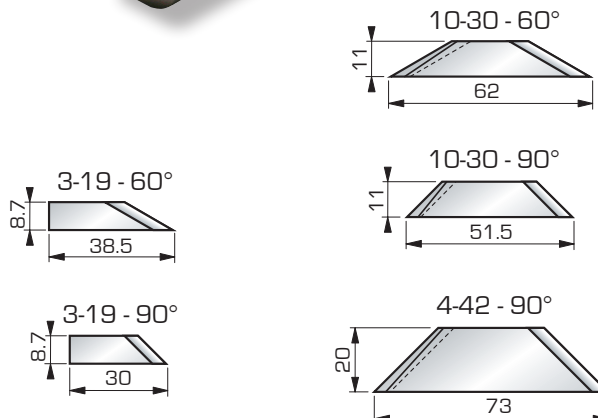
25° cutting angle for devices :	Ch.60°	Ch.90°
	HSS	
2 - 18	02-307	02-306
2 - 36 to 20 - 120	02-319	02-314



Cutting blades

Blade for inner chamfering device *Slim Line*

0° cutting angle for devices :	Ch.60° HSS	Ch.90° HSS	Ch.90° Carbide
3 - 19	03-312	03-322	
10 - 30	03-302	03-321	
4 - 42		03-352	01-351
14° cutting angle for devices :	Ch.60° HSS	Ch.90° HSS	
3 - 19	03-310	03-320	
10 - 30	03-305	03-300	
4 - 42		03-350	
20° cutting angle for devices :	Ch.60° HSS	Ch.90° HSS	
3 - 19	03-313	03-323	
10 - 30	03-308	03-328	
4 - 42		03-358	
25° cutting angle for devices :	Ch.60° HSS	Ch.90° HSS	
3 - 19	03-314	03-324	
10 - 30	03-309	03-329	
4 - 42		03-359	



This device works as a carpenter's plane.

The output adjusting of the blade controls the thickness of the chip and not the value of the chamfer.

*Ex. : blade output of 0.1 mm
the device will make 10 turns
for cut 1 mm.*

Recommended cutting speed between 10 and 20 m/min.

example : Ø 10 mm	320 to 640 rpm
Ø 15 mm	210 to 420 rpm
Ø 20 mm	160 to 320 rpm
Ø 30 mm	110 to 220 rpm
Ø 40 mm	80 to 160 rpm
Ø 60 mm	55 to 110 rpm

$$Rpm = \frac{\text{cutting speed} \times 1000}{\text{Diameter} \times 3.14}$$

Blade for KOPAL Tube

14° cutting angle for devices :	Inner HSS	Outer HSS
K 1	04-300	04-310
K 2 to K 5s	04-320	04-330
20° cutting angle for device :	Inner HSS	Outer HSS
K 1	04-303	04-313
K 2 to K 5	04-323	04-333

Material	Brass Bronze Cast iron Heat-resistant stainless steel	Steel Special bronze Perspex	Soft steel Copper AU 4 G Plastic Stainless steel	Aluminium Soft iron Sheet metal
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Cutting angle	0° HSS Carbure	14° HSS	20° HSS	25° HSS
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