GROUND PRECISION COMPONENTS

GROUND PRECISION COMPONENTS

FIBRO Precision Components cover a very wide range of materials, shapes and sizes and thus permit virtually unrestricted selection even to highly individual requirements.

At Hassmersheim and also abroad, stock levels of Precision Components reach seven-digit figures. It is therefore quite likely that your particular choice will be available for immediate delivery. Should this not be the case then our flexible batch production schedules will ensure that delays are kept to a minimum.

Batch production in our interpretation not only spells prompt delivery but also exceptional quality. Starting with the arrival inspection of raw materials, every single manufacturing operation on FIBRO Precision Components is followed by a quality check. Lastly, an uncompromising final inspection of each and every part guarantees that the trade mark FIBRO is and remains synonymous with Quality.

In view of the fact that a large portion of the Precision Components programme consists of punches and matrices, the importance of alignment in the operational die must be emphasized. Unless this requirement can be met to a high degree of accuracy, even the finest efforts in design and in the toolroom must fail!

Die alignment ultimately depends on the guides – FIBRO Die Sets and Guide Elements were developed and are made with this postulate in mind.
Tool life, production cost and work quality are to a large extent a function of tooling material selection versus strip stock characteristics and ancillary process conditions. A judicious choice from the wide range of materials for our punches and matrices will be facilitated by the orientation guide in this catalogue. Listing the principal characteristics of each material together with selection criteria, it is intended to help customers make the right choice.

Our experienced tooling specialists will assist you with further detailed information.

In keeping with the basic tenet of our firm, every effort is made to ensure that design, performance potential and quality of FIBRO Precision Components keep well abreast with latest technological developments.

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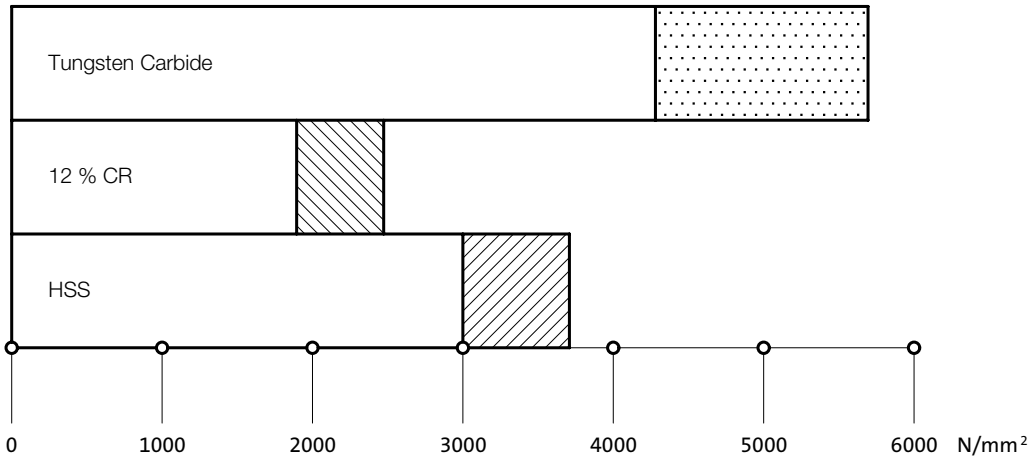
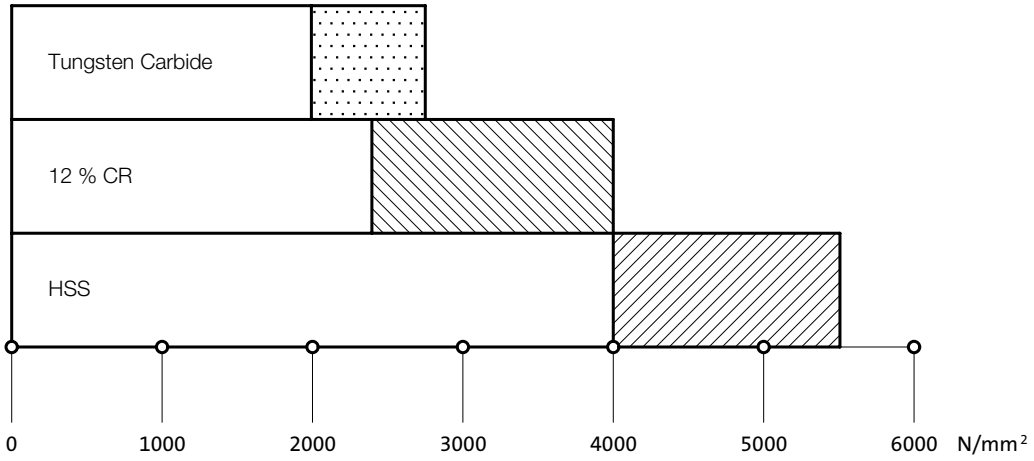
COMPARATIVE GRAPHS

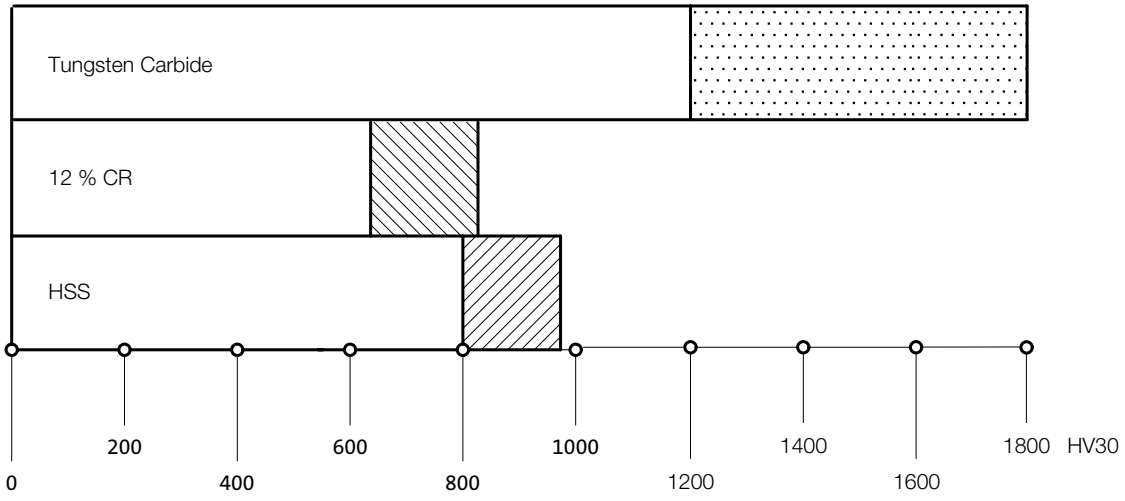
Compressive strength (0,2 proof stress)



Flexural strength



Hardness Vickers



PRECISION PARTS - MATERIAL DESCRIPTION

WS = **alloyed tool steel**

Material No 1.2210, 1.2516, 1.2842 or similar.

Characteristics: Hard and tough tool steel, medium wear resistance.

Application area: Piercing/blanking dies for mild steel, low carbon steels, non-ferrous metals, plastics, paper.

WS = material code = "1"

e.g. Order no. = 239.1. ...

HWS = **High Carbon – High Chrome Tool Steel (12% Cr)**

Material No 1.2436, 1.2379 or similar.

Characteristics: High resistance to wear.

Application area: Piercing/blanking dies of all types, trim dies, for all carbon steels, alloy steels, non-ferrous metals, plastics, paper.

HWS = material code = "2"

e.g. Order no. = 260.2. ...

HSS = **High Speed Steel**

Material No 1.3343 or similar.

Characteristics: High resistance to wear.

Application area: Piercing/blanking dies of all types – for tough materials e.g. spring steel, lamination steels, and abrasive papers as well as plastice.

HSS = material code = "3"

e.g. Order no. = 220.3. ...

ASP 23 = **High Speed Steel on Powder-Metallurgic Basis**

ASP 2023

Characteristics: High resistance to wear. Greater strength than HSS due to excellent homogenity of the material.

Application area: Same as HSS.

ASP 23

ASP 2023= material code = "6"

e.g. Order no. = 223.6. ...

HST = **High Speed Steel, Nitrided**

Characteristics: High wear-resistance, reduced tendency for cold welding.
The nitrogen nitrides diffused in during the nitriding treatment give the tool part even greater wear resistance and the best possible protection against cold welding.

Application area: Piercing/blanking dies of all types – for very hard and abrasive materials.

HST = material code = "4"

e.g. Order no. = 223.4. ...

PRECISION PARTS - MATERIAL DESCRIPTION

HZ = **Hard-coated Tooling Components for High-Performance**

HZC Composite Vapour Deposition (CVD) TIC-TIN Coating

Carrier materials: High-speed steels Material no. 1.3207, 1.3343, etc.
Cold steels Material no. 1.2379, 1.2436, etc.
Due to the risk of distortion, a coating should not be applied to thin tools with a streamlined size of l/d = 20:1. In addition, we cannot accept any liability for distortion for any other parts.

Characteristics: The titanium carbide substrate provides a pressure-resistant bond with the carrier metal, while the outer layer of titanium nitride offers the well-known advantages of optimum tribologic behaviour in contact with the stamping stock.
By virtue of its outstanding wear resistance, the TIN-layer largely eliminates seizing and cold welding problems in stamping.
Surface hardness approx. 3500 HV 0.05
Layer thickness approx. 5 - 8 µm.

Application area: All tooling components subject to high demands on wear resistance and performance, especially punches in progression/combination tools, as well as cold extrusion punches etc.

TIC-TIN = material code number = "5"

e.g. Order no. = 223.5. ...

HZN PVD titanium nitride TIN

Carrier materials: The TIN-coating offers excellent frictional characteristics but its compressive strength remains inferior to TIC-TIN deposits.
Option for partial coating.
Surface hardness approx. 2300 HV 0.05
Layer thickness 2 - 4 µm; < ø 2.0 = 1.5 µm ± 20 %
HSS Material No 1.3207 and 1.3343 etc.
HCHC Material No 1.2379
Other HCHC-steels are of conditional suitability.

Characteristics: The TIN-coating offers excellent frictional characteristics but its compressive strength remains inferior to TIC-TIN deposits.
Option for partial coating.
Surface hardness approx. 2300 HV 0.05
Layer thickness 2 - 4 µm; < ø 2.0 = 1.5 µm ± 20 %

Application area: Tooling for thin stamping stock such as cold rolled spring steel, zinc-galvanized sheet and strip, copper-beryllium bronze, German silver, and solenoid lamination steels.
Note that the ratio stock thickness to punch point diameter should not exceed 1:3.

TIN = material code number = "0"

e.g. Order no. = 223.0. ...

HM = **Tungsten Carbide**

Characteristics: Hard-sintered carbide on WC-basis and of recognized properties; produced by powder-metallurgic processes, FIBRO's exclusively used HIP-densified carbide exhibits much enhanced flexural strength and reduced residual porosity.

Application area: Die components for highest performance and very large stamping volumes – for altogether ultimate demands on tool life.

HM = material code = "9"

e.g. Order no. = 270.9. ...

NWA = **Nitrided hot-work tool steel**

Material No 1.2344 or similar.

Characteristics: Chrome-Molybdenum-Vanadium hot working die steel; core strength: > 1400 N/mm2; temperature resistant up to 650 °C; surface hardness (nitrided) ≥ 950 HV 0.3.

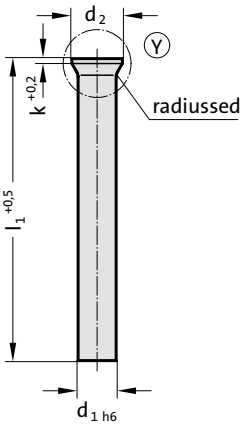
Application area: Ejector for die casting and injection moulds.

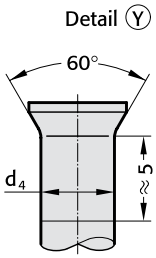
NWA = material code number = "8"

e.g. Order no. = 237.8. ...

PUNCH DIN 9861 SHAPE DA

222.





222. Punch DIN 9861 Shape DA

	Gradation						
d_1	d_1	d_2	k	l_1	71	80	100
0,5	0.05	0.9	0.2		●	●	●
0,55	0.05	1	0.2		●	●	●
0,6	0.05	1.1	0.2		●	●	●
0,65	0.05	1.2	0.2		●	●	●
0,7	0.05	1.3	0.2		●	●	●
0,8	0.05	1.4	0.4		●	●	●
0,9	0.05	1.6	0.4		●	●	●
1	0.1	1.8	0.5		●	●	●
1,2	0.1	2	0.5		●	●	●
1,4	0.1	2.2	0.5		●	●	●
1,6	0.1	2.5	0.5		●	●	●
1,8	0.1	2.8	0.5		●	●	●
2	0.1	3	0.5		●	●	●
2,1	0.1	3.2	0.5		●	●	●
2,3	0.1	3.5	0.5		●	●	●
2,6	0.1	4	0.5		●	●	●
3	0.1	4.5	0.5		●	●	●
3,5	0.1	5	0.5		●	●	●
4	0.1	5.5	0.5		●	●	●
4,5	0.1	6	0.5		●	●	●
5	0.1	6.5	0.5		●	●	●
5,5	0.1	7	0.5		●	●	●
6	0.1	8	0.5		●	●	●
6,5	0.5	9	1		●	●	●
7,5	0.5	10	1		●	●	●
8,5	0.5	11	1		●	●	●
9,5	0.5	12	1		●	●	●
10,5	0.5	13	1		●	●	●
11,5	0.5	14	1		●	●	●
12,5	0.5	15	1		●	●	●
13,5	0.5	16	1.5		●	●	●
14,5	0.5	17	1.5		●	●	●
15,5	0.5	18	1.5		●	●	●

Material:

HSS
Order No 222.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 222.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 222.0.
Hardness:
Surface 2300 HV 0,05
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shaft precision ground. Head hot upset-forged and tempered. Residual upset bulge below head normally much smaller than permissible acc. to DIN 9861.

d_4: For $d_1 < 1$ mm, $d_4 = d_1 + 0{,}02$
For $d_1 \geq 1$ mm, $d_4 = d_1 + 0{,}03$

Stock lenghts: 71, 80, 100 mm.
other lengths and diameters on request!

Note:

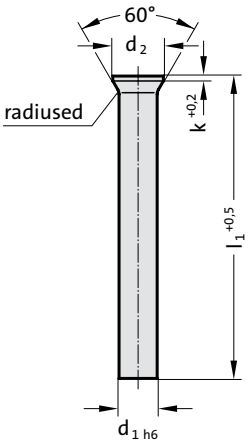
Punches are also available without head

Ordering Code (example):

Punch DIN 9861 Shape DA		=	222.
Material MAT	HSS	=	3.
Shaft diameter d_1	3 mm	=	0300.
Length l_1	71 mm	=	071
Order No		=	222. 3.0300. 071

PUNCH DIN 9861 SHAPE D / ISO 6752

223.



Material:

HSS
Order No 223.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 223.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 223.0.
Hardness:
Surface 2300 HV 0,05
Head 52 ± 3 HRC

ASP 23 - ASP 2023
Order No 223.6.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Head hot upset-forged and tempered. Shaft and head subsequently precision plunge-ground for perfect concentricity and full interchangeability with replacement punches.

Stock lenghts: 71, 80, 100 mm.
other lengths and diameters on request!

223. Punch DIN 9861 Shape D / ISO 6752

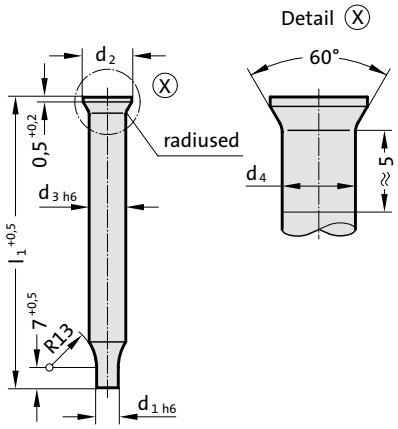
	Gradation						
d_1	d_1	d_2	k	l_1	71	80	100
0,5	0.05	0.9	0.2		●	●	●
0,55	0.05	1	0.2		●	●	●
0,6	0.05	1.1	0.2		●	●	●
0,65	0.05	1.2	0.2		●	●	●
0,7	0.05	1.3	0.2		●	●	●
0,8	0.05	1.4	0.4		●	●	●
0,9	0.05	1.6	0.4		●	●	●
1	0.1	1.8	0.5		●	●	●
1,2	0.1	2	0.5		●	●	●
1,4	0.1	2.2	0.5		●	●	●
1,6	0.1	2.5	0.5		●	●	●
1,8	0.1	2.8	0.5		●	●	●
2	0.1	3	0.5		●	●	●
2,1	0.1	3.2	0.5		●	●	●
2,3	0.1	3.5	0.5		●	●	●
2,6	0.1	4	0.5		●	●	●
3	0.1	4.5	0.5		●	●	●
3,5	0.1	5	0.5		●	●	●
4	0.1	5.5	0.5		●	●	●
4,5	0.1	6	0.5		●	●	●
5	0.1	6.5	0.5		●	●	●
5,5	0.1	7	0.5		●	●	●
6	0.1	8	0.5		●	●	●
6,5	0.5	9	1		●	●	●
7,5	0.5	10	1		●	●	●
8,5	0.5	11	1		●	●	●
9,5	0.5	12	1		●	●	●
10,5	0.5	13	1		●	●	●
11,5	0.5	14	1		●	●	●
12,5	0.5	15	1		●	●	●
13,5	0.5	16	1.5		●	●	●
14,5	0.5	17	1.5		●	●	●
15,5	0.5	18	1.5		●	●	●
16,5	0.5	19	1.5		●	●	●
17,5	0.5	20	1.5		●	●	●
18,5	0.5	21	1.5		●	●	●
19,5	0.5	22	1.5		●	●	●

Ordering Code (example):

Punch DIN 9861 Shape D / ISO 6752		=	223.
Material MAT	HSS	=	3.
Shaft diameter d_1	4 mm	=	0400.
Length l_1	71 mm	=	071
Order No		=	223. 3. 0400. 071

PUNCH DIN 9861 SHAPE CA

224.



224. Punch DIN 9861 Shape CA

	Gradation				
d_1	d_1	d_2	d_3	d_4	l_1
0,1 - 1,5	0.05	3	2	2.03	71
1,55 - 2,95	0.05	4.5	3	3.03	71

Material:

HSS
Order No 224.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 224.0.
Hardnes:
Surface 2300 HV 0,05
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Shaft precision ground. Head subsequently hot upset-forged and tempered; residual upset-buge below head normally much smaller than permissible acc. to DIN 9861.

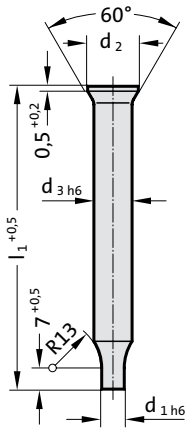
Stock lenghts: 71 mm.
Other lengths and diameters on request!

Ordering Code (example):

Punch DIN 9861 Shape CA		=	224.
Material MAT	HSS	=	3.
Cutting diameter d_1	1.55 mm	=	0155.
Length l_1	71 mm	=	071
Order No		=	224. 3. 0155. 071

PUNCH DIN 9861 SHAPE C

225.



Material:
HSS
Order No 225.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 225.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 225.0.
Hardness:
Surface 2300 HV 0,05
Head 52 ± 3 HRC

ASP 23 - ASP 2023
Order No 225.6.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Head hot upset-forged and tempered. Shaft and head subsequently precision plunge-ground for perfect concentricity and full interchangeability with replacement punches.

Stock lenghts: 71 mm.
Other lengths and diameters on request!

225. Punch DIN 9861 Shape C

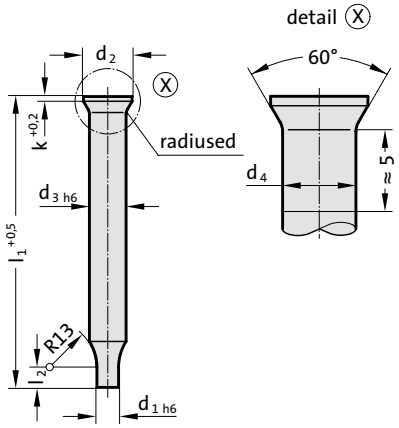
	Gradation			
d_1	d_1	d_2	d_3	l_1
0,1 - 1,5	0.05	3	2	71
1,55 - 2,95	0.05	4.5	3	71

Ordering Code (example):

Punch DIN 9861 Shape C		=	225.
Material MAT	HSS	=	3.
Cutting diameter d_1	1.55 mm	=	0155.
Length l_1	71 mm	=	071
Order No		=	225. 3. 0155. 071

PUNCH SIMILAR TO DIN 9861 SHAPE CA

274.



274. Punch similar to DIN 9861 Shape CA

	Gradation							71	80	100
d_1	d_1	d_2	d_3	d_4	l_2	k	l_1			
1 - 3,9	0.05	5.5	4	4.03	5 - 20	0.5		●	●	●
1,5 - 4,9	0.05	6.5	5	5.03	5 - 20	0.5		●	●	●
1,6 - 5,9	0.05	8	6	6.03	5 - 20	0.5		●	●	●
2,5 - 7,9	0.05	10	8	8.03	5 - 20	1		●	●	●
4 - 9,9	0.05	12	10	10.03	5 - 20	1		●	●	●
5 - 12,9	0.05	15	13	13.03	5 - 20	1		●	●	●
8 - 15,9	0.05	18	16	16.03	5 - 20	1.5		●	●	●

Description:

DIN 9861 restricts the range of stepped punches with conical head to shanks of 3 mm max. diameter and points of 2,95 mm max. diameter. Stepped punches of larger size are, however, quite popular owing to their rigidity and ability to sustain considerable stripping forces. In accommodation of this demand we supply larger sizes whichare ground from stock sizes of the 222.-series.
Please select from those ranges and complete your order in accordance with the example on the right.

Material:

HSS
Order No 274.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 274.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 274.0.
Hardness:
Surface 2300 HV 0,05
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

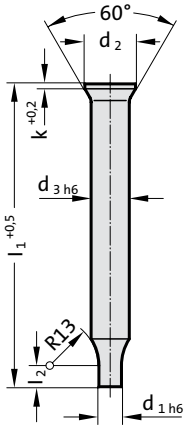
Shaft precision ground. Head subsequently hot upset-forged and tempered; residual upset-buge below head normally much smaller than permissible acc. to DIN 9861.
Stock lenghts: 71, 80, 100 mm.
other lengths and diameters on request!

Ordering Code (example):

Punch similar to DIN 9861 Shape CA		= 274.	
Material MAT	HSS	= 3.	
Shaft diameter d_3	8 mm	= 0800.	
Length l_1	71 mm	= 071.	
Cutting diameter d_1	2.5 mm	= 0250.	
Cutting length l_2	5 mm	= 05	
Order No		= 274. 3.0800. 071. 0250. 05	

PUNCH SIMILAR TO DIN 9861 SHAPE C

275.



Description:
DIN 9861 restricts the range of stepped punches with conical head to shanks of 3 mm max. diameter and points of 2,95 mm max. diameter. Stepped punches of larger size are, however, quite popular owing to their rigidity and ability to sustain considerable stripping forces. In accommodation of this demand we supply larger sizes whichare ground from stock sizes of the 223.-series
Please select from those ranges and complete your order in accordance with the example on the right.

Material:
HSS
Order No 275.3.
Hardness: Shaft 64 ± 2 HRC; Head 52 ± 3 HRC

HST
Order No 275.4.
Hardness: Surface ≥ 950 HV 0,3; Head 52 ± 3 HRC

HZ - TIN (HSS)
Order No 275.0.
Hardness: Surface 2300 HV 0,05; Head 52 ± 3 HRC

ASP 23 - ASP 2023
Order No 275.6.
Hardness: Shaft 64 ± 2 HRC; Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Head hot upset-forged and tempered. Shaft and head subsequently precision plunge-ground for perfect concentricity and full interchangeability with replacement punches.
Stock lenghts: 71, 80, 100 mm.
other lengths and diameters on request!

275. Punch similar to DIN 9861 Shape C

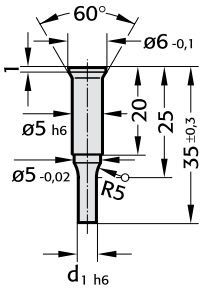
	Gradation								
d_1	d_1	d_2	d_3	l_2	k	l_1	71	80	100
1 - 3,9	0.05	5.5	4	5 - 20	0.5		●	●	●
1,5 - 4,9	0.05	6.5	5	5 - 20	0.5		●	●	●
1,6 - 5,9	0.05	8	6	5 - 20	0.5		●	●	●
2,5 - 7,9	0.05	10	8	5 - 20	1		●	●	●
4 - 9,9	0.05	12	10	5 - 20	1		●	●	●
5 - 12,9	0.05	15	13	5 - 20	1		●	●	●
8 - 15,9	0.05	18	16	5 - 20	1.5		●	●	●

Ordering Code (example):

Punch similar to DIN 9861 Shape C		=	275.
Material MAT	HSS	=	3.
Shaft diameter d_3	8 mm	=	0800.
Length l_1	71 mm	=	071.
Cutting diameter d_1	2.5 mm	=	0250.
Cutting length l_2	5 mm	=	05
Order No		=	275. 3. 0800. 071. 0250. 05

PUNCH VDI 3374

232.



232. Punch VDI 3374

	Gradation
d_1	d_1
2 - 5	0.1

Material:
HSS
Order No 232.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

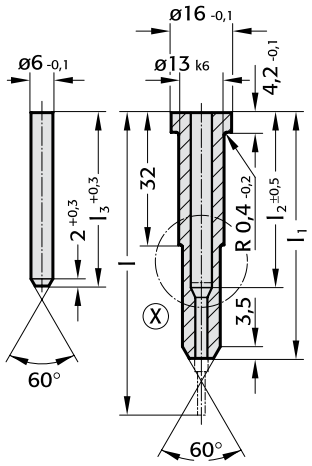
Note:
Matching insert sleeves 233. and 234.

Ordering Code (example):

Punch VDI 3374		= 232.	
Material MAT	HSS	=	3.
Cutting diameter d_1	2 mm	=	0200
Order No		= 232.	3.0200

INSERT SLEEVE WITH THRUST PIN VDI 3374 SHAPE A

233.



Material:

Insert sleeve:
Steel C 45 heat treated to 800 N/mm²
Thrust pin:
HWS, hardened 62 ± 2 HRC

Execution:

Insert sleeve: shaft precision ground
Thrust pin: ground

Note:

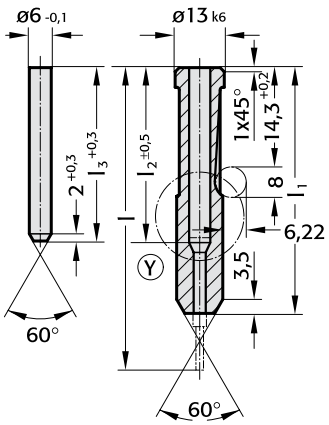
Matching punch 232.

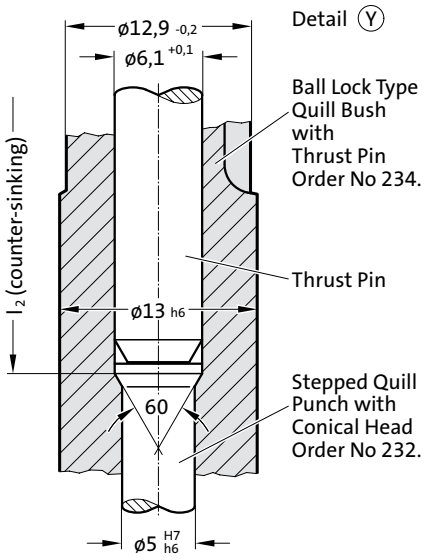
233. Insert sleeve with thrust pin VDI 3374 Shape A

Order No	l	l_1	l_2	l_3
233.7.048	63	48	29	29
233.7.057	71	57	37	37
233.7.065	80	65	46	46

INSERT SLEEVE WITH THRUST PIN VDI 3374 SHAPE B

234.





234. Insert sleeve with thrust pin VDI 3374 Shape B

Order No	l	l_1	l_2	l_3
234.7.048	63	48	29	29
234.7.057	71	57	37	37
234.7.065	80	65	46	46

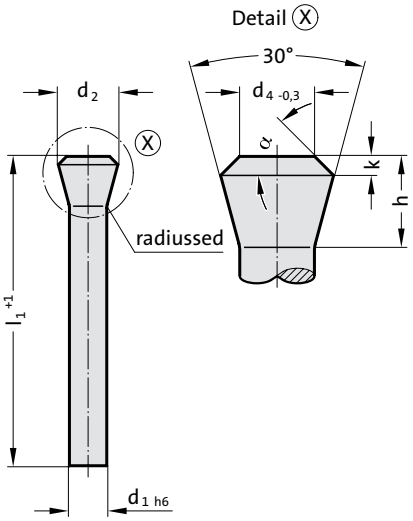
Material:
Insert sleeve:
Steel C 45 heat treated to 800 N/mm²
Thrust pin:
HWS, hardened 62 ± 2 HRC

Execution:
Insert sleeve: shaft precision ground
Thrust pin: ground

Note:
Matching punch 232.

PUNCH WITH TAPERED HEAD 30°, SHAPE D

2281.



Material:
HSS
Order No 2281.3.
Hardness:
Shaft 58 + 2 HRC
Head ≤ 50 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Head hot upset-forged and tempered. Shaft and head subsequently precision plunge-ground for perfect concentricity and full interchangeability with replacement punches.

2281. Punch with tapered head 30°, Shape D

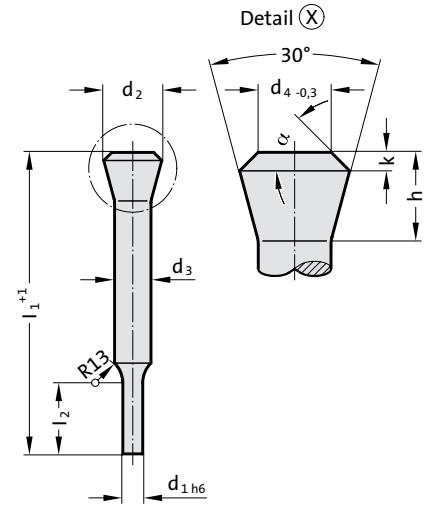
d_1	d_2	d_4	h	k	α ± 1°	l_1	100	120
5.5	8.98	5.5	7.5	1	30		●	●
6	9.75	6	8	1	28		●	●
8	12.8	8	10	1	22.5		●	●
9	14.4	9	11	1	20		●	●
10	15.9	10	12	1	19		●	●
12	18.7	12	14	1.5	24			●
14	21.8	14	16	1.5	21			●
16	24.6	16	18	2	25			●

Ordering Code (example):

Punch with tapered head 30°, Shape D		=	2281.
Material MAT	HSS	=	3.
Shaft diameter d_1	10 mm	=	1000.
Length l_1	100 mm	=	100
Order No		=	2281. 3. 1000. 100

PUNCH WITH TAPERED HEAD 30°,SHAPE C

2291.



2291. Punch with tapered head 30°,Shape C

d_3	d_2	d_4	h	k	α ± 1°	l_1	100	120
5.5	8.98	5.5	7.5	1	30		●	●
6	9.75	6	8	1	28		●	●
8	12.8	8	10	1	22.5		●	●
9	14.4	9	11	1	20		●	●
10	15.9	10	12	1	19		●	●
12	18.7	12	14	1.5	24			●
14	21.8	14	16	1.5	21			●
16	24.6	16	18	2	25			●

Material:
HSS
Order No 2291.3.
Hardness:
Shaft 58 + 2 HRC
Head ≤ 50 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Head hot upset-forged and tempered. Shaft and head subsequently precision plunge-ground for perfect concentricity and full interchangeability with replacement punches.

d_1 and l_2 to customer's specifications!

Ordering Code (example):

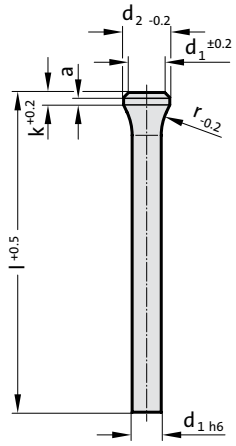
Punch with tapered head 30°,Shape C		=	2291.
Material MAT	HSS	=	3.
Shaft diameter d_3	10 mm	=	1000.
Length l_1	100 mm	=	100.
Cutting diameter d_1	5 mm	=	0500.
Cutting length l_2	5 mm	=	005
Order No		=	2291. 3. 1000. 100. 0500. 005

PUNCH WITH TAPERED HEAD, DIN 5118 SHAPE A

2284.3. Punch with tapered head, DIN 5118 Shape A

d_1	d_2	a	k	r	l	71	80	100	110
2	3	1	3	3.5		●	●	●	
2.1	3.2	1	3	5		●	●	●	
2.2	3.2	1	3	5		●	●	●	
2.3	3.5	1	3	5		●	●	●	
2.4	3.5	1	3	5		●	●	●	
2.5	3.5	1	3	5		●	●	●	
2.6	4	1	3	6.5		●	●	●	
2.7	4	1	3	6.5		●	●	●	
2.8	4	1	3	6.5		●	●	●	
2.9	4	1	3	6.5		●	●	●	
3.1	4.5	1	3	6.5		●	●	●	
3.2	4.5	1	3	6.5		●	●	●	
3.3	4.5	1	3	6.5		●	●	●	
3.4	4.5	1	3	6.5		●	●	●	
3.5	5	1	3	8		●	●	●	
3.6	5	1	3	8		●	●	●	
3.7	5	1	3	8		●	●	●	
3.8	5	1	3	8		●	●	●	
4.1	5.5	1.5	4	8		●	●	●	
4.2	5.5	1.5	4	8		●	●	●	
4.3	5.5	1.5	4	8		●	●	●	
4.4	5.5	1.5	4	8		●	●	●	
4.5	6	1.5	4	8		●	●	●	
4.6	6	1.5	4	8		●	●	●	
4.7	6	1.5	4	8		●	●	●	
4.8	6	1.5	4	8		●	●	●	
4.9	6	1.5	4	8		●	●	●	
5.1	7	1.5	4	10		●		●	
5.2	7	1.5	4	10			●	●	
5.5	8	1.5	4	10		●	●	●	
5.6	8	1.5	4	10				●	
6.1	9	1.5	4	10				●	
6.2	9	1.5	4	10				●	
6.3	9	1.5	4	10		●		●	
6.4	9	1.5	4	10		●		●	
6.5	10	1.5	4	12		●		●	●
7	10	1.5	4	12		●	●	●	
7.5	11	1.5	4	12		●	●	●	
7.7	11	1.5	4	12				●	
8.1	11	1.5	4	12		●		●	
8.5	13	1.5	4	15		●	●	●	
9	13	1.5	4	15		●	●	●	●
9.5	14	1.5	4	15		●		●	
10.5	15	1.5	4	15				●	
11	15	1.5	4	15				●	
11.5	16	1.5	4	15				●	
12	16	1.5	4	15				●	●
12.5	17	1.5	4	15				●	
13.5	18	1.5	4	15				●	
14	18	1.5	4	15				●	●
14.5	19	1.5	4	15				●	
15	19	1.5	4	15				●	●
15.5	20	1.5	4	15				●	
17	21	1.5	4	15		●		●	●
18	22	1.5	4	15				●	●
19	23	1.5	4	15				●	
19.5	25	1.5	4	15				●	

2284.3.



Material:
HSS
Order No 2284.3.
Hardness:
Shaft 62-66 HRC
Head 45-55 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Shaft precision ground. Head subsequently hot upset-forged and tempered.

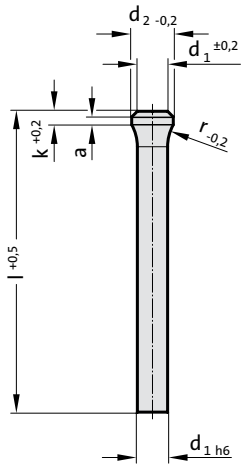
Note:
Matching piloted counterbore 2284.00.

Ordering Code (example):

Punch with tapered head, DIN 5118 Shape A		=	2284.3.
Shaft diameter d_1	5.2 mm	=	0520.
Length l	80 mm	=	080
Order No		=	2284.3. 0520. 080

PUNCH WITH TAPERED HEAD, BLANK, DIN 5118 SHAPE A

2206.



2206. Punch with tapered head, blank, DIN 5118 Shape A

d_1 / Order No	d_2	a	k	r	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)	150 (M)	200 (N)
3/(1)	4.5	1	3	6.5		●	●	●	●	●		
4/(2)	5.5	1.5	4	8		●	●	●	●	●		
5/(3)	7	1.5	4	10		●	●	●	●	●		
6/(4)	9	1.5	4	10		●	●	●	●	●		
8/(5)	11	1.5	4	12		●	●	●	●	●		
10/(6)	14	1.5	4	15		●	●	●	●	●	●	
13/(7)	17	1.5	4	15		●	●	●	●	●	●	●
16/(8)	20	1.5	4	15		●	●	●	●	●	●	●
20/(9)	25	1.5	4	15		●	●	●	●	●	●	●

Material:
HSS
Hardness:
Shaft 62-66 HRC
Head 45-55 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Shaft precision ground. Head subsequently hot upset-forged and tempered.

Note:
Matching piloted counterbore 2284.00.
Matching retainer ring2284.00.01.

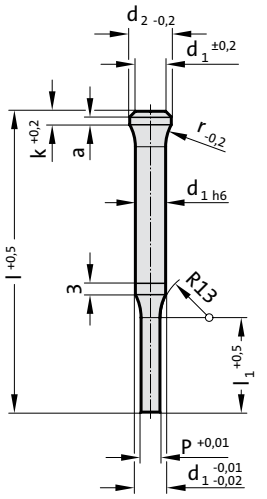
Ordering Code (example):

2206.7G

Length: l	100 mm	**Order Code character** = (G)
Diameter: d_1	13 mm	**Order No** = (7)
Type:	with tapered hea	**Order No** = (6)
Execution:	blank	**Order No** = (0)
Punch:	without ejector pin	= 22

PUNCH WITH TAPERED HEAD, STEPPED, ROUND, DIN 5118 SHAPE B

2216.



2216. Punch with tapered head, stepped, round, DIN 5118 Shape B

d_1 / Order No	d_2	p	l_1 / Order No	a	k	r	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)	150 (M)	200 (N)
3 / (1)	4.5	0.8-2.9	8(1) 10(2)	1	3	6.5		●	●	●	●	●		
4 / (2)	5.5	1.0-3.9	8(1) 13(3)	1.5	4	8		●	●	●	●	●		
5 / (3)	7	1.5-4.9	13(3) 19(4)	1.5	4	10		●	●	●	●	●		
6 / (4)	9	1.6-5.9	13(3) 19(4)	1.5	4	10		●	●	●	●	●		
8 / (5)	11	2.5-7.9	19(4) 25(5)	1.5	4	12		●	●	●	●	●		
10 / (6)	14	4.0-9.9	19(4) 25(5)	1.5	4	15		●	●	●	●	●	●	
13 / (7)	17	5.0-12.9	19(4) 25(5)	1.5	4	15		●	●	●	●	●	●	●
16 / (8)	20	8.0-15.9	19(4) 25(5)	1.5	4	15		●	●	●	●	●	●	●
20 / (9)	25	12.0-19.9	19(4) 25(5)	1.5	4	15		●	●	●	●	●	●	●

Ordering Code (example):

2216.7G4.0720

Shape: round	
P = ø7,2 mm	= 0720
Punch cutting length: l_1	**Order No**
19 mm	= (4)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_1	**Order No**
13 mm	= (7)
Type:	**Order No**
with tapered hea	= (6)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

Material:
HSS
Hardness:
Shaft 62-66 HRC
Head 45-55 HRC

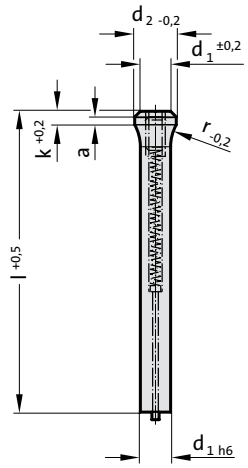
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Shaft precision ground. Head subsequently hot upset-forged and tempered.

Note:
Matching piloted counterbore 2284.00.
Matching retainer ring2284.00.01.

PUNCH WITH TAPERED HEAD, BLANK, WITH EJECTOR PIN, DIN 5118 SHAPE E

2706.



2706. Punch with tapered head, blank, with ejector pin, DIN 5118 Shape E

d_1 / Order No	d_2	a	k	r	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	7	1.5	4	10		●	●	●	●	●
6 / (4)	9	1.5	4	10		●	●	●	●	●
8 / (5)	11	1.5	4	12		●	●	●	●	●
10 / (6)	14	1.5	4	15		●	●	●	●	●
13 / (7)	17	1.5	4	15		●	●	●	●	●
16 / (8)	20	1.5	4	15		●	●	●	●	●
20 / (9)	25	1.5	4	15		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 62-66 HRC
Head 45-55 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Shaft precision ground. Head subsequently hot upset-forged and tempered.

Note:
Matching piloted counterbore 2284.00.
Matching retainer ring2284.00.01.

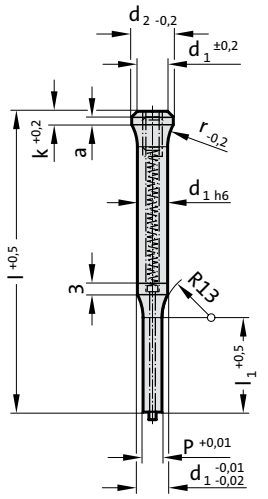
Ordering Code (example):

2706.7G

Length: l	100 mm	**Order Code character** = (G)
Diameter: d_1	13 mm	**Order No** = (7)
Type:	with tapered hea	**Order No** = (6)
Execution:	blank	**Order No** = (0)
Punch:	with ejector pin	= 27

PUNCH WITH TAPERED HEAD, STEPPED, ROUND, WITH EJECTOR PIN, DIN 5118 SHAPE F

2716.



2716. Punch with tapered head, stepped, round, with ejector pin, DIN 5118 Shape F

d_1 / Order No	d_2	P	l_1 / Order No	a	k	r	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	7	2 - 4.9	13 (3) 19 (4)	1.5	4	10		●	●	●	●	●
6 / (4)	9	2.5 - 5.9	13 (3) 19 (4)	1.5	4	10		●	●	●	●	●
8 / (5)	11	4 - 7.9	19 (4) 25 (5)	1.5	4	12		●	●	●	●	●
10 / (6)	14	5 - 9.9	19 (4) 25 (5)	1.5	4	15		●	●	●	●	●
13 / (7)	17	6 - 12.9	19 (4) 25 (5)	1.5	4	15		●	●	●	●	●
16 / (8)	20	8 - 15.9	19 (4) 25 (5)	1.5	4	15		●	●	●	●	●
20 / (9)	25	10 - 19.9	19 (4) 25 (5)	1.5	4	15		●	●	●	●	●

Ordering Code (example):

2716.7G4.0720

Shape: round		
P = ø7,2 mm	= 0720	**Order No**
Punch cutting length: l_1		
19 mm	= (4)	**Order No**
Length: l		**Order Code character**
100 mm	= (G)	
Diameter: d_1		**Order No**
13 mm	= (7)	
Type:		**Order No**
with tapered hea	= (6)	
Execution:		**Order No**
round	= (1)	
Punch:		
with ejector pin	= 27	

Material:
HSS
Hardness:
Shaft 62-66 HRC
Head 45-55 HRC

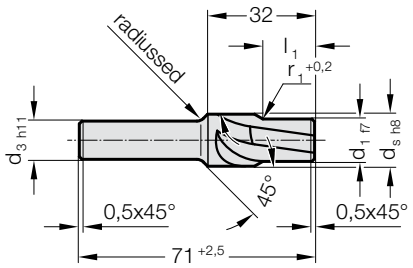
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Shaft precision ground. Head subsequently hot upset-forged and tempered.

Note:
Matching piloted counterbore 2284.00.
Matching retainer ring2284.00.01.

PILOTED COUNTERBORE FOR TAPERED-HEAD PUNCH

2284.00.



Material:
HSS, hardened 62-66 HRC

Execution:
Tempered and ground.

2284.00. Piloted counterbore for tapered-head punch

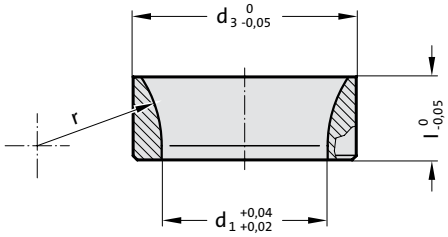
d_1	d_s	d_3	r_1	l_1
2	3.3	3.3	3.5	5
2.1	3.5	3.5	5	5
2.2	3.5	3.5	5	5
2.3	3.8	3.8	5	5
2.4	3.8	3.8	5	5
2.5	3.8	3.8	5	5
2.6	4.3	4.3	6.5	7
2.7	4.3	4.3	6.5	7
2.8	4.3	4.3	6.5	7
2.9	4.3	4.3	6.5	7
3	4.9	4.9	6.5	7
3.1	4.9	4.9	6.5	7
3.2	4.9	4.9	6.5	7
3.3	4.9	4.9	6.5	7
3.4	4.9	4.9	6.5	7
3.5	5.4	5.4	8	8
3.6	5.4	5.4	8	8
3.7	5.4	5.4	8	8
3.8	5.4	5.4	8	8
4	5.9	5.9	8	8
4.1	5.9	5.9	8	8
4.2	5.9	5.9	8	8
4.3	5.9	5.9	8	8
4.4	5.9	5.9	8	8
4.5	6.4	6.4	8	8
4.6	6.4	6.4	8	8
4.7	6.4	6.4	8	8
4.8	6.4	6.4	8	8
4.9	6.4	6.4	8	8
5	7.4	7.4	10	10
5.1	7.4	7.4	10	10
5.2	7.4	7.4	10	10
5.5	8.5	8.5	10	10
5.6	8.5	8.5	10	10
6	9.5	9.5	10	10
6.1	9.5	9.5	10	10
6.2	9.5	9.5	10	10
6.3	9.5	9.5	10	10
6.4	9.5	9.5	10	10
6.5	10.5	10.5	12	12
7	10.5	10.5	12	12
7.5	11.5	11.5	12	12
7.7	11.5	11.5	12	12
8	11.5	11.5	12	12
8.1	11.5	11.5	12	12
8.5	13.5	13	15	12
9	13.5	13	15	12
9.5	14.5	13	15	12
10	14.5	13	15	12
10.5	15.5	13	15	15
11	15.5	13	15	15
11.5	16.5	13	15	15
12	16.5	13	15	15
12.5	17.5	13	15	15
13	17.5	13	15	15
13.5	18.5	13	15	15
14	18.5	13	15	15
14.5	19.5	13	15	15
15	19.5	13	15	15
15.5	20.5	13	15	15
16	20.5	13	15	15
17	21.5	16	15	15
18	22.5	16	15	15
19	23.5	16	15	15
19.5	25.5	16	15	15
20	25.5	16	15	15

Ordering Code (example):

Piloted counterbore for tapered-head punch		= 2284.00.	
Punch shaft diameter d_1	5.6 mm	=	0560
Order No		= 2284.00.	0560

MOUNTING RING FOR PUNCH WITH TAPERED HEAD

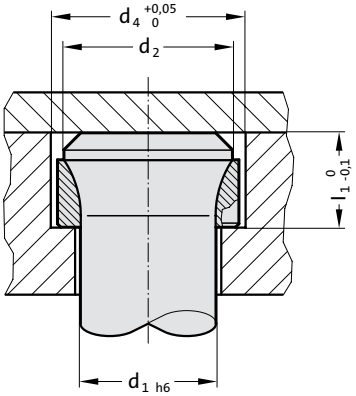
2284.00.01.



2284.00.01. Mounting ring for punch with tapered head

Order No	d_1	d_2	d_3	d_4	l	l_1	r
2284.00.01.0300	3	4.5	5.9	6	4	7	6.5
2284.00.01.0400	4	5.5	6.9	7	4	8	8
2284.00.01.0500	5	7	8.9	9	7	11	10
2284.00.01.0600	6	9	10.9	11	7	11	10
2284.00.01.0800	8	11	12.9	13	8	12	12
2284.00.01.1000	10	14	15.9	16	9	13	15
2284.00.01.1300	13	17	18.9	19	9	13	15
2284.00.01.1600	16	20	21.9	22	9	13	15
2284.00.01.2000	20	25	26.9	27	10	14	15

Mounting example



Material:
Tool steel, heat-treated

Note:
Used for punch with tapered neck

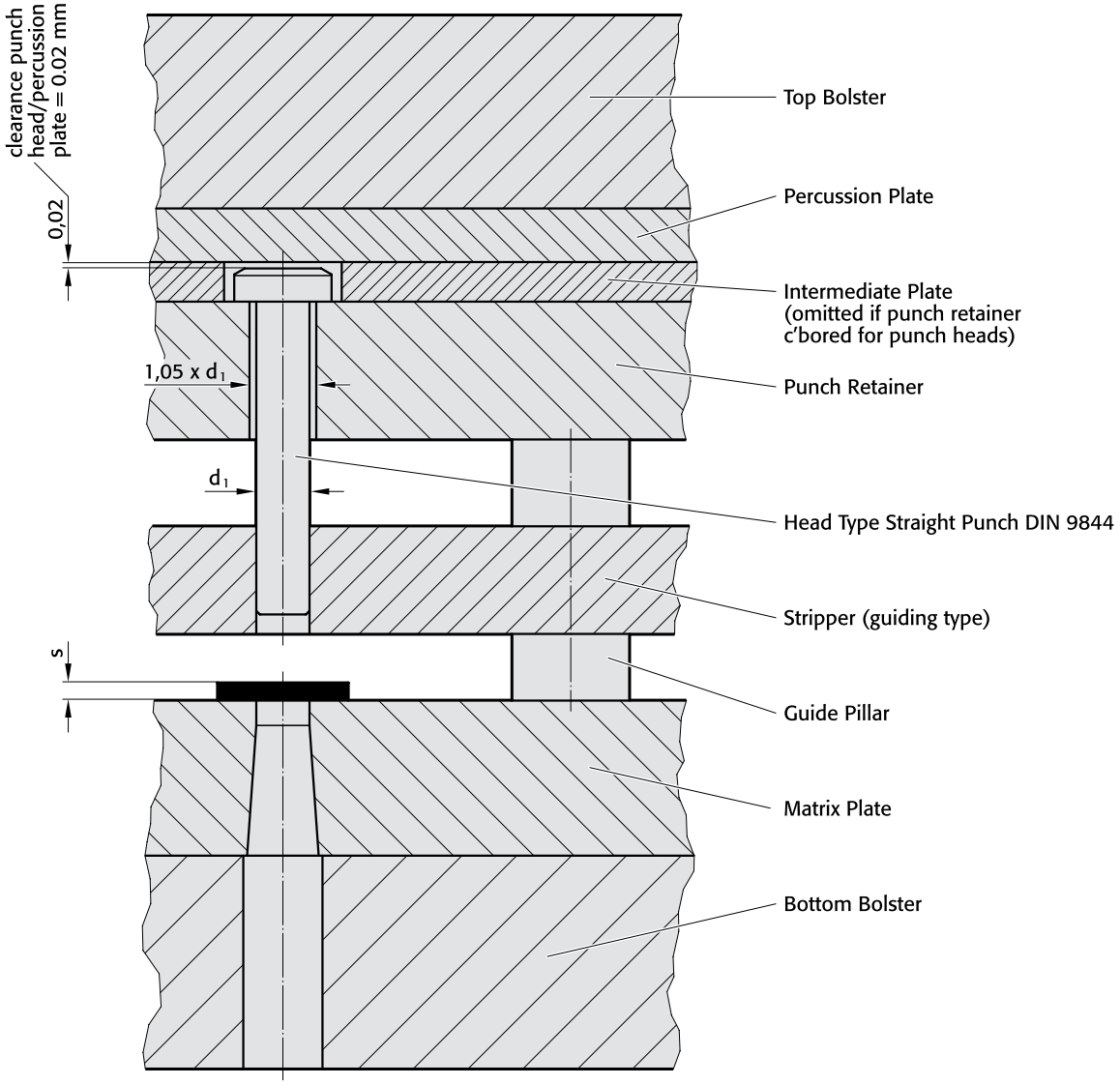
ASSEMBLY GUIDE LINES FOR HEAD TYPE PUNCHES WITH ROUND POINTS

Description:

Head type punches with round point (DIN 9844) are intended for floating assembly in the punch retainer. If there is sufficient clearance between the cutting punch, punch mounting plate and pressure plate, bending stresses can be avoided that can be caused by misalignments.
a) for rigid installation
b) with forced centring by the countersunk head.With punches held in this manner, a clear separation between transmission of perforation force and guiding is achieved.
In order to facilitate assembly of punches of different diameters, the height of the heads is standardized to $4^{+0.2}$ mm (DIN 9844).

Guide Lines:

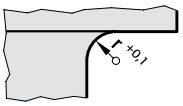
excerpts from DIN 9844, page 5
d_1 max. = stock thickness
Stripping force:
for d_1 from 1 to 5 mm = 20% of the cutting force
for d_1 from 5.1 to 16 mm = 10% of the cutting force
Cutting material: max. &dew;$_B$ = 400 N/mm^2
Punch retainer plate made from St 50-2 with $\sigma_{D\ perm.}$ = 300 N/mm^2
Locating hole in the punch retainer plate: 1.05 x d_1 or d_2
Clearance punch head/percussion plate = 0.02 mm.

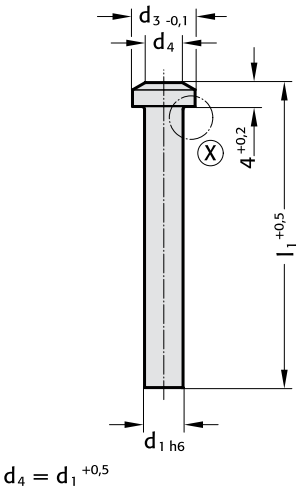


PUNCH DIN 9844, SHAPE A

220.

Detail Ⓧ
normal execution
with radius





$d_4 = d_1^{+0,5}$

Material:
HSS
Order No 220.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 220.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

Stock lenghts: 71, 90, 112 mm.
other lengths and diameters on request!

220. Punch DIN 9844, Shape A

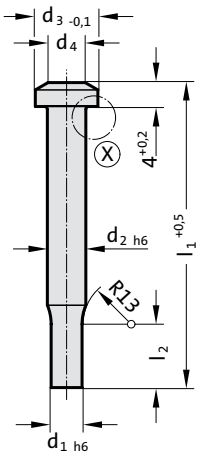
	Gradation						
d_1	d_1	d_3	r	l_1	71	90	112
2 - 2,2	0.1	3.6	0.2		●	●	●
2,3 - 2,5	0.1	4	0.2		●	●	●
2,6 - 2,8	0.1	4.5	0.3		●	●	●
3,6 - 4	0.1	7	0.3		●	●	●
2,9 - 3,2	0.1	5	0.3		●	●	●
3,3 - 3,5	0.1	6	0.3		●	●	●
4,6 - 5	0.1	8.5	0.5		●	●	●
5,1 - 5,4	0.1	9	0.5		●	●	●
4,1 - 4,5	0.1	8	0.5		●	●	●
5,5 - 5,9	0.1	9.5	0.5		●	●	●
6 - 6,4	0.1	10	0.5		●	●	●
7,5 - 8	0.5	12	0.7		●	●	●
8,5 - 9	0.5	13	0.7		●	●	●
6,5 - 7	0.5	10.8	0.7		●	●	●
9,5 - 10	0.5	14.5	0.7		●	●	●
10,5 - 11	0.5	16	1		●	●	●
11,5 - 12,5	0.5	18	1		●	●	●
13 - 14,5	0.5	20	1		●	●	●
15 - 16	0.5	22	1		●	●	●

Ordering Code (example):

Punch DIN 9844, Shape A		=	220.
Material MAT	HSS	=	3.
Cutting diameter d_1	5.5 mm	=	0550.
Length l_1	71 mm	=	071
Order No		=	220. 3. 0550. 071

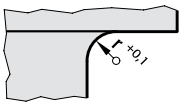
PUNCH DIN 9844, SHAPE B

221.



$d_4 = d_1^{+0,5}$

Detail X
normal execution
with radius



221. Punch DIN 9844, Shape B

	Gradation								
d_1	d_1	d_2	d_3	l_2	r	l_1	71	90	112
0,1 - 1,9	0.05	2	3.6	7	0.2		●	●	●
1,95 - 2,4	0.05	2.5	4	7	0.2		●	●	●
2,5 - 3,1	0.1	3.2	5	7	0.3		●	●	●
3,2 - 3,9	0.1	4	7	7	0.3		●	●	●
4 - 4,9	0.1	5	8.5	7	0.5		●	●	●
5 - 6,2	0.1	6.3	10	7	0.5		●	●	●
6,3 - 7,9	0.1	8	12	16	0.7		●	●	●
8 - 9,9	0.1	10	14.5	16	0.7		●	●	●
10 - 12,4	0.1	12.5	18	16	1		●	●	●
12,5 - 15,9	0.1	16	22	16	1		●	●	●

Material:
HSS
Order No 221.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

HST
Order No 221.4.
Hardness:
Surface ≥ 950 HV 0,3
Head 52 ± 3 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

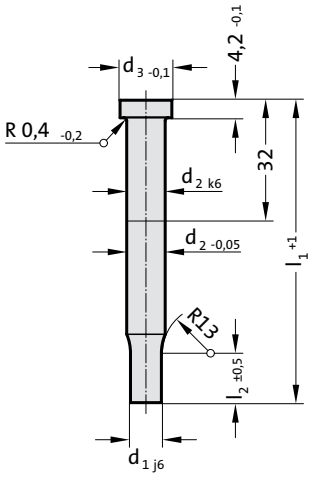
Stock lenghts: 71, 90, 112 mm.
other lengths and diameters on request!

Ordering Code (example):

Punch DIN 9844, Shape B		=	221.
Material MAT	HSS	=	3.
Cutting diameter d_1	5 mm	=	0500.
Length l_1	71 mm	=	071
Order No		=	221.3.0500. 071

PUNCH SIMILAR TO VDI 3374

266.



Material:
HSS
Order No 266.3.
Hardness:
Shaft 62 ± 2 HRC
Head 45 ± 5 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

Stock lenghts: 71, 80 mm.
other lengths and diameters on request!

266. Punch similar to VDI 3374

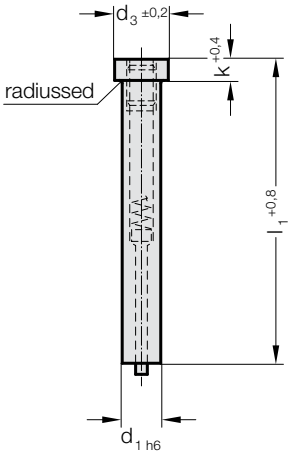
	Gradation						
d_1	d_1	d_2	d_3	l_2	l_1	71	80
5 - 8,9	0.1	10	13	13		●	●
9 - 11,9	0.1	13	16	13		●	●
12 - 15,9	0.1	16	19	13		●	●
16 - 19,5	0.5	20	24	13		●	●
20 - 24,5	0.5	25	29	13		●	●

Ordering Code (example):

Punch similar to VDI 3374		=	266.
Material MAT	HSS	=	3.
Cutting diameter d_1	12 mm	=	1200.
Length l_1	71 mm	=	071
Order No		=	266. 3.1200. 071

PUNCH WITH EJECTOR PIN

267.



267. Punch with ejector pin

$d_{1\ h6}$	d_3	k	l_1	60	71	80	90	100
5	8	5		●	●	●	●	●
6	9	5		●	●	●	●	●
8	11	5		●	●	●	●	●
10	13	5		●	●	●	●	●
13	16	5		●	●	●	●	●
16	19	6.4		●	●	●	●	●
20	23	6.4		●	●	●	●	●
25	28	6.4		●	●	●	●	●

Material:
HSS
Order No 267.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

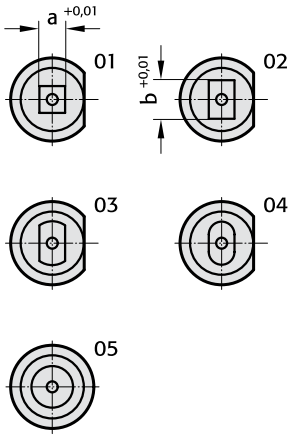
Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

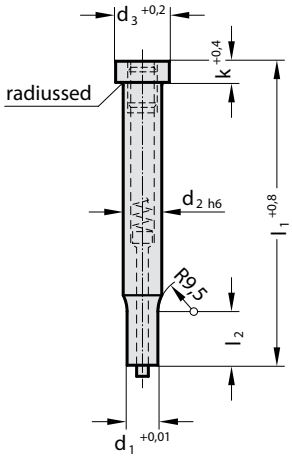
Ordering Code (example):

Punch with ejector pin		=	267.
Material MAT	HSS	=	3.
Shaft diameter d_1	13 mm	=	1300.
Length l_1	60 mm	=	060
Order No		=	267. 3.1300. 060

PUNCH WITH EJECTOR PIN, STEPPED, SHORT POINT

268.





Material:
HSS
Order No 268.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

Key flats parallel with longest size of shape, unless otherwise specified.

Note:
At a cutting gap of ≤ 0.04 mm, FIBRO rounds off sharp edges for shape 01 and shape 02, if punch and matrix are ordered together. This reduces the assembly time and the risk of an edge break during operation.

268. **Punch with ejector pin, stepped, short point**

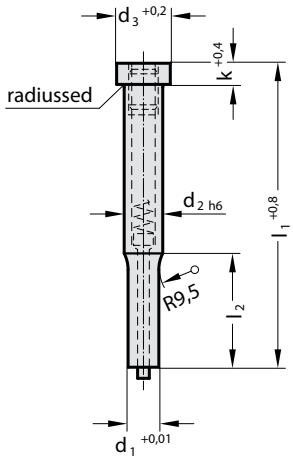
d_1	d_2	d_3	k	l_2	a_{min}	l_1	60	71	80	90	100
1.6 - 4.9	5	8	5	7	1.6		●	●	●	●	●
2.3 - 5.9	6	9	5	7	2.3		●	●	●	●	●
3.2 - 7.9	8	11	5	13	3.2		●	●	●	●	●
4.8 - 9.9	10	13	5	13	4.8		●	●	●	●	●
4.8 - 12.9	13	16	5	13	4.8		●	●	●	●	●
5.5 - 15.9	16	19	6.4	13	5.5		●	●	●	●	●
5.5 - 19.9	20	23	6.4	13	5.5		●	●	●	●	●
6.5 - 24.9	25	28	6.4	13	6.5		●	●	●	●	●

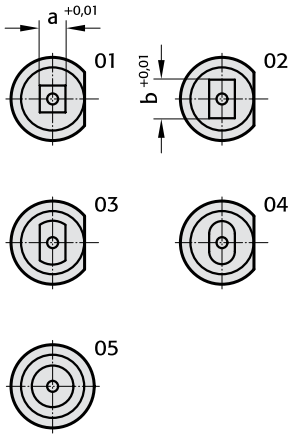
Ordering Code (example):

Punch with ejector pin, stepped, short point		= 268.3.	
Shaft diameter d_2	13 mm	= 1300.	
Length l_1	60 mm	= 060.	
Cutting form FORM	square	= 01.	
Cutting form width a	4.8 mm	= 0480.	
Cutting form length b	4.8 mm	= 0480	
Order No		= 268.3. 1300. 060. 01. 0480. 0480	

PUNCH WITH EJECTOR PIN, STEPPED, LONG POINT

269.





269. **Punch with ejector pin, stepped, long point**

d_1	d_2	d_3	k	l_2	a_{min}	l_1 60	71	80	90	100
2,3 - 5,9	6	9	5	17,5	2,3	●	●	●	●	●
3,2 - 7,9	8	11	5	25	3,2	●	●	●	●	●
4,8 - 9,9	10	13	5	28	4,8	●	●	●	●	●
4,8 - 12,9	13	16	5	28	4,8	●	●	●	●	●
5,5 - 15,9	16	19	6,4	28	5,5	●	●	●	●	●
5,5 - 19,9	20	23	6,4	28	5,5	●	●	●	●	●
6,5 - 24,9	25	28	6,4	28	6,5	●	●	●	●	●

Material:
HSS
Order No 269.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shaft and shoulder precision plunge-ground.

Key flats parallel with longest size of shape, unless otherwise specified.

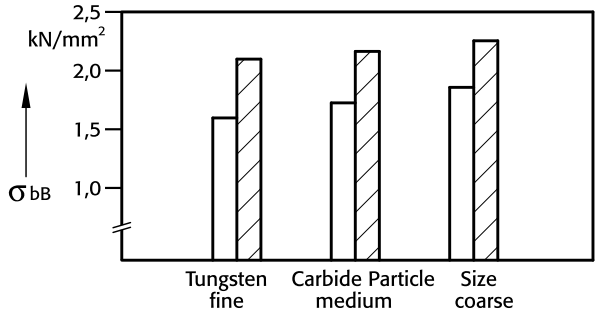
Note:
At a cutting gap of ≤ 0.04 mm, FIBRO rounds off sharp edges for shape 01 and shape 02, if punch and matrix are ordered together. This reduces the assembly time and the risk of an edge break during operation.

Ordering Code (example):

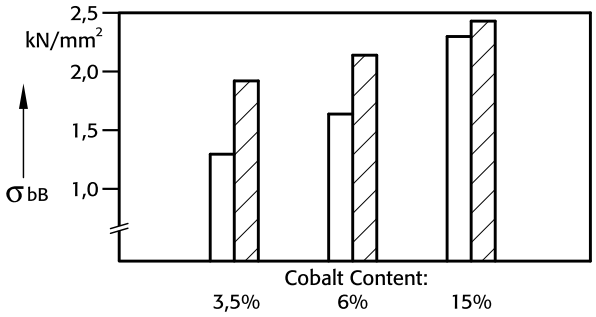
Punch with ejector pin, stepped, long point		= 269.3.	
Shaft diameter d_2	13 mm	= 1300.	
Length l_1	60 mm	= 060.	
Cutting form FORM	square	= 01.	
Cutting form width a	4.8 mm	= 0480.	
Cutting form length b	4.8 mm	= 0480	
Order No		= 269.3. 1300. 060. 01. 0480. 0480	

SINTERED HARD METAL HIP-DENSIFIED

The HIP process (hot isostatic pressing) consists of a special densification treatment of
WC – Co – hard metals
In this process, which is widely used in hard metal technology, the material is post-compacted under high pressure (1.2-3 kbar) in a high-temperature furnace below the sintering temperature after sintering.
This process reduces the residual porosity.
The reduction in porosity leads to an improvement in the strength properties and thus to an increase in the service life of the tools for non-cutting shaping.
As can be seen from the diagrams and tables, both compressive and flexural strength are improved.
For stamping die tooling, hard metal types of medium tungsten particle size, with a cobalt content of 9 to 12%, have been found successful in a wide field of applications.



a) influence of crystallite size of hard metal phase
left: sintered only
right: sintered and HIP-treated).



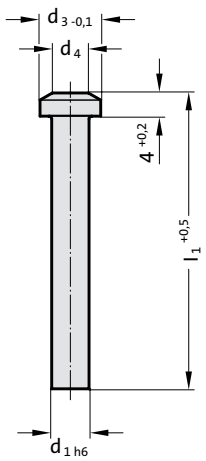
b) Influence of the cobalt content, sample condition as in figure a.
Flexural strength sbB of a WC-6Co alloy in the sintered and HIP-treated state as a function of various influencing variables.
Porosity in sintered condition: ≥A1
left, not shaded:Sintered condition
right, shaded:HIP-treated.

Change of Sintered Hard Metal by hot isostatic pressing

Tungsten carbide – particle size	Co %	Hardness HV_{30}		Flexural Strength N/mm²	
		before	after	before	after
fine	3	1800	no changes	1200	1700
	6	1650		1500	2300
	9	1400		2000	2600
medium	6	1600		2000	2600
	9	1450		2350	2700
	12	1300		2450	2900
	15	1200		2700	2850
coarse	6	1400		1900	2250
	8	1350		2300	2600
	10	1200		2650	2850

PUNCH SIMILAR TO DIN 9844, SHAPE A

270.



$d_4 = d_1^{+0,5}$

Material:
Tungsten-Cobalt-Carbide
Order No 270.9.

Execution:
Shaft precision ground.
Head: Steel, brazed to shaft or Tungsten-Cobalt Carbide.

Other diameters and lengths on request.

270. Punch similar to DIN 9844, Shape A

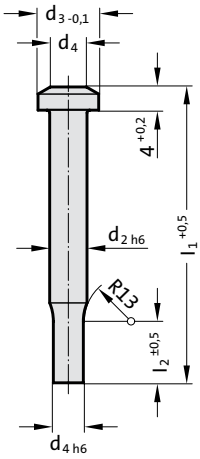
	Gradation						
d_1	d_1	d_3	r	l_1	71	90	112
1	0.1	3.6	0.2		●	●	●
2.3	0.1	4	0.2		●	●	●
2.6	0.1	4.5	0.3		●	●	●
2.9	0.1	5	0.3		●	●	●
3.3	0.1	6	0.3		●	●	●
3.6	0.1	7	0.3		●	●	●
4.1	0.1	8	0.5		●	●	●
4.6	0.1	8.5	0.5		●	●	●
5.1	0.1	9	0.5		●	●	●
5.5	0.1	9.5	0.5		●	●	●
6	0.1	10	0.5		●	●	●
6.5	0.5	10.8	0.7		●	●	●
7.5	0.5	12	0.7		●	●	●
8.5	0.5	13	0.7		●	●	●
9.5	0.5	14.5	0.7		●	●	●
10.5	0.5	16	1		●	●	●
11.5	0.5	18	1		●	●	●
13	0.5	20	1		●	●	●
15	0.5	22	1		●	●	●

Ordering Code (example):

Punch similar to DIN 9844, Shape A		= 270.9.	
Shaft diameter d_1	4.7 mm	=	0470.
Length l_1	71 mm	=	071
Order No		= 270.9.	0470. 071

PUNCH SIMILAR TO DIN 9844, SHAPE B

271.



$d_4 = d_1{}^{+0,5}$

271. Punch similar to DIN 9844, Shape B

	Gradation								
d_1	d_1	d_2	d_3	l_2	r	l_1	71	90	112
0.5	0.05	2	3.6	7	0.2		●	●	●
1.95	0.05	2.5	4	7	0.2		●	●	●
2.5	0.1	3.2	5	7	0.3		●	●	●
3.2	0.1	4	7	7	0.3		●	●	●
4	0.1	5	8.5	7	0.5		●	●	●
5	0.1	6.3	10	7	0.5		●	●	●
6.3	0.1	8	12	16	0.7		●	●	●
8	0.1	10	14.5	16	0.7		●	●	●
10	0.1	12.5	18	16	1		●	●	●
12.5	0.1	16	22	16	1		●	●	●

Material:
Tungsten-Cobalt-Carbide
Order No 271.9.

Execution:
Shaft precision ground.
Head: Steel, brazed to shaft or Tungsten-Cobalt Carbide.

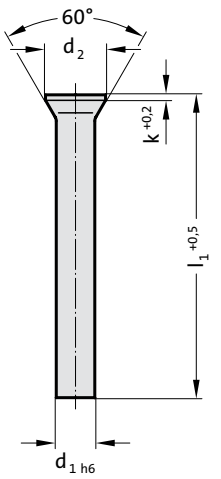
Other diameters and lengths on request.

Ordering Code (example):

Punch similar to DIN 9844, Shape B		=	271.9.
Cutting diameter d_1	7.3 mm	=	0730.
Length l_1	71 mm	=	071
Order No		=	271.9. 0730. 071

PUNCH SIMILAR TO DIN 9861, SHAPE D

272.



Material:
Tungsten-Cobalt-Carbide
Order No 272.9.

Execution:
Shaft precision ground.
Head: Steel, brazed to shaft or Tungsten-Cobalt Carbide.

Other diameters and lengths on request.

272. Punch similar to DIN 9861, Shape D

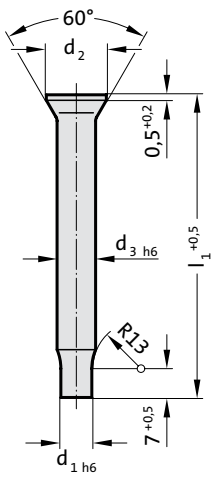
	Gradation						
d_1	d_1	d_2	k	l_1	71	80	100
1.5	0.1	2.2	0.5		●	●	●
2	0.1	3	0.5		●	●	●
3 - 3.4	0.1	4.5	0.5		●	●	●
4 - 4.4	0.1	5.5	0.5		●	●	●
5 - 5.4	0.1	6.5	0.5		●	●	●
6 - 6.4	0.1	8	0.5		●	●	●
1.6 - 1.7	0.1	2.5	0.5		●	●	●
1.8 - 1.9	0.1	2.8	0.5		●	●	●
2.1 - 2.2	0.1	3.2	0.5		●	●	●
2.3 - 2.5	0.1	3.5	0.5		●	●	●
2.6 - 2.9	0.1	4	0.5		●	●	●
3.5 - 3.9	0.1	5	0.5		●	●	●
4.5 - 4.9	0.1	6	0.5		●	●	●
5.5 - 5.9	0.1	7	0.5		●	●	●
6.5 - 7	0.5	9	1		●	●	●
7.5 - 8	0.5	10	1		●	●	●
8.5 - 9	0.5	11	1		●	●	●
9.5 - 10	0.5	12	1		●	●	●
10.5 - 11	0.5	13	1		●	●	●
11.5 - 12	0.5	14	1		●	●	●
12.5 - 13	0.5	15	1		●	●	●
13.5 - 14	0.5	16	1.5		●	●	●
14.5 - 15	0.5	17	1.5		●	●	●
15.5 - 16	0.5	18	1.5		●	●	●

Ordering Code (example):

Punch similar to DIN 9861, Shape D		=	272.9.
Shaft diameter d_1	5 mm	=	0500.
Length l_1	71 mm	=	071
Order No		=	272.9. 0500. 071

PUNCH SIMILAR TO DIN 9861, SHAPE C

273.



273. Punch similar to DIN 9861, Shape C

	Gradation			
d_1	d_1	d_2	d_3	l_1
0.5 - 1.5	0.05	3	2	71
1.55 - 2.95	0.05	4.5	3	71

Material:
Tungsten-Cobalt-Carbide
Order No 273.9.

Execution:
Shaft precision ground.
Head: Steel, brazed to shaft or Tungsten-Cobalt Carbide.

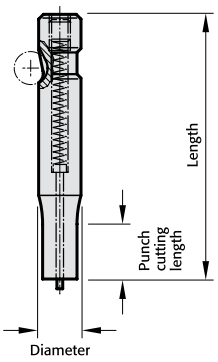
Other diameters and lengths on request.

Ordering Code (example):

Punch similar to DIN 9861, Shape C		=	273.9.
Cutting diameter d_1	1.75 mm	=	0175.
Length l_1	71 mm	=	071
Order No		=	273.9. 0175. 071

BALL-LOCK PUNCHES

BALL-LOCK PUNCH - EXAMPLE ORDERS



Note: **See table for standard dimensions**
Special dimensions to order

2 2 4 2 . 2 F 1 . 0 6 5 0 . 0 4 5 0 . B

Format: Slot length P = 6.5 mm

Form: slot width = 4.5 mm

Punch:
22 without ejector pin
27 with ejector pin

Punch cutting length: l_1

	Order No
13	= 1
19	= 2
25	= 3
30	= 4
special	= X

Angle:	Order Code character
0°	= A
90°	= B
180°	= C
270°	= D
special	= X

Execution:	Order No
blank	= 0
round	= 1
square	= 2
rectangular	= 3
slot	= 4
rectangle with radiused corners	= 5
Pilot pin with tapered tip	= 6
Pilot pin parabolic tip	= 7
special shapes	= 9

Type:	Order No
light	= 2
heavy	= 3
punch larger, light	= 4
punch larger, heavy	= 5

Diameter: d_2

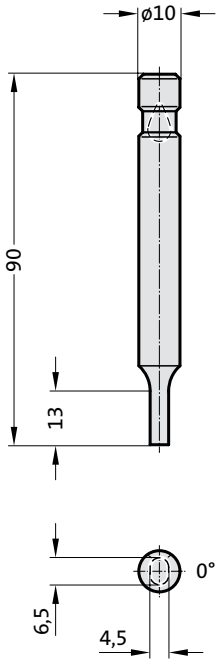
	Order No
6 (light duty only)	= 1
10	= 2
13	= 3
16	= 4
20	= 5
25	= 6
32	= 7
38 (light duty only)	= 8
40 (heavy duty only)	= 9

Length: l	Order Code character
50	= A
56	= B
63	= C
71	= D
80	= E
90	= F
100	= G
110	= H
125	= J
140	= K
150	= L
175	= M
200	= N
special	= X

Ordering Code (example):

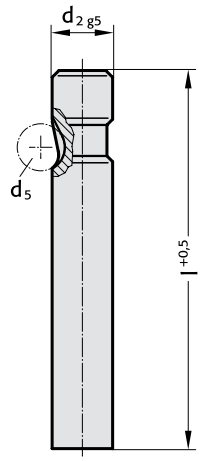
2 2 4 2 . 2 F 1 . 0 6 5 0 . 0 4 5 0 . B

- Angle = 90° (B)
- Format: Slot, width W = 4.5 mm (0450)
- Format: Slot, length P = 6.5 mm (0650)
- Punch cutting length: l1 = 13 mm (1)
- Length: l = 90 mm (F)
- Diameter: d2 = 10 mm (2)
- Type: light (2)
- Version: Slot (4)
- Punch without ejector pin (22)



BALL-LOCK PUNCH, BLANK, LIGHT DUTY

2202.



2202. Ball-Lock punch, blank, light duty

d_2 / Order No	d_5	l / (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)	140 (K)	150 (L)	175 (M)	200 (N)
6 / (1)	6		●	●	●	●	●						
10 / (2)	8		●	●	●	●	●	●	●				
13 / (3)	8		●	●	●	●	●	●	●	●	●	●	
16 / (4)	8		●	●	●	●	●	●	●	●	●	●	
20 / (5)	8		●	●	●	●	●	●	●	●	●	●	
25 / (6)	8		●	●	●	●	●	●	●	●	●	●	●
32 / (7)	8			●	●	●	●	●	●	●	●	●	●
38 / (8)	8				●	●	●	●	●	●	●	●	●

Ordering Code (example):

2202.7G

Length: l
100 mm
Order Code character
= (G)

Diameter: d_2
32 mm
Order No
= (7)

Type:
light
Order No
= (2)

Execution:
blank
Order No
= (0)

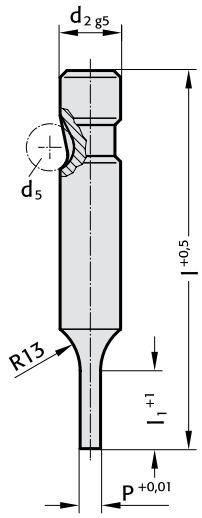
Punch:
without ejector pin
= 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, ROUND, LIGHT DUTY

2212.



2212. Ball-Lock punch, stepped, round, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	1,6 - 5,9	13(1)		●	●	●	●	●
10 / (2)	8	1,6 - 9,9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	5 - 12,9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8 - 15,9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	12 - 19,9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	16 - 24,9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	24 - 31,9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	30 - 37,9	19(2) 25(3) 30(4)				●	●	●

l_1=10 where P < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

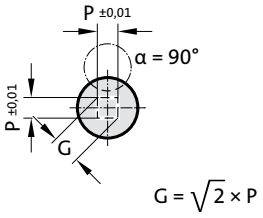
Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

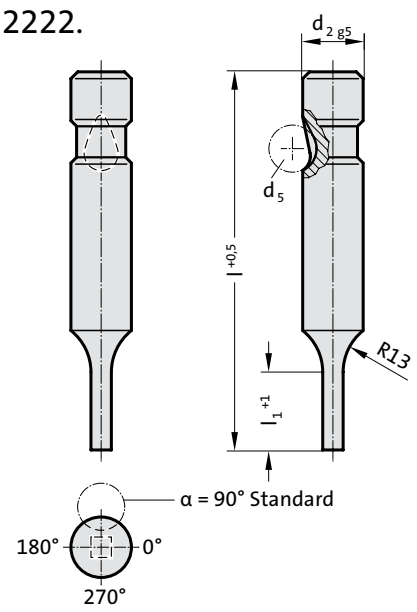
Ordering Code (example):

2212.7G2.2450

Shape: round	
P = ∅ 24,5 mm	= 2450
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
light	= (2)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

BALL-LOCK PUNCH, STEPPED, SQUARE, LIGHT DUTY





2222. Ball-Lock punch, stepped, square, light duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	1.6	5.9	13(1)		●	●	●	●	●
10 / (2)	8	1.6	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	4.5	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	10	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	14	37.9	19(2) 25(3) 30(4)				●	●	●

l_1=10 where P < 2.20

Ordering Code (example):

2222.2E1.0650.A

	Angle	**Order Code character**
	0°	= (A)
	Shape: square, Length P	
	P = 6,5 mm	= 0650
	Punch cutting length: l_1	**Order No**
	13 mm	= (1)
	Length: l	**Order Code character**
	80 mm	= (E)
	Diameter: d_2	**Order No**
	10 mm	= (2)
	Type:	**Order No**
	light	= (2)
	Execution:	**Order No**
	square	= (2)
	Punch:	
	without ejector pin	= 22

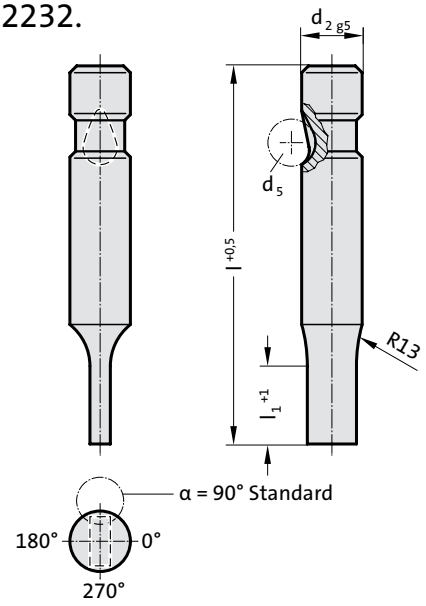
Material:
HSS
Hardness 62 ± 2 HRC

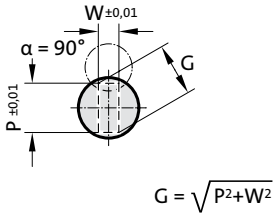
Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, STEPPED, RECTANGULAR, LIGHT DUTY

2232.





2232. Ball-Lock punch, stepped, rectangular, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	1.6	5.9	13(1)		●	●	●	●	●
10 / (2)	8	1.6	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	4.5	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	10	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	14	37.9	19(2) 25(3) 30(4)				●	●	●

l_1=10 where W < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

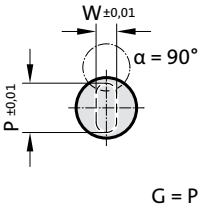
Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

Ordering Code (example):

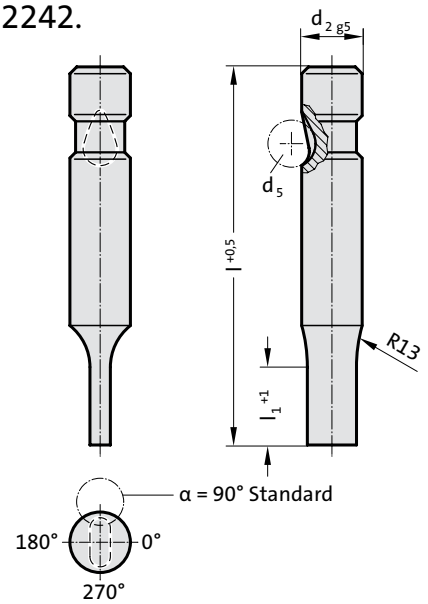
2232.2F1.0650.0450.B

Angle	90°	**Order Code character** = (B)
Shape: rectangular, Width W	W = 4,5 mm	= 0450
Shape: rectangular, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	light	**Order No** = (2)
Execution:	rectangular	**Order No** = (3)
Punch:	without ejector pin	= 22

BALL-LOCK PUNCH, STEPPED, SLOT, LIGHT DUTY



2242.



2242. Ball-Lock punch, stepped, slot, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	1.6	5.9	13(1)		●	●	●	●	●
10 / (2)	8	1.6	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	4.5	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	10	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	14	37.9	19(2) 25(3) 30(4)				●	●	●

l_1=10 where W < 2.20

Ordering Code (example):

2242.2F1.0650.0450.B

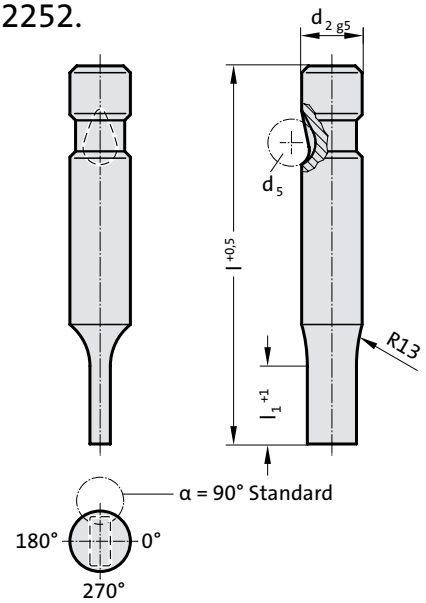
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 4,5 mm	= 0450
Shape: slot, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	light	**Order No** = (2)
Execution:	slot	**Order No** = (4)
Punch:	without ejector pin	= 22

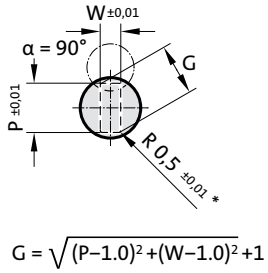
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, RECTANGLE WITH RADIUSSED CORNERS, LIGHT DUTY

2252.





$$G = \sqrt{(P-1.0)^2+(W-1.0)^2}+1$$

2252. Ball-Lock punch, stepped, rectangle with radiussed corners, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	1.6	5.9	13(1)		●	●	●	●	●
10 / (2)	8	1.6	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	4.5	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	10	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	14	37.9	19(2) 25(3) 30(4)				●	●	●

l_1=10 where W < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

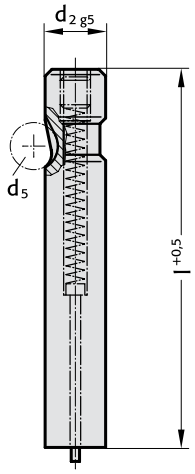
Ordering Code (example):

2252.2F1.0650.0450.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 4,5 mm	= 0450
Shape: rectangle with radiused corners, Length P P = 6,5 mm	= 0650
Punch cutting length: l_1 13 mm	**Order No** = (1)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 10 mm	**Order No** = (2)
Type: light	**Order No** = (2)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, BLANK, WITH EJECTOR PIN, LIGHT DUTY

2702.



2702. Ball-Lock punch, blank, with ejector pin, light duty

d_2 / Order No	d_5	l / (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6		●	●	●	●	●
10 / (2)	8		●	●	●	●	●
13 / (3)	8		●	●	●	●	●
16 / (4)	8		●	●	●	●	●
20 / (5)	8		●	●	●	●	●
25 / (6)	8		●	●	●	●	●
32 / (7)	8			●	●	●	●
38 / (8)	8				●	●	●

Ordering Code (example):

2702.7G

Length: l
100 mm
Order Code character
= (G)

Diameter: d_2
32 mm
Order No
= (7)

Type:
light
Order No
= (2)

Execution:
blank
Order No
= (0)

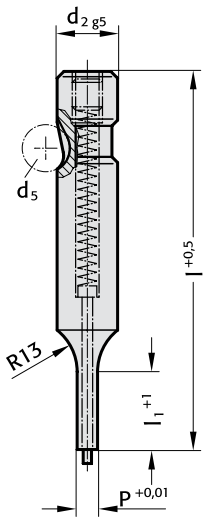
Punch:
with ejector pin
= 27

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, ROUND, WITH EJECTOR PIN, LIGHT DUTY

2712.



2712. Ball-Lock punch, stepped, round, with ejector pin, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2,5 - 5,9	13(1)		●	●	●	●	●
10 / (2)	8	5 - 9,9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	6 - 12,9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8 - 15,9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	10 - 19,9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	12 - 24,9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	16 - 31,9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	19 - 37,9	19(2) 25(3) 30(4)				●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

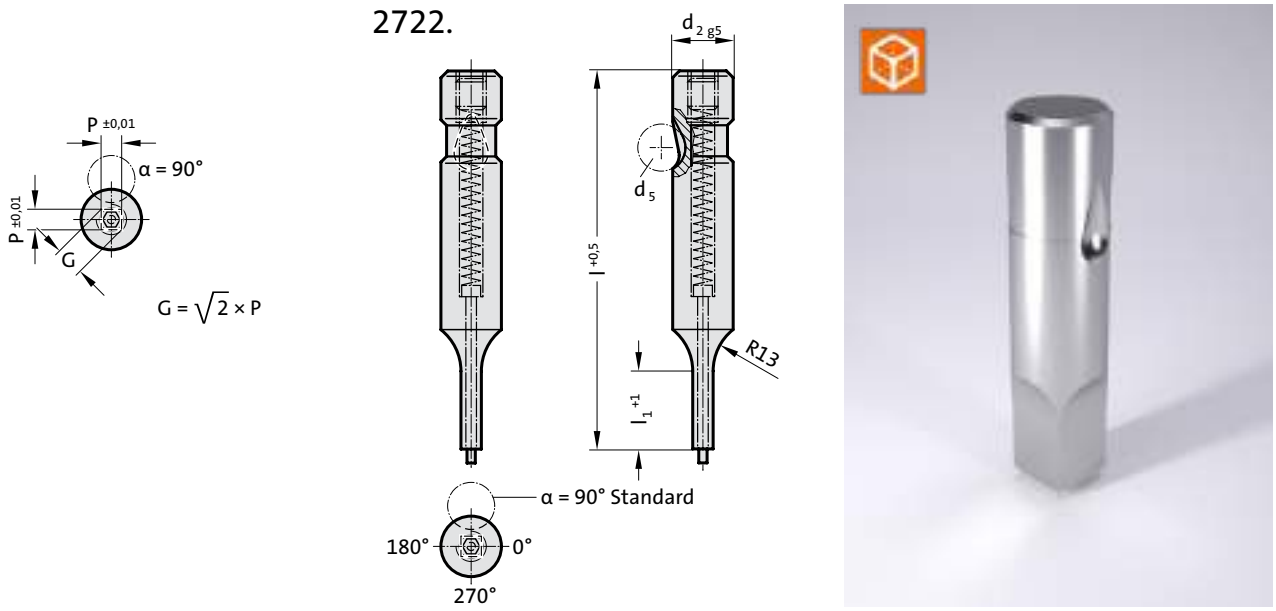
Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

Ordering Code (example):

2712.7G2.2450

Shape: round	
P = ∅ 24,5 mm	= 2450
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
light	= (2)
Execution:	**Order No**
round	= (1)
Punch:	
with ejector pin	= 27

BALL-LOCK PUNCH, STEPPED, SQUARE, WITH EJECTOR PIN, LIGHT DUTY



2722. Ball-Lock punch, stepped, square, with ejector pin, light duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2.5	5.9	13(1)		●	●	●	●	●
10 / (2)	8	4	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	6	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	10	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	12	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	16	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	19	37.9	19(2) 25(3) 30(4)				●	●	●

Ordering Code (example):

2722.2E1.0650.A

Angle:	0°	**Order Code character** = (A)
Shape: square, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	light	**Order No** = (2)
Execution:	square	**Order No** = (2)
Punch:	with ejector pin	= 27

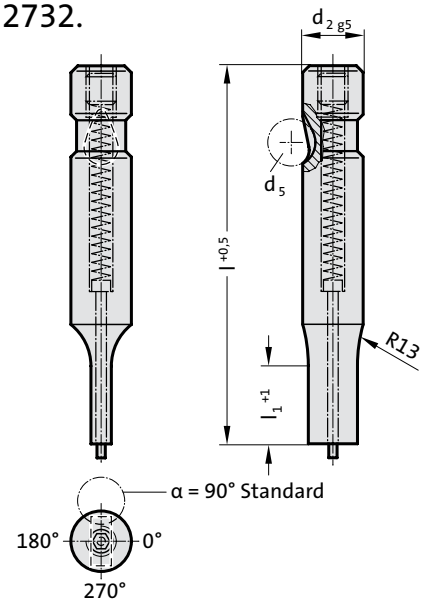
Material:
HSS
Hardness 62 ± 2 HRC

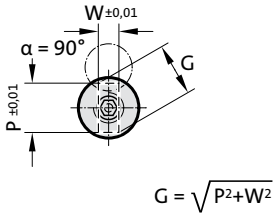
Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, STEPPED, RECTANGULAR, WITH EJECTOR PIN, LIGHT DUTY

2732.





2732. Ball-Lock punch, stepped, rectangular, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2.5	5.9	13(1)		●	●	●	●	●
10 / (2)	8	4	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	6	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	10	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	12	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	16	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	19	37.9	19(2) 25(3) 30(4)				●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

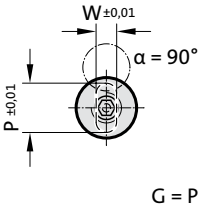
Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

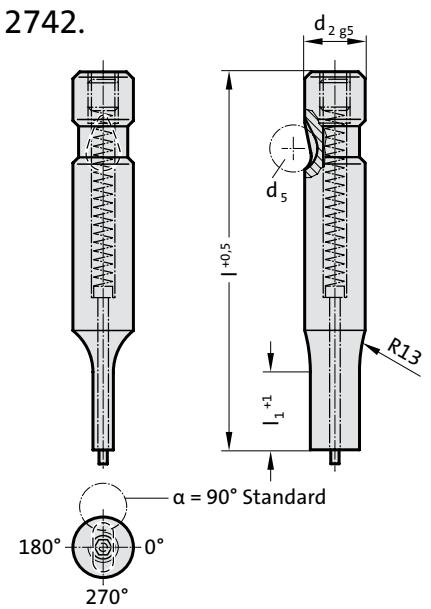
Ordering Code (example):

2732.2F1.0650.0450.B

Angle:	90°	**Order Code character** = (B)
Shape: rectangular, Width W	W = 4,5 mm	= 0450
Shape: rectangular, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	light	**Order No** = (2)
Execution:	rectangular	**Order No** = (3)
Punch:	with ejector pin	= 27

BALL-LOCK PUNCH, STEPPED, SLOT, WITH EJECTOR PIN, LIGHT DUTY





2742. Ball-Lock punch, stepped, slot, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2.5	5.9	13(1)		●	●	●	●	●
10 / (2)	8	4	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	6	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	10	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	12	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	16	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	19	37.9	19(2) 25(3) 30(4)				●	●	●

Ordering Code (example):

2742.2F1.0650.0450.B

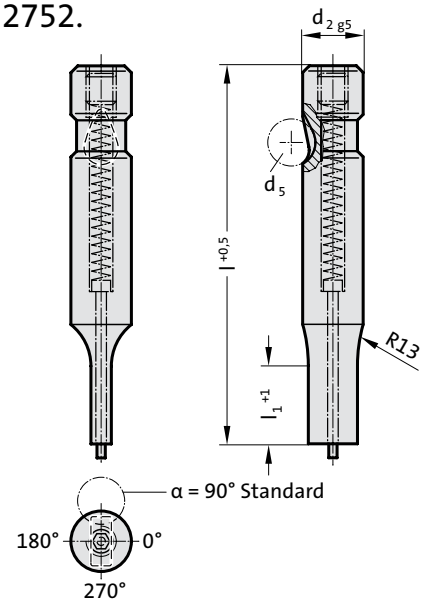
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 4,5 mm	= 0450
Shape: slot, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	light	**Order No** = (2)
Execution:	slot	**Order No** = (4)
Punch:	with ejector pin	= 27

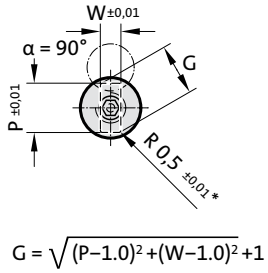
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, RECTANGLE WITH RADIUSSED CORNERS, WITH EJECTOR PIN, LIGHT DUTY

2752.





$$G = \sqrt{(P-1.0)^2+(W-1.0)^2}+1$$

2752. Ball-Lock punch, stepped, rectangle with radiussed corners, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2.5	5.9	13(1)		●	●	●	●	●
10 / (2)	8	4	9.9	13(1) 19(2)		●	●	●	●	●
13 / (3)	8	6	12.9	13(1) 19(2)		●	●	●	●	●
16 / (4)	8	8	15.9	13(1) 19(2) 25(3)		●	●	●	●	●
20 / (5)	8	10	19.9	13(1) 19(2) 25(3)		●	●	●	●	●
25 / (6)	8	12	24.9	13(1) 19(2) 25(3)		●	●	●	●	●
32 / (7)	8	16	31.9	13(1) 19(2) 25(3)			●	●	●	●
38 / (8)	8	19	37.9	19(2) 25(3) 30(4)				●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

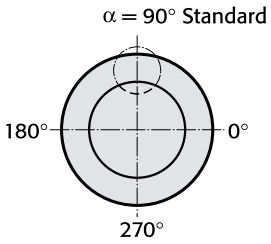
Ordering Code (example):

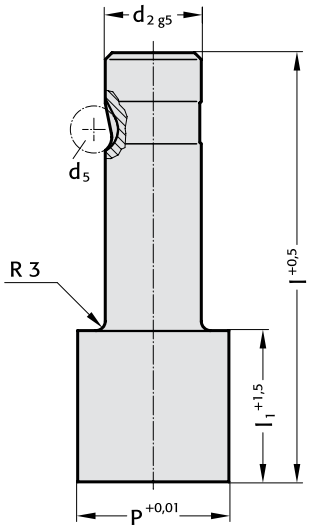
2752.2F1.0650.0450.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 4,5 mm	= 0450
Shape: rectangle with radiused corners, Length P P = 6,5 mm	= 0650
Punch cutting length: l_1 13 mm	**Order No** = (1)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 10 mm	**Order No** = (2)
Type: light	**Order No** = (2)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: with ejector pin	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, BLANK, LIGHT DUTY

2204.





2204. Ball-Lock punch, punch larger than shaft, blank, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	32	19 / (2) 30 / (4)		●	●	●
16 / (4)	8	38	19 / (2) 30 / (4)		●	●	●
20 / (5)	8	40	19 / (2) 30 / (4)		●	●	●
25 / (6)	8	44	19 / (2) 30 / (4)		●	●	●
32 / (7)	8	50	19 / (2) 30 / (4)		●	●	●

Ordering Code (example):

2204.4F4.3800

Shape: round		
P = ∅ 38 mm		= 3800
Punch cutting length: l_1		**Order No**
30 mm		= (4)
Length: l		**Order Code character**
90 mm		= (F)
Diameter: d_2		**Order No**
16 mm		= (4)
Type:		**Order No**
punch larger, light		= (4)
Execution:		**Order No**
blank		= (0)
Punch:		
without ejector pin		= 22

Material:

HSS

Hardness 62 ± 2 HRC

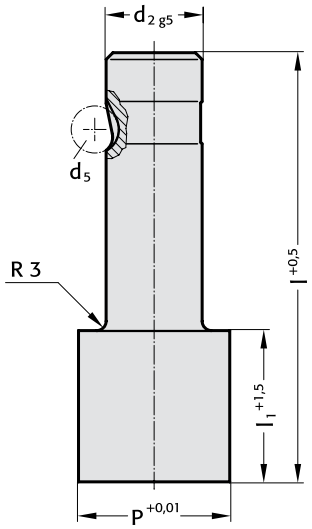
Execution:

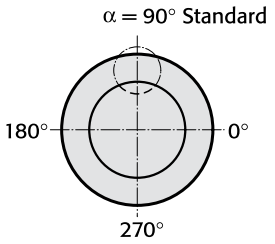
Shaft and punch diameter fine ground.

Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, ROUND, LIGHT DUTY

2214.





2214. Ball-Lock punch, punch larger than shaft, round, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	13,1 - 32	19(2) 30(4)		●	●	●
16 / (4)	8	16,1 - 38	19(2) 30(4)		●	●	●
20 / (5)	8	20,1 - 40	19(2) 30(4)		●	●	●
25 / (6)	8	25,1 - 44	19(2) 30(4)		●	●	●
32 / (7)	8	32,1 - 50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

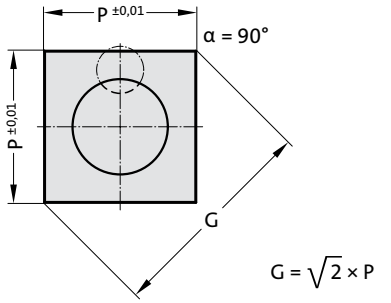
Ordering Code (example):

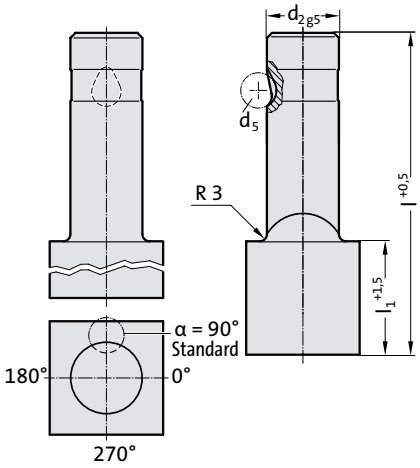
2214.7G2.3820

Shape: round	
P = ∅ 38,2 mm	= 3820
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
punch larger, light	= (4)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SQUARE, LIGHT DUTY

2224.





2224. Ball-Lock punch, punch larger than shaft, square, light duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	9.19	32	19(2) 30(4)		●	●	●
16 / (4)	8	11.31	38	19(2) 30(4)		●	●	●
20 / (5)	8	14.14	40	19(2) 30(4)		●	●	●
25 / (6)	8	17.68	44	19(2) 30(4)		●	●	●
32 / (7)	8	22.63	50	19(2) 30(4)		●	●	●

Ordering Code (example):

2224.7F2.3535.A

Angle:	0°	**Order Code character** = (A)
Shape: square, Length P	P = 35,35 mm	= 3535
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (7)
Type:	punch larger, light	**Order No** = (4)
Execution:	square	**Order No** = (2)
Punch:	without ejector pin	= 22

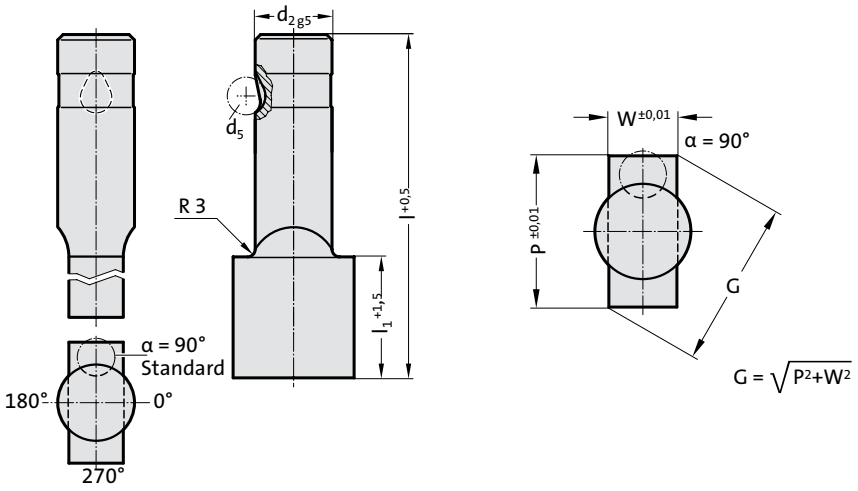
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGULAR, LIGHT DUTY

2234.



2234. Ball-Lock punch, punch larger than shaft, rectangular, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

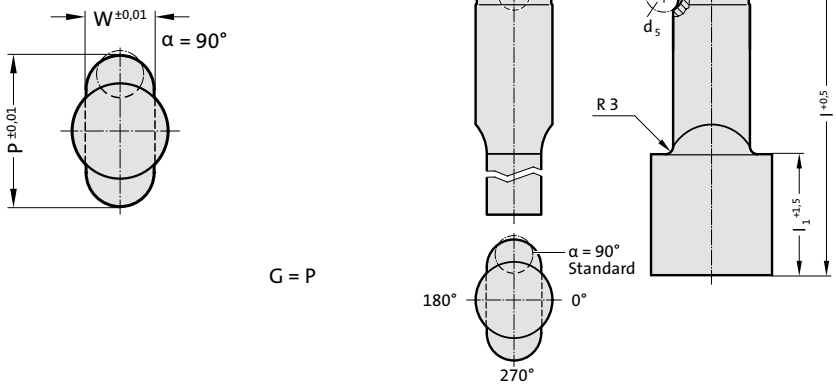
Ordering Code (example):

2234.7F2.3820.1150.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangular, Width W W = 11,5 mm	= 1150
Shape: rectangular, Length P P = 38,2 mm	= 3820
Punch cutting length: l_1 19 mm	**Order No** = (2)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (7)
Type: punch larger, light	**Order No** = (4)
Execution: rectangular	**Order No** = (3)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SLOT, LIGHT DUTY

2244.



2244. Ball-Lock punch, punch larger than shaft, slot, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Ordering Code (example):

2244.4F2.3720.1150.B

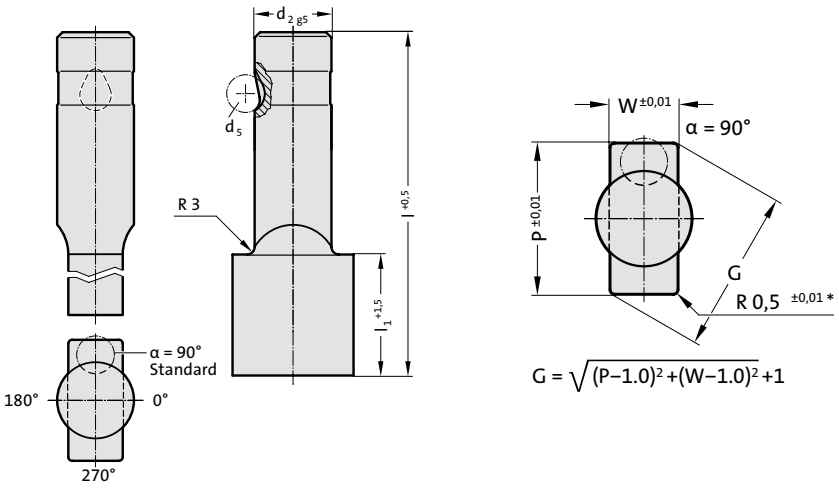
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 11,5 mm	= 1150
Shape: slot, Length P	P = 37,2 mm	= 3720
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	16 mm	**Order No** = (4)
Type:	punch larger, light	**Order No** = (4)
Execution:	slot	**Order No** = (4)
Punch:	without ejector pin	= 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGLE WITH RADIUSSED CORNERS, LIGHT DUTY

2254.



2254. Ball-Lock punch, punch larger than shaft, rectangle with radiussed corners, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

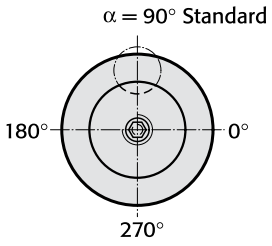
Ordering Code (example):

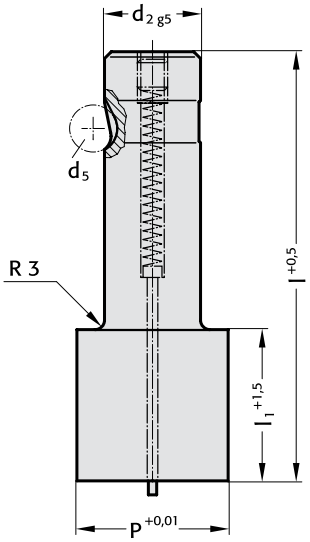
2254.7F2.3720.1150.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P P = 37,2 mm	= 3720
Punch cutting length: l_1 19 mm	**Order No** = (2)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (7)
Type: punch larger, light	**Order No** = (4)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, BLANK, WITH EJECTOR PIN, LIGHT DUTY

2704.





2704. Ball-Lock punch, punch larger than shaft, blank, with ejector pin, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	32	19(2) 30(4)		●	●	●
16 / (4)	8	38	19(2) 30(4)		●	●	●
20 / (5)	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	44	19(2) 30(4)		●	●	●
32 / (7)	8	50	19(2) 30(4)		●	●	●

Ordering Code (example):

2704.4F4.3800

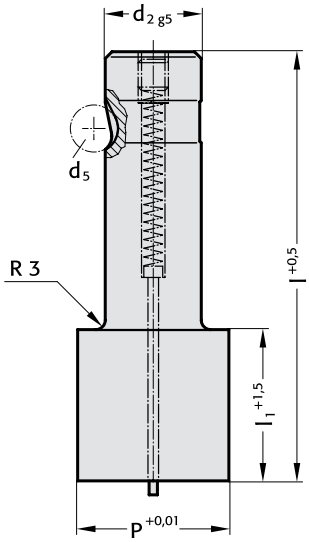
Shape: round	
P = ∅ 38 mm	= 3800
Punch cutting length: l_1	**Order No**
30 mm	= (4)
Length: l	**Order Code character**
90 mm	= (F)
Diameter: d_2	**Order No**
16 mm	= (4)
Type:	**Order No**
punch larger, light	= (4)
Execution:	**Order No**
blank	= (0)
Punch:	
with ejector pin	= 27

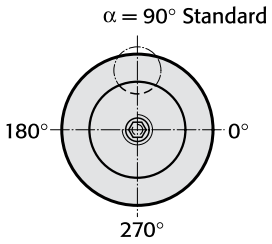
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, ROUND, WITH EJECTOR PIN, LIGHT DUTY

2714.





2714. Ball-Lock punch, punch larger than shaft, round, with ejector pin, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	13,1 - 32	19(2) 30(4)		●	●	●
16 / (4)	8	16,1 - 38	19(2) 30(4)		●	●	●
20 / (5)	8	20,1 - 40	19(2) 30(4)		●	●	●
25 / (6)	8	25,1 - 44	19(2) 30(4)		●	●	●
32 / (7)	8	32,1 - 50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

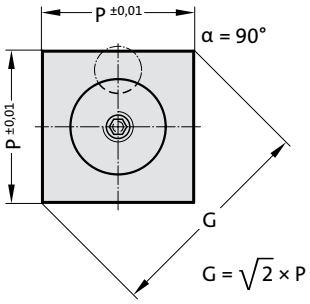
Ordering Code (example):

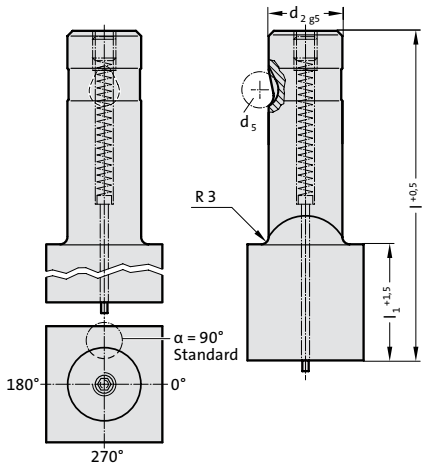
2714.7G2.4250

Shape: round	
P = ∅ 42,5 mm	= 4250
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
punch larger, light	= (4)
Execution:	**Order No**
round	= (1)
Punch:	
with ejector pin	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SQUARE, WITH EJECTOR PIN, LIGHT DUTY

2724.





2724. Ball-Lock punch, punch larger than shaft, square, with ejector pin, light duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	9.19	32	19(2) 30(4)		●	●	●
16 / (4)	8	11.31	38	19(2) 30(4)		●	●	●
20 / (5)	8	14.14	40	19(2) 30(4)		●	●	●
25 / (6)	8	17.68	44	19(2) 30(4)		●	●	●
32 / (7)	8	22.63	50	19(2) 30(4)		●	●	●

Ordering Code (example):

2724.5E2.2828.A

Angle:	0°	**Order Code character** = (A)
Shape: square, Length P	P =28,28 mm	= 2828
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_2	20 mm	**Order No** = (5)
Type:	punch larger, light	**Order No** = (4)
Execution:	square	**Order No** = (2)
Punch:	with ejector pin	= 27

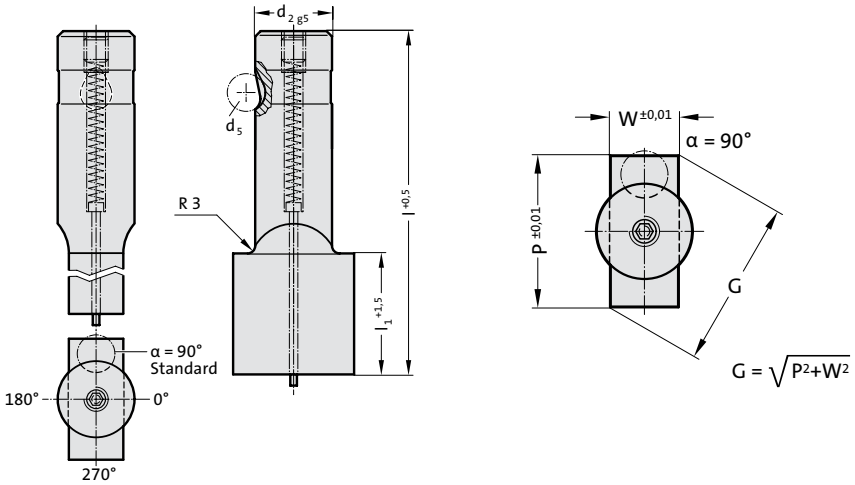
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGULAR, WITH EJECTOR PIN, LIGHT DUTY

2734.



2734. Ball-Lock punch, punch larger than shaft, rectangular, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

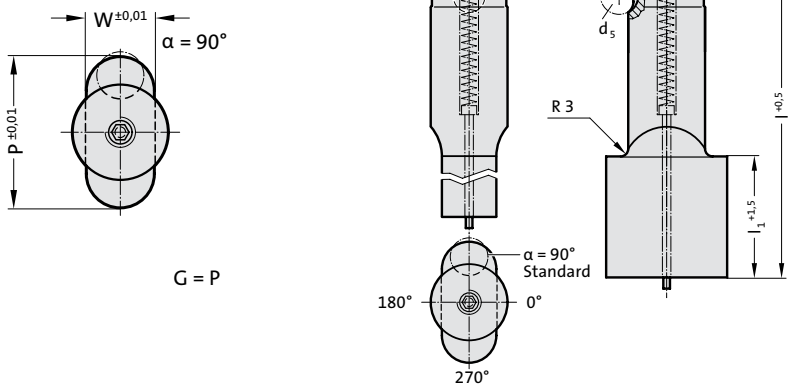
Ordering Code (example):

2734.7F2.3820.1150.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangular, Width W W = 11,5 mm	= 1150
Shape: rectangular, Length P P = 38,2 mm	= 3820
Punch cutting length: l_1 19 mm	**Order No** = (2)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (7)
Type: punch larger, light	**Order No** = (4)
Execution: rectangular	**Order No** = (3)
Punch: with ejector pin	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SLOT, WITH EJECTOR PIN, LIGHT DUTY

2744.



2744. Ball-Lock punch, punch larger than shaft, slot, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Ordering Code (example):

2744.7F2.3820.1150.B

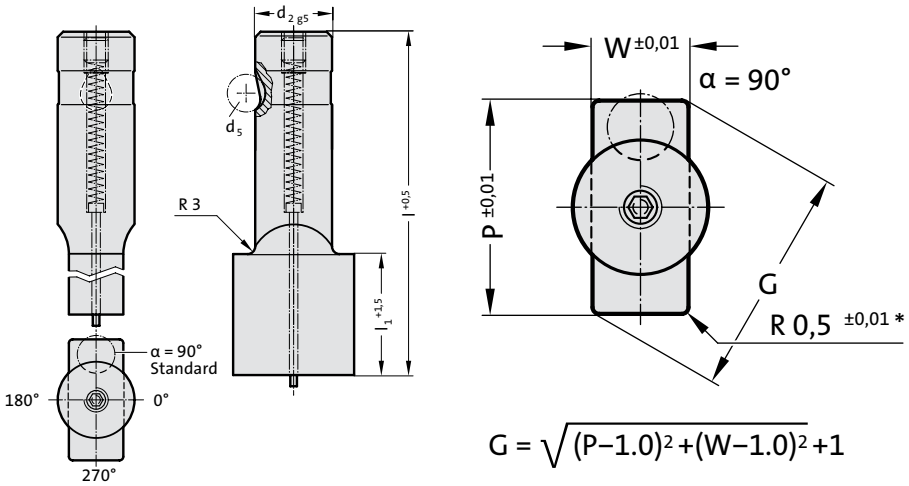
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 11,5 mm	= 1150
Shape: slot, Length P	P = 38,2 mm	= 3820
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (7)
Type:	punch larger, light	**Order No** = (4)
Execution:	slot	**Order No** = (4)
Punch:	with ejector pin	= 27

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGLE WITH RADIUSSED CORNERS, WITH EJECTOR PIN, LIGHT DUTY

2754.



2754. Ball-Lock punch, punch larger than shaft, rectangle with radiussed corners, with ejector pin, light duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	8	5	32	19(2) 30(4)		●	●	●
16 / (4)	8	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	8	8	40	19(2) 30(4)		●	●	●
25 / (6)	8	10	44	19(2) 30(4)		●	●	●
32 / (7)	8	11.5	50	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

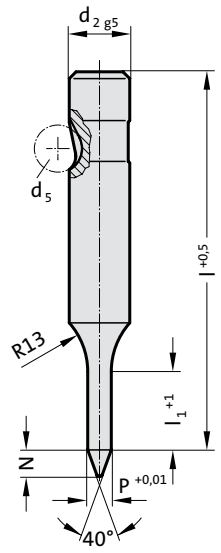
Ordering Code (example):

2754.7F2.3820.1150.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P P = 38,2 mm	= 3820
Punch cutting length: l_1 19 mm	**Order No** = (2)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (7)
Type: punch larger, light	**Order No** = (4)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: with ejector pin	= 27

BALL-LOCK PILOT PIN, WITH TAPERED TIP, LIGHT DUTY

2262.



2262. Ball-Lock pilot pin, with tapered tip, light duty

d_2 / Order No	d_5	P	l_1 / Order No	N	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)	140 (K)	150 (L)
10 / (2)	8	5,9 - 9,9	19(2)	8		●	●	●	●	●			
13 / (3)	8	9,9 - 12,9	19(2)	10		●	●	●	●	●	●	●	
16 / (4)	8	12,9 - 15,9	25(3)	15		●	●	●	●	●	●	●	●
20 / (5)	8	15,9 - 19,9	25(3)	20		●	●	●	●	●	●	●	●
25 / (6)	8	19,9 - 24,9	25(3)	25		●	●	●	●	●	●	●	●
32 / (7)	8	24,9 - 31,9	25(3)	30			●	●	●	●	●	●	●
38 / (8)	8	31,9 - 37,9	30(4)	35			●	●	●	●	●	●	●

Ordering Code (example):

2262.4G3.1410

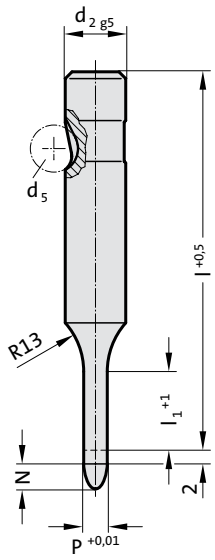
Shape: round
P = ∅ 14,1 mm = 1410
Punch cutting length: l_1 **Order No**
25 mm = (3)
Length: l **Order Code character**
100 mm = (G)
Diameter: d_2 **Order No**
16 mm = (4)
Type: **Order No**
light = (2)
Execution: **Order No**
Pilot pin with tapered tip = (6)
Punch:
without ejector pin = 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and pilot pin fine ground.
Special dimensions on request.

BALL-LOCK PILOT PIN, WITH PARABOLIC TIP, LIGHT DUTY

2272.



2272. Ball-Lock pilot pin, with parabolic tip, light duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	50 (A)	56 (B)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
6 / (1)	6	2,5 - 5,9	13(1)		●	●	●	●	●	●	●
10 / (2)	8	5,9 - 9,9	19(2)		●	●	●	●	●	●	●
13 / (3)	8	9,9 - 12,9	19(2)		●	●	●	●	●	●	●
16 / (4)	8	12,9 - 15,9	25(3)				●	●	●	●	●
20 / (5)	8	15,9 - 19,9	25(3)				●	●	●	●	●
25 / (6)	8	19,9 - 24,9	25(3)				●	●	●	●	●
32 / (7)	8	24,9 - 31,9	25(3)					●	●	●	●
38 / (8)	8	31,9 - 37,9	30(4)						●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and pilot pin fine ground.
Special dimensions on request.

Note:
The 2 mm length provides full guidance before the blanking punch contacts the sheet metal.

Length of parabolic tip N:
= 8 mm where P ≤ 10 mm
=12 mm where P 10,1 mm - 15 mm
=15 mm where P > 15 mm

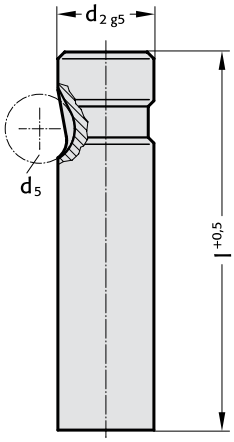
Ordering Code (example):

2272.4G3.1410

Shape: round P = ∅ 14,1 mm	= 1410
Punch cutting length: l_1 25 mm	**Order No** = (3)
Length: l 100 mm	**Order Code character** = (G)
Diameter: d_2 16 mm	**Order No** = (4)
Type: light	**Order No** = (2)
Execution: Pilot pin with parabolic tip	**Order No** = (7)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, BLANK, HEAVY DUTY

2203.



2203. Ball-Lock punch, blank, heavy duty

d_2 / Order No	d_5	l / (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)	140 (K)	150 (L)	175 (M)	200 (N)
10 / (2)	10		●	●	●	●	●	●	●				
13 / (3)	12		●	●	●	●	●	●	●	●	●	●	
16 / (4)	12		●	●	●	●	●	●	●	●	●	●	
20 / (5)	12		●	●	●	●	●	●	●	●	●	●	
25 / (6)	12			●	●	●	●	●	●	●	●	●	●
32 / (7)	12			●	●	●	●	●	●	●	●	●	●
40 / (9)	12				●	●	●	●	●	●	●	●	●

Ordering Code (example):

2203.7G

Length: l
100 mm
Order Code character
= (G)

Diameter: d_2
32 mm
Order No
= (7)

Type:
heavy
Order No
= (3)

Execution:
blank
Order No
= (0)

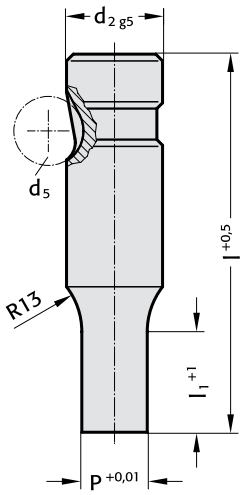
Punch:
without ejector pin
= 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, ROUND, HEAVY DUTY

2213.



2213. Ball-Lock punch, stepped, round, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	1,6 - 9,9	13(1) 19(2)		●	●	●	●	●	●	●
13 / (3)	12	5 - 12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8 - 15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	12 - 19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	16 - 24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	24 - 31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	30 - 39,9	19(2) 25(3) 30(4)				●	●	●	●	●

l_1=10 where P < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

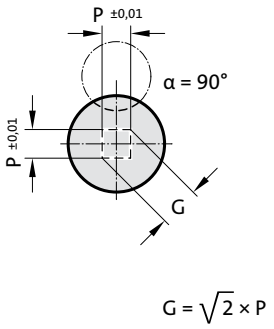
Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

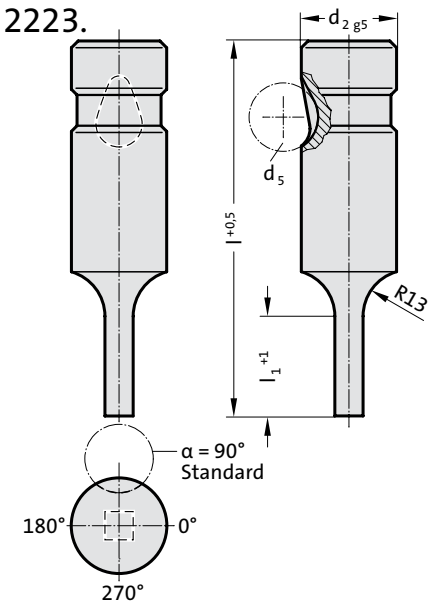
Ordering Code (example):

2213.7G2.2450

Shape: round	
P = ∅ 24,5 mm	= 2450
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
heavy	= (3)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

BALL-LOCK PUNCH, STEPPED, SQUARE, HEAVY DUTY





2223. Ball-Lock punch, stepped, square, heavy duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	1.6	9.9	13(1) 19(2)		●	●	●	●	●	●	●
13 / (3)	12	4.5	12.9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	10	24.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	14	39.9	19(2) 25(3) 30(4)				●	●	●	●	●

l_1=10 where P < 2.20

Ordering Code (example):

2223.3F1.0620.B

Angle:	90°	**Order Code character** = (B)
Shape: square, Length P	P = 6,2 mm	= 0620
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	13 mm	**Order No** = (3)
Type:	heavy	**Order No** = (3)
Execution:	square	**Order No** = (2)
Punch:	without ejector pin	= 22

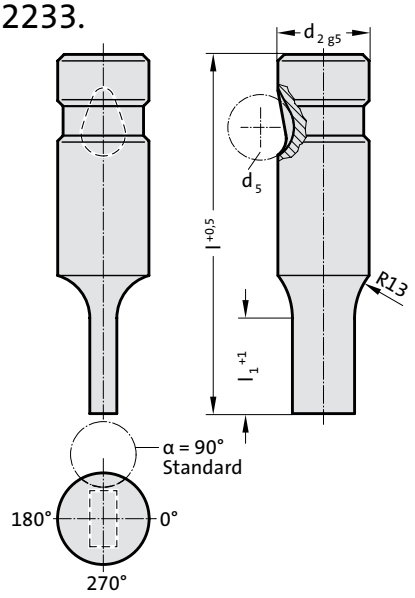
Material:
HSS
Hardness 62 ± 2 HRC

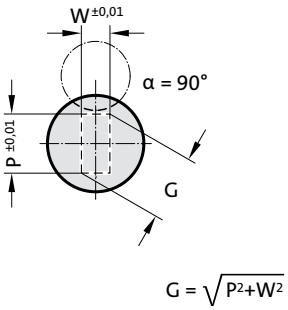
Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, STEPPED, RECTANGULAR, HEAVY DUTY

2233.





2233. Ball-Lock punch, stepped, rectangular, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	1.6	9.9	13(1) 19(2)		●	●	●	●	●	●	●
13 / (3)	12	4.5	12.9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	10	24.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	14	39.9	19(2) 25(3) 30(4)				●	●	●	●	●

l_1=10 where W < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

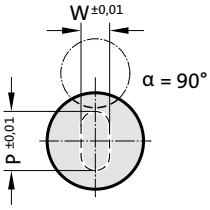
Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

Ordering Code (example):

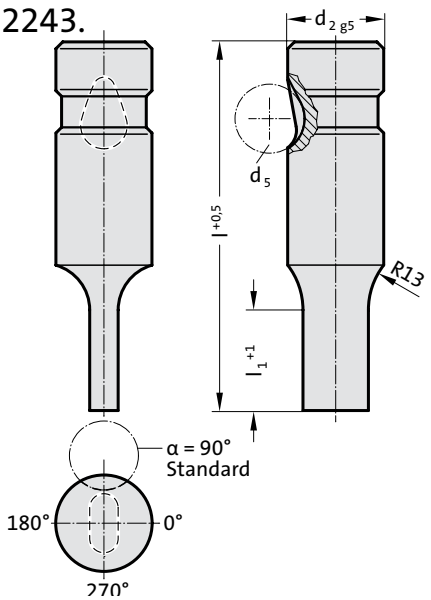
2233.2F1.0650.0450.B

Angle:	90°	**Order Code character** = (B)
Shape: rectangular, Width W	W = 4,5 mm	= 0450
Shape: rectangular, Length P	P = 6,5 mm	= 0650
Punch cutting length: l_1	13 mm	**Order No** = (1)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	10 mm	**Order No** = (2)
Type:	heavy	**Order No** = (3)
Execution:	rectangular	**Order No** = (3)
Punch:	without ejector pin	= 22

BALL-LOCK PUNCH, STEPPED, SLOT, HEAVY DUTY



G = P



2243. Ball-Lock punch, stepped, slot, heavy duty

d_2 / Order No	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	1.6	9.9	13(1) 19(2)		●	●	●	●	●	●	●
13 / (3)	4.5	12.9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	10	24.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	14	39.9	19(2) 25(3) 30(4)				●	●	●	●	●

l_1=10 where W < 2.20

Ordering Code (example):

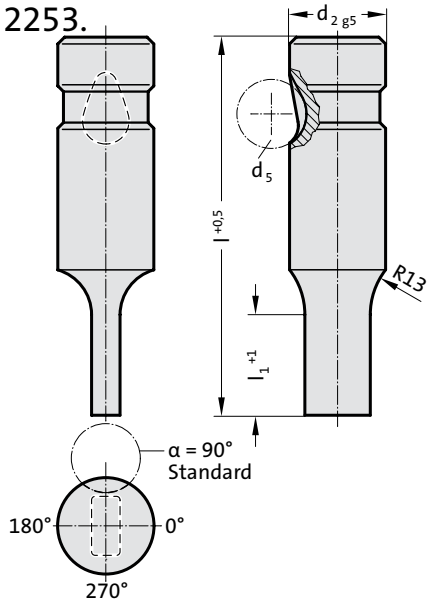
2243.3E2.1215.0915.B

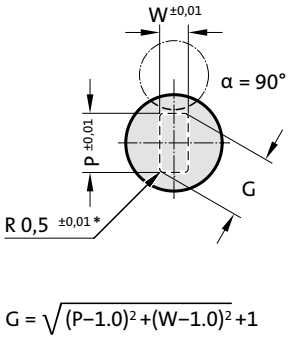
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 9,15 mm	= 0915
Shape: slot, Length P	P = 12,15 mm	= 1215
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_2	13 mm	**Order No** = (3)
Type:	heavy	**Order No** = (3)
Execution:	slot	**Order No** = (4)
Punch:	without ejector pin	= 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, STEPPED, RECTANGLE WITH RADIUSSED CORNERS, HEAVY DUTY





2253. Ball-Lock punch, stepped, rectangle with radiussed corners, heavy duty

d_2 / Order No	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	1.6	9.9	13(1) 19(2)		●	●	●	●	●	●	●
13 / (3)	4.5	12.9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	6	15.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	8	19.9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	10	24.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12.5	31.9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	14	39.9	19(2) 25(3) 30(4)				●	●	●	●	●

l_1=10 where W < 2.20

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

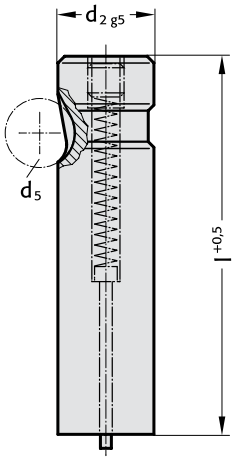
Ordering Code (example):

2253.2F1.0650.0450.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 4,5 mm	= 0450
Shape: rectangle with radiused corners, Length P P = 6,5 mm	= 0650
Punch cutting length: l_1 13 mm	**Order No** = (1)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 10 mm	**Order No** = (2)
Type: heavy	**Order No** = (3)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, BLANK, WITH EJECTOR PIN, HEAVY DUTY

2703.



2703. Ball-Lock punch, blank, with ejector pin, heavy duty

d_2 / Order No	d_5	l / (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10		●	●	●	●	●		
13 / (3)	12		●	●	●	●	●	●	●
16 / (4)	12		●	●	●	●	●	●	●
20 / (5)	12		●	●	●	●	●	●	●
25 / (6)	12			●	●	●	●	●	●
32 / (7)	12			●	●	●	●	●	●
40 / (9)	12				●	●	●	●	●

Ordering Code (example):

2703.7G

Length: l
100 mm
Order Code character
= (G)

Diameter: d_2
32 mm
Order No
= (7)

Type:
heavy
Order No
= (3)

Execution:
blank
Order No
= (0)

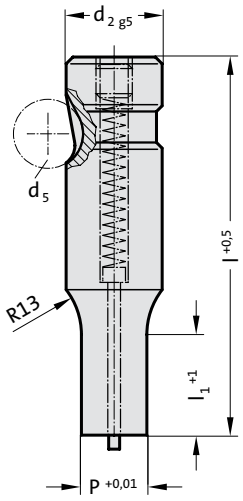
Punch:
with ejector pin
= 27

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft fine ground.
Special dimensions on request.

POINÇON À BILLE, ÉPAULÉ, ROND, AVEC ÉJECTEUR, FORTE CHARGE

2713.



2713. Poinçon à bille, épaulé, rond, avec éjecteur, forte charge

d_2 / Chiffre de référence	d_5	P	l_1 / Chiffre de référence	l (Lettre de référence)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	5 - 9,9	13(1) 19(2)		●	●	●	●	●		
13 / (3)	12	6 - 12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8 - 15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	10 - 19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	12 - 24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	16 - 31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	19 - 39,9	19(2) 25(3) 30(4)				●	●	●	●	●

*à d_2 = 16/ 20 et l = 63; $l_{1\ max.}$ = 19

Matière :
HSS
Dureté 62 ± 2 HRC

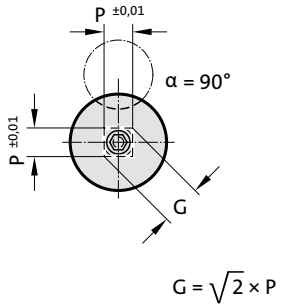
Exécution :
Corps et diamètre du tranchant superfinis.
Fabrication spéciale sur demande.

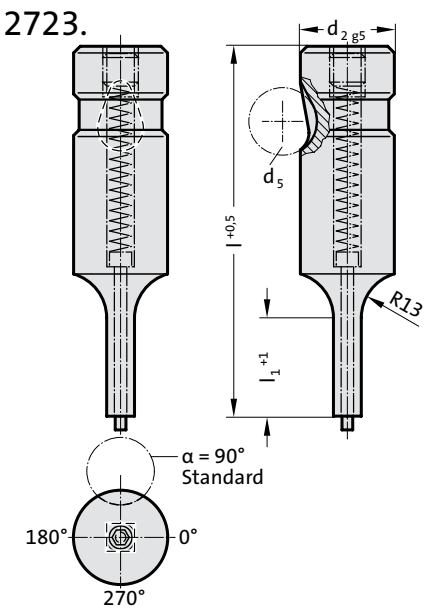
Exemple de commande :

2713.3C1.0550

Forme: Rond	
P = ∅ 5,5 mm	= 0550
Longueur épaulement: l_1	**Chiffre de référence**
13 mm	= (1)
Longueur: l	**Lettre de référence**
63 mm	= (C)
Diamètre: d_2	**Chiffre de référence**
13 mm	= (3)
Type:	**Chiffre de référence**
forte charge	= (3)
Exécution:	**Chiffre de référence**
Rond	= (1)
Poinçon de découpe:	
avec éjecteur	= 27

POINÇON À BILLE, ÉPAULÉ, CARRÉ, AVEC ÉJECTEUR, FORTE CHARGE





2723. Poinçon à bille, épaulé, carré, avec éjecteur, forte charge

d_2 / Chiffre de référence	d_5	P_{min}	G_{max}	l_1 / Chiffre de référence	l (Lettre de référence)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	4	9,9	13(1) 19(2)		●	●	●	●	●		
13 / (3)	12	6	12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8	15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	10	19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	12	24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	16	31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	19	39,9	19(2) 25(3) 30(4)				●	●	●	●	●

*à d_2 = 16/ 20 et l = 63; $l_{1\ max.}$ = 19

Exemple de commande :

2723.2F1.0650.B

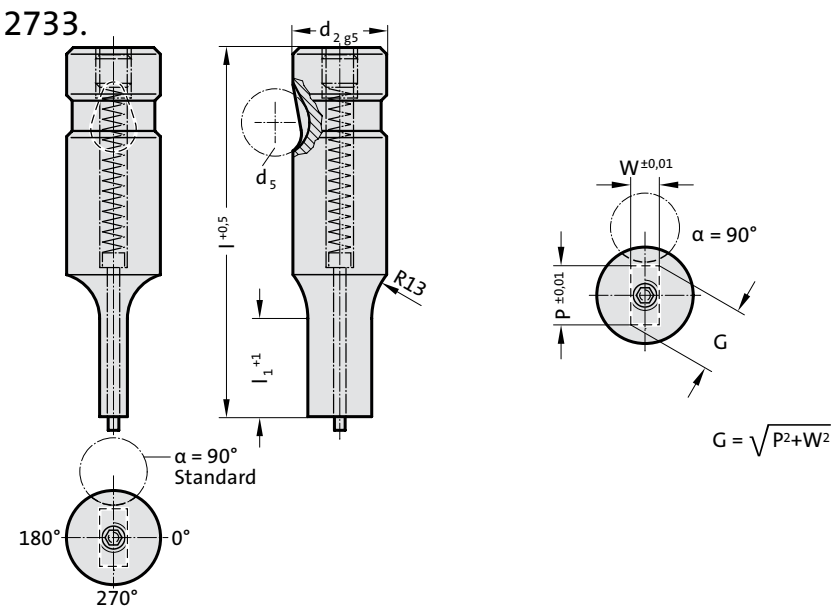
Angle: 90°	**Lettre de référence**	= (B)
Forme: Carré, Longueur P P = 6,5 mm		= 0650
Longueur épaulement: l_1 13 mm	**Chiffre de référence**	= (1)
Longueur: l 90 mm	**Lettre de référence**	= (F)
Diamètre: d_2 10 mm	**Chiffre de référence**	= (2)
Type: forte charge	**Chiffre de référence**	= (3)
Exécution: Carré	**Chiffre de référence**	= (2)
Poinçon de découpe: avec éjecteur		= 27

Matière :
HSS
Dureté 62 ± 2 HRC

Exécution :
Corps et embout profilé superfinis.
Fabrication spéciale sur demande.

Remarque :
En cas de fente de coupe ≤ 0,04 mm, FIBRO procède à l'arrondissement des arêtes tranchantes si un poinçon de découpe et une matrice sont commandés ensemble. Cela permet de réduire le temps de montage et les risques de cassure d'arêtes durant le fonctionnement.

POINÇON À BILLE, ÉPAULÉ, RECTANGLE, AVEC ÉJECTEUR, FORTE CHARGE



2733. Poinçon à bille, épaulé, rectangle, avec éjecteur, forte charge

d_2 / Chiffre de référence	d_5	W_{min}	G_{max}	l_1 / Chiffre de référence	l (Lettre de référence)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	4	9,9	13(1) 19(2)		●	●	●	●	●		
13 / (3)	12	6	12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8	15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	10	19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	12	24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	16	31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	19	39,9	19(2) 25(3) 30(4)				●	●	●	●	●

*à d_2 = 16/ 20 et l = 63; $l_{1\ max.}$ = 19

Matière :
HSS
Dureté 62 ± 2 HRC

Exécution :
Corps et embout profilé superfinis.
Fabrication spéciale sur demande.

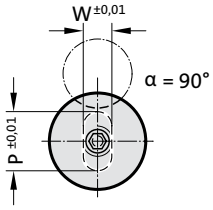
Remarque :
En cas de fente de coupe ≤ 0,04 mm, FIBRO procède à l'arrondissement des arêtes tranchantes si un poinçon de découpe et une matrice sont commandés ensemble. Cela permet de réduire le temps de montage et les risques de cassure d'arêtes durant le fonctionnement.

Exemple de commande :

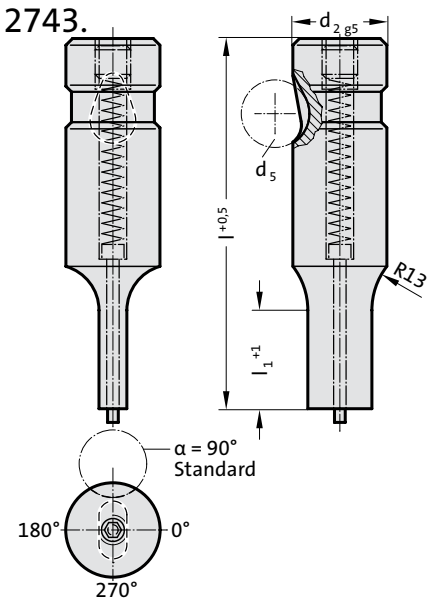
2733.7F2.1420.1250.B

Angle:	90°	**Lettre de référence** = (B)
Forme: Rectangle, Largeur W	W = 12,50 mm	= 1250
Forme: Rectangle, Longueur P	P = 14,20 mm	= 1420
Longueur épaulement: l_1	19 m	**Chiffre de référence** = (2)
Longueur: l	90 mm	**Lettre de référence** = (F)
Diamètre: d_2	32 mm	**Chiffre de référence** = (7)
Type:	forte charge	**Chiffre de référence** = (3)
Exécution:	Rectangle	**Chiffre de référence** = (3)
Poinçon de découpe:	avec éjecteur	= 27

POINÇON À BILLE, ÉPAULÉ, TROU OBLONG, AVEC ÉJECTEUR, FORTE CHARGE



G = P



2743. Poinçon à bille, épaulé, trou oblong, avec éjecteur, forte charge

d_2 / Chiffre de référence	d_5	W_{min}	G_{max}	l_1 / Chiffre de référence	l (Lettre de référence)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	4	9,9	13(1) 19(2)		●	●	●	●	●		
13 / (3)	12	6	12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8	15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	10	19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	12	24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	16	31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	19	39,9	19(2) 25(3) 30(4)				●	●	●	●	●

*à d_2 = 16/ 20 et l = 63; $l_{1\ max.}$ = 19

Exemple de commande :

2743.2F1.0650.0450.B

Angle:	90°	**Lettre de référence** = (B)
Forme: Trou oblong, Largeur W	W = 4,50 mm	= 0450
Forme: Trou oblong, Longueur P	P = 6,50 mm	= 0650
Longueur épaulement: l_1	13 mm	**Chiffre de référence** = (1)
Longueur: l	90 mm	**Lettre de référence** = (F)
Diamètre: d_2	10 mm	**Chiffre de référence** = (2)
Type:	forte charge	**Chiffre de référence** = (3)
Exécution:	Trou oblong	**Chiffre de référence** = (4)
Poinçon de découpe:	avec éjecteur	= 27

Matière :

HSS

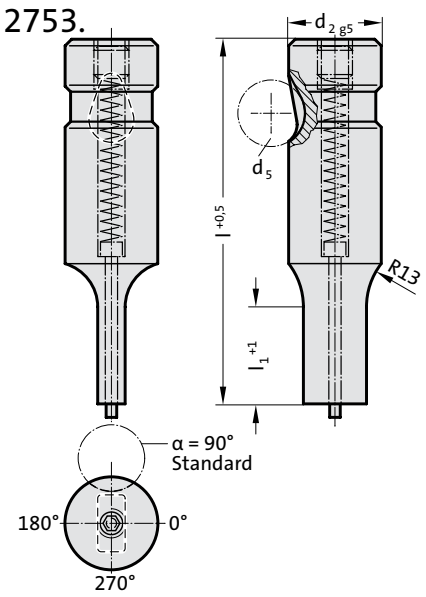
Dureté 62 ± 2 HRC

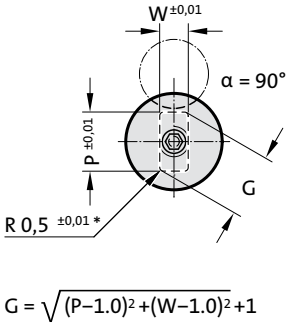
Exécution :

Corps et embout profilé superfinis.

Fabrication spéciale sur demande.

POINÇON À BILLE, ÉPAULÉ, RECTANGLE AVEC RAYON, AVEC ÉJECTEUR, FORTE CHARGE





2753. Poinçon à bille, épaulé, rectangle avec rayon, avec éjecteur, forte charge

d_2 / Chiffre de référence	d_5	W_{min}	G_{max}	l_1 / Chiffre de référence	l (Lettre de référence)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	4	9,9	13(1) 19(2)		●	●	●	●	●		
13 / (3)	12	6	12,9	13(1) 19(2)		●	●	●	●	●	●	●
16 / (4)	12	8	15,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
20 / (5)	12	10	19,9	13(1) 19(2) 25(3)		●	●	●	●	●	●	●
25 / (6)	12	12	24,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
32 / (7)	12	16	31,9	13(1) 19(2) 25(3)			●	●	●	●	●	●
40 / (9)	12	19	39,9	19(2) 25(3) 30(4)				●	●	●	●	●

*à d_2 = 16/ 20 et l = 63; $l_{1\ max.}$ = 19

Matière :
HSS
Dureté 62 ± 2 HRC

Exécution :
Corps et embout profilé superfinis.
Fabrication spéciale sur demande.
* Pour un autre rayon, voire Formees spéciales normalisées.

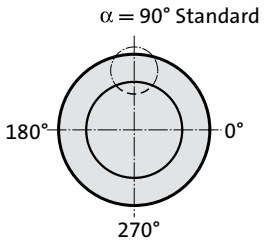
Exemple de commande :

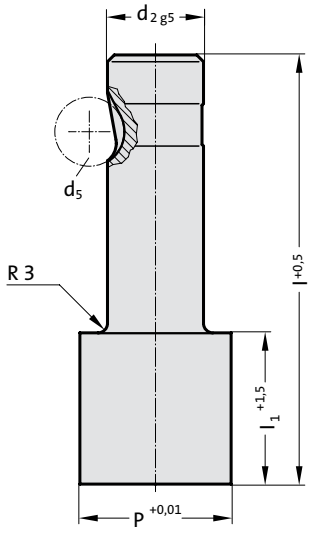
2753.3F1.1215.0915.B

Angle: 90°	**Lettre de référence** = (B)
Forme: Rectangle avec rayon, Largeur W W = 9,15 mm	= 0915
Forme: Rectangle avec rayon, Longueur P P = 12,15 mm	= 1215
Longueur épaulement: l_1 13 mm	**Chiffre de référence** = (1)
Longueur: l 90 mm	**Lettre de référence** = (F)
Diamètre: d_2 13 mm	**Chiffre de référence** = (3)
Type: forte charge	**Chiffre de référence** = (3)
Exécution: Rectangle avec rayon	**Chiffre de référence** = (5)
Poinçon de découpe: avec éjecteur	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, BLANK, HEAVY DUTY

2205.





2205. Ball-Lock punch, punch larger than shaft, blank, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	32	19(2) 30(4)		●	●	●
16 / (4)	12	38	19(2) 30(4)		●	●	●
20 / (5)	12	40	19(2) 30(4)		●	●	●
25 / (6)	12	44	19(2) 30(4)		●	●	●
32 / (7)	12	50	19(2) 30(4)		●	●	●
40 / (9)	12	56	19(2) 30(4)		●	●	●

Ordering Code (example):

2205.7G4.5000

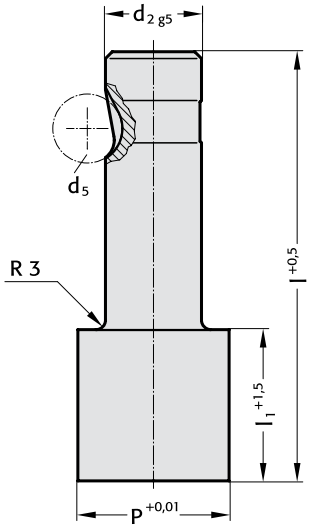
Shape: round
P = ∅ 50 mm = 5000
Punch cutting length: l_1 **Order No**
30 mm = (4)
Length: l **Order Code character**
100 mm = (G)
Diameter: d_2 **Order No**
32 mm = (7)
Type: **Order No**
punch larger, heavy = (5)
Execution: **Order No**
blank = (0)
Punch:
without ejector pin = 22

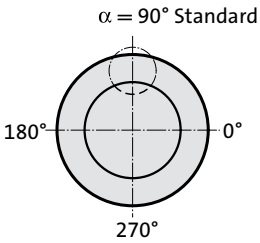
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, ROUND, HEAVY DUTY

2215.





2215. Ball-Lock punch, punch larger than shaft, round, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	13,1 - 32	19(2) 30(4)		●	●	●
16 / (4)	12	16,1 - 38	19(2) 30(4)		●	●	●
20 / (5)	12	20,1 - 40	19(2) 30(4)		●	●	●
25 / (6)	12	25,1 - 44	19(2) 30(4)		●	●	●
32 / (7)	12	32,1 - 50	19(2) 30(4)		●	●	●
40 / (9)	12	40,1 - 56	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

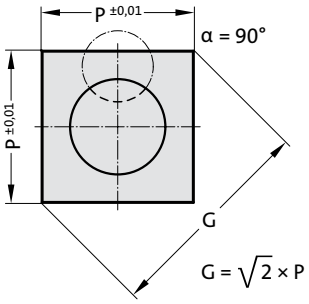
Ordering Code (example):

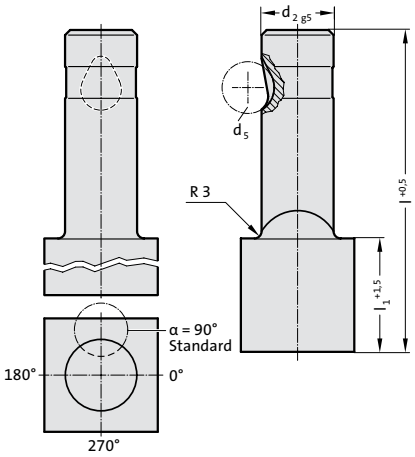
2215.7G2.3210

Shape: round	
P = ∅ 32,1 mm	= 3210
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
punch larger, heavy	= (5)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SQUARE, HEAVY DUTY

2225.





2225. Ball-Lock punch, punch larger than shaft, square, heavy duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	9.19	32	19(2) 30(4)		●	●	●
16 / (4)	12	11.31	38	19(2) 30(4)		●	●	●
20 / (5)	12	14.14	40	19(2) 30(4)		●	●	●
25 / (6)	12	17.68	44	19(2) 30(4)		●	●	●
32 / (7)	12	22.63	50	19(2) 30(4)		●	●	●
40 / (9)	12	28.28	56	19(2) 30(4)		●	●	●

Ordering Code (example):

2225.4F4.1150.B

Angle:	90°	**Order Code character** = (B)
Shape: square, Length P	P = 11,5 mm	= 1150
Punch cutting length: l_1	30 mm	**Order No** = (4)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	16 mm	**Order No** = (4)
Type:	punch larger, heavy	**Order No** = (5)
Execution:	square	**Order No** = (2)
Punch:	without ejector pin	= 22

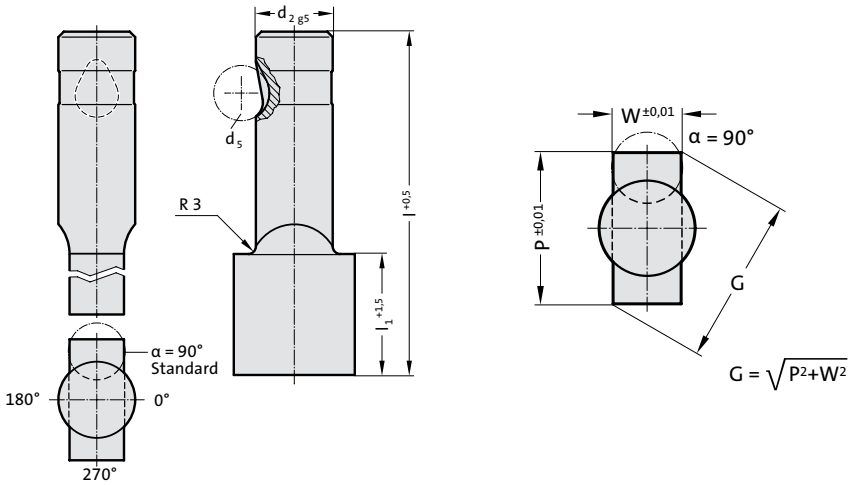
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGULAR, HEAVY DUTY

2235.



2235. Ball-Lock punch, punch larger than shaft, rectangular, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19(2) 30(4)		●	●	●
16 / (4)	12	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	12	8	40	19(2) 30(4)		●	●	●
25 / (6)	12	10	44	19(2) 30(4)		●	●	●
32 / (7)	12	11.5	50	19(2) 30(4)		●	●	●
40 / (9)	12	14	56	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

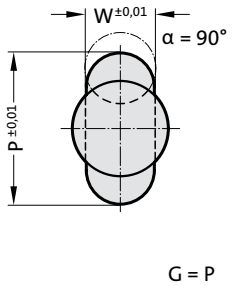
Ordering Code (example):

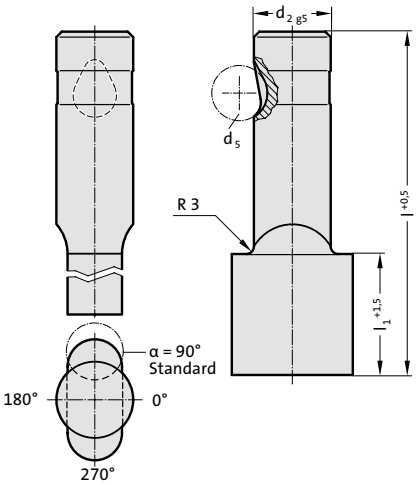
2235.4F4.1420.1150.B

Angle:	90°	**Order Code character** = (B)
Shape: rectangular, Width W	W = 11,5 mm	= 1150
Shape: rectangular, Length P	P = 14,2 mm	= 1420
Punch cutting length: l_1	30 mm	**Order No** = (4)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	16 mm	**Order No** = (4)
Type:	punch larger, heavy	**Order No** = (5)
Execution:	rectangular	**Order No** = (3)
Punch:	without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SLOT, HEAVY DUTY

2245.





2245. Ball-Lock punch, punch larger than shaft, slot, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19(2) 30(4)		●	●	●
16 / (4)	12	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	12	8	40	19(2) 30(4)		●	●	●
25 / (6)	12	10	44	19(2) 30(4)		●	●	●
32 / (7)	12	11.5	50	19(2) 30(4)		●	●	●
40 / (9)	12	14	56	19(2) 30(4)		●	●	●

Ordering Code (example):

2245.7F2.3720.1150.B

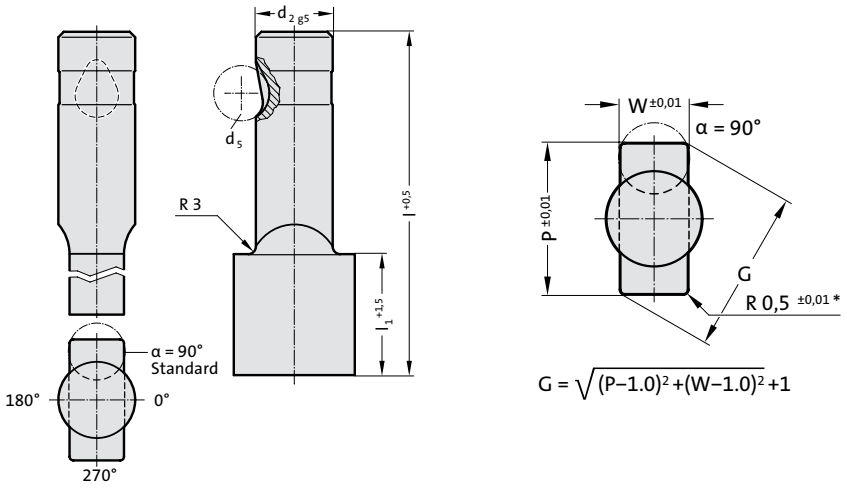
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 11,5 mm	= 1150
Shape: slot, Length P	P = 37,2 mm	= 3720
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (7)
Type:	punch larger, heavy	**Order No** = (5)
Execution:	slot	**Order No** = (4)
Punch:	without ejector pin	= 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGLE WITH RADIUSSED CORNERS, HEAVY DUTY

2255.



2255. Ball-Lock punch, punch larger than shaft, rectangle with radiussed corners, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19(2) 30(4)		●	●	●
16 / (4)	12	6.5	38	19(2) 30(4)		●	●	●
20 / (5)	12	8	40	19(2) 30(4)		●	●	●
25 / (6)	12	10	44	19(2) 30(4)		●	●	●
32 / (7)	12	11.5	50	19(2) 30(4)		●	●	●
40 / (9)	12	14	56	19(2) 30(4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

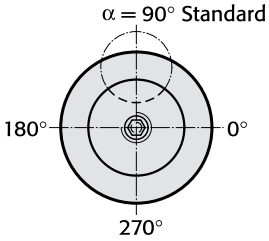
Ordering Code (example):

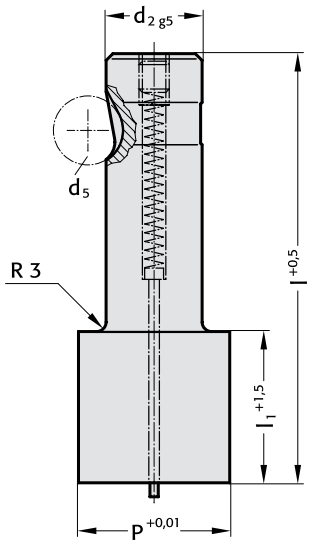
2255.4F2.1420.1150.B

Angle: 90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P P = 14,2 mm	= 1420
Punch cutting length: l_1 19 mm	**Order No** = (2)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 16 mm	**Order No** = (4)
Type: punch larger, heavy	**Order No** = (5)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: without ejector pin	= 22

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, BLANK, WITH EJECTOR PIN, HEAVY DUTY

2705.





2705. Ball-Lock punch, punch larger than shaft, blank, with ejector pin, heavy duty

d_2 / Order No	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	32	19 (2) 30 (4)		●	●	●
16 / (4)	38	19 (2) 30 (4)		●	●	●
20 / (5)	40	19 (2) 30 (4)		●	●	●
25 / (6)	44	19 (2) 30 (4)		●	●	●
32 / (7)	50	19 (2) 30 (4)		●	●	●
40 / (9)	56	19 (2) 30 (4)		●	●	●

Ordering Code (example):

2705.7G4.5000

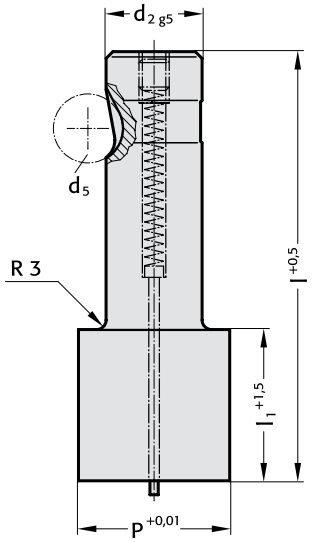
Shape: round
P = ∅ 50 mm = 5000
Punch cutting length: l_1 **Order No**
30 mm = (4)
Length: l **Order Code character**
100 mm = (G)
Diameter: d_2 **Order No**
32 mm = (7)
Type: **Order No**
punch larger, heavy = (5)
Execution: **Order No**
blank = (0)
Punch:
with ejector pin = 27

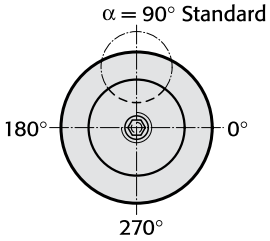
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, ROUND, WITH EJECTOR PIN, HEAVY DUTY

2715.





2715. Ball-Lock punch, punch larger than shaft, round, with ejector pin, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	13,1 - 32	19 (2) 30 (4)		●	●	●
16 / (4)	12	16,1 - 38	19 (2) 30 (4)		●	●	●
20 / (5)	12	20,1 - 40	19 (2) 30 (4)		●	●	●
25 / (6)	12	25,1 - 44	19 (2) 30 (4)		●	●	●
32 / (7)	12	32,1 - 50	19 (2) 30 (4)		●	●	●
40 / (9)	12	40,1 - 56	19 (2) 30 (4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch diameter fine ground.
Special dimensions on request.

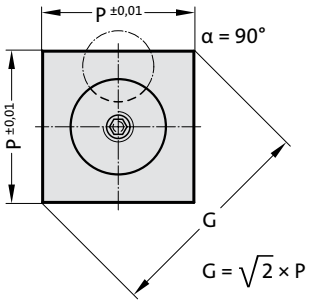
Ordering Code (example):

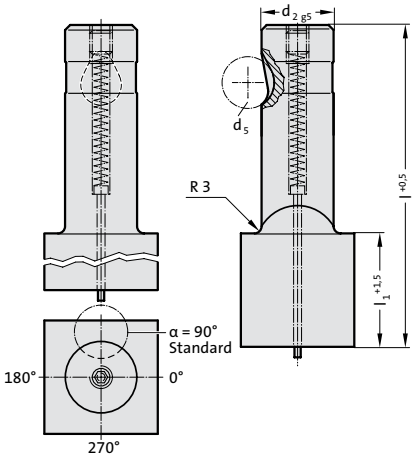
2715.7G2.3210

Shape: round	
P = ∅ 32,1 mm	= 3210
Punch cutting length: l_1	**Order No**
19 mm	= (2)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_2	**Order No**
32 mm	= (7)
Type:	**Order No**
punch larger, heavy	= (5)
Execution:	**Order No**
round	= (1)
Punch:	
with ejector pin	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SQUARE, WITH EJECTOR PIN, HEAVY DUTY

2725.





2725. Ball-Lock punch, punch larger than shaft, square, with ejector pin, heavy duty

d_2 / Order No	d_5	P_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	9.19	32	19 (2) 30 (4)		●	●	●
16 / (4)	12	11.31	38	19 (2) 30 (4)		●	●	●
20 / (5)	12	14.14	40	19 (2) 30 (4)		●	●	●
25 / (6)	12	17.68	44	19 (2) 30 (4)		●	●	●
32 / (7)	12	22.63	50	19 (2) 30 (4)		●	●	●
40 / (9)	12	28.28	56	19 (2) 30 (4)		●	●	●

Ordering Code (example):

2725.4F4.2450.B

Angle: 90°	**Order Code character** = (B)
Shape: square, Length P P = 24,5 mm	= 2450
Punch cutting length: l_1 30 mm	**Order No** = (4)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 16 mm	**Order No** = (4)
Type: punch larger, heavy	**Order No** = (5)
Execution: square	**Order No** = (2)
Punch: with ejector pin	= 27

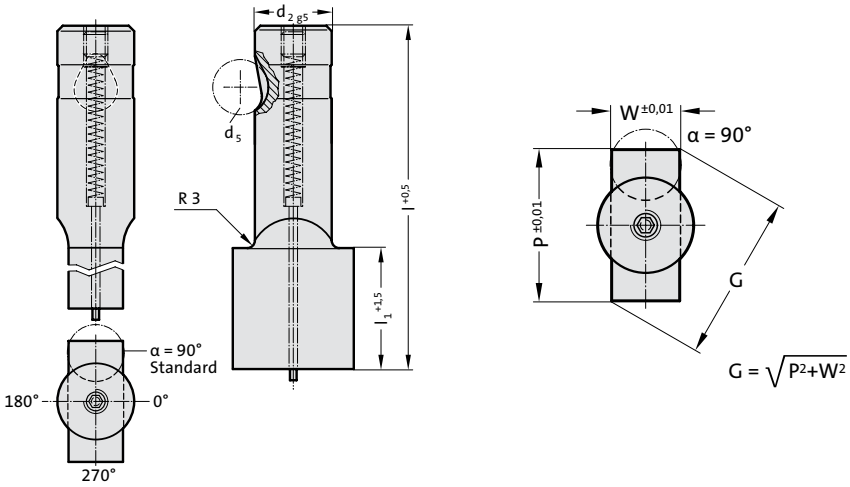
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGULAR, WITH EJECTOR PIN, HEAVY DUTY

2735.



2735. Ball-Lock punch, punch larger than shaft, rectangular, with ejector pin, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19 (2) 30 (4)		●	●	●
16 / (4)	12	6.5	38	19 (2) 30 (4)		●	●	●
20 / (5)	12	8	40	19 (2) 30 (4)		●	●	●
25 / (6)	12	10	44	19 (2) 30 (4)		●	●	●
32 / (7)	12	11.5	50	19 (2) 30 (4)		●	●	●
40 / (9)	12	14	56	19 (2) 30 (4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

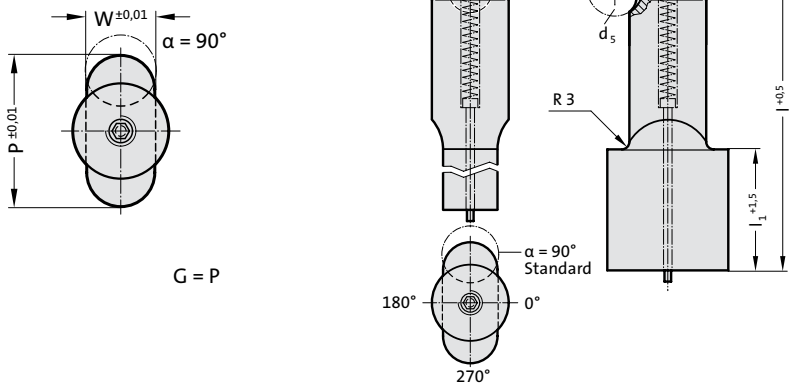
Ordering Code (example):

2735.4F4.1420.1150.B

	Order Code character
Angle: 90°	= (B)
Shape: rectangular, Width W W = 11,5 mm	= 1150
Shape: rectangular, Length P P = 14,2 mm	= 1420
Punch cutting length: l_1 30 mm	**Order No** = (4)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_2 16 mm	**Order No** = (4)
Type: punch larger, heavy	**Order No** = (5)
Execution: rectangular	**Order No** = (3)
Punch: with ejector pin	= 27

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, SLOT, WITH EJECTOR PIN, HEAVY DUTY

2745.



2745. Ball-Lock punch, punch larger than shaft, slot, with ejector pin, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19 (2) 30 (4)		●	●	●
16 / (4)	12	6.5	38	19 (2) 30 (4)		●	●	●
20 / (5)	12	8	40	19 (2) 30 (4)		●	●	●
25 / (6)	12	10	44	19 (2) 30 (4)		●	●	●
32 / (7)	12	11.5	50	19 (2) 30 (4)		●	●	●
40 / (9)	12	14	56	19 (2) 30 (4)		●	●	●

Ordering Code (example):

2745.7F2.3720.1150.B

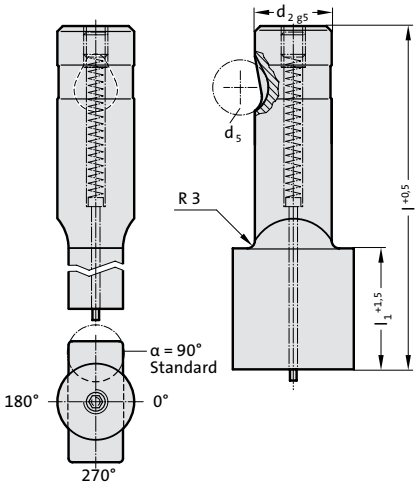
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 11,5 mm	= 1150
Shape: slot, Length P	P = 37,2 mm	= 3720
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (7)
Type:	punch larger, heavy	**Order No** = (5)
Execution:	slot	**Order No** = (4)
Punch:	with ejector pin	= 27

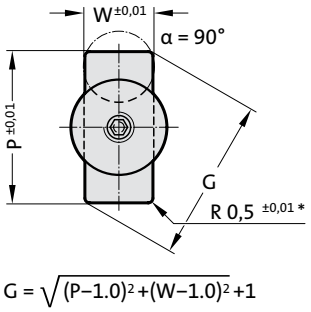
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.

BALL-LOCK PUNCH, PUNCH LARGER THAN SHAFT, RECTANGLE WITH RADIUSSED CORNERS, WITH EJECTOR PIN, HEAVY DUTY

2755.





2755. Ball-Lock punch, punch larger than shaft, rectangle with radiussed corners, with ejector pin, heavy duty

d_2 / Order No	d_5	W_{min}	G_{max}	l_1 / Order No	l (Order Code character)	80 (E)	90 (F)	100 (G)
13 / (3)	12	5	32	19 (2) 30 (4)		●	●	●
16 / (4)	12	6.5	38	19 (2) 30 (4)		●	●	●
20 / (5)	12	8	40	19 (2) 30 (4)		●	●	●
25 / (6)	12	10	44	19 (2) 30 (4)		●	●	●
32 / (7)	12	11.5	50	19 (2) 30 (4)		●	●	●
40 / (9)	12	14	56	19 (2) 30 (4)		●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and punch shape fine ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

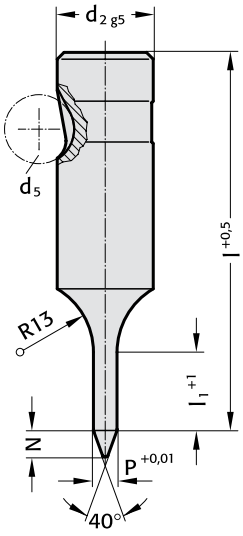
Ordering Code (example):

2755.3F2.1215.1150.B

Angle:	90°	**Order Code character** = (B)
Shape: rectangle with radiused corners, Width W	W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P	P = 12,15 mm	= 1215
Punch cutting length: l_1	19 mm	**Order No** = (2)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_2	13 mm	**Order No** = (3)
Type:	punch larger, heavy	**Order No** = (5)
Execution:	rectangle with radiused corners	**Order No** = (5)
Punch:	with ejector pin	= 27

BALL-LOCK PILOT PIN, WITH TAPERED TIP, HEAVY DUTY

2263.



2263. Ball-Lock pilot pin, with tapered tip, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	N	l (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)	140 (K)	150 (L)
10 / (2)	10	5,9 - 9,9	19 (2)	8		●	●	●	●	●			
13 / (3)	12	9,9 - 12,9	19 (2)	10		●	●	●	●	●	●	●	
16 / (4)	12	12,9 - 15,9	25 (3)	15		●	●	●	●	●	●	●	●
20 / (5)	12	15,9 - 19,9	25 (3)	20		●	●	●	●	●	●	●	●
25 / (6)	12	19,9 - 24,9	25 (3)	25			●	●	●	●	●	●	●
32 / (7)	12	24,9 - 31,9	25 (3)	30			●	●	●	●	●	●	●
40 / (9)	12	31,9 - 39,9	30 (4)	40			●	●	●	●	●	●	●

Ordering Code (example):

2263.4G3.1410

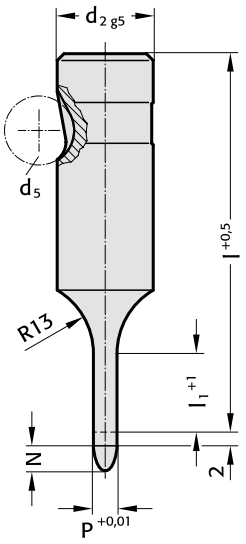
Shape: round
P = ∅ 14,1 mm = 1410
Punch cutting length: l_1 **Order No**
25 mm = (3)
Length: l **Order Code character**
100 mm = (G)
Diameter: d_2 **Order No**
16 mm = (4)
Type: **Order No**
heavy = (3)
Execution: **Order No**
Pilot pin with tapered tip = (6)
Punch:
without ejector pin = 22

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and pilot pin fine ground.
Special dimensions on request.

BALL-LOCK PILOT PIN, WITH PARABOLIC TIP, HEAVY DUTY

2273.



2273. Ball-Lock pilot pin, with parabolic tip, heavy duty

d_2 / Order No	d_5	P	l_1 / Order No	l (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (J)
10 / (2)	10	5,9 - 9,9	19 (2)		●	●	●	●	●		
13 / (3)	12	9,9 - 12,9	19 (2)		●	●	●	●	●	●	●
16 / (4)	12	12,9 - 15,9	25 (3)		●	●	●	●	●	●	●
20 / (5)	12	15,9 - 19,9	25 (3)		●	●	●	●	●	●	●
25 / (6)	12	19,9 - 24,9	25 (3)		●	●	●	●	●	●	●
32 / (7)	12	24,9 - 31,9	25 (3)			●	●	●	●	●	●
40 / (9)	12	31,9 - 39,9	30 (4)				●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Shaft and pilot pin fine ground.
Special dimensions on request.

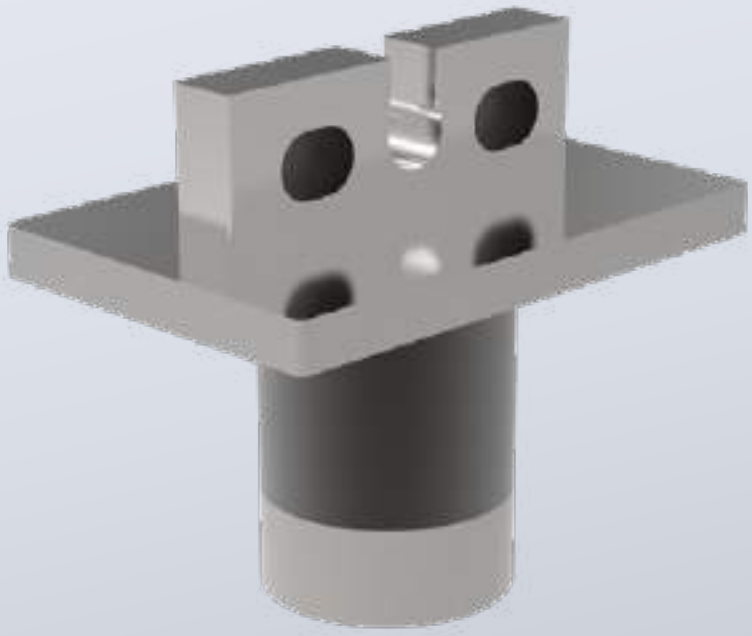
Note:
The 2 mm length provides full guidance before the blanking punch contacts the sheet metal.

Length of parabolic tip N:
= 8 mm where P ≤ 10 mm
=12 mm where P 10,1 mm - 15 mm
=15 mm where P > 15 mm

Ordering Code (example):
2273.4G3.1410

Shape: round P = ∅ 14,1 mm	= 1410
Punch cutting length: l_1 25 mm	**Order No** = (3)
Length: l 100 mm	**Order Code character** = (G)
Diameter: d_2 16 mm	**Order No** = (4)
Type: heavy	**Order No** = (3)
Execution: Pilot pin with parabolic tip	**Order No** = (7)
Punch: without ejector pin	= 22

PUNCHES BOLT LOCK



PUNCHES AND RETAINERS BOLT LOCK

The development of the BOLT LOCK system is a logical continuation of today‘s quick-release systems for punches beyond a shaft diameter of 40 mm.

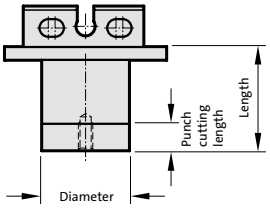
Since the punches are available for any geometries, the compact system can be used for a variety of applications. An example of this is the use of punches to cut sheet metal parts, which are not manufactured as individual parts, but rather mainly as multiple parts for economic reasons. Large perforations in structured parts of the car body can be manufactured without a problem using the system.

In the area of follow-on composites, the system can also be used to cut the grating or remove the pc board.
The system makes a valuable contribution to the further standardisation of tools and connected advantages in regard to time, costs and quality.

- Designed as a replacement for today‘s serially produced parts previously manufactured individually.
- Punches available in standard shapes and customer-specific special shapes according to data record.
- High quality due to automated serial production.
- Cost savings in design due to CAD standard parts library. Data in the currently common data formats can be called worldwide directly through fibro.partcommunity.com and is thus always up-to-date free of cost.
- Low spatial requirement as conventional system and therefore also an option for saving operations.
- Geometrical changes of the cutting contour do not affect the retaining plate, thus permitting cost savings in case of changes.
- Low mounting effort in tool maintenance, quick-release system.
- Punches are provided with extraction thread in the standard version. Lateral borehole in the case of cutting form width W < 20 mm.

BOLT LOCK PUNCHES - EXAMPLE ORDERS

Note: See table for standard dimensions
Special dimensions to order



22 4 7 . 2 3 E 2 . 10000 . 03000 Z

Punch
22 without ejector pin

Shape: Slot
Length P = 100 mm

Shape: Slot
Width W = 30 mm

Punch cutting length: l_1	Order No
20	= 2

Length: l	Order Code character
77	= E

optional:	Order Code character
with retaining plate BOLT LOCK	= Z

Execution:	Order No
blank	= 0**
round	= 1*
square	= 2*
rectangular	= 3
slot	= 4
rectangle with radiused corners	= 5

*only for size (a x b): 01, 04, 05
**only available as CAD download
Note:
Special forms available upon customer's request.
Use blank 2207. for CAD data,
(see fibro.partcommunity.com).

Size (a_1 x b_1):	Order No
01 (80 x 55)	= 1
02 (100 x 40)	= 2
03 (160 x 40)	= 3
04 (120 x 80)	= 4
05 (160 x 120)	= 5
06 (240 x 45)	= 6

Type:	Order No
BOLT LOCK	= 7

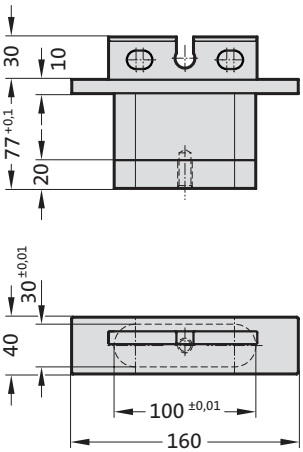
Material:	Order No
HWS (1.2379)	= 2

other materials and coatings available upon request

Ordering Code (example):

2247.23E2.10000.03000 Z

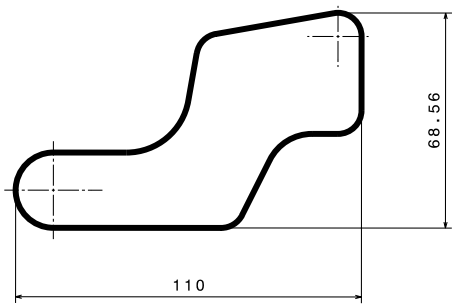
optional: with retaining plate BOLT LOCK (Z)
Shape: Slot, width W = 30 mm (03000)
Shape: Slot, length P = 100 mm (10000)
Punch cutting length: l_1 = 20 mm (2)
Length: l = 77 mm (E)
Size 03 (a_1 x b_1 = 160 x 40 mm) (3)
Material: HWS (1.2379) = (2)
Typ: BOLT LOCK (7)
Version: Slot (4)
Punch without ejector pin (22)



SPECIAL VERSION
PUNCH BOLT LOCK

BOLT LOCK punches, can be designed with individual punch contours.
For this purpose, blanks are available as starting models.
In this starting model, the corresponding cutting contour can be imported using the CAD system after download and preferably sent to FIBRO in STEP format.
Six sizes are available on the download portal:
In the selection, the max. dimensions X,Y of the punch form apply as the limit.

Example:



customer-specific cutting contour - max. dimensions of 110 x 69 mm

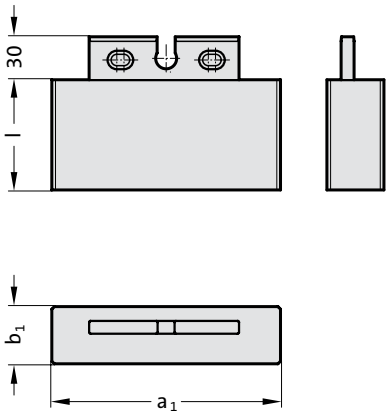
Selection of punch BOLT LOCK, blank according to the max. dimensions of the cutting form
Size 04 (A1 x B1 : 120 x 80 mm)

Download of model in desired CAD format (e.g.: STEP, CATIA, etc.)

Incorporation of the cutting contour into the punch BOLT LOCK blank model.
Send the data to FIBRO in STEP format.

PUNCH BOLT LOCK, BLANK

2207.



2207. Punch BOLT LOCK, blank

Size / (Order No)	a_1	b_1	l / (Order Code character)
01 / (1)	80	55	77 / (E)
02 / (2)	100	40	77 / (E)
03 / (3)	160	40	77 / (E)
04 / (4)	120	80	77 / (E)
05 / (5)	160	120	77 / (E)
06 / (6)	240	45	77 / (E)

Material:
HWS (1.2379)
Hardness 60 +2 HRC

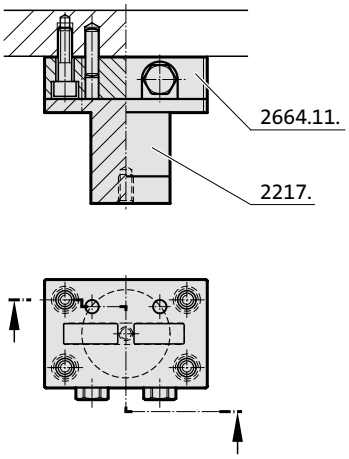
Other materials upon request.

☞Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

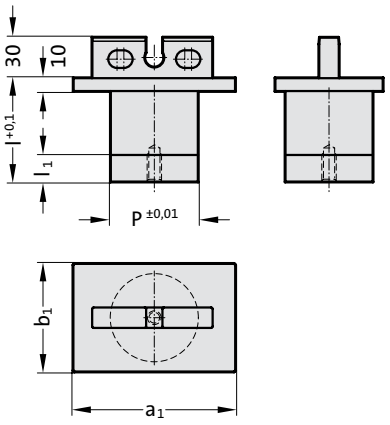
Note:
BOLT LOCK punches, blank, cannot be ordered. They are used only for customer-specific cutting contours/special designs.

PUNCH BOLT LOCK, ROUND

Mounting example



2217.



2217. Punch BOLT LOCK, round

Size / (Order No)	a_1	b_1	P_{min}	P_{max}	l_1 / Order No	l / (Order Code character)
01 / (1)	80	55	35	54.9	20 / (E)	77 / (E)
04 / (4)	120	80	50	79.9	20 / (E)	77 / (E)
05 / (5)	160	120	75	119.9	20 / (E)	77 / (E)

Ordering Code (example):

2217.21E2.05000

Shape: round		
P = ∅ 50 mm	= 05000	
Punch cutting length: l_1	**Order No**	
20 mm	= (2)	
Length: l	**Order Code character**	
77 mm	= (E)	
Size:	**Order No**	
01 (a_1 x b_1: 80 x 55 mm)	= (1)	
Material:	**Order No**	
HWS (1.2379)	= (2)	
Type:	**Order No**	
BOLT LOCK	= (7)	
Execution:	**Order No**	
round	= (1)	
Punch:		
without ejector pin	= 22	

Material:
HWS (1.2379)
Hardness 60 +2 HRC

Other materials upon request.

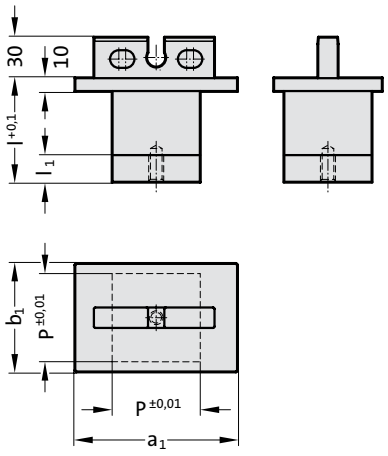
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
BOLT LOCK punches, round, are provided with an extraction thread (M10).

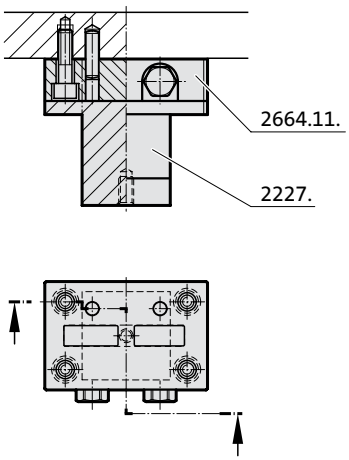
Note:
Order number for punch BOLT LOCK, round with retaining plate BOLT LOCK, including screws and pins:
2217.2□E2.□□□□□Z

PUNCH BOLT LOCK, SQUARE

2227.



Mounting example



2227. Punch BOLT LOCK, square

Size / (Order No)	a_1	b_1	P_{min}	P_{max}	l_1 / Order No	l / (Order Code character)
01 / (1)	80	55	35	54.9	20 / (E)	77 / (E)
04 / (4)	120	80	50	79.9	20 / (E)	77 / (E)
05 / (5)	160	120	75	119.9	20 / (E)	77 / (E)

Material:
HWS (1.2379)
Hardness 60 +2 HRC

Other materials upon request.

☞Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
BOLT LOCK punches, square, are provided with an extraction thread (M10).

Note:
Order number for punch BOLT LOCK, square with retaining plate BOLT LOCK, including screws and pins:
2227.2□E2.□□□□□Z

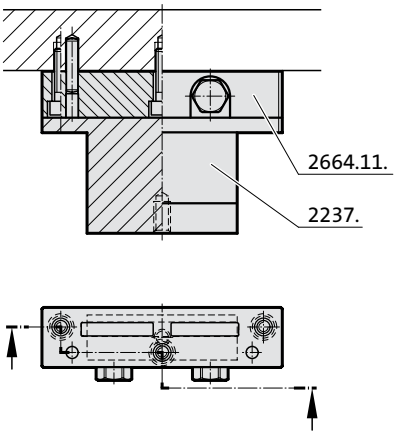
Ordering Code (example):

2227.21E2.04050

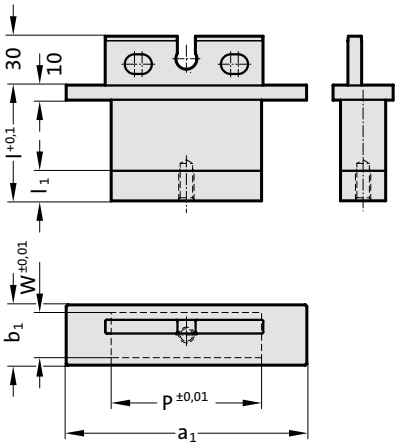
Shape: square , Length P	
P = 40,5 mm	= 04050
Punch cutting length: l_1	**Order No**
20 mm	= (2)
Length: l	**Order Code character**
77 mm	= (E)
Size:	**Order No**
01 (a_1 x b_1: 80 x 55 mm)	= (1)
Material:	**Order No**
HWS (1.2379)	= (2)
Type:	**Order No**
BOLT LOCK	= (7)
Execution:	**Order No**
square	= (2)
Punch:	
without ejector pin	= 22

PUNCH BOLT LOCK, RECTANGULAR

Mounting example



2237.



2237. Punch BOLT LOCK, rectangular

Size / (Order No)	a_1	b_1	P_{min}	P_{max}	W_{min}	W_{max}	l_1 / Order No	l / (Order Code character)
01 / (1)	80	55	55	79.9	10	54.9	20 / (E)	77 / (E)
02 / (2)	100	40	40	99.9	10	39.9	20 / (E)	77 / (E)
03 / (3)	160	40	40	159.9	10	39.9	20 / (E)	77 / (E)
04 / (4)	120	80	80	119.9	10	79.9	20 / (E)	77 / (E)
05 / (5)	160	120	120	159.9	10	119.9	20 / (E)	77 / (E)
06 / (6)	240	45	45	239.9	10	44.9	20 / (E)	77 / (E)

Ordering Code (example):

2237.21E2.07050.04550

Shape: rectangular, Width W
W = 45,5 mm = 04550
Shape: rectangular, Length P
P = 70,5 mm = 07050
Punch cutting length: l_1 **Order No**
20 mm = (2)
Length: l **Order Code character**
77 mm = (E)
Size: **Order No**
01 (a_1 x b_1: 80 x 55 mm) = (1)
Material: **Order No**
HWS (1.2379) = (2)
Type: **Order No**
BOLT LOCK = (7)
Execution: **Order No**
rectangular = (3)
Punch:
without ejector pin = 22

Material:
HWS (1.2379)
Hardness 60 +2 HRC

Other materials upon request.

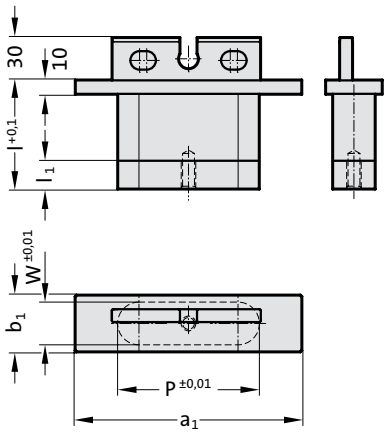
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
BOLT LOCK punches, rectangle, are provided with an extraction thread (M10).
For cutting form width W < 20 mm, the punch is provided with a transverse bore (ø 10 mm).

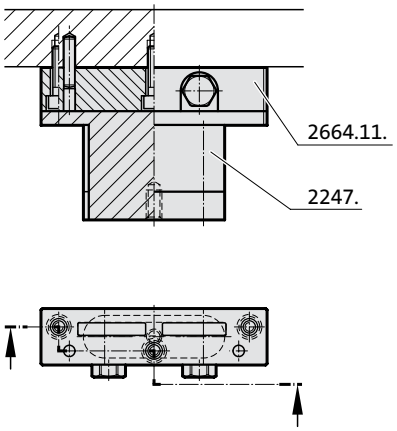
Note:
Order number for punch BOLT LOCK, rectangle with retaining plate BOLT LOCK, including screws and pins:
2237.2□E2.□□□□□.□□□□□Z

PUNCH BOLT LOCK, SLOT

2247.



Mounting example



2247. Punch BOLT LOCK, slot

Size / (Order No)	a_1	b_1	P_{min}	P_{max}	W_{min}	W_{max}	l_1 / Order No	l / (Order Code character)
01 / (1)	80	55	55	79.9	10	54.9	20 / (E)	77 / (E)
02 / (2)	100	40	40	99.9	10	39.9	20 / (E)	77 / (E)
03 / (3)	160	40	40	159.9	10	39.9	20 / (E)	77 / (E)
04 / (4)	120	80	80	119.9	10	79.9	20 / (E)	77 / (E)
05 / (5)	160	120	120	159.9	10	119.9	20 / (E)	77 / (E)
06 / (6)	240	45	45	239.9	10	44.9	20 / (E)	77 / (E)

Material:
HWS (1.2379)
Hardness 60 +2 HRC

Other materials upon request.

☞Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
BOLT LOCK punches with an slot are provided with an extraction thread (M10).
For cutting form width W < 20 mm, the punch is provided with a transverse bore (ø 10 mm).

Note:
Order number for punch BOLT LOCK, slot with retaining plate BOLT LOCK, including screws and pins:
2247.2□E2.□□□□□.□□□□□Z

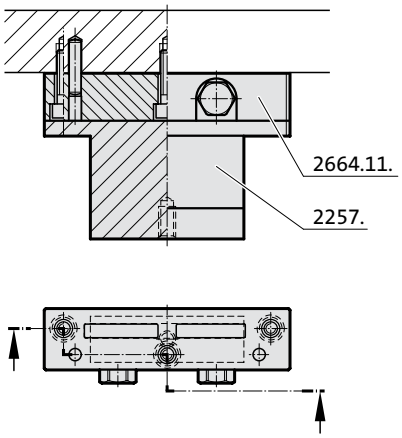
Ordering Code (example):

2247.21E2.07050.04550

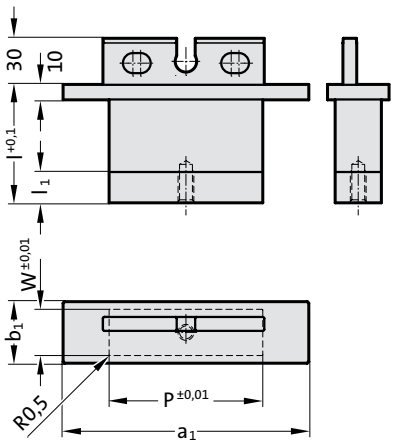
Shape: slot, Width W	
W = 45,5 mm	= 04550
Shape: slot, Length P	
P = 70,5 mm	= 07050
Punch cutting length: l_1	**Order No**
20 mm	= (2)
Length: l	**Order Code character**
77 mm	= (E)
Size:	**Order No**
01 (a_1 x b_1: 80 x 55 mm)	= (1)
Material:	**Order No**
HWS (1.2379)	= (2)
Type:	**Order No**
BOLT LOCK	= (7)
Execution:	**Order No**
slot	= (4)
Punch:	
without ejector pin	= 22

PUNCH BOLT LOCK, RECTANGLE WITH RADIUSED CORNERS

Mounting example



2257.



2257. Punch BOLT LOCK, rectangle with radiused corners

Size / (Order No)	a_1	b_1	P_{min}	P_{max}	W_{min}	W_{max}	l_1 / Order No	l / (Order Code character)
01 / (1)	80	55	55	79.9	10	54.9	20 / (E)	77 / (E)
02 / (2)	100	40	40	99.9	10	39.9	20 / (E)	77 / (E)
03 / (3)	160	40	40	159.9	10	39.9	20 / (E)	77 / (E)
04 / (4)	120	80	80	119.9	10	79.9	20 / (E)	77 / (E)
05 / (5)	160	120	120	159.9	10	119.9	20 / (E)	77 / (E)
06 / (6)	240	45	45	239.9	10	44.9	20 / (E)	77 / (E)

Ordering Code (example):

2257.21E2.07050.04550

Shape: rectangle with radiused corners, Width W
W = 45,5 mm = 04550
Shape: rectangle with radiused corners, Length P
P = 70,5 mm = 07050
Punch cutting length: l_1 **Order No**
20 mm = (2)
Length: l **Order Code character**
77 mm = (E)
Size: **Order No**
01 (a_1 x b_1: 80 x 55 mm) = (1)
Material: **Order No**
HWS (1.2379) = (2)
Type: **Order No**
BOLT LOCK = (7)
Execution: **Order No**
rectangle with radiused corners = (5)
Punch:
without ejector pin = 22

Material:
HWS (1.2379)
Hardness 60 +2 HRC

Other materials upon request.

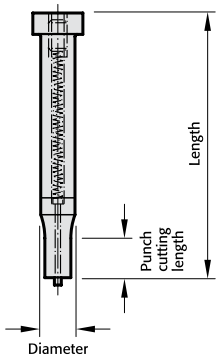
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
BOLT LOCK punches, rectangle with radius, are provided with an extraction thread (M10). For cutting form width W < 20 mm, the punch is provided with a transverse bore (ø 10 mm).

Note:
Order number for punch BOLT LOCK, rectangle with radius and retaining plate BOLT LOCK, including screws and pins:
2257.2□E2.□□□□□.□□□□□Z

PUNCHES ISO 8020

PUNCH ISO 8020 - EXAMPLE ORDERS



Note: **See table for standard dimensions**
Special dimensions to order

2 2 4 1 . 7 G 4 . 0 6 5 0 . 0 4 5 0 . A

Format: Slot length P = 6.5 mm

Form: slot width = 4.5 mm

Punch:
22 without ejector pin
27 with ejector pin

Punch cutting length: l_1

	Order No
8	= 1
10	= 2
13	= 3
19	= 4
25	= 5
30	= 6
special	= X

Execution:	Order No
blank	= 0
round	= 1
square	= 2
rectangular	= 3
slot	= 4
rectangle with radiused corners	= 5
Pilot pin with tapered tip	= 6
Pilot pin parabolic tip	= 7
special shapes	= 9

Type:	Order No
ISO	= 1

Diameter: d_1	Order No
3	= 1
4	= 2
5	= 3
6	= 4
8	= 5
10	= 6
13	= 7
16	= 8
20	= 9
25	=10
32	=11

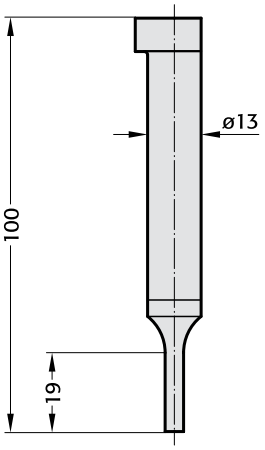
Length: l	Order Code character
50	= A
56	= B
63	= C
71	= D
80	= E
90	= F
100	= G
110	= H
120	= J
125	= K
140	= L
150	= M
200	= N
special	= X

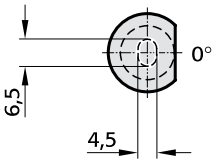
Angle:	Order Code character
0°	= A
90°	= B
180°	= C
270°	= D
special	= X

Ordering Code (example):

2 2 4 1 . 7 G 4 . 0 6 5 0 . 0 4 5 0 . A

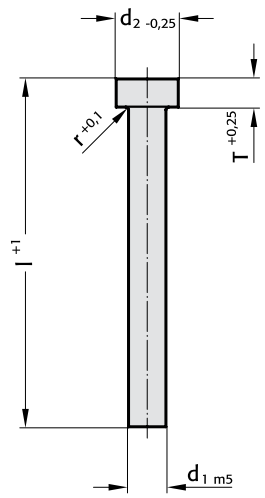
- Angle = 0° (A)
- Format: Slot, width W = 4.5 mm (0450)
- Format: Slot, length P = 6.5 mm (0650)
- Punch cutting length: l_1 = 19 mm (4)
- Length: l = 100 mm (G)
- Diameter: d_1 = 13 mm (7)
- Type: ISO (1)
- Version: Slot (4)
- Punch without ejector pin (22)





PUNCH, BLANK, ISO 8020

2201.



2201. Punch, blank, ISO 8020

d_1 / Order No	d_2	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)	150 (M)	200 (N)
3 / (1)	5	0.25	3		●	●	●	●	●		
4 / (2)	6	0.25	3		●	●	●	●	●		
5 / (3)	8	0.3	5		●	●	●	●	●		
6 / (4)	9	0.3	5		●	●	●	●	●		
8 / (5)	11	0.3	5		●	●	●	●	●		
10 / (6)	13	0.3	5		●	●	●	●	●	●	
13 / (7)	16	0.4	5		●	●	●	●	●	●	
16 / (8)	19	0.4	5		●	●	●	●	●	●	●
20 / (9)	23	0.4	5		●	●	●	●	●	●	●
25 / (10)	28	0.4	5		●	●	●	●	●	●	●
32 / (11)	35	0.4	5		●	●	●	●	●	●	●

Ordering Code (example):

2201.7G .ASP

complete for material ASP

Length: l
100 mm
Diameter: d_1
13 mm
Type:
ISO
Execution:
blank
Punch:
without ejector pin

Order Code character
= (G)
Order No
= (7)
Order No
= (1)
Order No
= (0)

= 22

Material:

HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

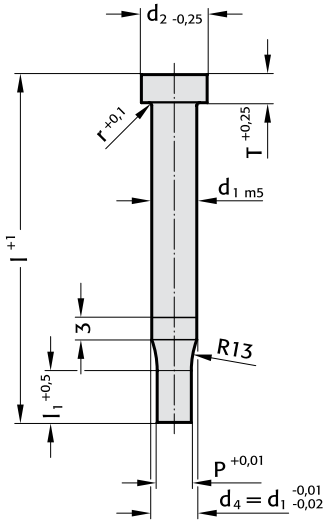
ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Punch head hot upset-forged. Shoulder and shaft fine ground.
Special dimensions on request.

PUNCH, STEPPED, ROUND, ISO 8020

2211.



2211. Punch, stepped, round, ISO 8020

d_1 / Order No	d_2	P	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
3 / (1)	5	0,8 - 2,9	8 (1) 10 (2)	0.25	3		●	●	●	●	●
4 / (2)	6	1 - 3,9	8 (1) 13 (3)	0.25	3		●	●	●	●	●
5 / (3)	8	1,5 - 4,9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	1,6 - 5,9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	2,5 - 7,9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	4 - 9,9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	5 - 12,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8 - 15,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	12 - 19,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	16,5 - 24,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	20 - 31,9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

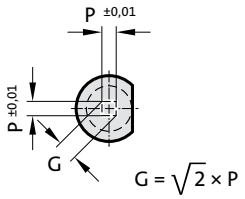
Execution:
Punch head hot upset-forged. Shoulder, shaft and punch diameter fine ground.
Special dimensions on request.

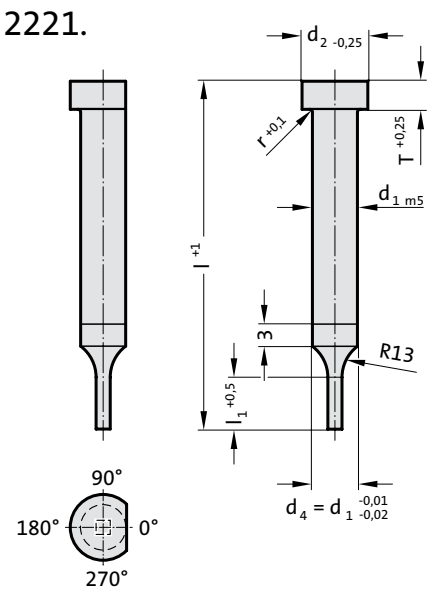
Ordering Code (example):

2211.7G4.0720

Shape: round	
P = ∅ 7,2 mm	= 0720
Punch cutting length: l_1	**Order No**
19 mm	= (4)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_1	**Order No**
13 mm	= (7)
Type:	**Order No**
ISO	= (1)
Execution:	**Order No**
round	= (1)
Punch:	
without ejector pin	= 22

PUNCH, STEPPED, SQUARE, ISO 8020





2221. Punch, stepped, square, ISO 8020

d_1 / Order No	d_2	P_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
3 / (1)	5	0.5	2.9	8 (1) 10 (2)	0.25	3		●	●	●	●	●
4 / (2)	6	0.8	3.9	8 (1) 13 (3)	0.25	3		●	●	●	●	●
5 / (3)	8	1	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	1.6	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	2	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	3.5	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	4.5	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	6	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	8	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	10	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	10	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Ordering Code (example):

2221.9E5.1550.B

Angle:
90°
Shape: square, Length P
P = 15,5 mm
Punch cutting length: l_1
25 mm
Length: l
80 mm
Diameter: d_1
20 mm
Type:
ISO
Execution:
square
Punch:
without ejector pin

Order Code character
= (B)

= 1550
Order No
= (5)
Order Code character
= (E)
Order No
= (9)
Order No
= (1)
Order No
= (2)

= 22

Material:

HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

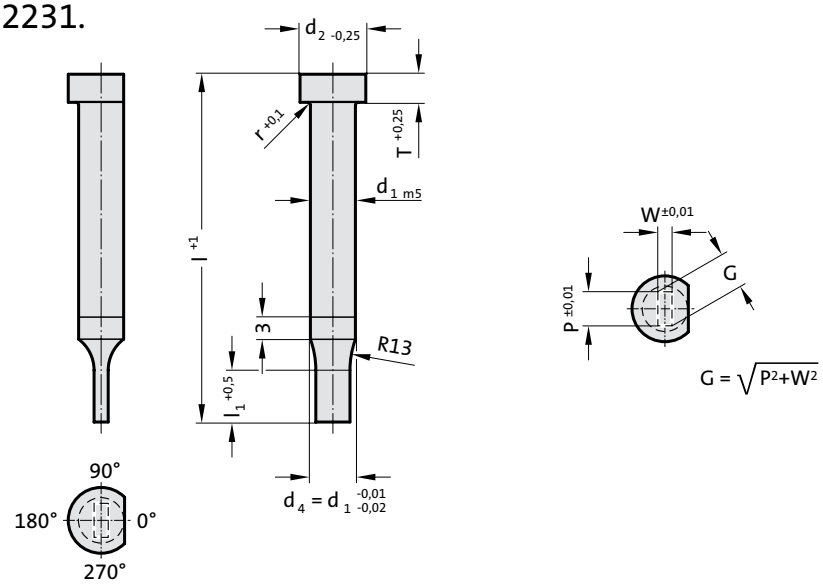
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

Note:

With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

PUNCH, STEPPED, RECTANGULAR, ISO 8020

2231.



2231. Punch, stepped, rectangular, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
3 / (1)	5	0.5	2.9	8 (1) 10 (2)	0.25	3		●	●	●	●	●
4 / (2)	6	0.8	3.9	8 (1) 13 (3)	0.25	3		●	●	●	●	●
5 / (3)	8	1	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	1.6	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	2	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	3.5	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	4.5	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	6	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	8	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	10	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	10	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

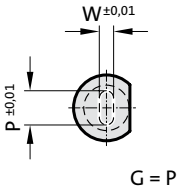
Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

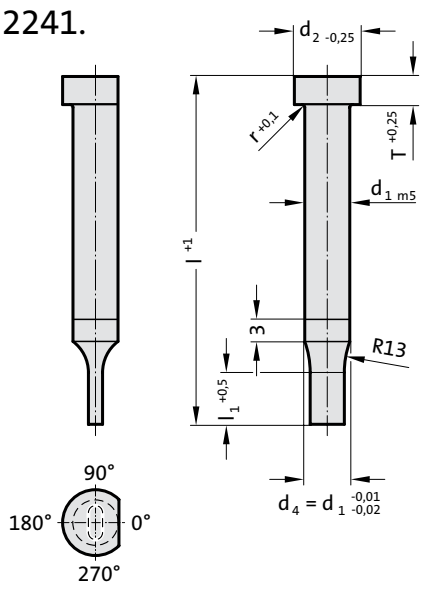
Ordering Code (example):

2231.9F4.1550.1150.B

Angle:	90°	**Order Code character** = (B)
Shape: rectangular, Width W	W = 11,5 mm	= 1150
Shape: rectangular, Length P	P = 15,5 mm	= 1550
Punch cutting length: l_1	19 mm	**Order No** = (4)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	rectangular	**Order No** = (3)
Punch:	without ejector pin	= 22

PUNCH, STEPPED, SLOT, ISO 8020





2241. Punch, stepped, slot, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
3 / (1)	5	0.5	2.9	8 (1) 10 (2)	0.25	3		●	●	●	●	●
4 / (2)	6	0.8	3.9	8 (1) 13 (3)	0.25	3		●	●	●	●	●
5 / (3)	8	1	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	1.6	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	2	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	3.5	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	4.5	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	6	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	8	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	10	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	10	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Ordering Code (example):

2241.9E5.1650.1220.B

Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 12,2 mm	= 1220
Shape: slot, Length P	P = 16,5 mm	= 1650
Punch cutting length: l_1	25 mm	**Order No** = (5)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	slot	**Order No** = (4)
Punch:	without ejector pin	= 22

Material:

HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

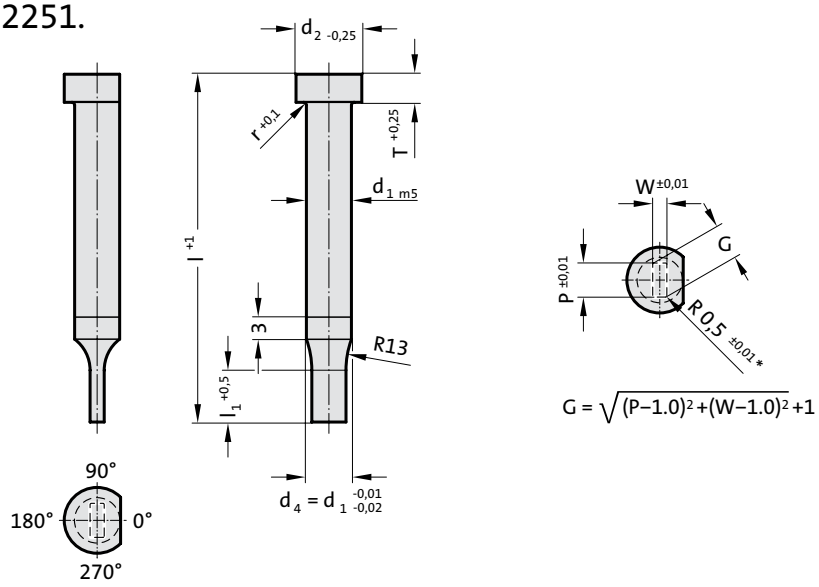
ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

PUNCH, STEPPED, RECTANGLE WITH RADIUSED CORNERS, ISO 8020

2251.



2251. Punch, stepped, rectangle with radiused corners, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
3 / (1)	5	1.1	2.9	8 (1) 10 (2)	0.25	3		●	●	●	●	●
4 / (2)	6	1.1	3.9	8 (1) 13 (3)	0.25	3		●	●	●	●	●
5 / (3)	8	1.1	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	1.6	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	2	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	3.5	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	4.5	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	6	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	8	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	10	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	10	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

ASP 23 - ASP 2023
upon request
☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.
* For other radius options, see standardised special shapes.

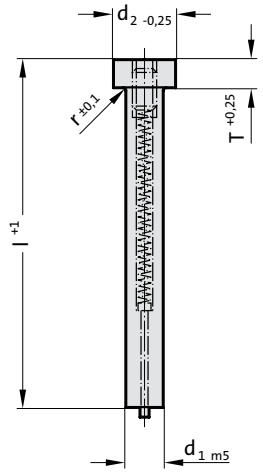
Ordering Code (example):

2251.9F4.1215.1150.B

		Order Code character
Angle:	90°	= (B)
Shape: rectangle with radiused corners, Width W	W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P	P = 12,15 mm	= 1215
Punch cutting length: l_1	19 mm	**Order No** = (4)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	rectangle with radiused corners	**Order No** = (5)
Punch:	without ejector pin	= 22

PUNCH, BLANK, WITH EJECTOR PIN, ISO 8020

2701.



2701. Punch, blank, with ejector pin, ISO 8020

d_1 / Order No	d_2	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	0.3	5		●	●	●	●	●
6 / (4)	9	0.3	5		●	●	●	●	●
8 / (5)	11	0.3	5		●	●	●	●	●
10 / (6)	13	0.3	5		●	●	●	●	●
13 / (7)	16	0.4	5		●	●	●	●	●
16 / (8)	19	0.4	5		●	●	●	●	●
20 / (9)	23	0.4	5		●	●	●	●	●
25 / (10)	28	0.4	5		●	●	●	●	●
32 / (11)	35	0.4	5		●	●	●	●	●

Ordering Code (example):

2701.8G

Length: l
100 mm
Order Code character
= (G)

Diameter: d_1
16 mm
Order No
= (8)

Type:
ISO
Order No
= (1)

Execution:
blank
Order No
= (0)

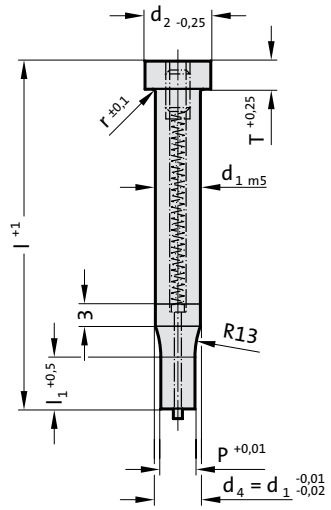
Punch:
with ejector pin
= 27

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Punch head hot upset-forged. Shoulder and shaft fine ground.
Special dimensions on request.

PUNCH, STEPPED, ROUND, WITH EJECTOR PIN, ISO 8020

2711.



2711. Punch, stepped, round, with ejector pin, ISO 8020

d_1 / Order No	d_2	P	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	2 - 4,9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	2,5 - 5,9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	4 - 7,9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	5 - 9,9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	6 - 12,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8 - 15,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	10 - 19,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	12 - 24,9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	16 - 31,9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

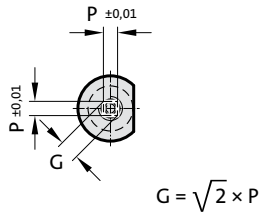
Execution:
Punch head hot upset-forged. Shoulder, shaft and punch diameter fine ground.
Special dimensions on request.

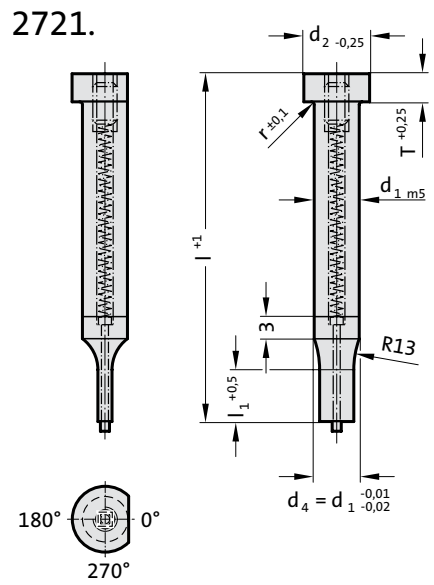
Ordering Code (example):

2711.7G4.0720

Shape: round P = ∅ 7,2 mm	= 0720
Punch cutting length: l_1 19 mm	**Order No** = (4)
Length: l 100 mm	**Order Code character** = (G)
Diameter: d_1 13 mm	**Order No** = (7)
Type: ISO	**Order No** = (1)
Execution: round	**Order No** = (1)
Punch: with ejector pin	= 27

PUNCH, STEPPED, SQUARE, WITH EJECTOR PIN, ISO 8020





2721. Punch, stepped, square, with ejector pin, ISO 8020

d_1 / Order No	d_2	P_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	2	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	2.5	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	4	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	4	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	6	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	10	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	12	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	16	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Ordering Code (example):

2721.9E5.1550.A

Angle:	0°	**Order Code character** = (A)
Shape: square, Length P	P = 15,5 mm	= 1550
Punch cutting length: l_1	25 mm	**Order No** = (5)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	square	**Order No** = (2)
Punch:	with ejector pin	= 27

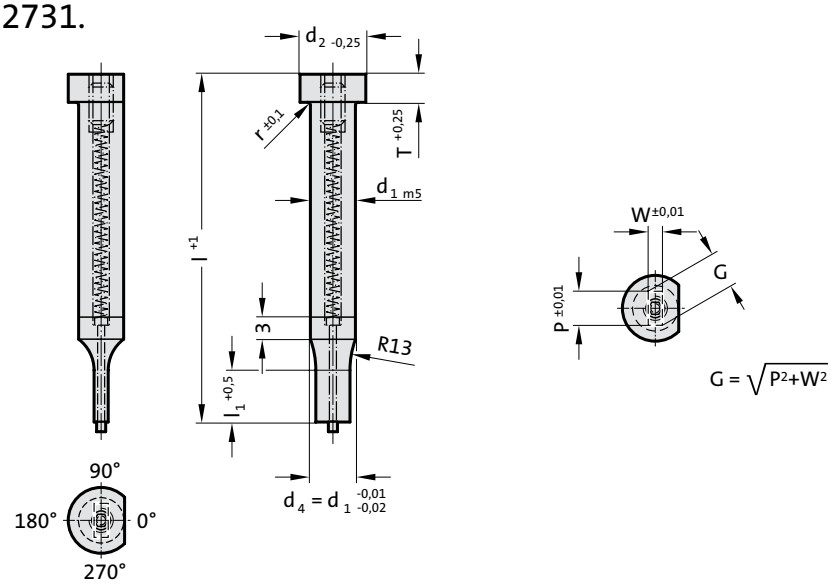
Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

PUNCH, STEPPED, RECTANGULAR, WITH EJECTOR PIN, ISO 8020

2731.



2731. Punch, stepped, rectangular, with ejector pin, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	2	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	2.5	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	4	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	4	9.9	19 (4) 205 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	6	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	10	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	12	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	16	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

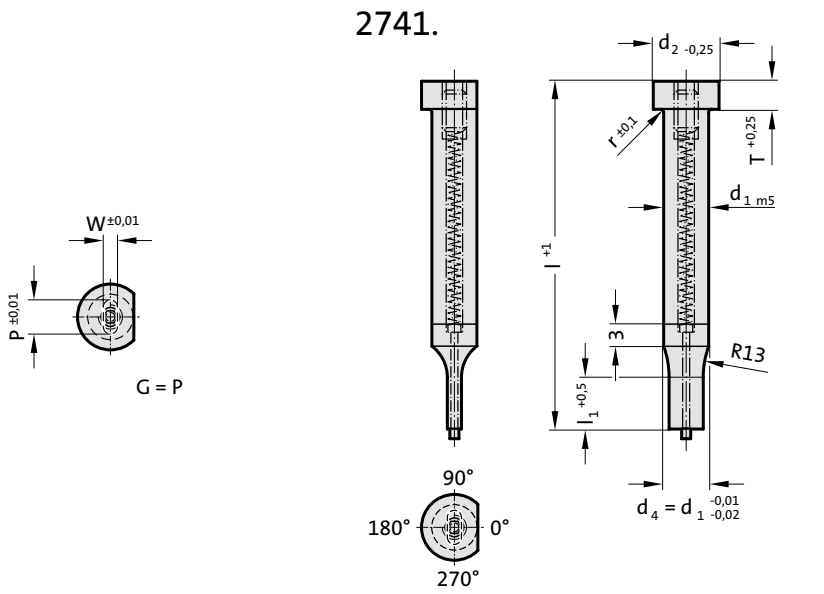
Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

Ordering Code (example):

2731.9F4.1550.1150.A

Angle:	0°	**Order Code character** = (A)
Shape: rectangular, Width W	W = 11,5 mm	= 1150
Shape: rectangular, Length P	P = 15,5 mm	= 1550
Punch cutting length: l_1	19 mm	**Order No** = (4)
Length: l	90 mm	**Order Code character** = (F)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	rectangular	**Order No** = (3)
Punch:	with ejector pin	= 27

PUNCH, STEPPED, SLOT, WITH EJECTOR PIN, ISO 8020



2741. Punch, stepped, slot, with ejector pin, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	2	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	2.5	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	4	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	4	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	6	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	10	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	12	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	16	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Ordering Code (example):

2741.9E5.1650.1220.B

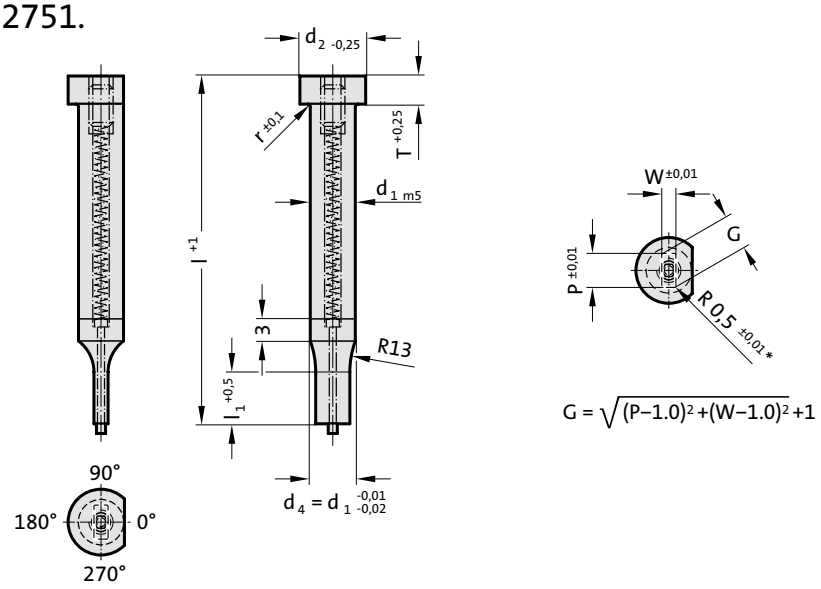
Angle:	90°	**Order Code character** = (B)
Shape: slot, Width W	W = 12,2 mm	= 1220
Shape: slot, Length P	P = 16,5 mm	= 1650
Punch cutting length: l_1	25 mm	**Order No** = (5)
Length: l	80 mm	**Order Code character** = (E)
Diameter: d_1	20 mm	**Order No** = (9)
Type:	ISO	**Order No** = (1)
Execution:	slot	**Order No** = (4)
Punch:	with ejector pin	= 27

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.

PUNCH, STEPPED, RECTANGLE WITH RADIUSSED CORNERS, WITH EJECTOR PIN, ISO 8020

2751.



2751. Punch, stepped, rectangle with radiussed corners, with ejector pin, ISO 8020

d_1 / Order No	d_2	W_{min}	G_{max}	l_1 / Order No	r	T	l / (Order Code character)	71 (D)	80 (E)	90 (F)	100 (G)	120 (J)
5 / (3)	8	2	4.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
6 / (4)	9	2.5	5.9	13 (3) 19 (4)	0.3	5		●	●	●	●	●
8 / (5)	11	4	7.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
10 / (6)	13	4	9.9	19 (4) 25 (5)	0.3	5		●	●	●	●	●
13 / (7)	16	6	12.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
16 / (8)	19	8	15.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
20 / (9)	23	10	19.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
25 / (10)	28	12	24.9	19 (4) 25 (5)	0.4	5		●	●	●	●	●
32 / (11)	35	16	31.9	25 (5) 30 (6)	0.4	5		●	●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Punch head hot upset-forged. Shoulder, shaft and punch shape fine ground.
The anti-rotation surface parallel to P = 0° as standard.
Special dimensions on request.
* For other radius options, see standardised special shapes.

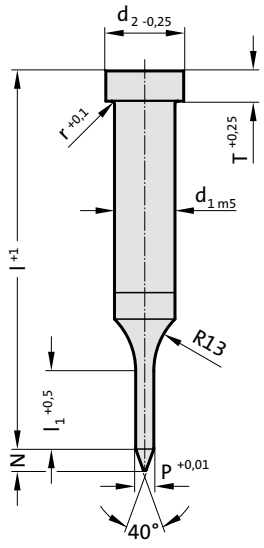
Ordering Code (example):

2751.9F4.1550.1150.A

Angle: 0°	**Order Code character** = (A)
Shape: rectangle with radiused corners, Width W W = 11,5 mm	= 1150
Shape: rectangle with radiused corners, Length P P = 15,5 mm	= 1550
Punch cutting length: l_1 19 mm	**Order No** = (4)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_1 20 mm	**Order No** = (9)
Type: ISO	**Order No** = (1)
Execution: rectangle with radiused corners	**Order No** = (5)
Punch: with ejector pin	= 27

PILOT PIN WITH TAPERED TIP, ISO 8020

2261.



2261. Pilot pin with tapered tip, ISO 8020

d_1 / Order No	d_2	T	P	l_1 / Order No	N	l / (Order Code character)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)	110 (H)	125 (K)	140 (L)
5 / (3)	8	5	1 - 4,9	13 (3)	4		●	●						
6 / (4)	9	5	1,6 - 5,9	13 (3)	5		●	●	●					
8 / (5)	11	5	2,5 - 7,9	13 (3)	6		●	●	●	●				
10 / (6)	13	5	4 - 9,9	13 (3) 19 (4)	8		●	●	●	●	●	●		
13 / (7)	16	5	5 - 12,9	13 (3) 19 (4)	10		●	●	●	●	●	●	●	
16 / (8)	19	5	8 - 15,9	13 (3) 19 (4) 25 (5)	15			●	●	●	●	●	●	●
20 / (9)	23	5	12 - 19,9	13 (3) 19 (4) 25 (5)	20			●	●	●	●	●	●	●
25 / (10)	28	5	16,5 - 24,9	13 (3) 19 (4) 25 (5)	25			●	●	●	●	●	●	●
32 / (11)	35	5	20 - 31,9	19 (4) 25 (5)	30				●	●	●	●	●	●

Ordering Code (example):

2261.6G3.0710

Shape: round	
P = ∅ 7,1 mm	= 0710
Punch cutting length: l_1	**Order No**
13 mm	= (3)
Length: l	**Order Code character**
100 mm	= (G)
Diameter: d_1	**Order No**
10 mm	= (6)
Type:	**Order No**
ISO	= (1)
Execution:	**Order No**
Pilot pin with tapered tip	= (6)
Punch:	
without ejector pin	= 22

Material:

HSS

Hardness:

Shaft 64 ± 2 HRC

Head 52 ± 5 HRC

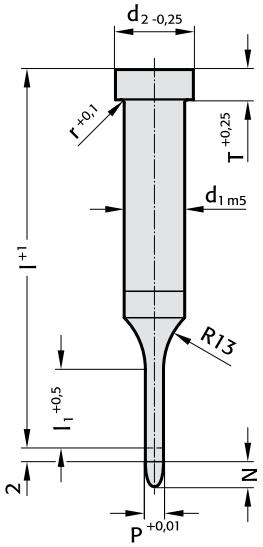
Execution:

Head hot upset-forged. Shoulder, shaft and pilot fine ground.

Special dimensions on request.

PILOT PIN WITH PARABOLIC TIP, ISO 8020

2271.



2271. Pilot pin with parabolic tip, ISO 8020

d_1 / Order No	d_2	T	P	l_1 / Order No	l / (Order Code character)	50 (A)	56 (B)	63 (C)	71 (D)	80 (E)	90 (F)	100 (G)
5 / (3)	8	5	1 - 4,9	10 (2) 13 (3)		●	●	●	●			
6 / (4)	9	5	1,6 - 5,9	10 (2) 13 (3)		●	●	●	●	●		
8 / (5)	11	5	2,5 - 7,9	10 (2) 13 (3)		●	●	●	●	●		
10 / (6)	13	5	4 - 9,9	10 (2) 13 (3) 19 (4)		●	●	●	●	●	●	●
13 / (7)	16	5	5 - 12,9	10 (2) 13 (3) 19 (4)		●	●	●	●	●	●	●
16 / (8)	19	5	8 - 15,9	13 (3) 19 (4)		●	●	●	●	●	●	●
20 / (9)	23	5	12 - 19,9	13 (3) 19 (4)			●	●	●	●	●	●
25 / (10)	28	5	16,5 - 24,9	13 (3) 19 (4)			●	●	●	●	●	●
32 / (11)	35	5	20 - 31,9	19 (4)					●	●	●	●

Material:
HSS
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 5 HRC

Execution:
Head hot upset-forged. Shoulder, shaft and pilot fine ground.
Special dimensions on request.

Note:
The 2 mm length provides full guidance before the blanking punch contacts the sheet metal.

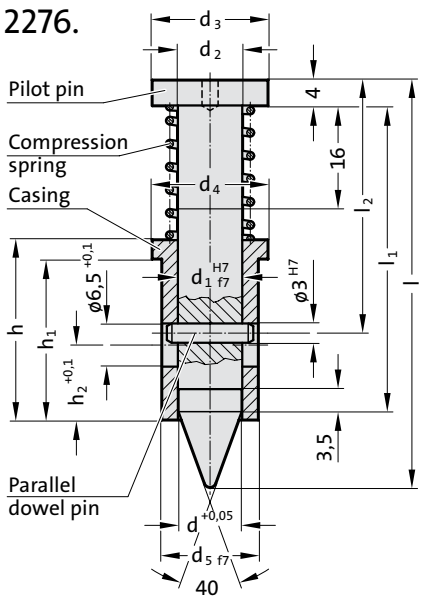
Length of parabolic tip N:
= 8 mm where P ≤ 10 mm
=12 mm where P 10,1 mm - 15 mm
=15 mm where P > 15 mm

Ordering Code (example):

2271.9F4.1870

Shape: round P = ∅ 18,7 mm	= 1870
Punch cutting length: l_1 19 mm	**Order No** = (4)
Length: l 90 mm	**Order Code character** = (F)
Diameter: d_1 20 mm	**Order No** = (9)
Type: ISO	**Order No** = (1)
Execution: Pilot pin with parabolic tip	**Order No** = (7)
Punch: without ejector pin	= 22

PILOT UNIT TO MERCEDES-BENZ STANDARD



2276. Pilot unit to Mercedes-Benz Standard

Order No	d	d_1	d_2	d_3	d_4	d_5	h	h_1	h_2	l_1	l_2	l	Spring force preloaded [daN]	Spring force pressed [daN]
2276.1.A.0980	9.8	10	10	18	18	15	28	25	12	47.5	39.3	63.2	4.9	6.2
2276.2.B.1580	15.8	16	16	24	30	26	28	25	12	54.5	46.3	72.5	4.8	5.6

Ordering Code (example):

2276.1.A.0980

Diameter: d
9,8 mm = 0980
15,8 mm = 1580
Length: l
63,2 mm = (A)
72,5 mm = (B)
Diameter: d_1
10 mm = (1)
16 mm = (2)
Standard:
Mercedes = (6)
Execution:
Pilot pin = (7)

= 22

Order Code character
Order No
Order No
Order No

Description:

The pilot unit provides exact positioning of sheet metal parts.
There are 2 sizes.
The pilot unit 10 (2276.1.) can used for a hole diameter of 5 to 10 mm and is available as a finished item, 9.8 mm diameter.
The pilot unit 16 (2276.2.) is used for diameter > 10 - 16 mm and is available as a finished item, 15.8 mm diameter.
Smaller diameters have to be ground by the tool making department.

Material:

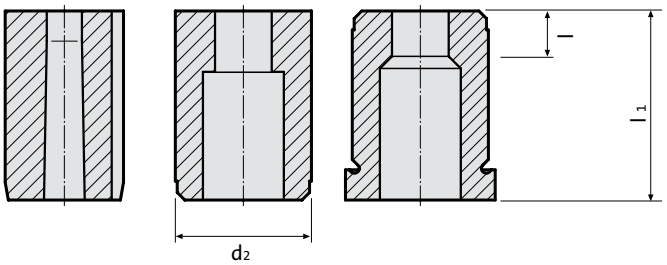
Sleeve: 1.3505
Hardness 58 ± 2 HRC
Pilot pin: 1.2550
Hardness 50 ± 2 HRC

Execution:

The pilot unit consists of:
Pilot pin, sleeve, compression spring, dowel pin.

MATRIXES

CUTTING BUSHINGS - ORDER EXAMPLE



Note: **See table for standard dimensions**
Special dimensions to order

2 6 4 6 . 1 0 F 6 . 1 3 5 0 . 0 6 5 0 . A 2

Format: Slot length P = 13.5 mm

Format: Slot width W = 6.5 mm

Matrixes:
26 = matrixes

Shape cutting length: l	Order No
2	= 1
3	= 2
4	= 3
5	= 4
6	= 5
8	= 6
10	= 7
12	= 8
special	= X

Execution:	Order No
blank (pilot hole bore)	= 0
round	= 1
square	= 2
rectangular	= 3
slot	= 4
rectangle with radiused corners	= 5
special shapes	= 9

Length: l_1	Order Code character
13	= A
16	= B
20	= C
22	= D
25	= E
28	= F
30	= G
32	= H
35	= J
40	= K
special	= X

Angle:	Order Code character
0°	= A
90°	= B
180°	= C
270°	= D
special	= X

Type:	Order No
automotive standard	= 5
without shoulder ISO 8977	= 6
with shoulder ISO 8977	= 7

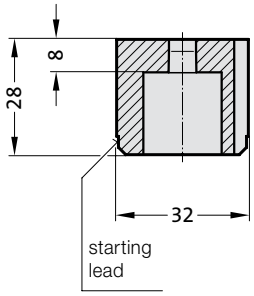
Diameter: d_2	Order No
5	= 1
6	= 2
8	= 3
10	= 4
13	= 5
16	= 6
20	= 7
22	= 8
25	= 9
32	= 10
38	= 11
40	= 12
45	= 13
50	= 14
56	= 15
63	= 16
71	= 17
76	= 18
85	= 19
90	= 20
100	= 21

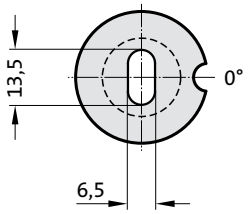
Anti-rotation element:	Order No
Pin ø3	= 1
Pin ø4	= 2
Pin ø6	= 3
polished Surface (continuous)	= 4
polished Surface top, 14 mm	= 5
polished Surface bottom, 14 mm	= 6
special	= X

Ordering Code (example):

2 6 4 6 . 1 0 F 6 . 1 3 5 0 . 0 6 5 0 . A 2

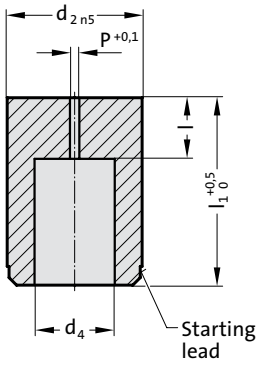
- Anti-rotation element: Pin ∅ = 4 mm (2)
- Angle = 0° (A)
- Format: Slot width W = 6,5 mm (0650)
- Format: Slot length P = 13,5 mm (1350)
- Shape cutting length: l = 8 mm (6)
- Length: l_1 = 28 mm (F)
- Diameter: d_2 = 32 mm (10)
- Type: without shoulder ISO 8977 (6)
- Version: Slot (4)
- Matrixes (26)





MATRIX WITHOUT SHOULDER, BLANK, ISO 8977

2606.



2606. Matrix without shoulder, blank, ISO 8977

d_2 / Order No	d_4	P	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
5 / (1)	2.8	0.8	2 (1)		●	●	●	●	●	●	●	●	
6 / (2)	3.5	1	3 (2)		●	●	●	●	●	●	●	●	
8 / (3)	4	1	4 (3)		●	●	●	●	●	●	●	●	
10 / (4)	5.8	1	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	1.2	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	1.2	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	1.5	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	1.5	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	1.5	8 (6) 12 (8)					●	●	●	●	●	●

Ordering Code (example):

2606.10F8

Shape cutting length: l	12 mm	**Order No** = (8)
Length: l_1	28 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (10)
Type:	without shoulder ISO 8977	**Order No** = (6)
Execution:	blank (pilot hole bore)	**Order No** = (0)
Matrix		= 26

Material:

HSS

Hardness 62 ± 2 HRC

Execution:

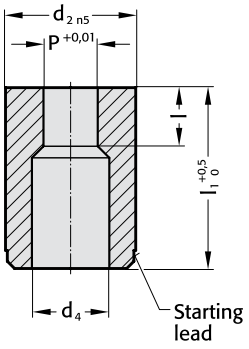
Diameter d_2, starting lead and face surfaces ground.

Diameter P is a bored pilot hole for wire EDM.

Special dimensions on request.

MATRIX WITHOUT SHOULDER, ROUND, ISO 8977

2616.



2616. Matrix without shoulder, round, ISO 8977

d_2 / Order No	d_4	P	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
5 / (1)	2.8	1 - 2,4	2 (1)		●	●	●	●	●	●	●	●	
6 / (2)	3.5	1,6 - 3	3 (2)		●	●	●	●	●	●	●	●	
8 / (3)	4	2 - 3,5	4 (3)		●	●	●	●	●	●	●	●	
10 / (4)	5.8	2,5 - 5	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	4 - 7	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	6 - 9	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	8 - 11	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	9 - 14	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	10,7 - 16	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	15 - 20	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	19 - 27	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	19 - 27	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	26 - 36	8 (6) 12 (8)					●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

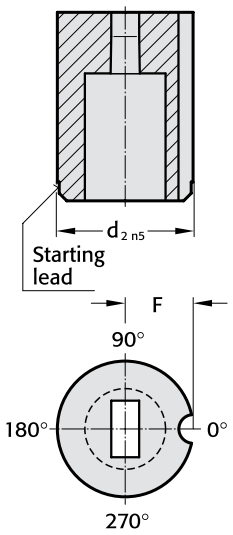
Ordering Code (example): without anti-rotation element

2616.10F8.1510

Shape: round	
P =ø15,1 mm	= 1510
Shape cutting length: l	**Order No**
12 mm	= (8)
Length: l_1	**Order Code character**
28 mm	= (F)
Diameter: d_2	**Order No**
32 mm	= (10)
Type:	**Order No**
without shoulder	
ISO 8977	= (6)
Execution:	**Order No**
round	= (1)
Matrix	= 26

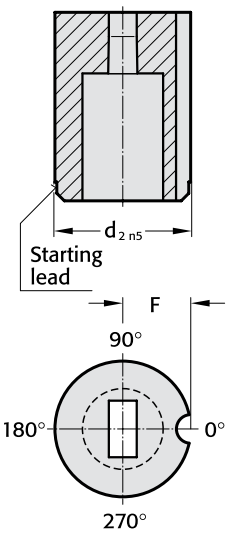
MATRIXES WITHOUT SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



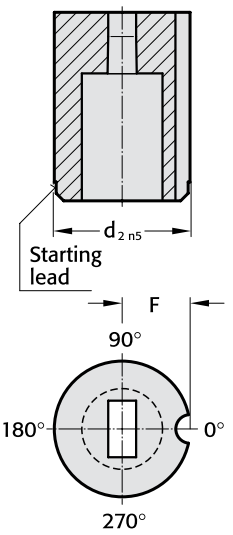
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 2 (2)



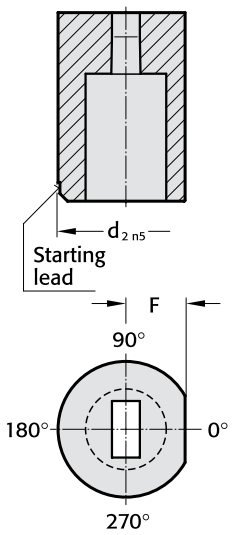
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 3 (3)



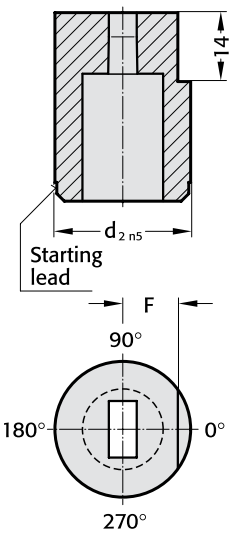
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
50	25

Anti-rotation element 4 (4)



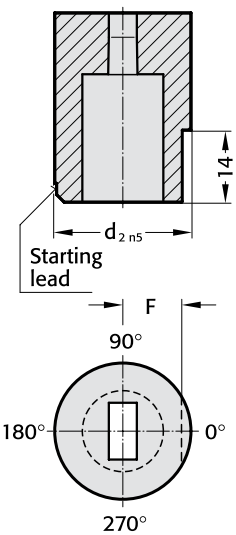
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

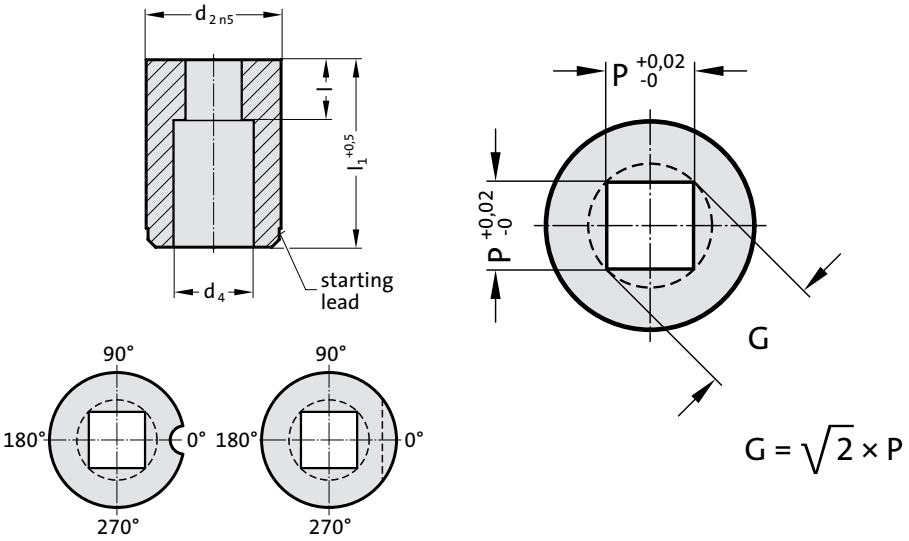
Ordering Code (example): with anti-rotation element from $d_2 \geq 10$ mm

2616.10F8.1510.A4

Anti-rotation element: Polished surface (continuous)	**Order No** = (4)
Angle: 0°	**Order Code character** = (A)
Shape: round P = ø 15,1 mm	= 1510
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder ISO 8977	**Order No** = (6)
Execution: round	**Order No** = (1)
Matrix	= 26

MATRIX WITHOUT SHOULDER, SQUARE, ISO 8977

2626.



2626. Matrix without shoulder, square, ISO 8977

d_2 / Order No	d_4	P_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	9	36	8 (6) 12 (8)					●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

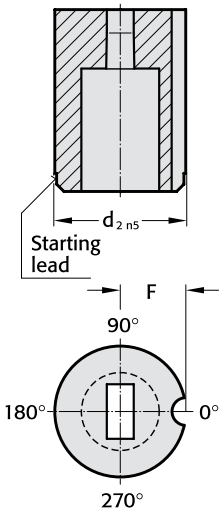
Ordering Code (example): with anti-rotation element

2626.10F8.1350.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No**	= (3)
Angle: 0°	**Order Code character**	= (A)
Shape: square, Length P P = 13,5 mm		= 1350
Shape cutting length: l 12 mm	**Order No**	= (8)
Length: l_1 28 mm	**Order Code character**	= (F)
Diameter: d_2 32 mm	**Order No**	= (10)
Type: without shoulder ISO 8977	**Order No**	= (6)
Execution: square	**Order No**	= (2)
Matrix		= 26

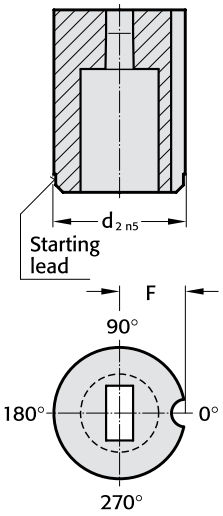
MATRIXES WITHOUT SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



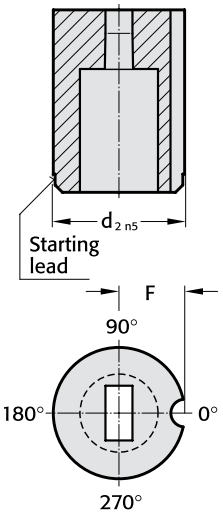
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 2 (2)



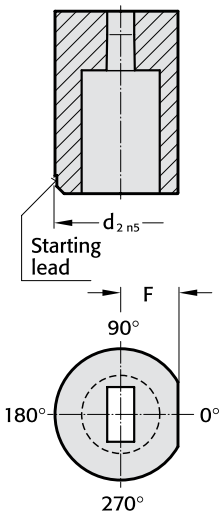
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 3 (3)



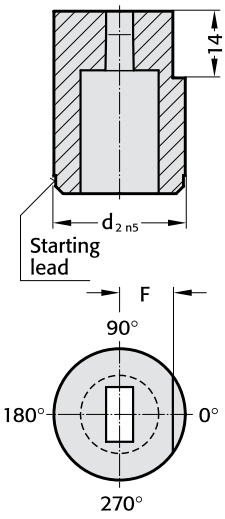
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
50	25

Anti-rotation element 4 (4)



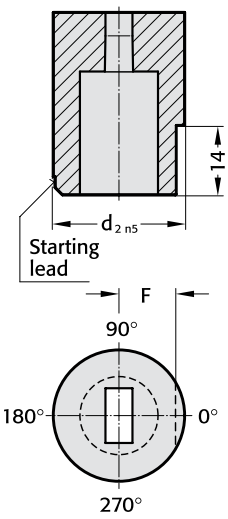
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

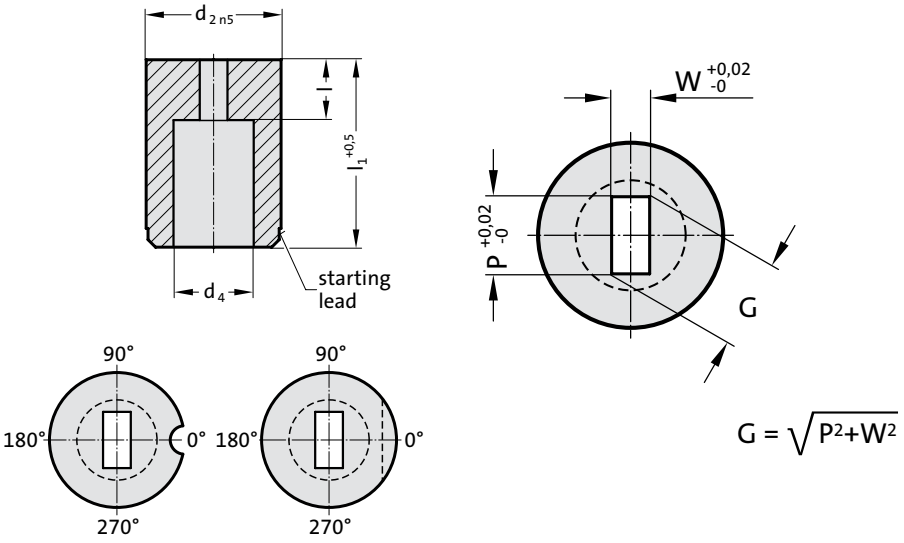
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

MATRIX WITHOUT SHOULDER, RECTANGULAR, ISO 8977

2636.



2636. Matrix without shoulder, rectangular, ISO 8977

d_2 / Order No	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	9	36	8 (6) 12 (8)					●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

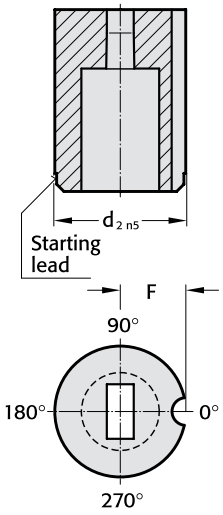
Ordering Code (example): with anti-rotation element

2636.10F8.1350.0650.B4

Anti-rotation element: Polished surface (continuous)	**Order No** = (4)
Angle: 90°	**Order Code character** = (B)
Shape: rectangular, Width W W = 6,5 mm	= 0650
Shape: rectangular, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder ISO 8977	**Order No** = (6)
Execution: rectangular	**Order No** = (3)
Matrix	= 26

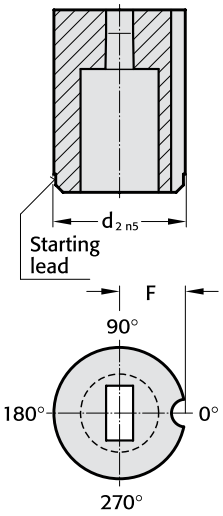
MATRIXES WITHOUT SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



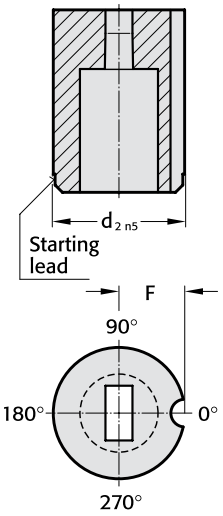
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 2 (2)



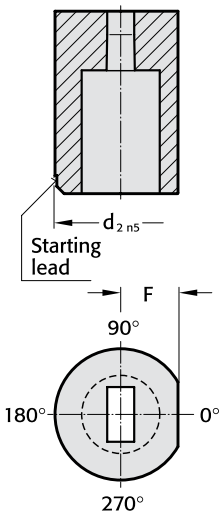
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 3 (3)



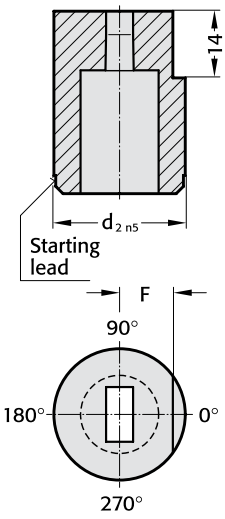
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
50	25

Anti-rotation element 4 (4)



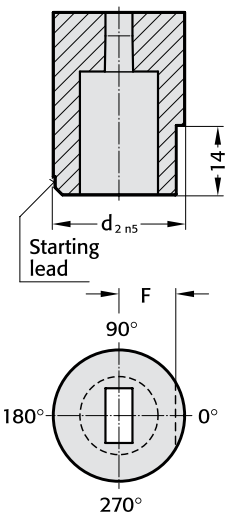
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

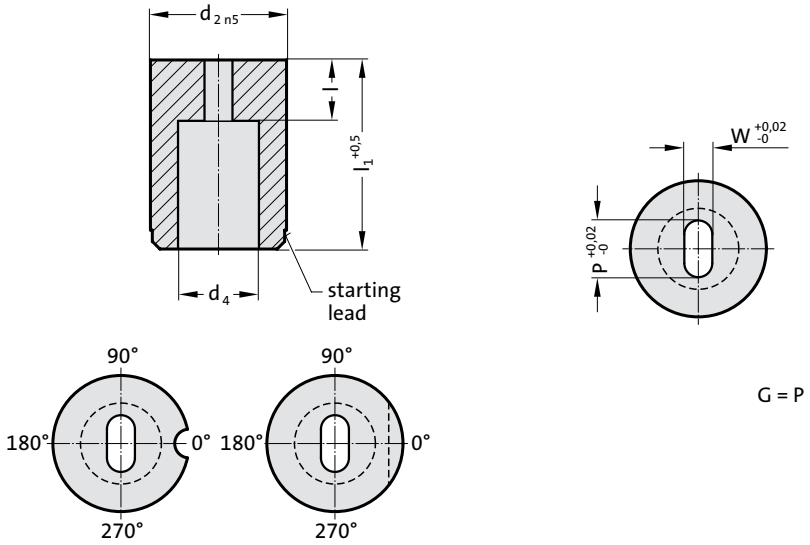
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

MATRIX WITHOUT SHOULDER, SLOT, ISO 8977

2646.



2646. Matrix without shoulder, slot, ISO 8977

d_2 / Order No	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	9	36	8 (6) 12 (8)					●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

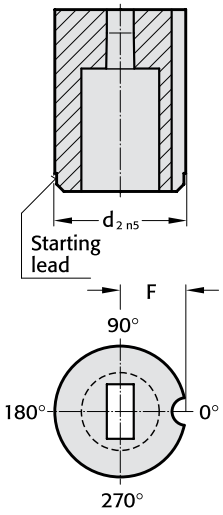
Ordering Code (example): with anti-rotation element

2646.10F8.1350.0650.B2

Anti-rotation element: Pin ∅ 4 mm	**Order No** = (2)
Angle: 90°	**Order Code character** = (B)
Shape: slot, Width W W = 6,5 mm	= 0650
Shape: slot, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder ISO 8977	**Order No** = (6)
Execution: slot	**Order No** = (4)
Matrix	= 26

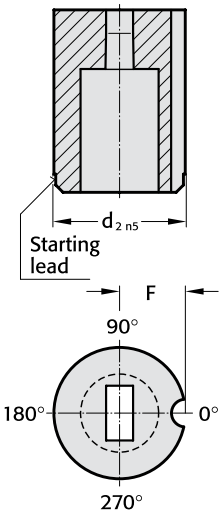
MATRIXES WITHOUT SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



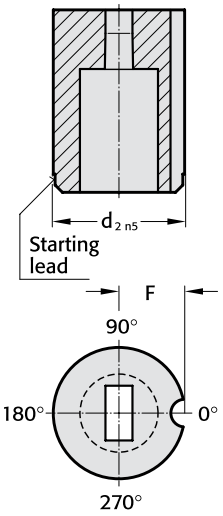
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 2 (2)



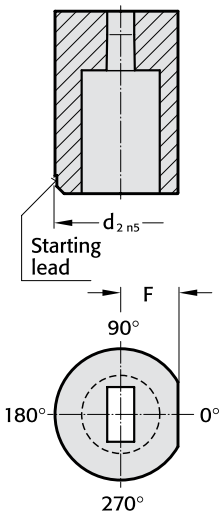
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 3 (3)



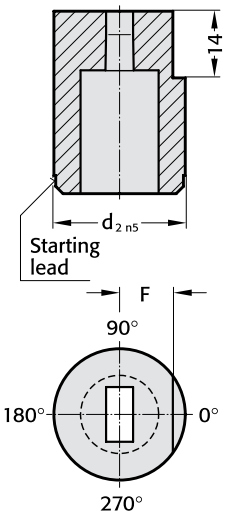
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
50	25

Anti-rotation element 4 (4)



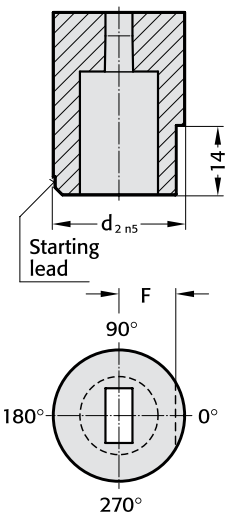
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

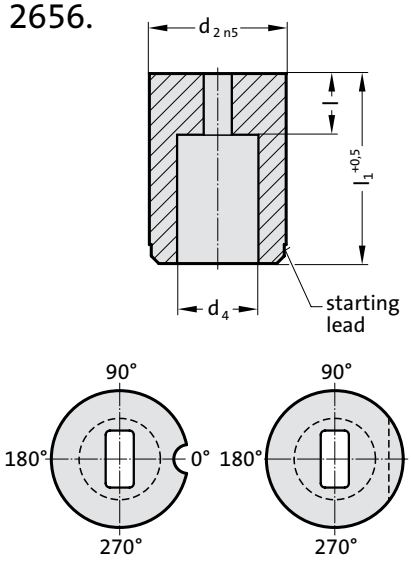
Anti-rotation element 6 (6)

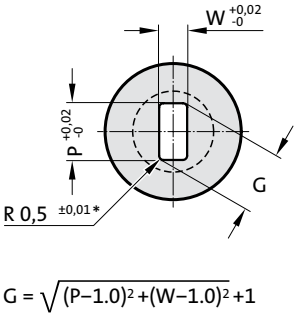


d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

MATRIX WITHOUT SHOULDER, RECTANGLE WITH RADIUSSED CORNERS, ISO 8977

2656.





$$G = \sqrt{(P-1.0)^2+(W-1.0)^2}+1$$

2656. Matrix without shoulder, rectangle with radiussed corners, ISO 8977

d_2 / Order No	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●	
13 / (5)	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●	
16 / (6)	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●	
20 / (7)	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●	
22 / (8)	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●	
25 / (9)	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●	
32 / (10)	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●	
38 / (11)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
40 / (12)	27.7	6.4	27	8 (6) 12 (8)					●	●	●	●	●	
50 / (14)	37	9	36	8 (6) 12 (8)					●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

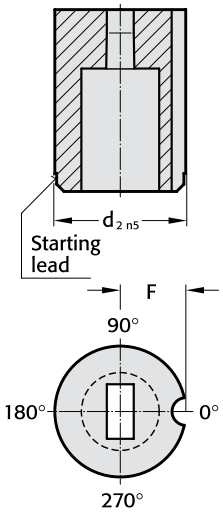
Ordering Code (example): with anti-rotation element

2656.10F8.1350.0650.A1

Anti-rotation element: Pin ∅ 3 mm	**Order No** = (1)
Angle: 0°	**Order Code character** = (A)
Shape: rectangle with radiused corners, Width W W = 6,5 mm	= 0650
Shape: rectangle with radiused corners, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder ISO 8977	**Order No** = (6)
Execution: rectangle with radiused corners	**Order No** = (5)
Matrix	= 26

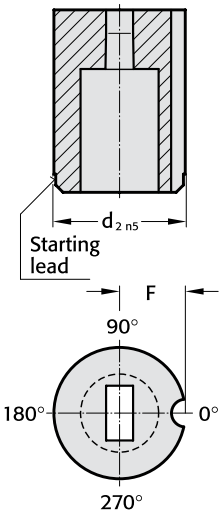
MATRIXES WITHOUT SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



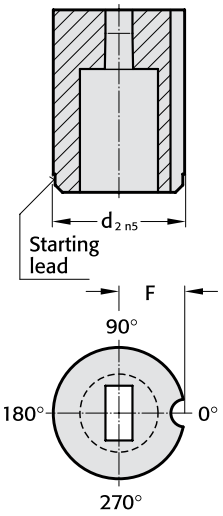
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 2 (2)



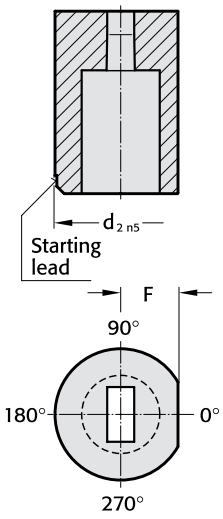
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
50	25

Anti-rotation element 3 (3)



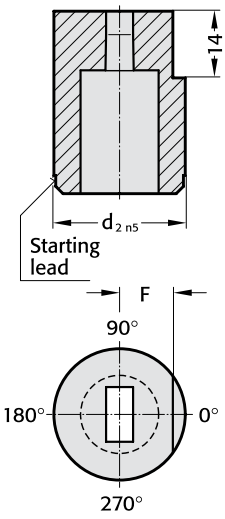
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
50	25

Anti-rotation element 4 (4)



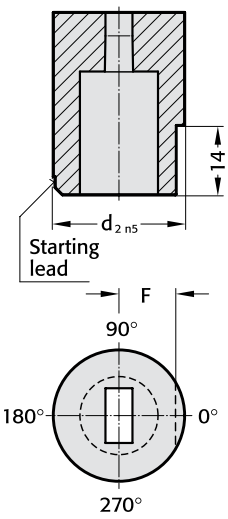
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

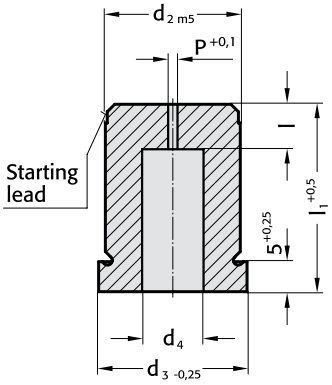
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
50	23

MATRIX WITH SHOULDER, BLANK, ISO 8977

2607.



2607. Matrix with shoulder, blank, ISO 8977

d_2 / Order No	d_3	d_4	P	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
5 / (1)	8	2.8	0.8	2 (1)		●	●	●	●	●	●	●	●
6 / (2)	9	3.5	1	3 (2)		●	●	●	●	●	●	●	●
8 / (3)	11	4	1	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	1	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	1.2	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	1.2	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	1.5	8 (6) 12 (8)			●	●	●	●	●	●	●

Ordering Code (example):

2607.11E6

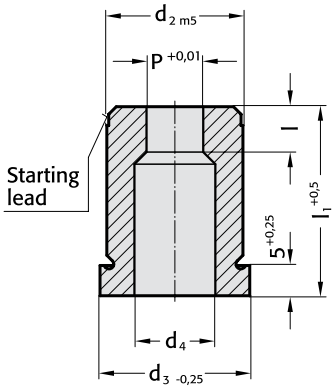
Shape cutting length: l	8 mm	**Order No** = (6)
Length: l_1	25 mm	**Order Code character** = (E)
Diameter: d_2	38 mm	**Order No** = (11)
Type:	with shoulder ISO 8977	**Order No** = (7)
Execution:	blank (pilot hole bore)	**Order No** = (0)
Matrix		= 26

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Diameter P is a bored pilot hole for wire EDM.
Special dimensions on request.

MATRIX WITH SHOULDER, ROUND, ISO 8977

2617.



2617. Matrix with shoulder, round, ISO 8977

d_2 / Order No	d_3	d_4	P	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
5 / (1)	8	2.8	1 - 2,4	2 (1)		●	●	●	●	●	●	●	●
6 / (2)	9	3.5	1,6 - 3	3 (2)		●	●	●	●	●	●	●	●
8 / (3)	11	4	2 - 3,5	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	2,5 - 5	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	4 - 7	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	6 - 9	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	8 - 11	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	9 - 14	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	10,7 - 16	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	15 - 20	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	19 - 27	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	19 - 27	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	26 - 36	8 (6) 12 (8)			●	●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

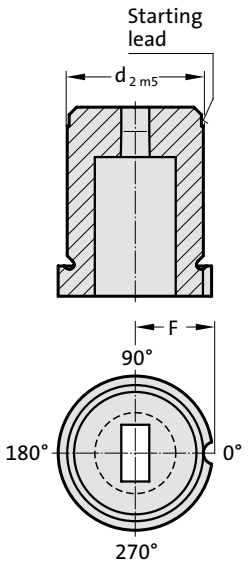
Ordering Code (example): without anti-rotation element

2617.10F8.1510

Shape: round	
P = ø15,1 mm	= 1510
Shape cutting length: l	**Order No**
12 mm	= (8)
Length: l_1	**Order Code character**
28 mm	= (F)
Diameter: d_2	**Order No**
32 mm	= (10)
Type:	**Order No**
with shoulder	
ISO 8977	= (7)
Execution:	**Order No**
round	= (1)
Matrix	= 26

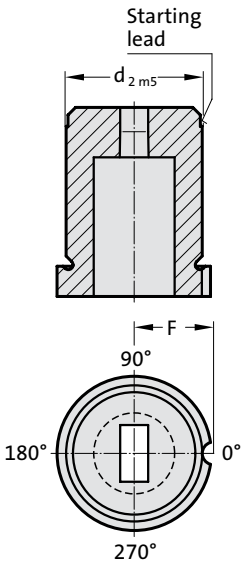
MATRIXES WITH SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



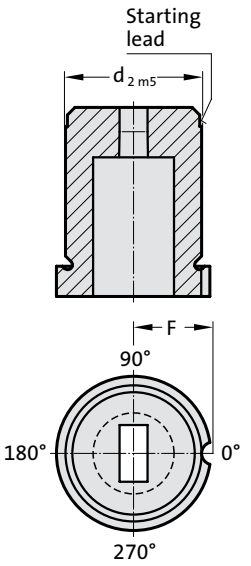
Pin ø3	
d_2	F
8	5,5
10	6,5
13	8
16	9,5
20	11,5
22	12,5
25	14
32	17,5
40	21,5
50	26,5

Anti-rotation element 2 (2)



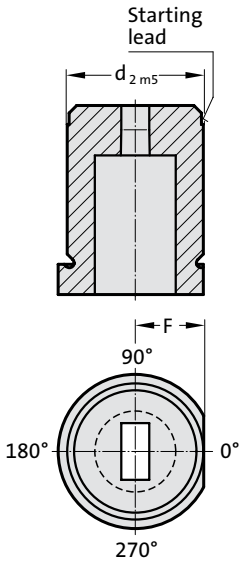
Pin ø4	
d_2	F
8	6
10	7
13	8,5
16	10
20	12
22	13
25	14,5
32	18
40	22
50	27

Anti-rotation element 3 (3)



Pin ø6	
d_2	F
8	7
10	8
13	9,5
16	11
20	13
22	14
25	15,5
32	19
40	23
50	28

Anti-rotation element 4 (4)



$F = d_2 / 2$

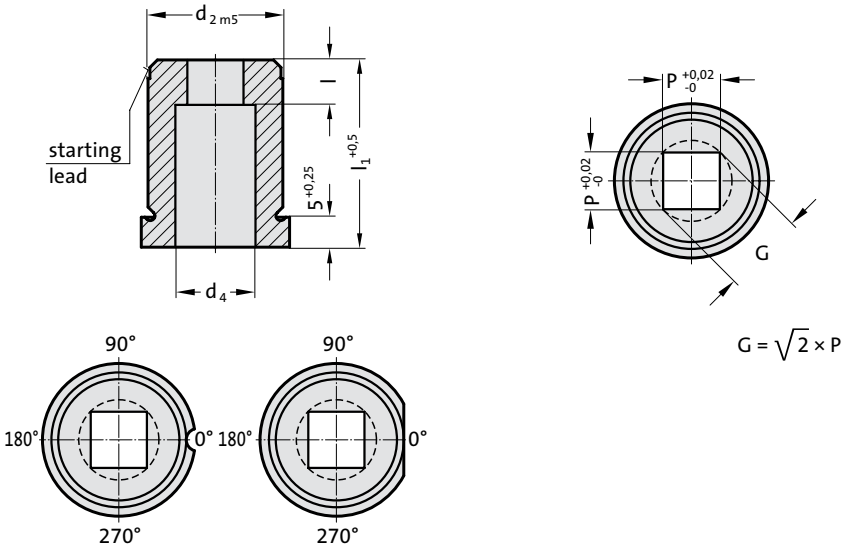
Ordering Code (example): with anti-rotation element from $d_2 \geq 8$ mm

2617.10F8.1510.A4

Anti-rotation element: Polished surface (continuous)	**Order No** = (4)
Angle: 0°	**Order Code character** = (A)
Shape: round P =ø15,1 mm	= 1510
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: with shoulder ISO 8977	**Order No** = (7)
Execution: round	**Order No** = (1)
Matrix	= 26

MATRIX WITH SHOULDER, SQUARE, ISO 8977

2627.



2627. Matrix with shoulder, square, ISO 8977

d_2 / Order No	d_3	d_4	P_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
8 / (3)	11	4	1.2	3.5	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	6.4	36	8 (6) 12 (8)			●	●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

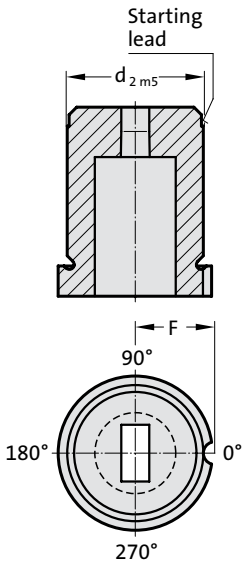
Ordering Code (example): with anti-rotation element

2627.10F8.1350.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No**	= (3)
Angle: 0°	**Order Code character**	= (A)
Shape: square, Length P P = 13,5 mm		= 1350
Shape cutting length: l 12 mm	**Order No**	= (8)
Length: l_1 28 mm	**Order Code character**	= (F)
Diameter: d_2 32 mm	**Order No**	= (10)
Type: with shoulder ISO 8977	**Order No**	= (7)
Execution: square	**Order No**	= (2)
Matrix		= 26

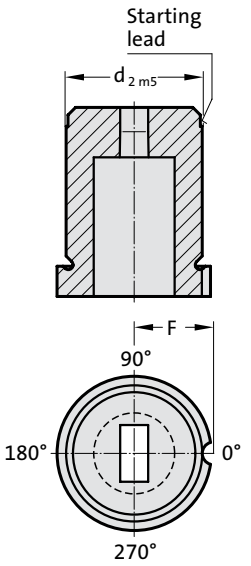
MATRIXES WITH SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



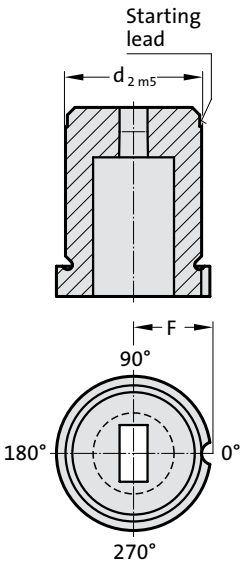
Pin ø3	
d_2	F
8	5,5
10	6,5
13	8
16	9,5
20	11,5
22	12,5
25	14
32	17,5
38	20,5
40	21,5
50	26,5

Anti-rotation element 2 (2)



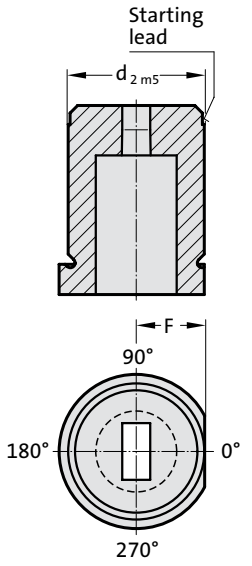
Pin ø4	
d_2	F
8	6
10	7
13	8,5
16	10
20	12
22	13
25	14,5
32	18
38	21
40	22
50	27

Anti-rotation element 3 (3)



Pin ø6	
d_2	F
8	7
10	8
13	9,5
16	11
20	13
22	14
25	15,5
32	19
38	22
40	23
50	28

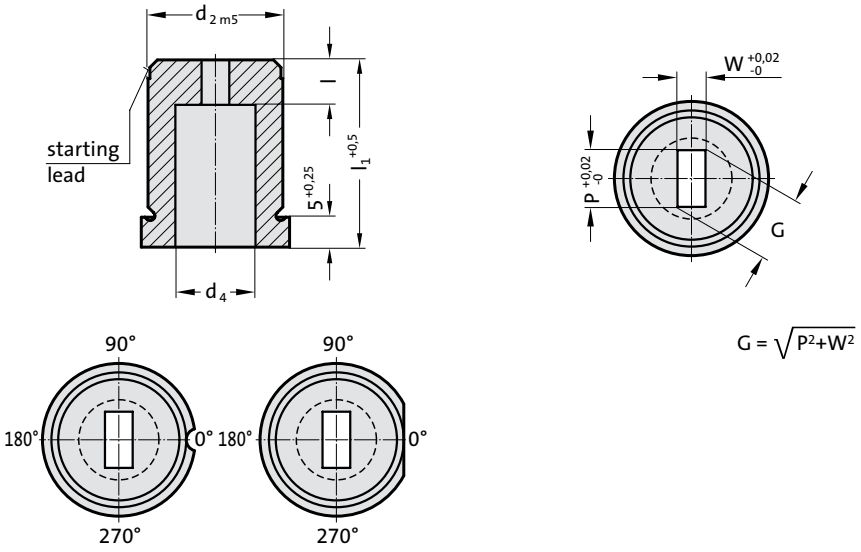
Anti-rotation element 4 (4)



$F = d_2 / 2$

MATRIX WITH SHOULDER, RECTANGULAR, ISO 8977

2637.



2637. Matrix with shoulder, rectangular, ISO 8977

d_2 / Order No	d_3	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
8 / (3)	11	4	1.2	3.5	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	6.4	36	8 (6) 12 (8)			●	●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

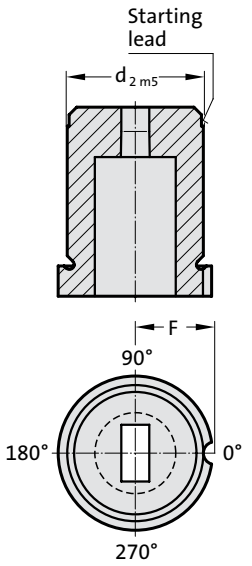
Ordering Code (example): with anti-rotation element

2637.10F8.1350.0650.B2

Anti-rotation element: Pin ∅ 4 mm	**Order No** = (2)
Angle: 90°	**Order Code character** = (B)
Shape: rectangular, Width W W = 6,5 mm	= 0650
Shape: rectangular, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: with shoulder ISO 8977	**Order No** = (7)
Execution: rectangular	**Order No** = (3)
Matrix	= 26

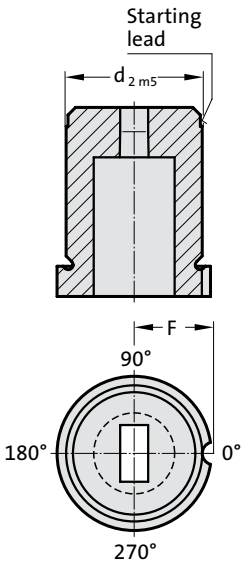
MATRIXES WITH SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



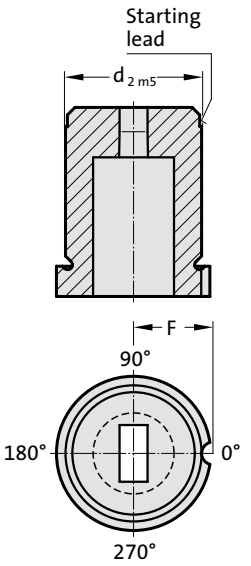
Pin ø3	
d_2	F
8	5,5
10	6,5
13	8
16	9,5
20	11,5
22	12,5
25	14
32	17,5
38	20,5
40	21,5
50	26,5

Anti-rotation element 2 (2)



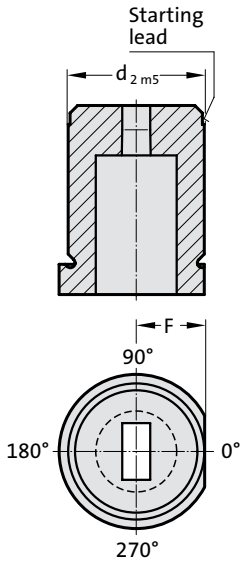
Pin ø4	
d_2	F
8	6
10	7
13	8,5
16	10
20	12
22	13
25	14,5
32	18
38	21
40	22
50	27

Anti-rotation element 3 (3)



Pin ø6	
d_2	F
8	7
10	8
13	9,5
16	11
20	13
22	14
25	15,5
32	19
38	22
40	23
50	28

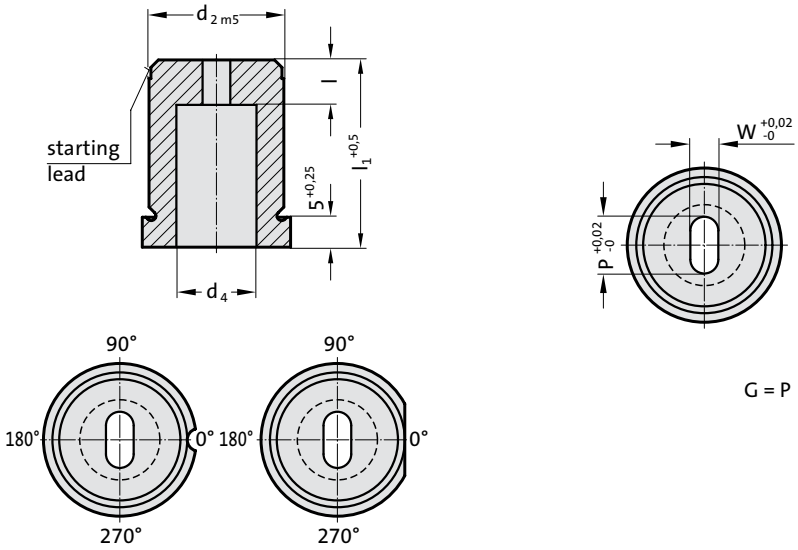
Anti-rotation element 4 (4)



$F = d_2 / 2$

MATRIX WITH SHOULDER, SLOT, ISO 8977

2647.



2647. Matrix with shoulder, slot, ISO 8977

d_2 / Order No	d_3	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
8 / (3)	11	4	1.2	3.5	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	6.4	36	8 (6) 12 (8)			●	●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.

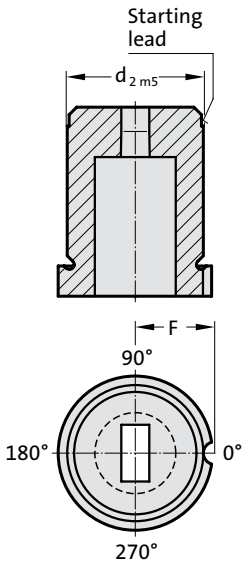
Ordering Code (example): with anti-rotation element

2647.10F8.1350.0650.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: slot, Width W W = 6,5 mm	= 0650
Shape: slot, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: with shoulder ISO 8977	**Order No** = (7)
Execution: slot	**Order No** = (4)
Matrix	= 26

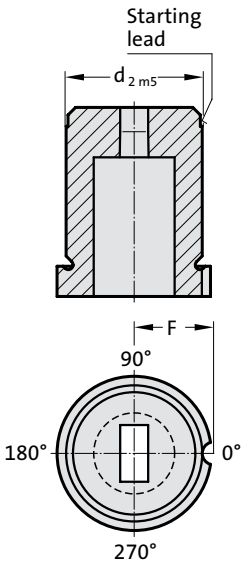
MATRIXES WITH SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



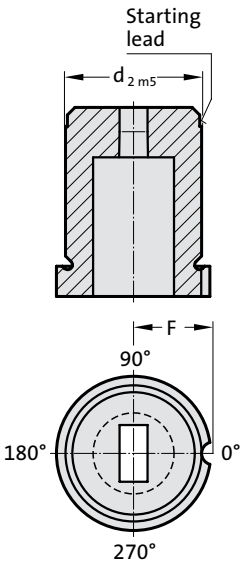
Pin ø3	
d_2	F
8	5,5
10	6,5
13	8
16	9,5
20	11,5
22	12,5
25	14
32	17,5
38	20,5
40	21,5
50	26,5

Anti-rotation element 2 (2)



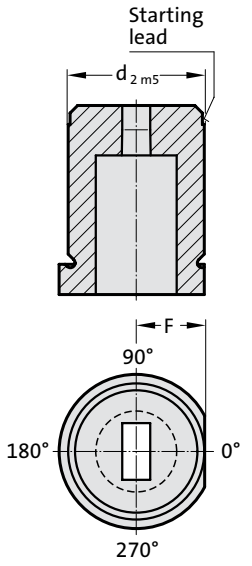
Pin ø4	
d_2	F
8	6
10	7
13	8,5
16	10
20	12
22	13
25	14,5
32	18
38	21
40	22
50	27

Anti-rotation element 3 (3)



Pin ø6	
d_2	F
8	7
10	8
13	9,5
16	11
20	13
22	14
25	15,5
32	19
38	22
40	23
50	28

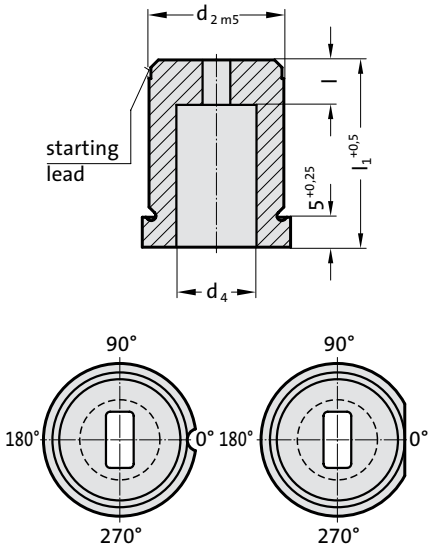
Anti-rotation element 4 (4)

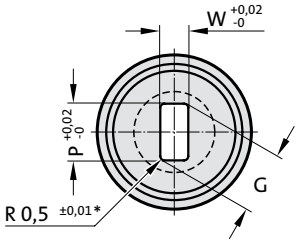


$F = d_2 / 2$

MATRIX WITH SHOULDER, RECTANGLE WITH RADIUSSED CORNERS, ISO 8977

2657.





$$G = \sqrt{(P-1.0)^2+(W-1.0)^2}+1$$

2657. Matrix with shoulder, rectangle with radiussed corners, ISO 8977

d_2 / Order No	d_3	d_4	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)
8 / (3)	11	4	1.2	3.5	4 (3)		●	●	●	●	●	●	●	●
10 / (4)	13	5.8	1.2	5	4 (3) 8 (6)		●	●	●	●	●	●	●	●
13 / (5)	16	8	2	7	5 (4) 8 (6)			●	●	●	●	●	●	●
16 / (6)	19	9.5	2.4	9	5 (4) 8 (6)			●	●	●	●	●	●	●
20 / (7)	23	12	3.2	11	8 (6) 12 (8)			●	●	●	●	●	●	●
22 / (8)	25	15	4	14	8 (6) 12 (8)			●	●	●	●	●	●	●
25 / (9)	28	17.3	4.8	16	8 (6) 12 (8)			●	●	●	●	●	●	●
32 / (10)	35	20.7	5.5	20	8 (6) 12 (8)			●	●	●	●	●	●	●
38 / (11)	41	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
40 / (12)	43	27.7	6.4	27	8 (6) 12 (8)			●	●	●	●	●	●	●
50 / (14)	53	37	6.4	36	8 (6) 12 (8)			●	●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

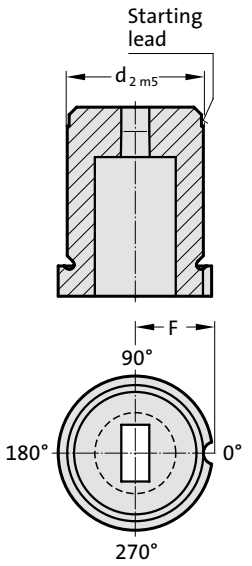
Ordering Code (example): with anti-rotation element

2657.10F8.1350.0650.A1

Anti-rotation element: Pin ∅ 3 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: rectangle with radiused corners, Width W W = 6,5 mm	= 0650
Shape: rectangle with radiused corners, Length P P = 13,5 mm	= 1350
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: with shoulder ISO 8977	**Order No** = (7)
Execution: rectangle with radiused corners	**Order No** = (5)
Matrix	= 26

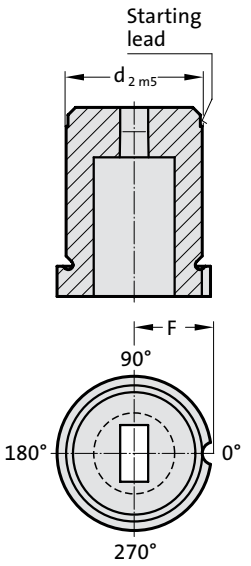
MATRIXES WITH SHOULDER, CYLINDRICAL, ISO 8977, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



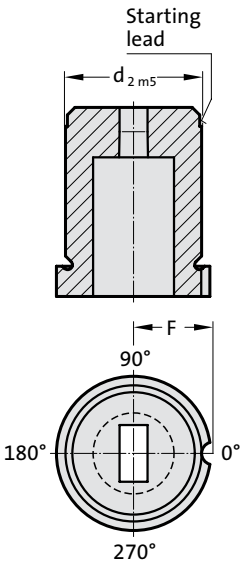
	Pin ø3
d_2	F
8	5,5
10	6,5
13	8
16	9,5
20	11,5
22	12,5
25	14
32	17,5
38	20,5
40	21,5
50	26,5

Anti-rotation element 2 (2)



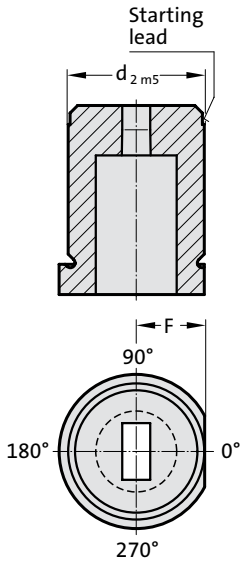
	Pin ø4
d_2	F
8	6
10	7
13	8,5
16	10
20	12
22	13
25	14,5
32	18
38	21
40	22
50	27

Anti-rotation element 3 (3)



	Pin ø6
d_2	F
8	7
10	8
13	9,5
16	11
20	13
22	14
25	15,5
32	19
38	22
40	23
50	28

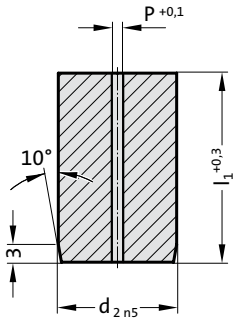
Anti-rotation element 4 (4)



$F = d_2 / 2$

MATRIX WITHOUT SHOULDER, BLANK, AUTOMOTIVE STANDARD

2605.



2605. Matrix without shoulder, blank, Automotive Standard

d_2 / Order No	P	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	0.8		●	●	●	●	●	●	●	●	●	
13 / (5)	0.8		●	●	●	●	●	●	●	●	●	
16 / (6)	1.5				●	●	●	●	●	●	●	
20 / (7)	1.5				●	●	●	●	●	●	●	
22 / (8)	1.5				●	●	●	●	●	●	●	
25 / (9)	1.5				●	●	●	●	●	●	●	
32 / (10)	1.5				●	●	●	●	●	●	●	
38 / (11)	1.5				●	●	●	●	●	●	●	●
40 / (12)	1.5					●	●	●	●	●	●	●
45 / (13)	1.5					●	●	●	●	●	●	●
50 / (14)	1.5					●	●	●	●	●	●	●
56 / (15)	1.5					●	●	●	●	●	●	●
63 / (16)	1.5					●	●	●	●	●	●	●
71 / (17)	1.5					●	●	●	●	●	●	●
76 / (18)	1.5						●	●	●	●	●	●
85 / (19)	1.5						●	●	●	●	●	●
90 / (20)	1.5						●	●	●	●	●	●
100 / (21)	1.5						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and face surfaces ground.
Diameter P is a bored pilot hole for wire EDM.
Special dimensions on request.

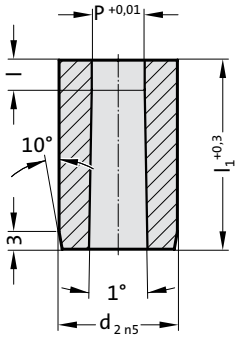
Ordering Code (example):

2605.10F

Length: l	28 mm	**Order Code character** = (F)
Diameter: d_2	32 mm	**Order No** = (10)
Type: without shoulder	Automotive Standard	**Order No** = (5)
Execution:	Blank (pilot hole bore)	**Order No** = (0)
Matrix		= 26

MATRIX WITHOUT SHOULDER, ROUND, AUTOMOTIVE STANDARD

2615.



2615. Matrix without shoulder, round, Automotive Standard

d_2 / Order No	P	l / Order No	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	1,6 - 6,8	3 (2) 4 (3) 5 (4)		●	●	●	●	●	●	●	●	●	
13 / (5)	3 - 8,8	3 (2) 5 (4) 8 (6)		●	●	●	●	●	●	●	●	●	
16 / (6)	7,4 - 10,8	3 (2) 5 (4) 8 (6)				●	●	●	●	●	●	●	
20 / (7)	9,5 - 13,6	3 (2) 5 (4) 10 (7)				●	●	●	●	●	●	●	
22 / (8)	10,5 - 15	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
25 / (9)	12 - 17	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
32 / (10)	16 - 22	3 (2) 6 (5) 12 (8)				●	●	●	●	●	●	●	
38 / (11)	18 - 27	3 (2) 8 (6) 12 (8)				●	●	●	●	●	●	●	●
40 / (12)	18 - 27	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
45 / (13)	18 - 35	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
50 / (14)	18 - 40	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
56 / (15)	18 - 45	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
63 / (16)	18 - 50	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
71 / (17)	18 - 56	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
76 / (18)	25 - 60	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
85 / (19)	25 - 66	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
90 / (20)	32 - 70	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
100 / (21)	32 - 78	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and end faces ground.
Special dimensions on request.

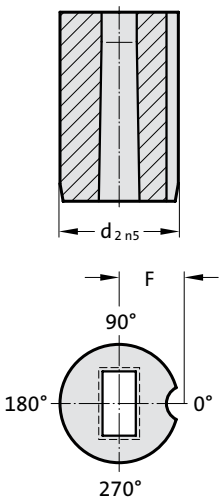
Ordering Code (example): without / with anti-rotation element

2615.10F8.2190/.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: round P = ∅ 21,9 mm	= (2190)
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder Automotive Standard	**Order No** = (5)
Execution: round	**Order No** = (1)
Matrix	= 26

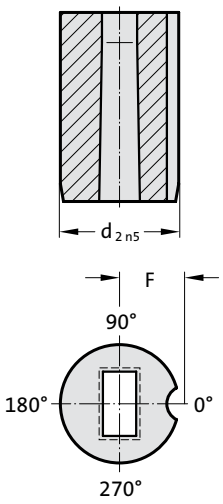
MATRIX WITHOUT SHOULDER, AUTOMOTIVE STANDARD, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



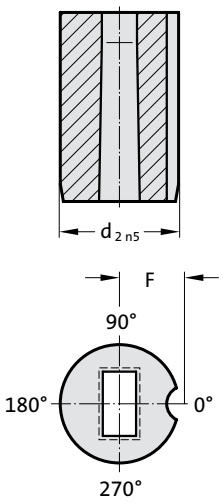
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 2 (2)



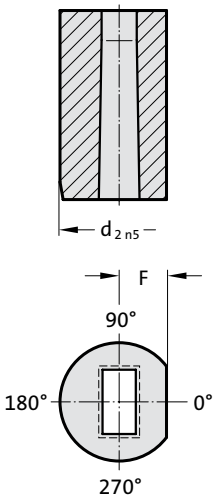
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 3 (3)



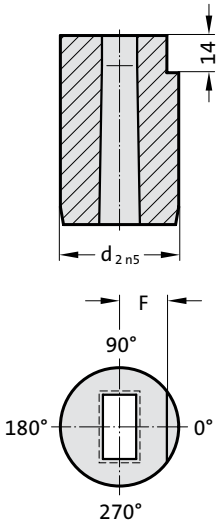
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 4 (4)



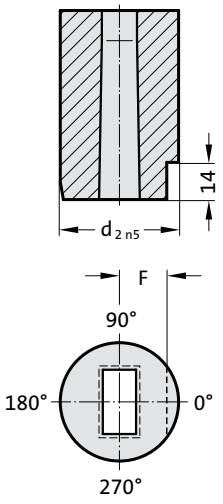
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

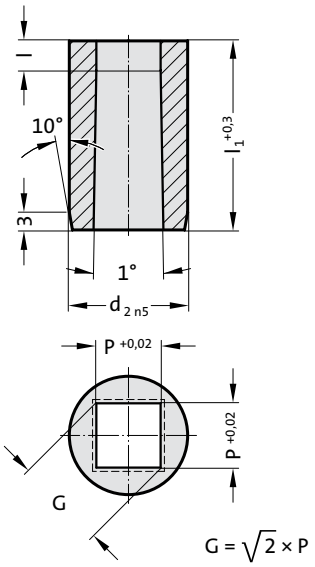
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

MATRIX WITHOUT SHOULDER, SQUARE, AUTOMOTIVE STANDARD

2625.



2625. Matrix without shoulder, square, Automotive Standard

d_2 / Order No	P_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	1.3	6.8	3 (2) 4 (3) 5 (4)		●	●	●	●	●	●	●	●	●	
13 / (5)	1.9	8.8	3 (2) 5 (4) 8 (6)		●	●	●	●	●	●	●	●	●	
16 / (6)	1.9	10.8	3 (2) 5 (4) 8 (6)				●	●	●	●	●	●	●	
20 / (7)	1.9	13.6	3 (2) 5 (4) 10 (7)				●	●	●	●	●	●	●	
22 / (8)	1.9	15	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
25 / (9)	1.9	17	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
32 / (10)	1.9	22	3 (2) 6 (5) 12 (8)				●	●	●	●	●	●	●	
38 / (11)	1.9	27	3 (2) 8 (6) 12 (8)				●	●	●	●	●	●	●	●
40 / (12)	1.9	27	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
45 / (13)	2.4	35	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
50 / (14)	4	40	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
56 / (15)	4	45	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
63 / (16)	4	50	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
71 / (17)	4	56	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
76 / (18)	5.6	60	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
85 / (19)	5.6	66	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
90 / (20)	5.6	70	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
100 / (21)	5.6	78	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and end faces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

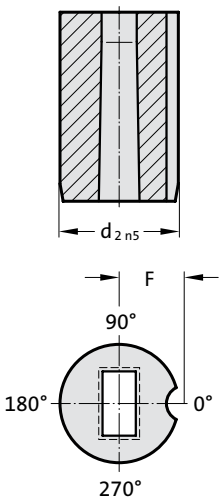
Ordering Code (example): with anti-rotation element

2625.10F8.1350.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No**	= (3)
Angle: 0°	**Order Code character**	= (A)
Shape: square, Length P P = 13,5 mm	**Order No**	= (1350)
Shape cutting length: l 12 mm	**Order No**	= (8)
Length: l_1 28 mm	**Order Code character**	= (F)
Diameter: d_2 32 mm	**Order No**	= (10)
Type: without shoulder Automotive Standard	**Order No**	= (5)
Execution: square	**Order No**	= (2)
Matrix		= 26

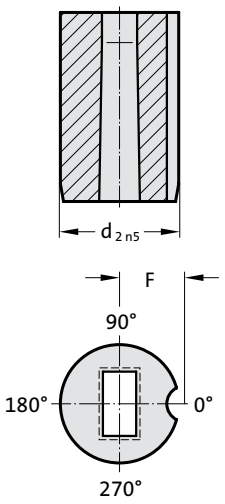
MATRIX WITHOUT SHOULDER, AUTOMOTIVE STANDARD, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



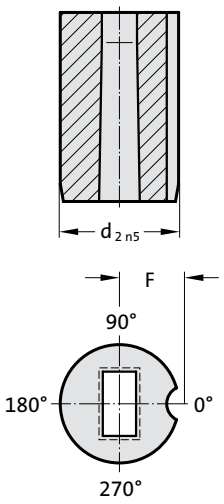
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 2 (2)



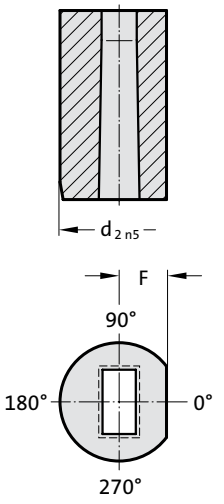
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 3 (3)



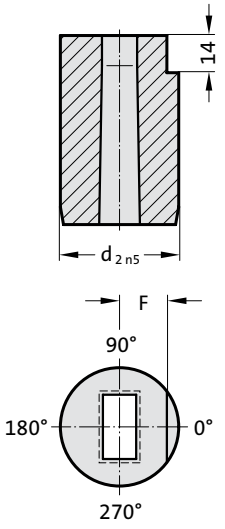
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 4 (4)



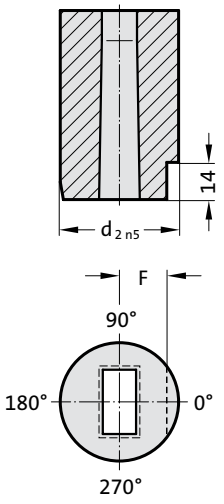
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

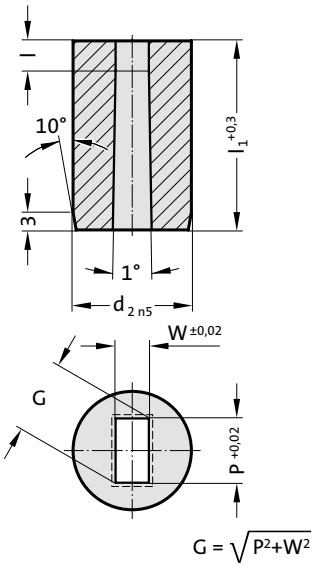
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

MATRIX WITHOUT SHOULDER, RECTANGULAR, AUTOMOTIVE STANDARD

2635.



2635. Matrix without shoulder, rectangular, Automotive Standard

d_2 / Order No	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	1.3	6.8	3 (2) 4 (3) 5 (4)		●	●	●	●	●	●	●	●	●	
13 / (5)	1.9	8.8	3 (2) 5 (4) 8 (6)		●	●	●	●	●	●	●	●	●	
16 / (6)	1.9	10.8	3 (2) 5 (4) 8 (6)				●	●	●	●	●	●	●	
20 / (7)	1.9	13.6	3 (2) 5 (4) 10 (7)				●	●	●	●	●	●	●	
22 / (8)	1.9	15	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
25 / (9)	1.9	17	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
32 / (10)	1.9	22	3 (2) 6 (5) 12 (8)				●	●	●	●	●	●	●	
38 / (11)	1.9	27	3 (2) 8 (6) 12 (8)				●	●	●	●	●	●	●	●
40 / (12)	1.9	27	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
45 / (13)	2.4	35	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
50 / (14)	4	40	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
56 / (15)	4	45	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
63 / (16)	4	50	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
71 / (17)	4	56	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
76 / (18)	5.6	60	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
85 / (19)	5.6	66	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
90 / (20)	5.6	70	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
100 / (21)	5.6	78	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and end faces ground.
Special dimensions on request.

Note:
With kerf ≤ 0.04 mm, FIBRO rounds off sharp edges if the punch and piercing die bush are ordered together. This reduces the fitting time and the risk of an edge break during operation.

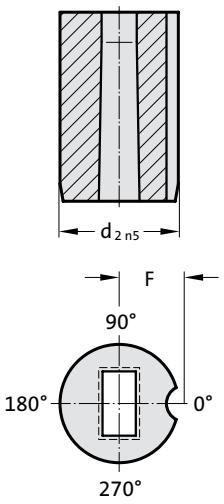
Ordering Code (example): with anti-rotation element

2635.10F8.1350.0650.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: rectangular, Width W W = 6,5 mm	= (0650)
Shape: rectangular, Length P P = 13,5 mm	= (1350)
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder Automotive Standard	**Order No** = (5)
Execution: rectangular	**Order No** = (3)
Matrix	= 26

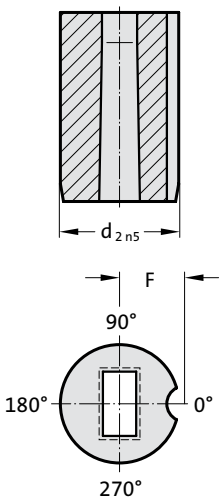
MATRIX WITHOUT SHOULDER, AUTOMOTIVE STANDARD, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



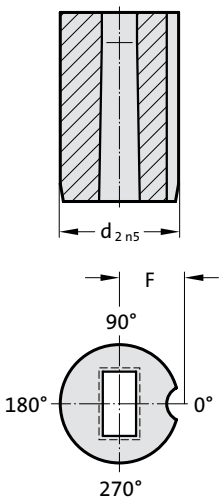
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 2 (2)



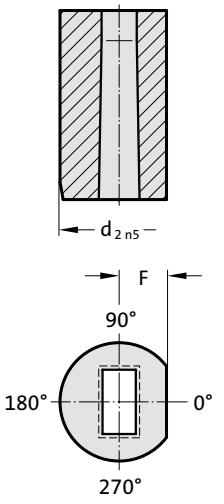
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 3 (3)



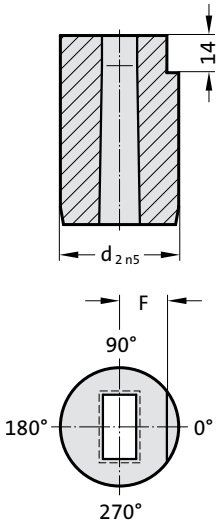
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 4 (4)



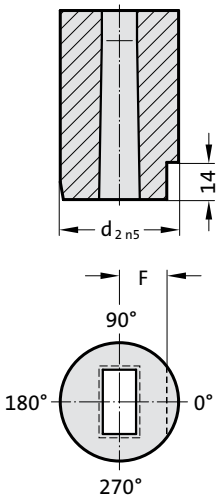
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

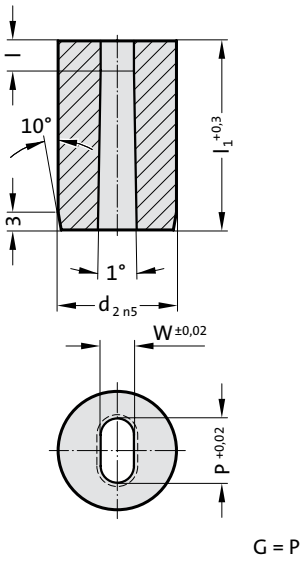
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

MATRIX WITHOUT SHOULDER, SLOT, AUTOMOTIVE STANDARD

2645.



2645. Matrix without shoulder, slot, Automotive Standard

d_2 / Order No	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	1.3	6.8	3 (2) 4 (3) 5 (4)		●	●	●	●	●	●	●	●	●	
13 / (5)	1.9	8.8	3 (2) 5 (4) 8 (6)		●	●	●	●	●	●	●	●	●	
16 / (6)	1.9	10.8	3 (2) 5 (4) 8 (6)				●	●	●	●	●	●	●	
20 / (7)	1.9	13.6	3 (2) 5 (4) 10 (7)				●	●	●	●	●	●	●	
22 / (8)	1.9	15	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
25 / (9)	1.9	17	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
32 / (10)	1.9	22	3 (2) 6 (5) 12 (8)				●	●	●	●	●	●	●	
38 / (11)	1.9	27	3 (2) 8 (6) 12 (8)				●	●	●	●	●	●	●	●
40 / (12)	1.9	27	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
45 / (13)	2.4	35	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
50 / (14)	4	40	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
56 / (15)	4	45	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
63 / (16)	4	50	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
71 / (17)	4	56	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
76 / (18)	5.6	60	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
85 / (19)	5.6	66	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
90 / (20)	5.6	70	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
100 / (21)	5.6	78	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and end faces ground.
Special dimensions on request.

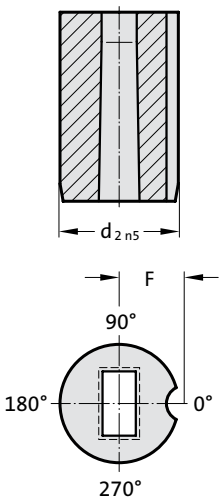
Ordering Code (example): with anti-rotation element

2645.10F8.1350.0650.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: slot, Width W W = 6,5 mm	= (0650)
Shape: slot, Length P P = 13,5 mm	= (1350)
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder Automotive Standard	**Order No** = (5)
Execution: slot	**Order No** = (4)
Matrix	= 26

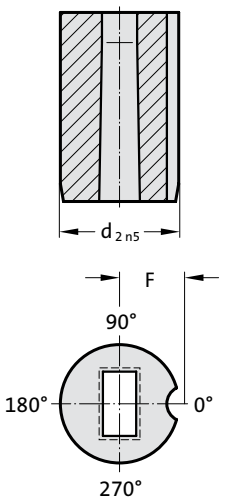
MATRIX WITHOUT SHOULDER, AUTOMOTIVE STANDARD, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



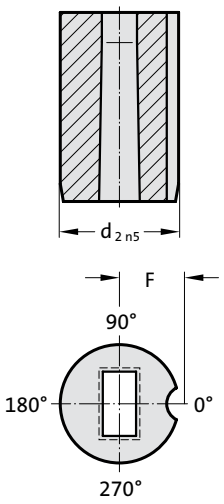
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 2 (2)



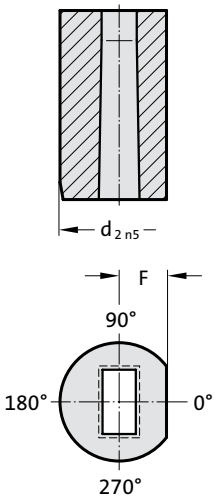
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 3 (3)



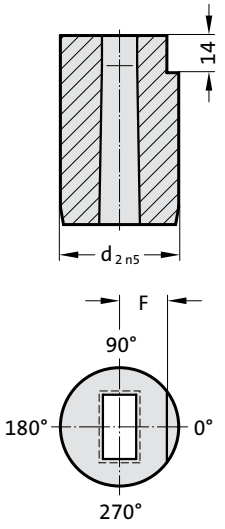
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 4 (4)



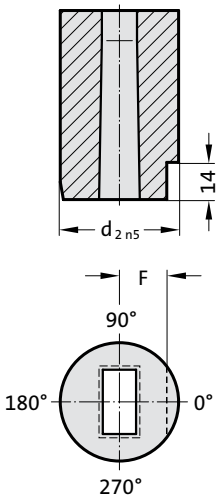
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

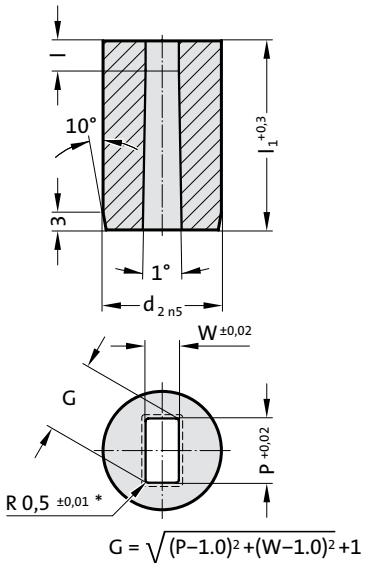
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

MATRIX WITHOUT SHOULDER, RECTANGLE WITH RADIUSED CORNERS, AUTOMOTIVE STANDARD

2655.



2655. Matrix without shoulder, rectangle with radiused corners, Automotive Standard

d_2 / Order No	W_{min}	G_{max}	l / Order No	l_1 / (Order Code character)	13 (A)	16 (B)	20 (C)	22 (D)	25 (E)	28 (F)	30 (G)	32 (H)	35 (J)	40 (K)
10 / (4)	1.3	6.8	3 (2) 4 (3) 5 (4)		●	●	●	●	●	●	●	●	●	
13 / (5)	1.9	8.8	3 (2) 5 (4) 8 (6)		●	●	●	●	●	●	●	●	●	
16 / (6)	1.9	10.8	3 (2) 5 (4) 8 (6)				●	●	●	●	●	●	●	
20 / (7)	1.9	13.6	3 (2) 5 (4) 10 (7)				●	●	●	●	●	●	●	
22 / (8)	1.9	15	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
25 / (9)	1.9	17	3 (2) 6 (5) 10 (7)				●	●	●	●	●	●	●	
32 / (10)	1.9	22	3 (2) 6 (5) 12 (8)				●	●	●	●	●	●	●	
38 / (11)	1.9	27	3 (2) 8 (6) 12 (8)				●	●	●	●	●	●	●	●
40 / (12)	1.9	27	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
45 / (13)	2.4	35	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
50 / (14)	4	40	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
56 / (15)	4	45	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
63 / (16)	4	50	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
71 / (17)	4	56	3 (2) 8 (6) 12 (8)					●	●	●	●	●	●	●
76 / (18)	5.6	60	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
85 / (19)	5.6	66	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
90 / (20)	5.6	70	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●
100 / (21)	5.6	78	3 (2) 8 (6) 12 (8)						●	●	●	●	●	●

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2 and end faces ground.
Special dimensions on request.
* For other radius options, see standardised special shapes.

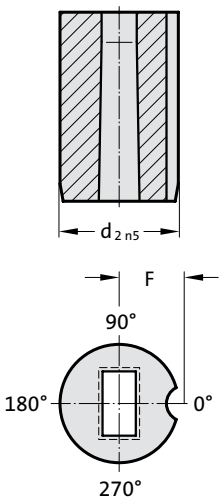
Ordering Code (example): with anti-rotation element

2655.10F8.1350.0650.A3

Anti-rotation element: Pin ∅ 6 mm	**Order No** = (3)
Angle: 0°	**Order Code character** = (A)
Shape: rectangle with radiused corners, Width W W = 6,5 mm	= (0650)
Shape: rectangle with radiused corners, Length P P = 13,5 mm	= (1350)
Shape cutting length: l 12 mm	**Order No** = (8)
Length: l_1 28 mm	**Order Code character** = (F)
Diameter: d_2 32 mm	**Order No** = (10)
Type: without shoulder Automotive Standard	**Order No** = (5)
Execution: rectangle with radiused corners	**Order No** = (5)
Matrixes	= 26

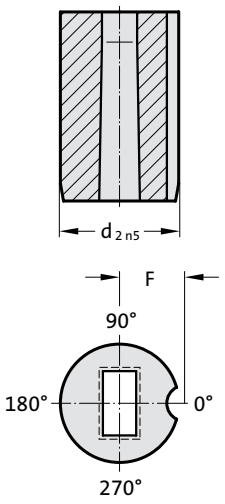
MATRIX WITHOUT SHOULDER, AUTOMOTIVE STANDARD, ANTI-ROTATION ELEMENTS

Anti-rotation element 1 (1)



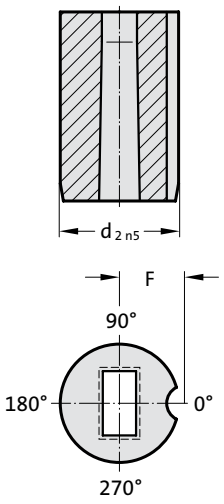
	Pin ø3
d_2	F
10	5
13	6,5
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 2 (2)



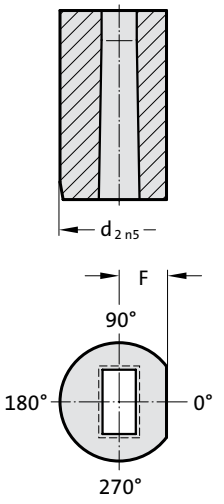
	Pin ø4
d_2	F
10	6
13	7,2
16	8
20	10
22	11
25	12,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 3 (3)



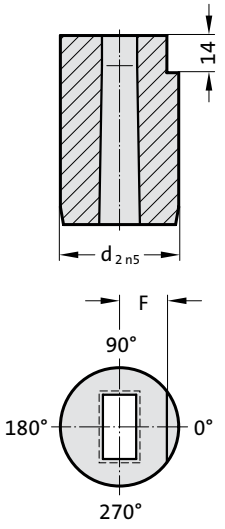
	Pin ø6
d_2	F
10	7
13	8,2
16	9
20	11
22	12
25	13,5
32	16
38	19
40	20
45	22,5
50	25
56	28
63	31,5
71	35,5
76	38
85	42,5
90	45
100	50

Anti-rotation element 4 (4)



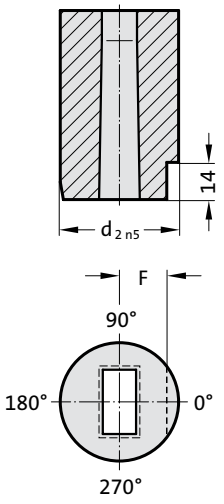
d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

Anti-rotation element 5 (5)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

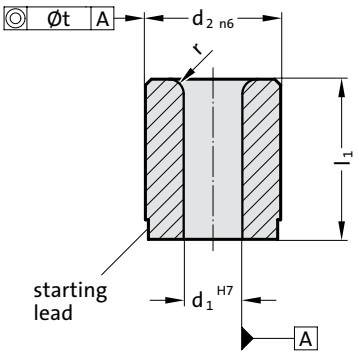
Anti-rotation element 6 (6)



d_2	F
10	4
13	5,5
16	7
20	8,5
22	9,5
25	11
32	14
38	17
40	18
45	20,5
50	23
56	26
63	29,5
71	33,5
76	35,5
85	40
90	42,5
100	47,5

GUIDE BUSH FOR PUNCH, DIN 9845 SHAPE C

262.



262. Guide bush for punch, DIN 9845 Shape C

d_1	Gradation d_1	d_2	t	l_1	r
0,5 - 1	0.1	5	0.01	9	1
1,1 - 2	0.1	6	0.01	12	1
2,1 - 3	0.1	7	0.01	12	1
3,1 - 4	0.1	8	0.01	12	1
4,1 - 5	0.1	10	0.01	16	1
5,1 - 6	0.1	12	0.02	16	1.5
6,1 - 8	0.1	15	0.02	20	1.5
8,1 - 10	0.1	18	0.02	20	2
10,1 - 12	0.1	22	0.02	28	2
12,1 - 15	0.1	26	0.02	28	2
15,1 - 18	0.5	30	0.02	36	2

Material:
Case hardened steel
Hardness 740 ± 40 HV 10

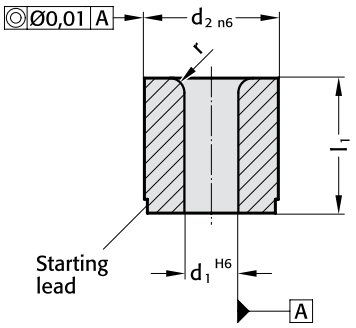
Execution:
Diameters d_1, d_2 and starting lead ground.

Ordering Code (example):

Guide bush for punch, DIN 9845 Shape C		=	262.1.
Diameter of conduit d_1	5.1 mm	=	0510.
Length l_1	16 mm	=	016
Order No		=	262.1. 0510. 016

GUIDE BUSH FOR PUNCH, ISO 8978

2621.



Material:
WS
Hardness 60 ± 2 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Diameters d_1, d_2 and starting lead ground.

2621. Guide bush for punch, ISO 8978

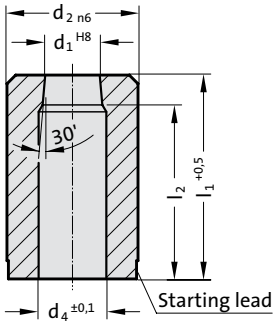
	Gradation			
d_1	d_1	d_2	l_1	r
1 - 2,4	0.1	5	8	1
1,6 - 3	0.1	6	12.5	1
2 - 3,5	0.1	8	12.5	1.5
3 - 5	0.1	10	16	2
4 - 7,2	0.1	13	16	2
6 - 8,8	0.1	16	20	2
7,5 - 11,3	0.1	20	20	2.5
11 - 16,6	0.1	25	25	2.5
15 - 20	0.5	32	25	4
18 - 27	0.5	40	32	4
26 - 36	0.5	50	40	4

Ordering Code (example):

Guide bush for punch, ISO 8978		= 2621.1.		
Diameter of conduit d_1	6 mm	=	0600.	
Outer diameter d_2	16 mm	=		1600
Order No		= 2621.1.	0600.	1600

MATRIX WITHOUT COLLAR, DIN 9845 SHAPE A

260.



260. Matrix without collar, DIN 9845 Shape A

	Gradation				
d_1	d_1	d_2	l_1	20	28
0,5 - 1	0.1	5	l_2	18	
1,1 - 2	0.1	6		17	25
2,1 - 3	0.1	7		17	25
3,1 - 4	0.1	8		17	25
4,1 - 5	0.1	10		16	24
5,1 - 6	0.1	12		16	24
6,1 - 8	0.1	15		16	24
8,1 - 10	0.1	18		16	24
10,1 - 12	0.1	22		15	23
12,1 - 15	0.1	26		15	23
15,1 - 18	0.1	30			23

Material:

HSS
Order No 260.3.
Hardness 62 ± 2 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:

Diameters d_1, d_2 and face surfaces ground.

d_4: For $d_1 \leq 2$ mm, $d_4 = d_1 + 0,3$
For d_1 = 2,1 mm to 4,0 mm, $d_4 = d_1 + 0,5$
For d_1 = 4,1 mm to 8,0 mm, $d_4 = d_1 + 0,7$
For $d_1 \geq 8,1$ mm, $d_4 = d_1 + 1$

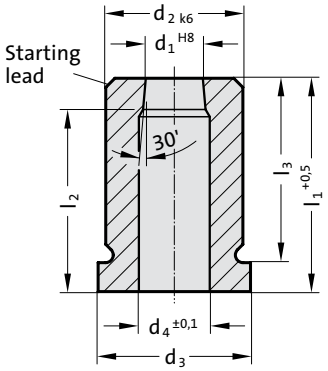
Other diameters on request.

Ordering Code (example):

Matrix without collar, DIN 9845 Shape A		= 260.3.	
Cutting diameter d_1	5.1 mm	= 0510.	
Length l_1	20 mm	=	020
Order No		= 260.3. 0510.	020

MATRIX WITH COLLAR, DIN 9845 SHAPE B

261.



Material:
HSS
Order No 261.3.
Hardness 62 ± 2 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Diameters d_1, d_2 and face surfaces ground.

d_4: For $d_1 \leq 2$ mm, $d_4 = d_1 + 0{,}3$
For d_1 = 2,1 mm to 4,0 mm, $d_4 = d_1 + 0{,}5$
For d_1 = 4,1 mm to 8,0 mm, $d_4 = d_1 + 0{,}7$
For $d_1 \geq 8{,}1$ mm, $d_4 = d_1 + 1$

Other diameters on request.

261. Matrix with collar, DIN 9845 Shape B

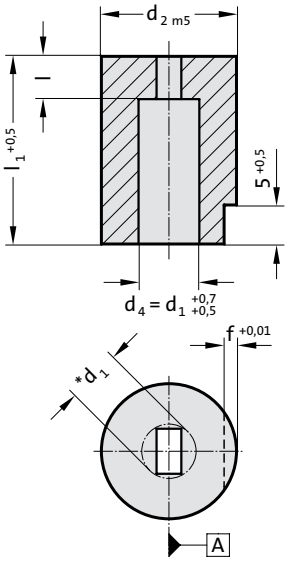
	Gradation								
d_1	d_1	d_2	d_3	l_1	20	28	l_1	20	28
0,5 - 1	0.1	5	7	l_2	18		l_3	16	
1,1 - 2	0.1	6	8		17	25		16	24
2,1 - 3	0.1	7	9		17	25		16	24
3,1 - 4	0.1	8	10		17	25		16	24
4,1 - 5	0.1	10	12		16	24		16	24
5,1 - 6	0.1	12	14		16	24		16	24
6,1 - 8	0.1	15	17		16	24		16	24
8,1 - 10	0.1	18	20		16	24		16	24
10,1 - 12	0.1	22	24		15	23		16	24
12,1 - 15	0.1	26	28		15	23		16	24
15,1 - 18	0.1	30	32			23			24

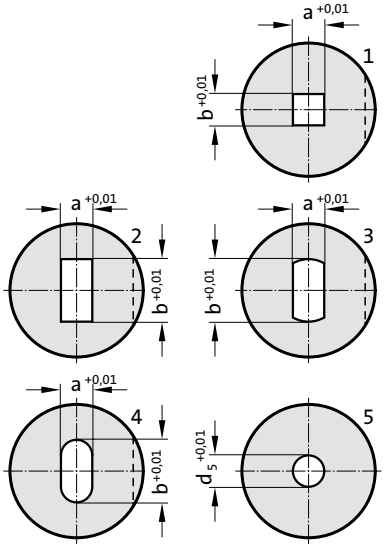
Ordering Code (example):

Matrix with collar, DIN 9845 Shape B		=	261.3.
Cutting diameter d_1	5.1 mm	=	0510.
Length l_1	20 mm	=	020
Order No		=	261.3. 0510. 020

MATRIX WITHOUT COLLAR, CYLINDRICAL

2602.





2602. Matrix without collar, cylindrical

d_1 , d_5	d_2	l	f	l_1	16	19	22	25	28	32
1,8 - 3,2	8	3	1		●	●	●	●	●	●
2 - 5	10	3	1		●	●	●	●	●	●
3 - 7	13	3	1.5		●	●	●	●	●	●
5 - 8	16	5	1.5		●	●	●	●	●	●
7 - 11	20	5	1.5		●	●	●	●	●	●
11 - 16	25	5	2.5		●	●	●	●	●	●
16 - 19	32	7	2.5		●	●	●	●	●	●
19 - 28	40	7	2.5		●	●	●	●	●	●

Material:

HSS
Order No. 2602.3.
Hardness 64 ± 2 HRC

Execution:

Diameter d_2 and end faces ground.
Key flats parallel with reference axis “A” unless otherwise specified.
*d_1 = size over corners

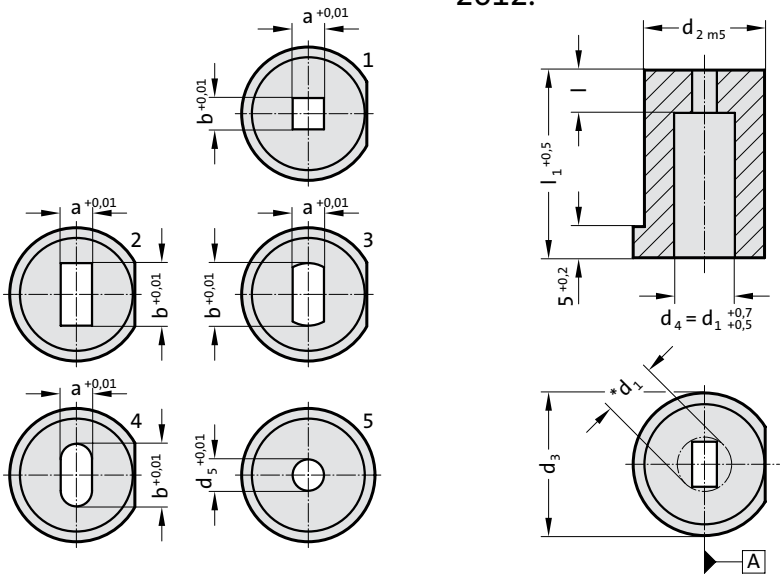
With starting holes for wire-EDM as per 2601.

Ordering Code (example):

Matrix without collar, cylindrical		= 2602.3.	
Mount diameter d_2	20 mm	= 020.	
Length l_1	16 mm	= 016.	
Cutting form Shape	square	= 1.	
Cutting form width a	320	= 0320.	
Cutting form length b	320	=	0320
Order No		= 2602.3. 020. 016. 1. 0320. 0320	

MATRIX WITH COLLAR, CYLINDRICAL

2612.



Material:

HSS

Order No. 2612.3.

Hardness 64 ± 2 HRC

Execution:

Diameter d_2 and end faces ground.

Key flats parallel with reference axis “A” unless otherwise specified.

*d_1 = size over corners

With starting holes for wire-EDM as per 2611.

2612. Matrix with collar, cylindrical

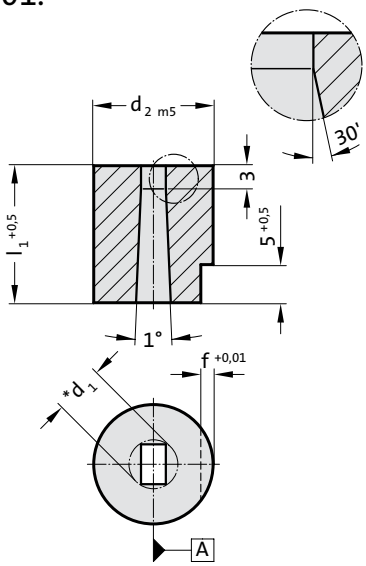
d_1 , d_5	d_2	d_3	l	l_1	16	19	22	25	28	32
1,8 - 3,2	8	11	3		●	●	●	●	●	●
2 - 5	10	13	3		●	●	●	●	●	●
3 - 7	13	16	3		●	●	●	●	●	●
5 - 8	16	19	5		●	●	●	●	●	●
7 - 11	20	23	5		●	●	●	●	●	●
11 - 16	25	28	5		●	●	●	●	●	●
16 - 19	32	35	7		●	●	●	●	●	●
19 - 28	40	43	7		●	●	●	●	●	●

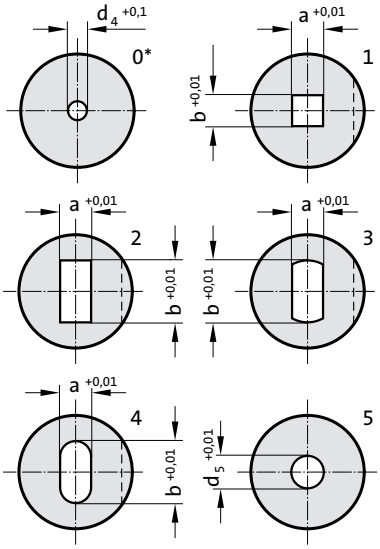
Ordering Code (example):

Matrix with collar, cylindrical		= 2612.3.	
Mount diameter d_2	20 mm	= 020.	
Length l_1	16 mm	= 016.	
Cutting form Shape	square	= 1.	
Cutting form width a	320	= 0320.	
Cutting form length b	320	=	0320
Order No		= 2612.3. 020. 016. 1. 0320. 0320	

MATRIX WITHOUT COLLAR, CONICAL

2601.





2601. Matrix without collar, conical

d_1 , d_5	d_2	d_4	f	l_1	16	19	22	25	28	32
1,6 - 3,2	8	1	1		●	●	●	●	●	●
2 - 5	10	1	1		●	●	●	●	●	●
3 - 7	13	1.5	1.5		●	●	●	●	●	●
5 - 8	16	1.5	1.5		●	●	●	●	●	●
7 - 11	20	1.5	1.5		●	●	●	●	●	●
11 - 16	25	2.5	2.5		●	●	●	●	●	●
16 - 19	32	2.5	2.5		●	●	●	●	●	●
19 - 28	40	2.5	2.5		●	●	●	●	●	●

Material:

HSS

Order No. 2601.3.

Hardness 64 ± 2 HRC

Execution:

Diameter d_2 and end faces ground.

Key flats parallel with reference axis “A” unless otherwise specified.

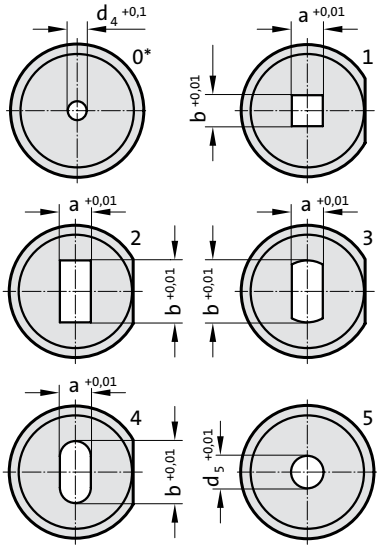
*d_1 = size over corners

*0 = Execution only with starting hole for wire-EDM

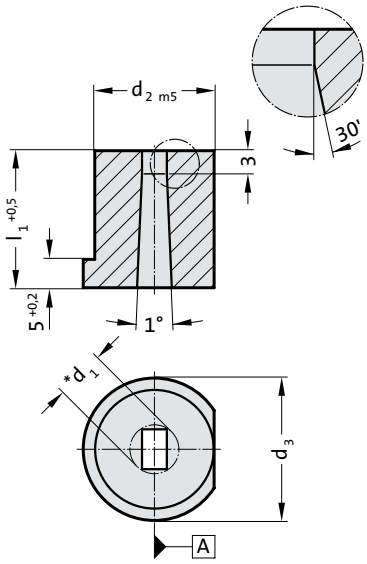
Ordering Code (example):

Matrix without collar, conical		= 2601.3.	
Mount diameter d_2	20 mm	= 020.	
Length l_1	16 mm	= 016.	
Cutting form Shape	square	= 1.	
Cutting form width a	320	= 0320.	
Cutting form length b	320	= 0320	
Order No		= 2601.3. 020. 016. 1. 0320. 0320	

MATRIX WITH COLLAR, CONICAL



2611.



Material:

HSS

Order No. 2611.3.

Hardness 64 ± 2 HRC

Execution:

Diameter d_2 and end faces ground.

Key flats parallel with reference axis “A” unless otherwise specified.

*d_1 = size over corners

*0 = Execution only with starting hole for wire-EDM

2611. Matrix with collar, conical

d_1 , d_5	d_2	d_3	d_4	l_1	16	19	22	25	28	32
1,6 - 3,2	8	11	1		●	●	●	●	●	●
2 - 5	10	13	1		●	●	●	●	●	●
3 - 7	13	16	1.5		●	●	●	●	●	●
5 - 8	16	19	1.5		●	●	●	●	●	●
7 - 11	20	23	1.5		●	●	●	●	●	●
11 - 16	25	28	2.5		●	●	●	●	●	●
16 - 19	32	35	2.5		●	●	●	●	●	●
19 - 28	40	43	2.5		●	●	●	●	●	●

Ordering Code (example):

Matrix with collar, conical		= 2611.3.	
Mount diameter d_2	20 mm	= 020.	
Length l_1	16 mm	= 016.	
Cutting form Shape	square	= 1.	
Cutting form width a	320	= 0320.	
Cutting form length b	320	= 0320	
Order No		= 2611.3. 020. 016. 1. 0320. 0320	

STANDARDISED SPECIAL SHAPES

PUNCH/CUTTING BUSHINGS, STANDARDISED SPECIAL FORMS - EXAMPLE ORDERS

22 9 1 . ____ . F44 ...

Attention!
All the parameters must be given for special shapes!

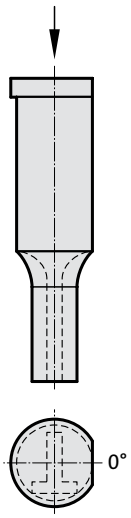
Punch:
22 without ejector pin

Special shape

Special shape F 44

Type:	Order No
ISO	= 1
ball-lock, light duty	= 2
ball-lock, heavy duty	= 3
ball-lock, larger cutting edge, light duty	= 4
ball-lock, larger cutting edge, heavy duty	= 5

You will find diameters and lengths on the pages of punches you have selected.



26 9 6 . ____ . F44 ...

Attention!
All the parameters must be given for special shapes!

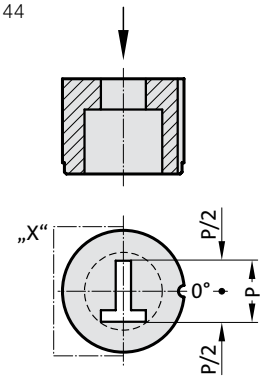
Matrixes

Special shape

Special shape F 44

Type:	Order No
automotive standard	= 5
without shoulder ISO 8977	= 6
with shoulder ISO 8977	= 7

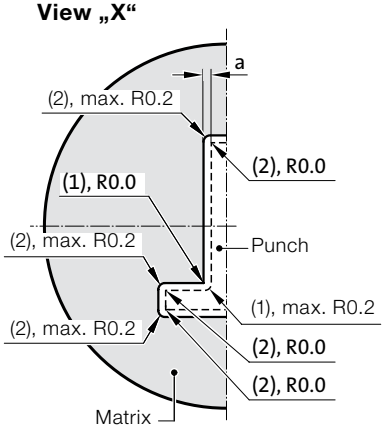
You will find diameters and lengths on the pages of cutting bushes you have selected.



Cutting gap (a)
Roundings with the corresponding sharp corners reduce the cutting gap per side (a). If the cutting gap is 0.04 mm (a) or less, FIBRO will round the sharp edges if the cutting punch and the matrixes are ordered together. This reduces the installation time and the risk of an edge breaking during operation.

Note:
(1) and (2) - roundings and sharp edges
(1) rounding on the cutting punch of max. R0.2, corresponds to a sharp edge on the matrix
(2) rounding on the cutting matrix of max. R0.2, corresponds to a sharp edge on the punch

View „X“

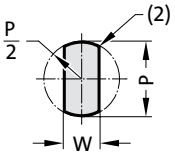


STANDARDISED SPECIAL SHAPES

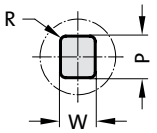
90°

Round, flattened

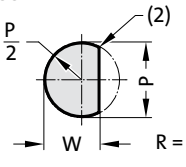
F10



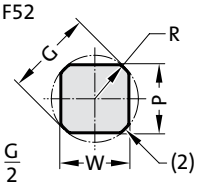
F11



F33

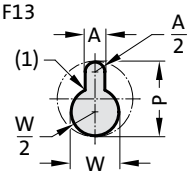


F52

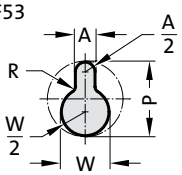


Key-hole shapes

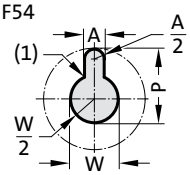
F13



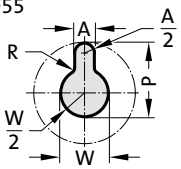
F53



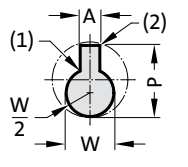
F54



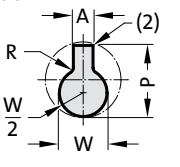
F55



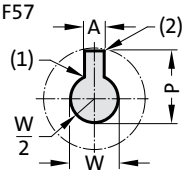
F14



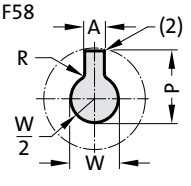
F56



F57

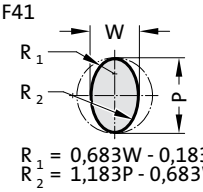


F58

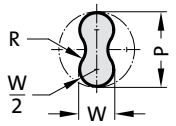


Various

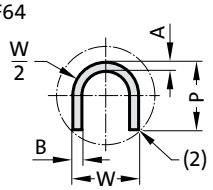
F41



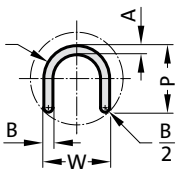
F93



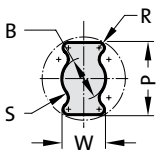
F64



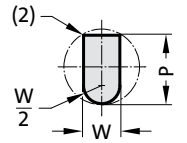
F65



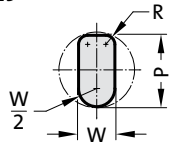
F27



F28



F29



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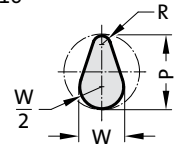
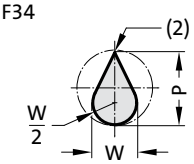


F34

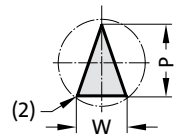


180°

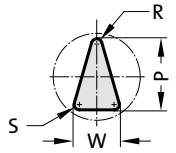
Triangles, trapezes

0°

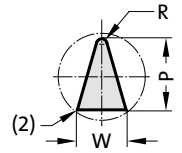
F22



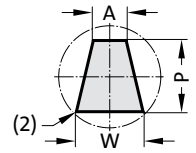
F23



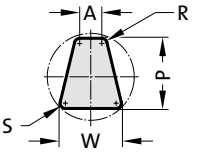
F24



F25

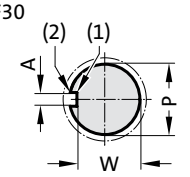


F26

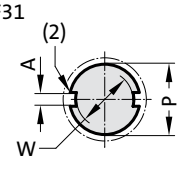


Key-hole

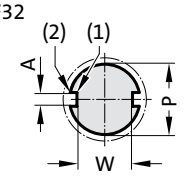
F30



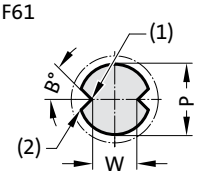
F31



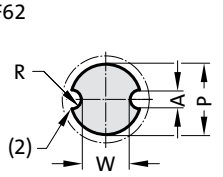
F32



F61

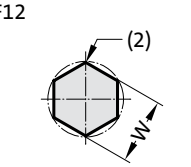


F62

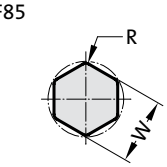


Polygons

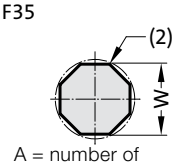
F12



F85

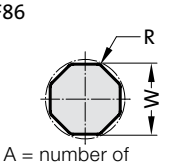


F35



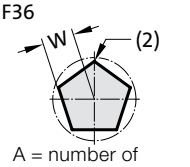
A = number of straight edges

F86



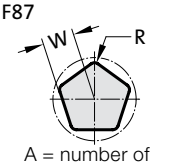
A = number of straight edges

F36



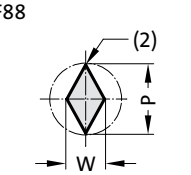
A = number of non- straight edges

F87

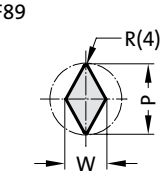


A = number of non- straight edges

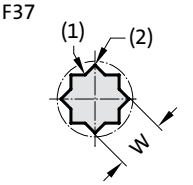
F88



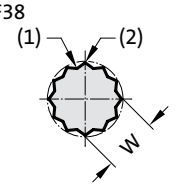
F89



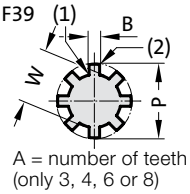
F37



F38

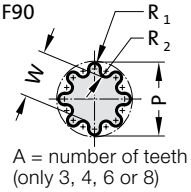


F39



A = number of teeth (only 3, 4, 6 or 8)

F90



A = number of teeth (only 3, 4, 6 or 8)

270°

PUNCH/CUTTING BUSHINGS, STANDARDISED SPECIAL FORMS - EXAMPLE ORDERS

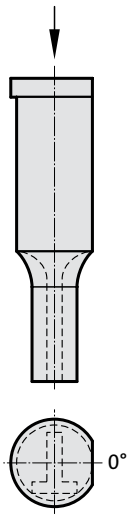
22 9 1 . ____ . F44 ...

Punch:
22 without ejector pin

Special shape

Attention!
All the parameters must be given for special shapes!

Special shape F 44



Type:	Order No
ISO	= 1
ball-lock, light duty	= 2
ball-lock, heavy duty	= 3
ball-lock, larger cutting edge, light duty	= 4
ball-lock, larger cutting edge, heavy duty	= 5

You will find diameters and lengths on the pages of punches you have selected.

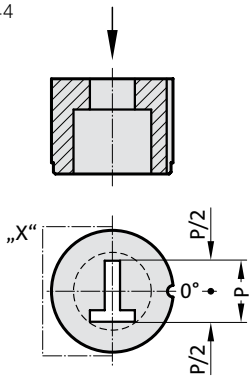
26 9 6 . ____ . F44 ...

Matrixes

Special shape

Attention!
All the parameters must be given for special shapes!

Special shape F 44



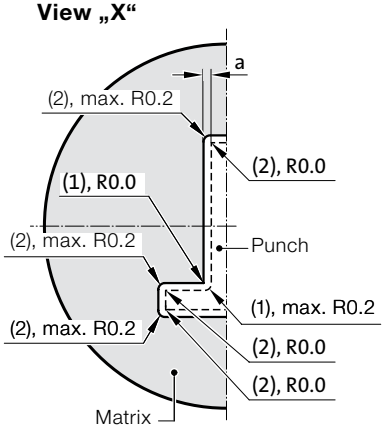
Type:	Order No
automotive standard	= 5
without shoulder ISO 8977	= 6
with shoulder ISO 8977	= 7

You will find diameters and lengths on the pages of cutting bushes you have selected.

Cutting gap (a)
Roundings with the corresponding sharp corners reduce the cutting gap per side (a). If the cutting gap is 0.04 mm (a) or less, FIBRO will round the sharp edges if the cutting punch and the matrixes are ordered together. This reduces the installation time and the risk of an edge breaking during operation.

Note:
(1) and (2) - roundings and sharp edges
(1) rounding on the cutting punch of max. R0.2, corresponds to a sharp edge on the matrix
(2) rounding on the cutting matrix of max. R0.2, corresponds to a sharp edge on the punch

View „X“

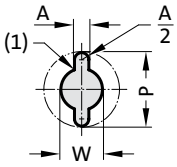


STANDARDISED SPECIAL SHAPES

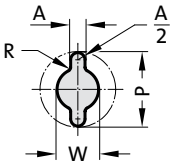
90°

Multi key-hole shapes

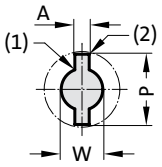
F19



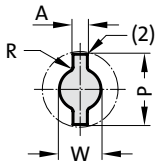
F59



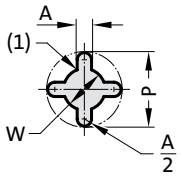
F20



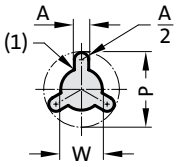
F60



F17

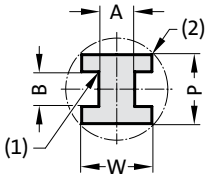


F18

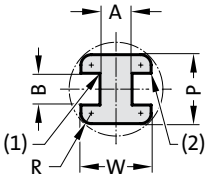


Double T-shapes

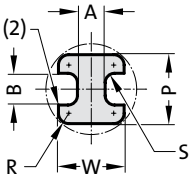
F21



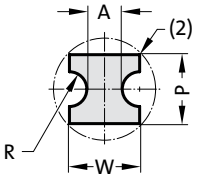
F91



F92

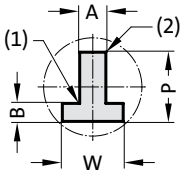


F15

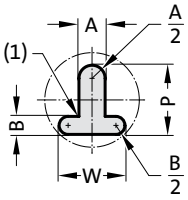


Simple T-shapes

F44



F66



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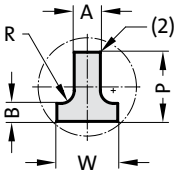
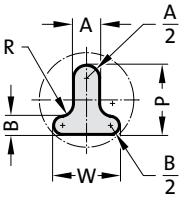


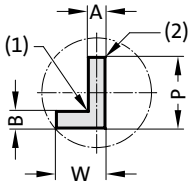
F67



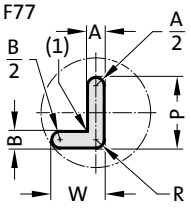
L-shapes

180°

F46



F77



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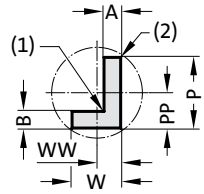
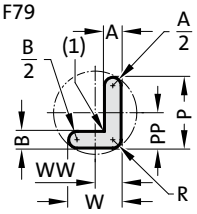
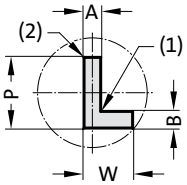


F79



F48



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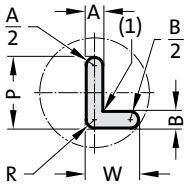
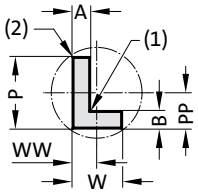


0°

F81



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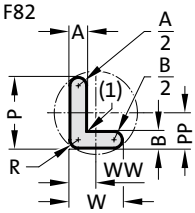

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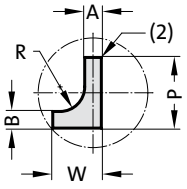

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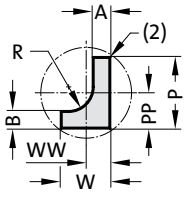

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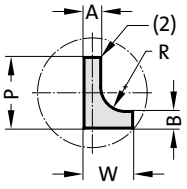

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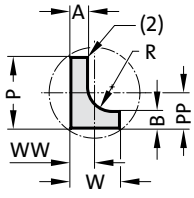
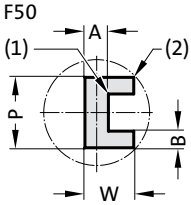
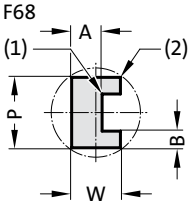


U-shapes

F50



F68



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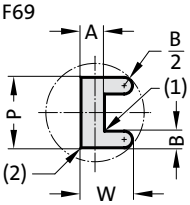

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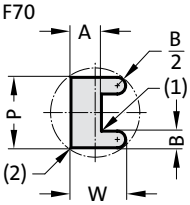
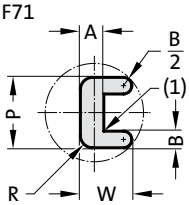
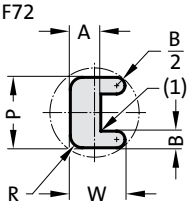


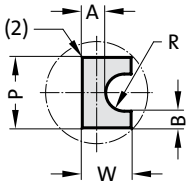
F71



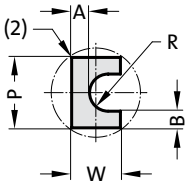
F72



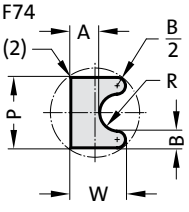
F51



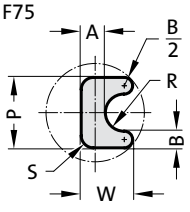
F73



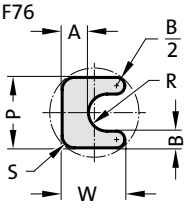
F74



F75



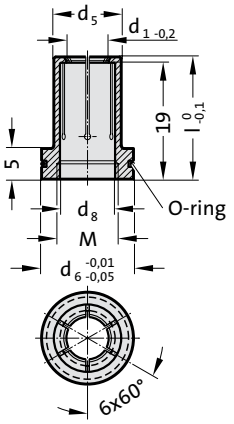
F76

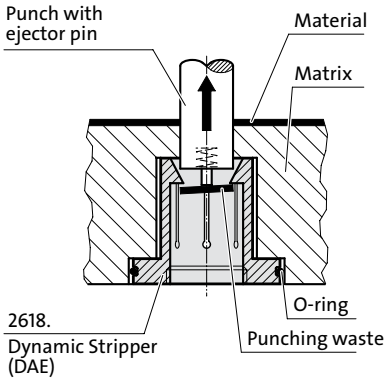


270°

DYNAMIC STRIPPING ELEMENT (DAE)

2618.

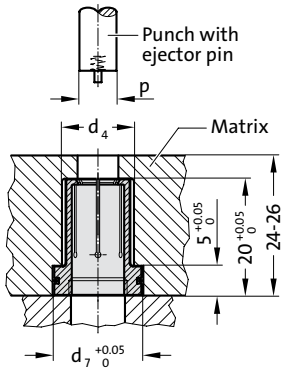




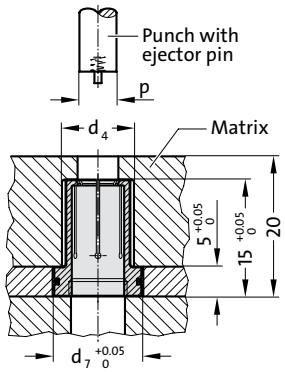
Description:
The dynamic stripper is used in blanking tools for punching operations using material up to 2 mm thick. The stripper is below the die. It is similar in shape to a segmented chuck. After the punching operation the punch enters the stripper with the punch waste still attached. The dynamic stripper opens up to receive the punch. On the return stroke the dynamic stripper strips the punch waste from the punch. The stripping element diameter d_1 is manufactured 0.2 mm smaller than the diameter p of the punch. To ensure reliable stripping the minimum entry depth into the dynamic stripper must be no less than 1 mm.
The dynamic stripper can help to protect both the tool and the product from damage and also accelerate the production rate.

Material:
Steel, hardened

Mounting example



Mounting example



DYNAMIC STRIPPING ELEMENT (DAE)

2618. Dynamic stripping element (DAE)

Cutting punch p Diameter steps 0.01	DAE d_1 Order-∅	d_5	d_6	l	M	Matrix d_4	d_7
3.00-3.09	3	7	11	19.95	6	8	11
3.10-3.19	3.1	7	11	19.95	6	8	11
3.20-3.29	3.2	7	11	19.95	6	8	11
3.30-3.39	3.3	7	11	19.95	6	8	11
3.40-3.49	3.4	7	11	19.95	6	8	11
3.50-3.59	3.5	7	11	19.95	6	8	11
3.60-3.69	3.6	7	11	19.95	6	8	11
3.70-3.79	3.7	7	11	19.95	6	8	11
3.80-3.89	3.8	7	11	19.95	6	8	11
3.90-3.99	3.9	7	11	19.95	6	8	11
4.00-4.09	4	7	11	19.95	6	8	11
4.10-4.19	4.1	8	12	19.95	8	9	12
4.20-4.29	4.2	8	12	19.95	8	9	12
4.30-4.39	4.3	8	12	19.95	8	9	12
4.40-4.49	4.4	8	12	19.95	8	9	12
4.50-4.59	4.5	8	12	19.95	8	9	12
4.60-4.69	4.6	8	12	19.95	8	9	12
4.70-4.79	4.7	8	12	19.95	8	9	12
4.80-4.89	4.8	8	12	19.95	8	9	12
4.90-4.99	4.9	8	12	19.95	8	9	12
5.00-5.09	5	8	12	19.95	8	9	12
5.10-5.19	5.1	9	13	19.95	8	10	13
5.20-5.29	5.2	9	13	19.95	8	10	13
5.30-5.39	5.3	9	13	19.95	8	10	13
5.40-5.49	5.4	9	13	19.95	8	10	13
5.50-5.59	5.5	9	13	19.95	8	10	13
5.60-5.69	5.6	9	13	19.95	8	10	13
5.70-5.79	5.7	9	13	19.95	8	10	13
5.80-5.89	5.8	9	13	19.95	8	10	13
5.90-5.99	5.9	9	13	19.95	8	10	13
6.00-6.09	6	9	13	19.95	8	10	13
6.10-6.19	6.1	10	14	19.95	10	11	14
6.20-6.29	6.2	10	14	19.95	10	11	14
6.30-6.39	6.3	10	14	19.95	10	11	14
6.40-6.49	6.4	10	14	19.95	10	11	14
6.50-6.59	6.5	10	14	19.95	10	11	14
6.60-6.69	6.6	10	14	19.95	10	11	14
6.70-6.79	6.7	10	14	19.95	10	11	14
6.80-6.89	6.8	10	14	19.95	10	11	14
6.90-6.99	6.9	10	14	19.95	10	11	14
7.00-7.09	7	10	14	19.95	10	11	14
7.10-7.19	7.1	11	15	19.95	10	12	15
7.20-7.29	7.2	11	15	19.95	10	12	15
7.30-7.39	7.3	11	15	19.95	10	12	15
7.40-7.49	7.4	11	15	19.95	10	12	15
7.50-7.59	7.5	11	15	19.95	10	12	15
7.60-7.69	7.6	11	15	19.95	10	12	15
7.70-7.79	7.7	11	15	19.95	10	12	15
7.80-7.89	7.8	11	15	19.95	10	12	15
7.90-7.99	7.9	11	15	19.95	10	12	15
8.00-8.09	8	11	15	19.95	10	12	15

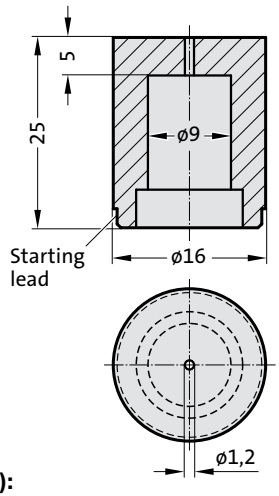
Ordering Code (example):

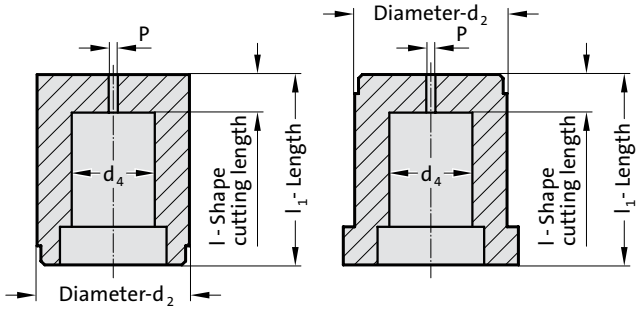
Dynamic stripping element (DAE)		= 2618.	
Outer diameter d_5	9 mm	= 09.	
Order length BL	20 mm	= 020.	
Order diameter d_1	5.5 mm	= 0550	
Order No		= 2618. 09. 020. 0550	

MATRIXES FOR DYNAMIC STRIPPER (DAE) - ORDERING CODE (EXAMPLE)

Note:

See table for standard dimensions





Ordering Code (example):

2618.06.6E4.09

d_4 = 9 mm	(09)	
Shape cutting length: l = 5 mm	(4)	
Length: l_1 = 25 mm	(E)	
Diameter: d_2 = 16 mm	(6)	
Type: without collar for DAE	(6)	
Execution: Blank (pilot hole bore)	(0)	
Matrix for Dynamic Stripper (DAE) (2618)		

d_4= 9 mm

Shape cutting length: l	Order No
5	= 4

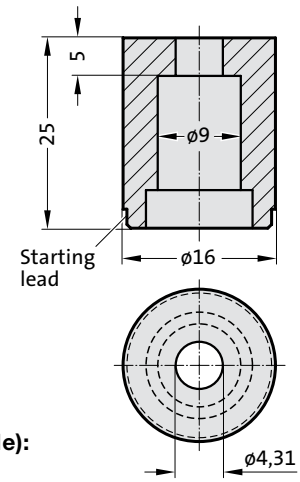
Length: l_1	Order Code character
25	= E

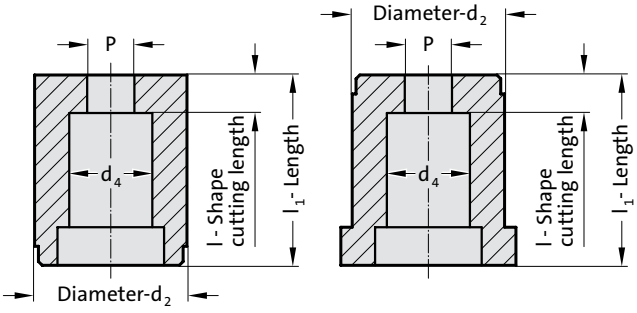
Diameter: d_2	Order No
13	= 5
16	= 6
20	= 7

Type:	Order No
without collar for DAE	= 6
with collar for DAE	= 7

Execution:	Order No
blank (pilot hole bore)	= 0

Matrixes for Dynamic Stripper (DAE)





Ordering Code (example):

2618.16.6E4.0431

Format: round, P = 4,31 mm	(0431)	
Shape cutting length: l = 5 mm	(4)	
Length: l_1 = 25 mm	(E)	
Diameter: d_2 = 16 mm	(6)	
Type: without collar for DAE	(6)	
Execution: round	(1)	
Matrix for Dynamic Stripper (DAE) (2618)		

Format: round, P = 4,31 mm

Shape cutting length: l	Order No
5	= 4

Length: l_1	Order Code character
25	= E

Diameter: d_2	Order No
13	= 5
16	= 6
20	= 7

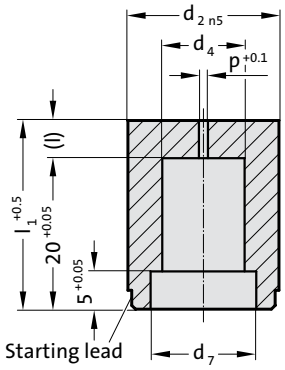
Type:	Order No
without collar for DAE	= 6
with collar for DAE	= 7

Execution:	Order No
round	= 1

Matrixes for Dynamic Stripper (DAE)

MATRIX WITHOUT COLLAR FOR DYNAMIC STRIPPER (DAE), BLANK

2618.06.



2618.06. Matrix without collar for dynamic stripper (DAE), blank

d_2 / Order No	d_4	d_7	p	l / (Order No)	l_1 / (Order Code character)
13 / (5)	8	11	1.2	5 / (4)	25/(E)
16 / (6)	9	12	1.2	5 / (4)	25/(E)
16 / (6)	10	13	1.5	5 / (4)	25/(E)
20 / (7)	11	14	1.5	5 / (4)	25/(E)
20 / (7)	12	15	1.5	5 / (4)	25/(E)

Ordering Code (example):

2618.06.6E4.09

Diameter d_4	9 mm	= 09
Shape cutting length: l	5 mm	**Order No** = (4)
Length: l_1	25 mm	**Order Code character** = (E)
Diameter d_2	16 mm	**Order No** = (6)
Type:	without collar for DAE	**Order No** = (6)
Execution:	blank (pilot hole bore) for Dynamic Stripper (DAE)	**Order No** = (0)
Matrix		= 18 = 26

Material:

HSS

Hardness 62 ± 2 HRC

Execution:

Diameter d_2, starting lead and face surfaces ground.

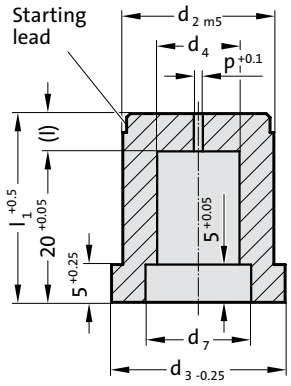
Diameter P is a bored pilot hole for wire EDM.

Note:

Order dynamic stripping element (DAE) separately.

MATRIX WITH COLLAR FOR DYNAMIC STRIPPER (DAE), BLANK

2618.07.



2618.07. Matrix with collar for dynamic stripper (DAE), blank

d_2 / Order No	d_3	d_4	d_7	p	l / (Order No)	l_1 / (Order Code character)
13 / (5)	16	8	11	1.2	5 / (4)	25/(E)
16 / (6)	19	9	12	1.2	5 / (4)	25/(E)
16 / (6)	19	10	13	1.5	5 / (4)	25/(E)
20 / (7)	23	11	14	1.5	5 / (4)	25/(E)
20 / (7)	23	12	15	1.5	5 / (4)	25/(E)

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and face surfaces ground.
Diameter P is a bored pilot hole for wire EDM.

Note:
Order dynamic stripping element (DAE) separately.

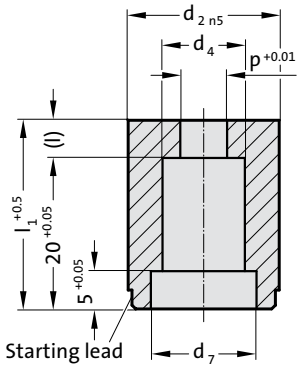
Ordering Code (example):

2618.07.6E4.09

Diameter d_4	9 mm	= 09
Shape cutting length: l	5 mm	**Order No** = (4)
Length: l_1	25 mm	**Order Code character** = (E)
Diameter d_2	16 mm	**Order No** = (6)
Type:	with collar for DAE	**Order No** = (7)
Execution:	blank (pilot hole bore) for Dynamic Stripper (DAE)	**Order No** = (0) = 18
Matrix		= 26

MATRIX WITHOUT COLLAR FOR DYNAMIC STRIPPER (DAE), ROUND

2618.16.



2618.16. Matrix without collar for dynamic stripper (DAE), round

d_2 / Order No	d_4	d_7	l / (Order No)	l_1 / (Order Code character)	Matrix Diameter steps 0.01 P	DAE d_5	d_1 Gradation 0.1
13 / (5)	8	11	5 / (4)	25/(E)	3 - 4,29	7	3-4
16 / (6)	9	12	5 / (4)	25/(E)	4,3 - 5,29	8	4,1-5
16 / (6)	10	13	5 / (4)	25/(E)	5,3 - 6,29	9	5,1-6
20 / (7)	11	14	5 / (4)	25/(E)	6,3 - 7,29	10	6,1-7
20 / (7)	12	15	5 / (4)	25/(E)	7,3 - 8,29	11	7,1-8

Ordering Code (example):

2618.16.6E4.0431

Shape: round	
P = ø4,31 mm	= 0431
Shape cutting length: l	**Order No**
5 mm	= (4)
Length: l_1	**Order Code character**
25 mm	= (E)
Diameter d_2	**Order No**
16 mm	= (6)
Type:	**Order No**
without collar for DAE	= (6)
Execution:	**Order No**
round	= (1)
for Dynamic Stripper (DAE)	= 18
Matrix	= 26

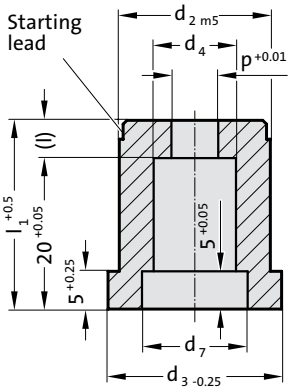
Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and end faces ground.

Note:
Order dynamic stripping element (DAE) separately.

MATRIX WITH COLLAR FOR DYNAMIC STRIPPER (DAE), ROUND

2618.17.



2618.17. Matrix with collar for dynamic stripper (DAE), round

d_2 / Order No	d_3	d_4	d_7	l / (Order No)	l_1 / (Order Code character)	Matrix Diameter steps 0.01 P	DAE d_5	d_1 Gradation 0.1
13 / (5)	16	8	11	5 / (4)	25/(E)	3 - 4,29	7	3-4
16 / (6)	19	9	12	5 / (4)	25/(E)	4,3 - 5,29	8	4,1-5
16 / (6)	19	10	13	5 / (4)	25/(E)	5,3 - 6,29	9	5,1-6
20 / (7)	23	11	14	5 / (4)	25/(E)	6,3 - 7,29	10	6,1-7
20 / (7)	23	12	15	5 / (4)	25/(E)	7,3 - 8,29	11	7,1-8

Material:
HSS
Hardness 62 ± 2 HRC

Execution:
Diameter d_2, starting lead and end faces ground.

Note:
Order dynamic stripping element (DAE) separately.

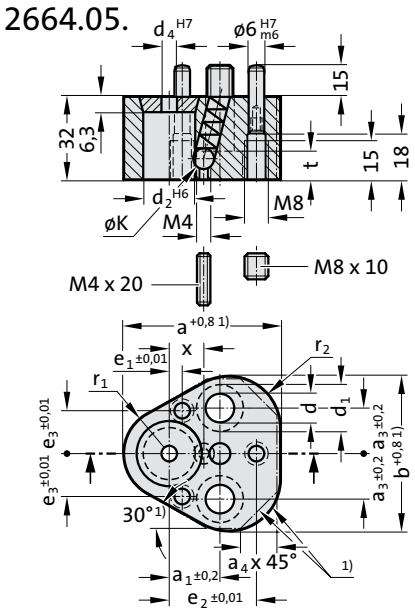
Ordering Code (example):

2618.17.6E4.0431

Shape: round	
P = ø4,31 mm	= 0431
Shape cutting length: l	**Order No**
5 mm	= (4)
Length: l_1	**Order Code character**
25 mm	= (E)
Diameter d_2	**Order No**
16 mm	= (6)
Type:	**Order No**
with collar for DAE	= (7)
Execution:	**Order No**
round	= (1)
for Dynamic Stripper (DAE)	= 18
Matrix	= 26

TRIANGLE RETAINERS FOR BALL-LOCK PUNCHES

TRIANGLE RETAINER FOR BALL-LOCK PUNCHES, LIGHT DUTY



Execution:

Version for metal thicknesses up to 3 mm. The punch locating hole d_2 is manufactured to a tolerance of ± 0.01 mm relative to the 6 stud holes H7. This ensures the interchangeability of the locating plate with other polygon versions.

Note:

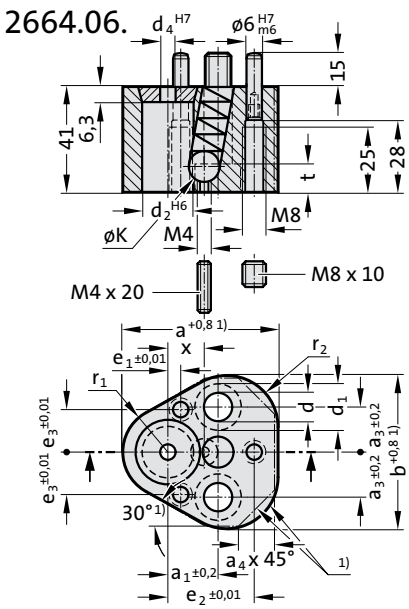
Special punch retainers available to order.

1) Contours may vary. Maximum dimensions are specified in the table.

2664.05. Triangle retainer for ball-lock punches, light duty

Order No	d	d_1	d_2	d_4	a	a_1	a_3	a_4	b	e_1	e_2	e_3	ØK	t	r_1	r_2	x
2664.05.10	9	15	10	6	44.5	19	11.1	10	43.7	7.5	26.925	9	8	9	9.5	12	8.2
2664.05.13	9	15	13	6	50.8	19	14.3	12	50	6.5	29.97	12	8	9	12.7	15.2	9.5
2664.05.16	9	15	16	6	54	19	15.9	13	53.2	6	31.75	13.5	8	9	14.3	16.8	11.2
2664.05.20	11	18	20	6	60.3	19	17.5	14	59.5	5	33.53	16.5	8	11	17.5	20	13.2
2664.05.25	13.5	20	25	6	69.9	23.8	19.8	16	69.1	7	40.64	22	8	13.5	22.2	24.7	15.7
2664.05.32	13.5	20	32	6	69.9	23.8	19.8	16	69.1	7	40.64	22	8	13.5	22.2	24.7	19.25
2664.05.38	13.5	20	38	6	77.4	27	24	18	76.6	10	43.993	26	8	13.5	26	28.5	22.25

TRIANGLE RETAINER FOR BALL-LOCK PUNCHES, HEAVY DUTY



Execution:
Version for metal thicknesses $groesser. 3 mm/max. 6 mm. The punch locating hole d_2 is manufactured to a tolerance of ± 0.01 mm relative to the 6 stud holes H7. This ensures the interchangeability of the locating plate with other polygon versions.

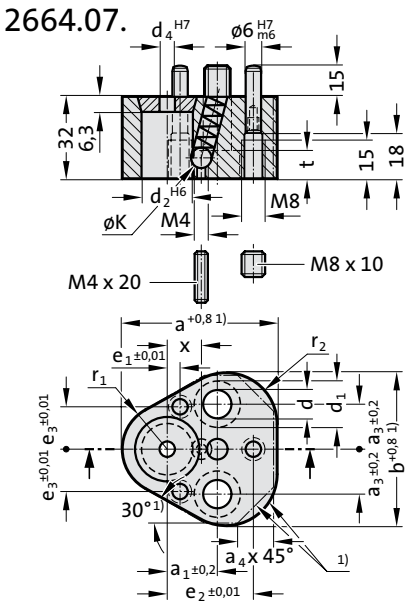
Note:
Special punch retainers available to order.

1) Contours may vary. Maximum dimensions are specified in the table.

2664.06. Triangle retainer for ball-lock punches, heavy duty

Order No	d	d_1	d_2	d_4	a	a_1	a_3	a_4	b	e_1	e_2	e_3	ØK	t	r_1	r_2	x
2664.06.10	9	15	10	6	44.5	19	11.1	10	43.7	7.5	26.925	9	10	9	9.5	12	9.8
2664.06.13	9	15	13	6	50.8	19	14.3	12	50	6.5	29.97	12	12	9	12.7	15.2	11.3
2664.06.16	9	15	16	6	54	19	15.9	13	53.2	6	31.75	13.5	12	9	14.3	16.8	12.8
2664.06.20	11	18	20	6	60.3	19	17.5	14	59.5	5	33.53	16.5	12	11	17.5	20	14.8
2664.06.25	13.5	20	25	6	69.9	23.8	19.8	16	69.1	7	40.64	22	12	13.5	22.2	24.7	17.3
2664.06.32	13.5	20	32	6	69.9	23.8	19.8	16	69.1	7	40.64	22	12	13.5	22.2	24.7	20.8
2664.06.40	13.5	20	40	6	77.4	27	24	18	76.6	10	43.993	26	12	13.5	26	28.5	24.8

TRIANGLE RETAINER FOR BALL-LOCK PUNCHES, LIGHT DUTY



Execution:
Version for metal thicknesses up to 3 mm. The punch locating hole d_2 is manufactured to a tolerance of ± 0.01 mm relative to the 6 stud holes H7. This ensures the interchangeability of the locating plate with other polygon versions.

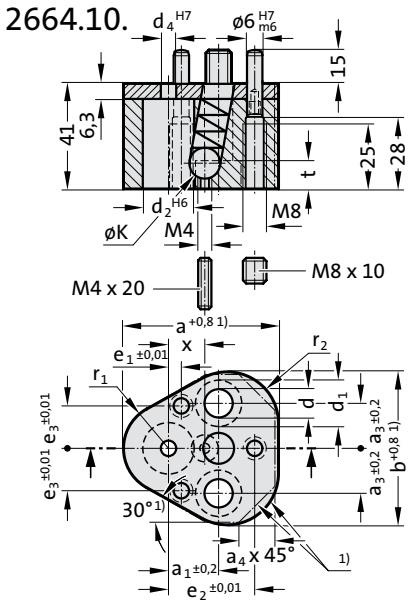
Note:
Special punch retainers available to order.

1) Contours may vary. Maximum dimensions are specified in the table.

2664.07. Triangle retainer for ball-lock punches, light duty

Order No	d	d_1	d_2	d_4	a	a_1	a_3	a_4	b	e_1	e_2	e_3	ØK	t	r_1	r_2	x
2664.07.06	6.6	11	6	3	35	19	11.1	6	37.5	9	23	8	6	7	8	8	5.7

TRIANGLE RETAINER FOR BALL-LOCK PUNCHES, HEAVY DUTY



Execution:
Version for metal thicknesses $groesser. 3 mm/max. 6 mm. The punch locating hole d_2 is manufactured to a tolerance of ± 0.01 mm relative to the 6 stud holes H7. This ensures the interchangeability of the locating plate with other polygon versions.

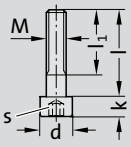
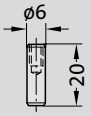
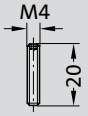
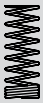
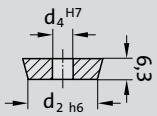
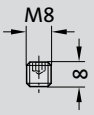
Note:
Special punch retainers available to order.
Pressure plate welded.

1) Contours may vary. Maximum dimensions are specified in the table.

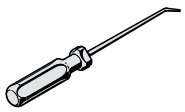
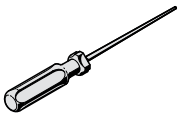
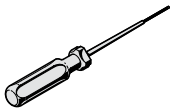
2664.10. Triangle retainer for ball-lock punches, heavy duty

Order No	d	d_1	d_2	d_4	a	a_1	a_3	a_4	b	e_1	e_2	e_3	ØK	t	r_1	r_2	x
2664.10.10	9	15	10	6	44.5	19	11.1	10	43.7	7.5	26.925	9	10	9	9.5	12	9.8
2664.10.13	9	15	13	6	50.8	19	14.3	12	50	6.5	29.97	12	12	9	12.7	15.2	11.3
2664.10.16	9	15	16	6	54	19	15.9	13	53.2	6	31.75	13.5	12	9	14.3	16.8	12.8
2664.10.20	11	18	20	6	60.3	19	17.5	14	59.5	5	33.53	16.5	12	11	17.5	20	14.8
2664.10.25	13.5	20	25	6	69.9	23.8	19.8	16	69.1	7	40.64	22	12	13.5	22.2	24.7	17.3
2664.10.32	13.5	20	32	6	69.9	23.8	19.8	16	69.1	7	40.64	22	12	13.5	22.2	24.7	20.8
2664.10.40	13.5	20	40	6	77.4	27	24	18	76.6	10	43.993	26	12	13.5	26	28.5	24.8

ACCESSORIES FOR RETAINERS, TRIANGULAR, FOR BALL-LOCK PUNCHES

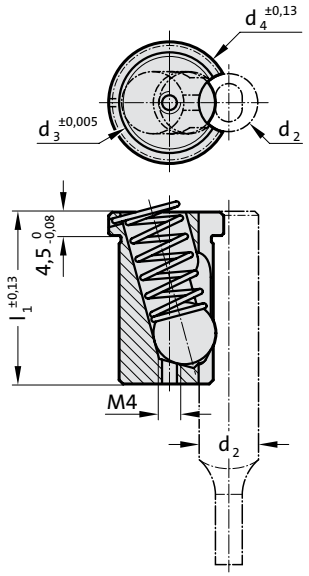
		2192.10.	236.1.	2666.04.	2192.72.	2666.06.	2666.01. .1	2192.72.
								
Retainer	ø d_2	Socket head cap screw	Dowel pin	Ball	Ball release pin	Spring	Pressure disk for centring pin	Pin screw
2664.05.	10	2192.10.08.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.10.1	2192.72.08.008
	13	2192.10.08.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.13.1	2192.72.08.008
	16	2192.10.08.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.16.1	2192.72.08.008
	20	2192.10.10.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.20.1	2192.72.08.008
	25	2192.10.12.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.25.1	2192.72.08.008
	32	2192.10.12.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.32.1	2192.72.08.008
	38	2192.10.12.035	236.1.0600.020	2666.04.008	2192.72.04.020	2666.06.008	2666.01.38.1	2192.72.08.008
2664.06./10.	10	2192.10.08.040	236.1.0600.020	2666.04.010	2192.72.04.020	2666.06.010	2666.01.10.1	2192.72.08.008
	13	2192.10.08.040	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.13.1	2192.72.08.008
	16	2192.10.08.040	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.16.1	2192.72.08.008
	20	2192.10.10.050	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.20.1	2192.72.08.008
	25	2192.10.12.050	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.25.1	2192.72.08.008
	32	2192.10.12.050	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.32.1	2192.72.08.008
	40	2192.10.12.050	236.1.0600.020	2666.04.012	2192.72.04.020	2666.06.012	2666.01.40.1	2192.72.08.008
2664.07.	6	2192.10.06.035	236.1.0600.020	2666.04.006	2192.72.04.020	2666.06.006	2666.01.06.1	2192.72.08.008

Ball release tool

Hook shape	straight shape	straight shape with threaded tip
2666.05.01	2666.05.02	2666.05.03
		

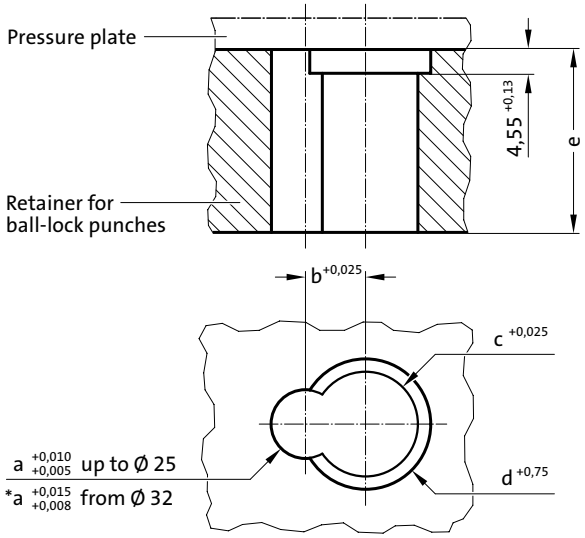
ACCU-LOCK FIXTURE DEVICE FOR BALL-LOCK PUNCHES, LIGHT DUTY

2668.2.



Note:
Use ball release tool 2666.05.02, straight.

Mounting example

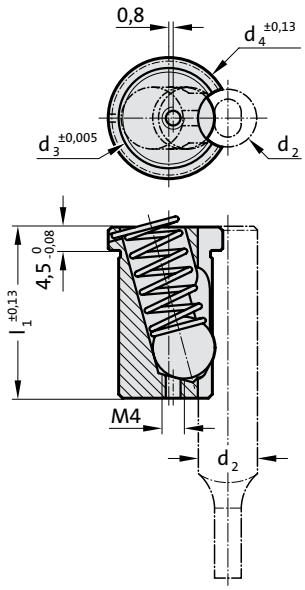


2668.2. ACCU-LOCK Fixture device for ball-lock punches, light duty

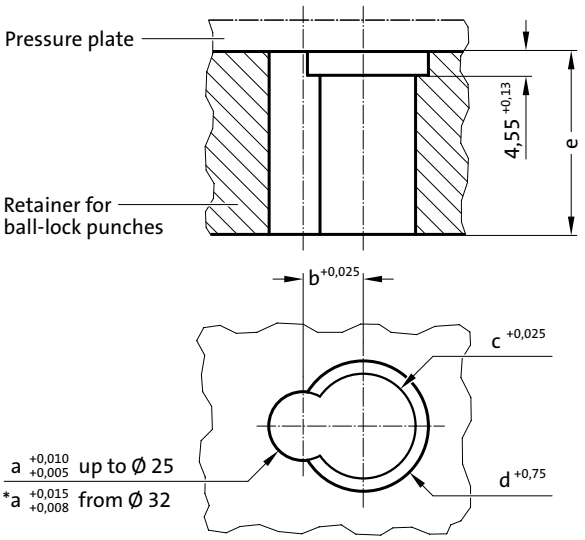
Order No	d_2	d_3	d_4	l_1	a	b	c	d	e
2668.2.06	6	12	14.6	25.7	6	6.5	12.013	15	25.7
2668.2.10	10	14	16.6	25.7	10	9	14.013	17	25.7
2668.2.13	13	14	16.6	25.7	13	10.5	14.013	17	25.7
2668.2.16	16	14	16.6	25.7	16	12	14.013	17	25.7
2668.2.20	20	16	18.6	25.7	20	14	16.013	19	25.7
2668.2.25	25	16	18.6	25.7	25	16.5	16.013	19	25.7
2668.2.32	32	16	18.6	25.7	32	20	16.013	19	25.7
2668.2.38	38	16	18.6	25.7	38	23	16.013	19	25.7

ACCU-LOCK FIXTURE DEVICE FOR BALL-LOCK PUNCHES, HEAVY DUTY

2668.3.



Mounting example

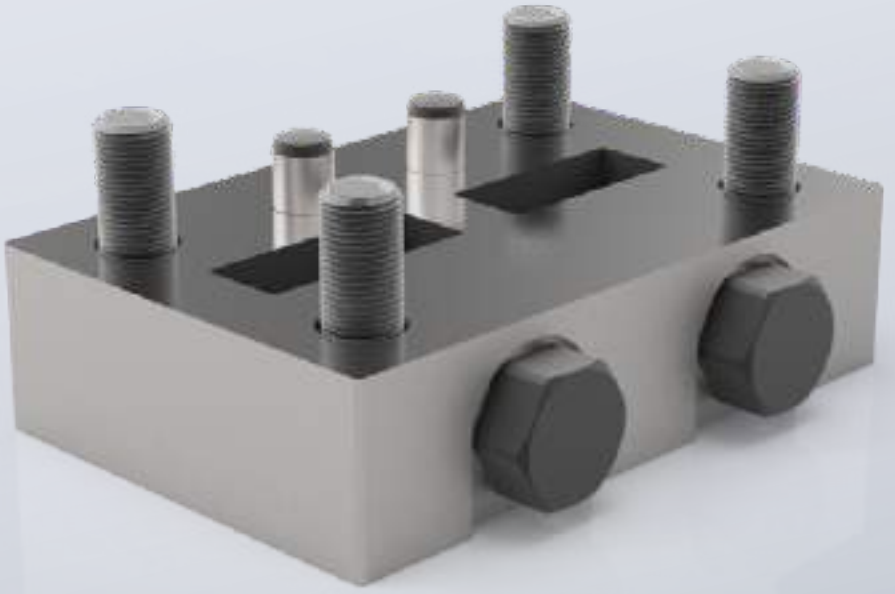


Note:
Use ball release tool 2666.05.02, straight.

2668.3. ACCU-LOCK Fixture device for ball-lock punches, heavy duty

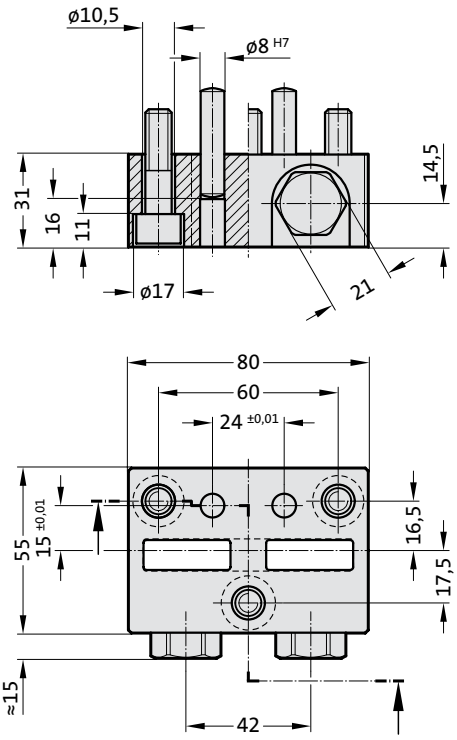
Order No	d_2	d_3	d_4	l_1	a	b	c	d	e
2668.3.10	10	16	19.6	34.7	10	10	16.013	20	34.7
2668.3.13	13	20	24.6	34.7	13	11.5	20.013	25	34.7
2668.3.16	16	20	24.6	34.7	16	13	20.013	25	34.7
2668.3.20	20	20	24.6	34.7	20	15	20.013	25	34.7
2668.3.25	25	20	24.6	34.7	25	17.5	20.013	25	34.7
2668.3.32	32	20	24.6	34.7	32	21	20.013	25	34.7
2668.3.40	40	20	24.6	34.7	40	25	20.013	25	34.7

RETAINERS
BOLT LOCK



RETAINER BOLT LOCK

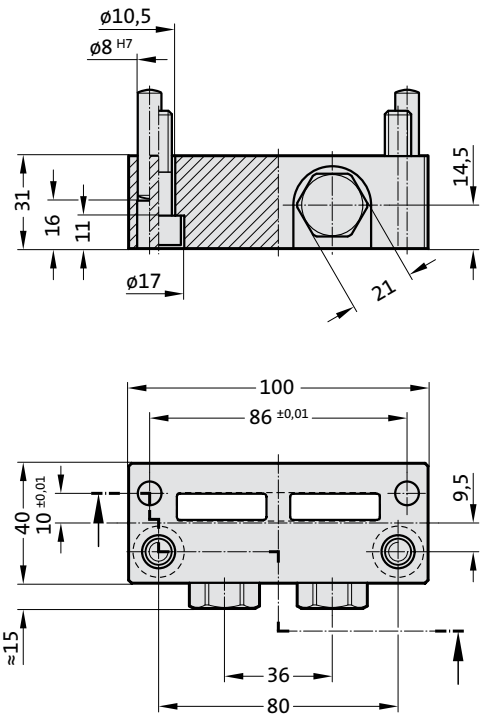
2664.11.01



Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

2664.11.02

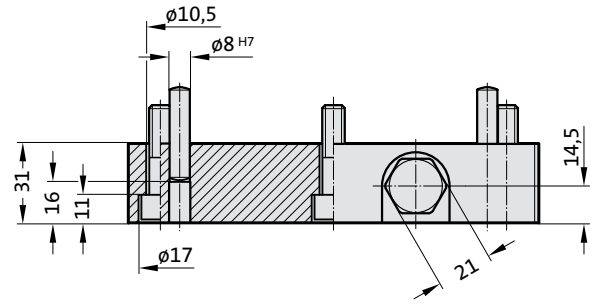


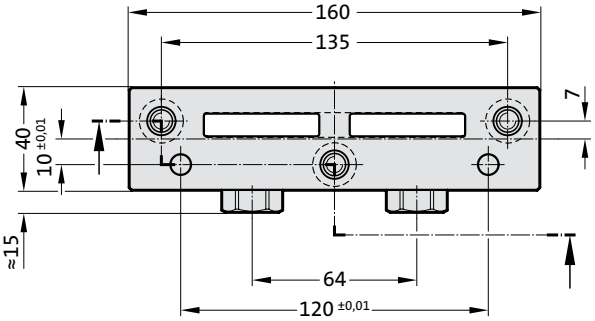
Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

RETAINER BOLT LOCK

2664.11.03

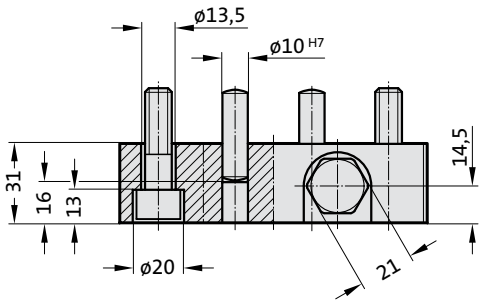


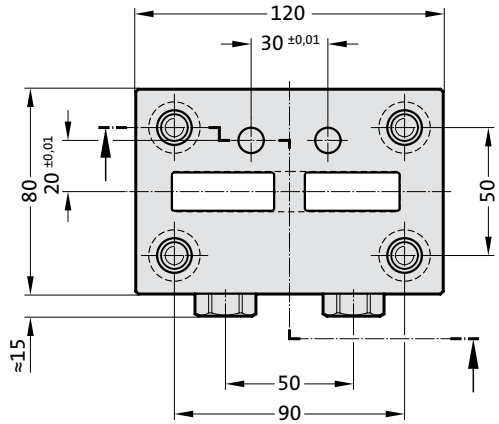


Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

2664.11.04



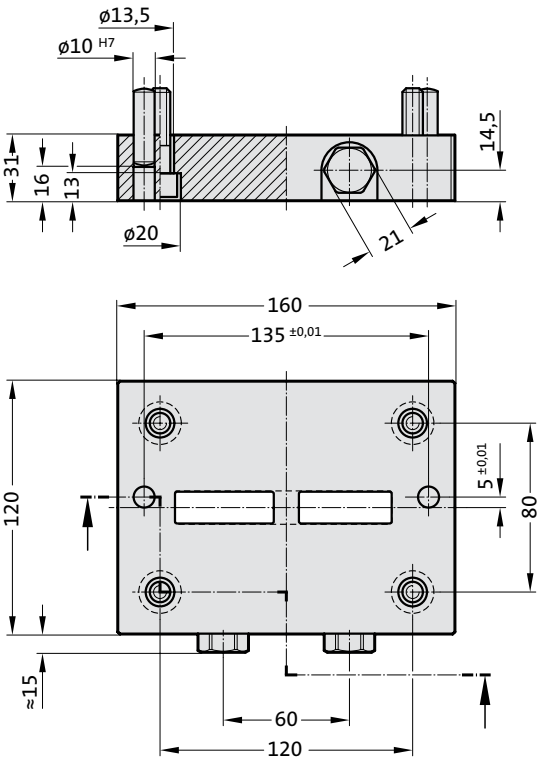


Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

RETAINER BOLT LOCK

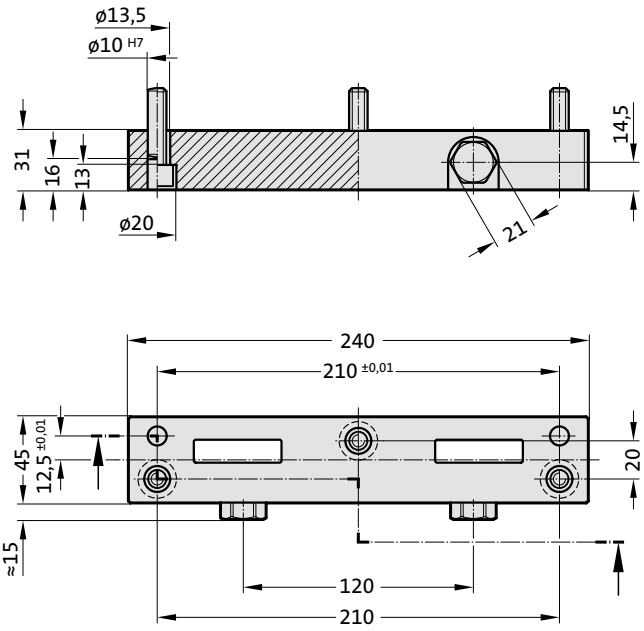
2664.11.05



Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

2664.11.06

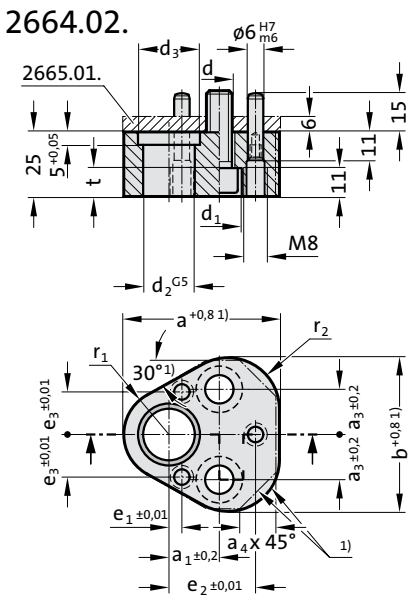


Material:
HWS (1.2379)
Hardness 60 +2 HRC

Note:
Delivery including socket cap screws
DIN EN ISO 4762 and pins
DIN EN ISO 8735

TRIANGLE RETAINERS FOR PUNCHES
ISO 8020

TRIANGLE RETAINER, FOR PUNCHES ISO 8020 WITHOUT ANTI-ROTATION ELEMENT



Execution:

The centres of the pinholes are the reference points for the position of the punch bore.
The dimensions e_1, e_2 and e_3 have a tolerance of ± 0.01 mm.
The triangle ball-lock retainers are interchangeable.

Note:

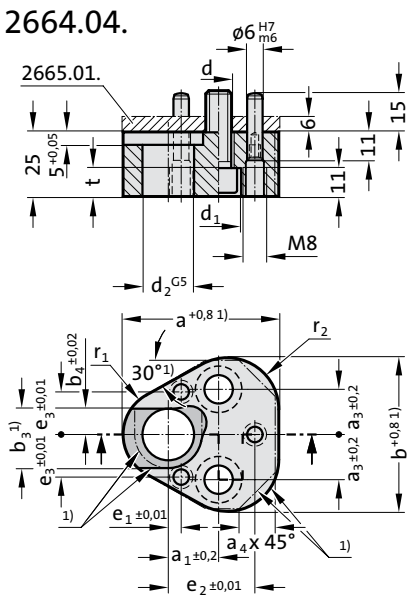
Pressure plate 2665.01. to be ordered separately for the receiving punch plate.

1) Contours may vary. Maximum dimensions are specified in the table.

2664.02. Triangle retainer, for punches ISO 8020 without anti-rotation element

Order No	d	d_1	d_2	d_3	a	a_1	a_3	a_4	b	e_1	e_2	e_3	t	r_1	r_2
2664.02.10	9	15	10	14	44.5	19	11.1	10	43.7	7.5	26.925	9	9	9.5	12
2664.02.13	9	15	13	17	50.8	19	14.3	12	50	6.5	29.97	12	9	12.7	15.2
2664.02.16	9	15	16	20	54	19	15.9	13	53.2	6	31.75	13.5	9	14.3	16.8
2664.02.20	11	18	20	24	60.3	19	17.5	14	59.5	5	33.53	16.5	11	17.5	20
2664.02.25	13.5	20	25	29	69.9	23.8	19.8	16	69.1	7	40.64	22	13.5	22.2	24.7
2664.02.32	13.5	20	32	36	69.9	23.8	19.8	16	69.1	7	40.64	22	13.5	22.2	24.7

TRIANGLE RETAINER, FOR PUNCHES ISO 8020 WITH ANTI-ROTATION ELEMENT



Execution:

The centres of the pinholes are the reference points for the position of the punch bore.
The dimensions e_1, e_2 and e_3 have a tolerance of ± 0.01 mm.
The triangle ball-lock retainers are interchangeable.

Note:

Pressure plate 2665.01. to be ordered separately for the receiving punch plate.

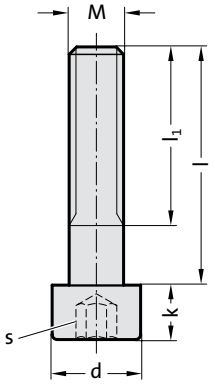
1) Contours may vary. Maximum dimensions are specified in the table.

2664.04. Triangle retainer, for punches ISO 8020 with anti-rotation element

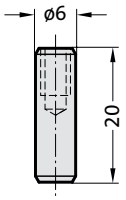
Order No	d	d_1	d_2	a	a_1	a_3	a_4	b	b_3	b_4	e_1	e_2	e_3	t	r_1	r_2
2664.04.10	9	15	10	44.5	19	11.1	10	43.7	12	5	7.5	26.925	9	9	9.5	12
2664.04.13	9	15	13	50.8	19	14.3	12	50	15	6.5	6.5	29.97	12	9	12.7	15.2
2664.04.16	9	15	16	54	19	15.9	13	53.2	18	8	6	31.75	13.5	9	14.3	16.8
2664.04.20	11	18	20	60.3	19	17.5	14	59.5	22	10	5	33.53	16.5	11	17.5	20
2664.04.25	13.5	20	25	69.9	23.8	19.8	16	69.1	27	12.5	7	40.64	22	13.5	22.2	24.7
2664.04.32	13.5	20	32	69.9	23.8	19.8	16	69.1	34	16	7	40.64	22	13.5	22.2	24.7

ACCESSORIES FOR RETAINERS, TRIANGULAR, FOR PUNCHES TO ISO 8020

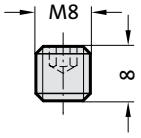
2192.10.



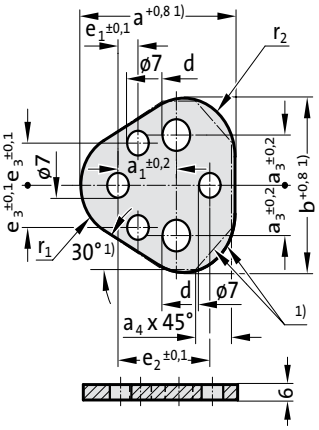
236.1.



2192.72.

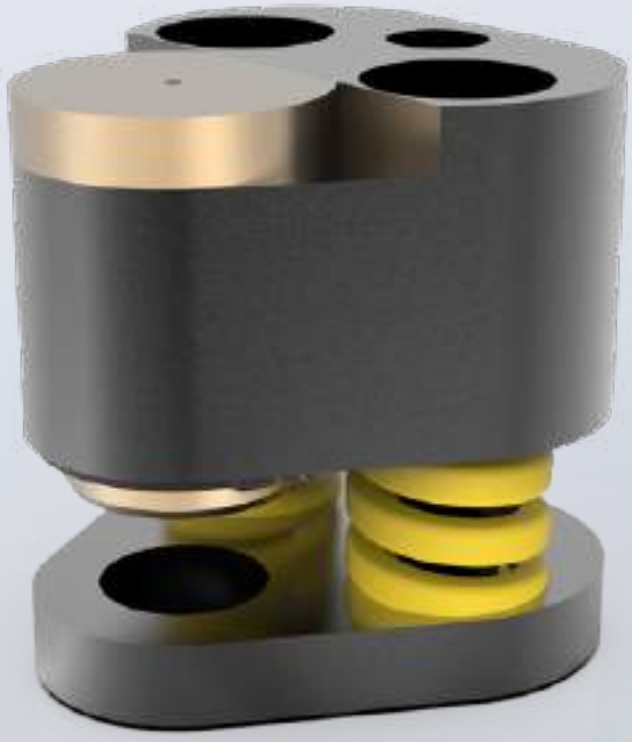


2665.01.



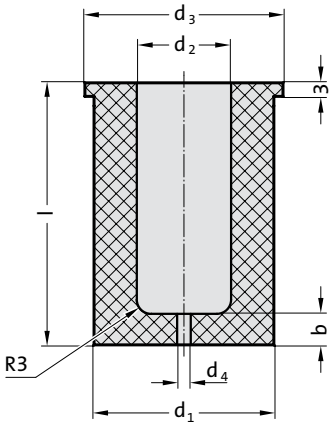
Retainer	∅ d_2	Socket head cap screw	Dowel pin	Pin screw	Pressure plate
2664.02./04.	10	2192.10.08.035	236.1.0600.020	2192.72.08.008	2665.01.10
	13	2192.10.08.035	236.1.0600.020	2192.72.08.008	2665.01.13
	16	2192.10.08.035	236.1.0600.020	2192.72.08.008	2665.01.16
	20	2192.10.10.035	236.1.0600.020	2192.72.08.008	2665.01.20
	25	2192.10.12.035	236.1.0600.020	2192.72.08.008	2665.01.25
	32	2192.10.12.035	236.1.0600.020	2192.72.08.008	2665.01.32

ACCESSORIES

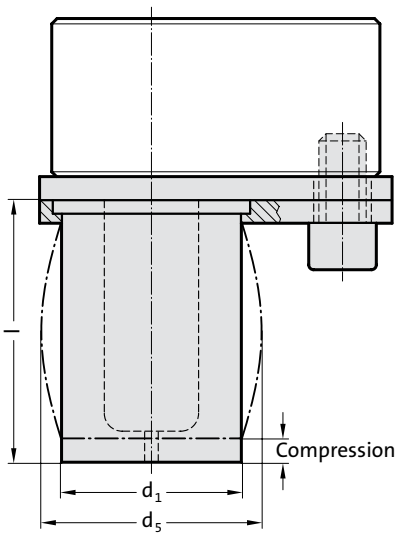


ELASTOMER STRIPPER

2431.7.



Mounting example:



Material:
FIBROFLEX® 95 Shore A

Note:
Stripping units can be used for retainers 2664.02./04./05./06./10.
* values for the stripping force are dependent on a number of parameters (e.g. lubricant, temperature etc.) and may vary from those given here.
** max spring travel should not exceed 15% of the length

2431.7. Elastomer Stripper

						Stripping unit length l				
d_2	d_1	d_3	d_4	d_5 max.	b	35	43	53	63	73
10	18	21	1,6	22	6	O	●	●	●	
13	23	26	3	26,5	6	O	●	●	●	●
16	28	31	3	34	6	O	●	●	●	●
20	33	36	3	38	7	O	●	●	●	●
25	40	43	3	47,6	7	O	●	●	●	●
32	50	55	3	57,9	7	O	●	●	●	●
38	60	65	3	69,6	8		O	O	O	O
40	60	65	3	69,6	8		●	●	●	O
						Punch lengths in use				
		Ball-lock punch, light duty				63	71	80	90	100
		Ball-lock punch, heavy duty				71	80	90	100	110
		Precision punch ISO 8020				-	71	80	90	100
		O = Special measures upon request								

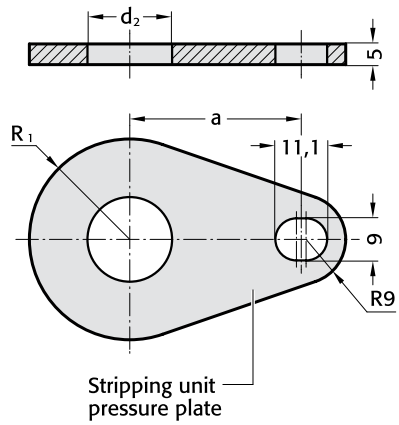
stroke**	3mm	6mm	9mm	3mm	6mm	9mm	3mm	6mm	9mm	3mm	6mm	9mm	3mm	6mm	9mm
Length	35	35	35	43	43	43	53	53	53	63	63	63	73	73	73
d_2	Stripping forces (N)*														
10	1300	-	-	1060	1820	-	900	1650	-	720	1450	1860	-	-	-
13	2100	-	-	1700	2850	-	1460	2610	-	1170	2320	2910	930	2080	2500
16	3000	-	-	2310	3900	-	1990	3560	-	1590	3150	3980	1270	2810	3440
20	3500	-	-	2900	4900	-	2500	4470	-	2000	3950	5000	1590	3420	4330
25	5400	-	-	4440	7520	-	3810	6860	-	3050	6050	7680	2420	5390	6780
32	8400	-	-	6840	11390	-	5880	10450	-	4700	9310	11640	3740	8370	10280
38	-	-	-	9280	19740	-	8140	15890	-	6440	11570	18030	5460	8850	11680
40	-	-	-	10100	20190	-	8650	17300	-	6890	13780	20670	6000	9800	12700

Ordering Code (example):

Elastomer Stripper	=	2431.7.
d_2 = 10 mm	=	10.
l = 53 mm	=	53
Order No	=	2431.7.10.53

STRIPPING UNIT - PRESSURE PLATE

2667.1.

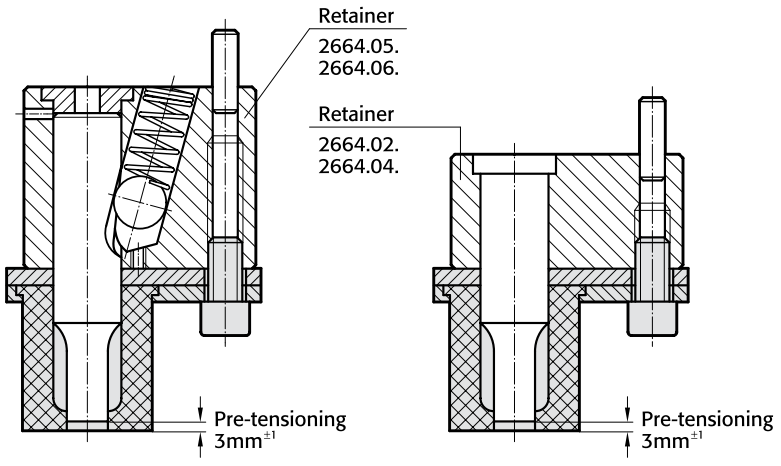


2667.1. Stripping unit - Pressure plate

Order No	d_2	R_1	a
2667.1.010	10	13	28
2667.1.013	13	15.5	31
2667.1.016	16	18	32.9
2667.1.020	20	20.5	34.8
2667.1.025	25	24	39.8
2667.1.032	32	31	41.3
2667.1.038	38	36	45
2667.1.040	40	36	45

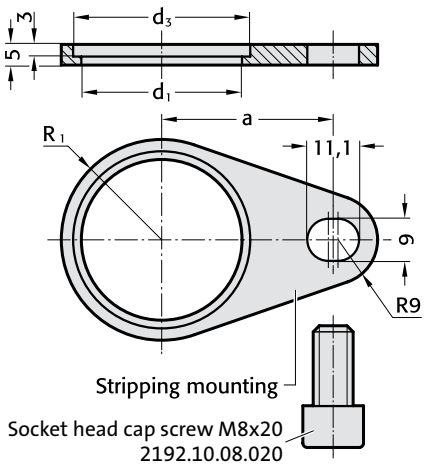
Note:
Pressure plate, mounting plate and screw must all be ordered individually.

Mounting example



STRIPPING UNIT - MOUNTING PLATE

2667.2.

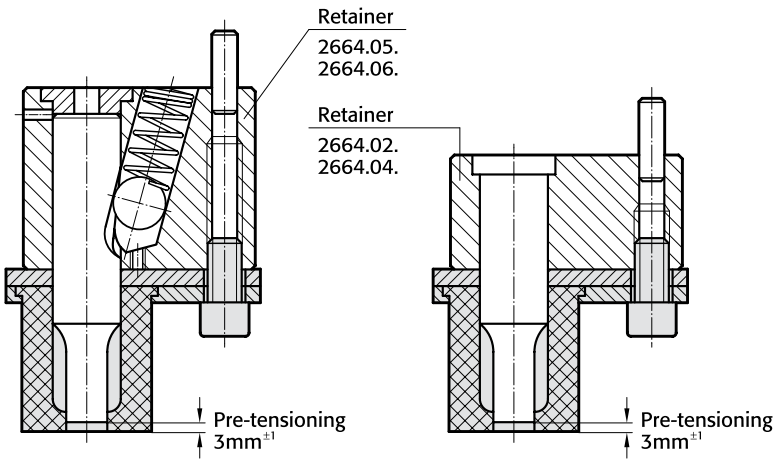


Note:
Pressure plate, mounting plate and screw must all be ordered individually.

2667.2. Stripping unit - Mounting plate

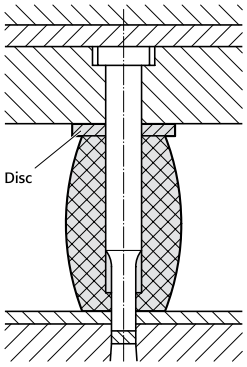
Order No	d_2	d_1	d_3	R_1	a
2667.2.010	10	19	22	13	28
2667.2.013	13	24	27	15.5	31
2667.2.016	16	29	32	18	32.9
2667.2.020	20	34	37	20.5	34.8
2667.2.025	25	41	44	24	39.8
2667.2.032	32	51	56	31	41.3
2667.2.038	38	61	66	36	45
2667.2.040	40	61	66	36	45

Mounting example

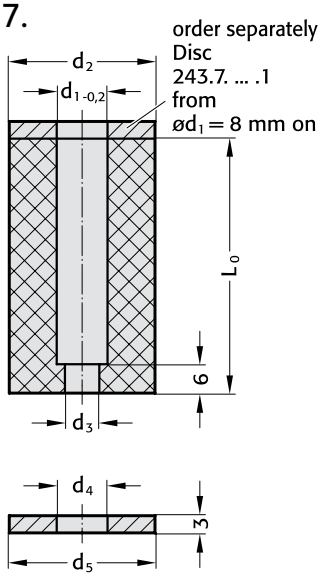


ELASTOMER STRIPPER

Mounting example



243.7.



Description:
Repairs, sharpening and modifications on dies equipped with elastomer strippers do not necessitate the dismantling of a stripper plate, thus becoming very expedient.
Any marring of delicate part surfaces is precluded. This makes elastomer strippers ideal for all painted, anodized, plastic-coated and polished parts. FIBROFLEX® Elastomer Strippers are resistant against oils and greases.

Material:
FIBROFLEX®
Hardness: 95 Shore A

Execution:
Stock lenghts: 39, 47, 56 mm.
Other lengths on request (max. 56 mm)!

Application:
Especially in large dies, where the use of elastomer strippers does away with the need of huge stripper plates.

Mounting:
Push stripper over punch, where it will stay put on account of its elasticity.
No other form of retention will be required.
A single press stroke will then pierce a hole through the bottom portion of the stripper that matches the punch shape exactly.

243.7. Elastomer Stripper

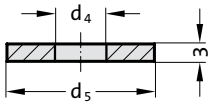
d_1	d_2	d_3	L_0	39	47	56
4	17	1.6		●	●	●
5	17	1.6		●	●	●
6	19	1.6		●	●	●
6.3	19	1.6		●	●	●
8	21	3		●	●	●
10	23	3		●	●	●
12.5	26	3		●	●	●
13	26	3		●	●	●
16	30	3		●	●	●
20	38	3		●	●	●
25	50	3		●	●	●
32	55	3		●	●	●
38	60	3		●	●	●
40	63	3		●	●	●

Ordering Code (example):

Elastomer Stripper		=	243.7.
Inner diameter d_1	13 mm	=	130.
Length L0	39 mm	=	039
Order No		=	243.7. 130. 039

WASHER

243.7. .1



Material:
Steel

243.7. .1 Washer

Order No	d_4	d_5
243.7.085.1	8.5	21
243.7.105.1	10.5	23
243.7.130.1	13	26
243.7.135.1	13.5	26
243.7.165.1	16.5	30
243.7.205.1	20.5	38
243.7.255.1	25.5	50
243.7.325.1	32.5	55
243.7.385.1	38.5	60
243.7.405.1	40.5	63

POLY STRIP STRIPPER UNIT - ORDER EXAMPLES

Note: See table for standard dimensions
Special dimensions to order

2 6 6 7 . F B 4 A . 0 6 5 0 . 0 4 5 0 . A

Stripper unit
POLY STRIP

Format: Slot
length P = 6.5 mm

Form: Slot
width W = 4.5 mm

Scraper bush length: l_1	Order Code character
Standard	= A
long	= B

Punch diameter: d_1	Order Code character
10	= F
13	= G
16	= H
20	= J
25	= K
32	= L
38 (SWL*)	= M
40 (SWS*)	= N

Cutting form:	Order No
blank (pilot hole bore)	= 0
round	= 1
square	= 2
rectangular	= 3
slot	= 4
rectangle with radiused corners	= 5

Cutting form position:	Order Code character
0°	= A
90°	= B
180°	= C
270°	= D
special	= X

Punch type:	ISO	SWL*	SWS*	Length l:
Order Code	= A	= D		80
character:	= B	= E	= G	90
	= C	= F	= H	100

*SWL: for ball-lock punch, lightweight design
*SWS: for ball-lock punch, heavy-duty design

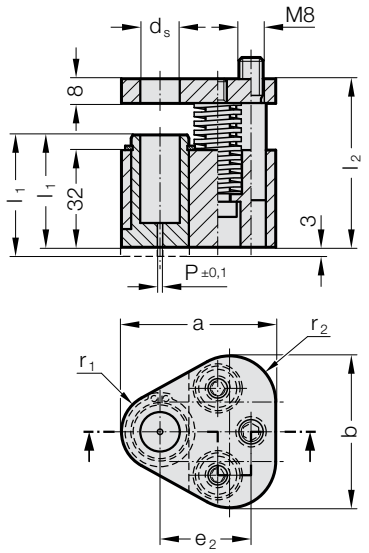
Ordering Code (example):

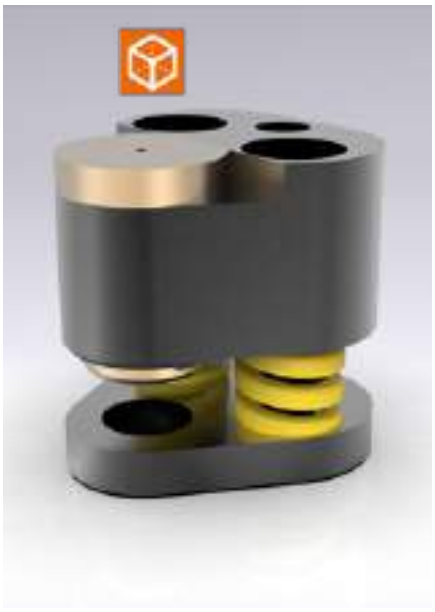
2 6 6 7 . F B 4 A . 0 6 5 0 . 0 4 5 0 . A

Cutting form position:	**Order Code character**
0°	= (A)
Form: Slot width W	
W = 4,5 mm	= 0450
Form: Slot length P	
P = 6,5 mm	= 0650
Scraper bush length: l_1	**Order Code character**
Standard	= (A)
Cutting form:	**Order No**
slot	= (4)
Punch type/Length: l	**Order Code character**
ISO / l = 90 mm	= (B)
Punch diameter: d_1	**Order Code character**
d_1 = 10 mm	= (F)
Stripper unit POLY STRIP	= 2667

POLY STRIP STRIPPER UNIT, WITH START BOREHOLE, FOR ISO 8020 PUNCH

2667.□□0□.





2667.xx0x. POLY STRIP stripper unit, with start borehole, for ISO 8020 punch

d_s / (Order Code character)	P	a	b	e_2	r_1	r_2	l (Order Code character) l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A)	40 (B)
10 / (F)	1.5	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	1.5	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	1.5	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	1.5	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	1.5	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	1.5	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l Scraper bush l_1	80 37	80 40	90 37	90 40	100 37	100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Ordering Code (example):

2667.FC0A.A

Cutting form position: 0°	**Order Code character**	= (A)
Scraper bush length: l_1 Standard	**Order Code character**	= (A)
Cutting form: Start borehole	**Order No**	= (0)
Punch type/length: l ISO / l = 100 mm	**Order Code character**	= (C)
Punch diameter: d_1 d_1 = 10 mm	**Order Code character**	= (F)
Stripper unit POLY STRIP		= 2667

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.02./2664.04.

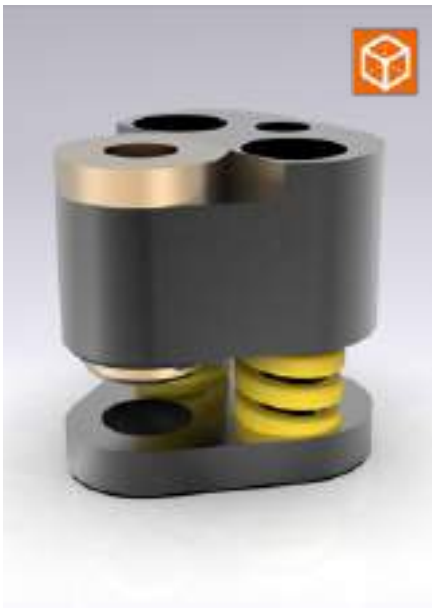
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

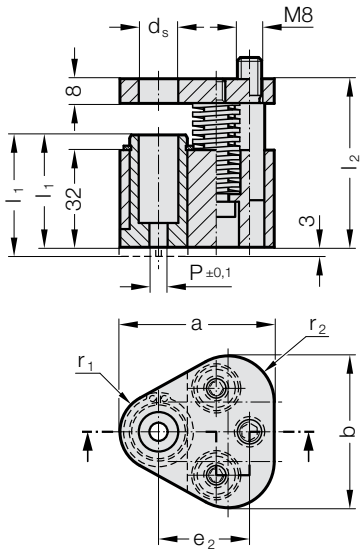
Note:

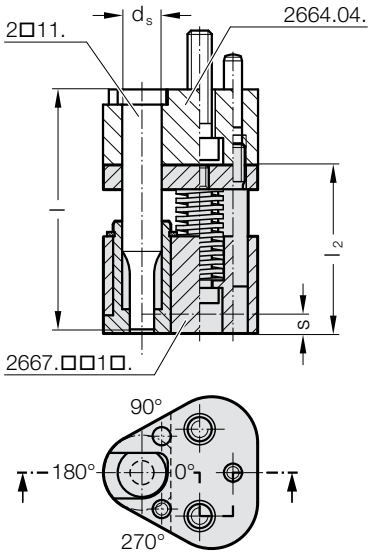
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.

POLY STRIP STRIPPER UNIT, ROUND, FOR ISO 8020 PUNCH



2667.□□1□.





2667.xx1x. POLY STRIP stripper unit, round, for ISO 8020 punch

d_s / (Order Code character)	P	a	b	e_2	r_1	r_2	l (Order Code character) l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	4 - 9,9	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	5 - 12,9	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	8 - 15,9	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	12 9,9	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	16,5 4,9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	20 1,9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l Scraper bush l_1	80 37	80 40	90 37	90 40	100 37	100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.02./2664.04.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

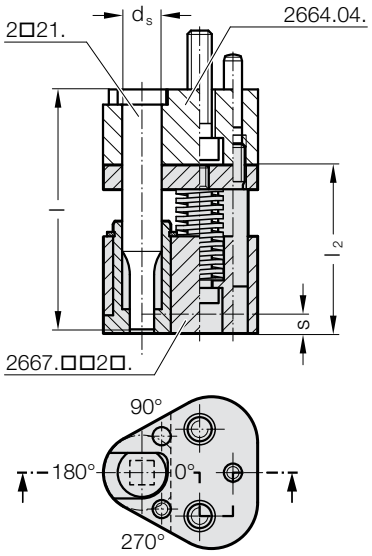
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

Ordering Code (example):

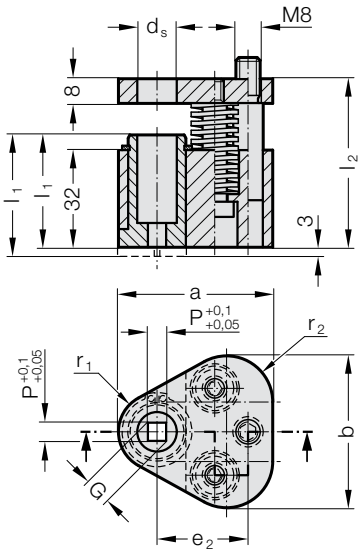
2667.FC1A.0400.A

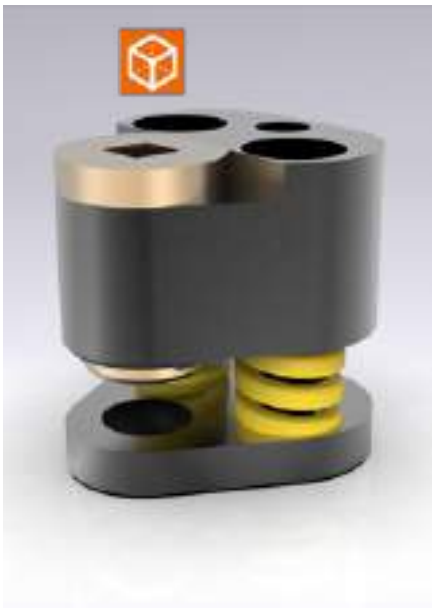
Cutting form position: 0°	**Order Code character** = (A)
Shape: round P = ø4,0 mm	= 0400
Scraper bush length: l_1 Standard	**Order Code character** = (A)
Cutting form: round	**Order No** = (1)
Punch type/length: l ISO / l = 100 mm	**Order Code character** = (C)
Punch diameter: d_1 d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP	= 2667

POLY STRIP STRIPPER UNIT, SQUARE, FOR ISO 8020 PUNCH



2667.□□2□.





2667.xx2x. POLY STRIP stripper unit, square, for ISO 8020 punch

d_s / (Order Code character)	P_{min}	G_{max}	a	b	e_2	r_1	r_2	l (Order Code character) l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	3.5	9.9	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	10	31.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l Scraper bush l_1	80 37	80 40	90 37	90 40	100 37	100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Ordering Code (example):

2667.FB2A.0400.A

Cutting form position:	0°	**Order Code character** = (A)
Form: Square length P	P = 4,0 mm	= 0400
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	square	**Order No** = (2)
Punch type/length: l	ISO / l = 90 mm	**Order Code character** = (B)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP		= 2667

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.04.

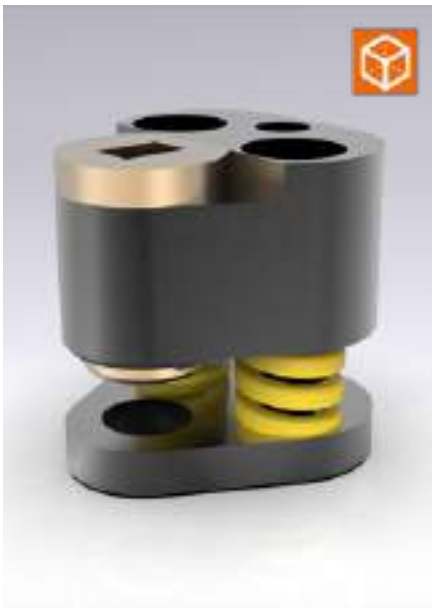
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

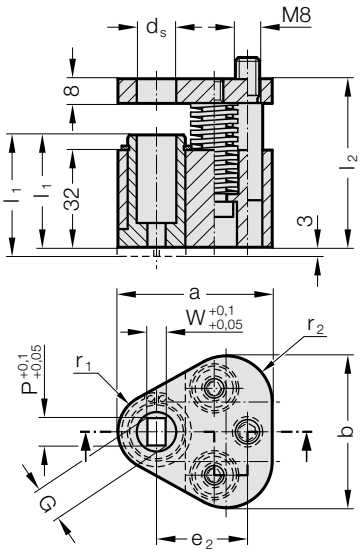
Note:

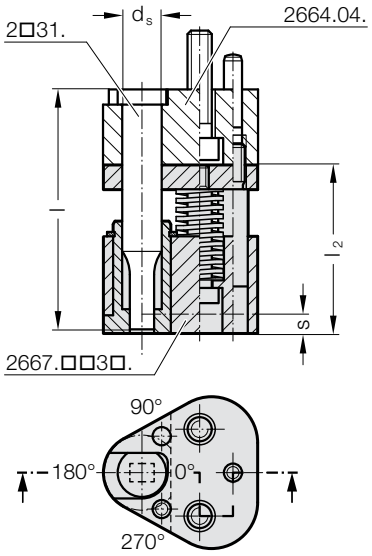
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

POLY STRIP STRIPPER UNIT, RECTANGLE, FOR ISO 8020 PUNCH



2667.□□3□.





2667.xx3x. POLY STRIP stripper unit, rectangle, for ISO 8020 punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2	l (Order Code character) l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	3.5	9.9	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	10	31.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l Scraper bush l_1	80 37	80 40	90 37	90 40	100 37	100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.04.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

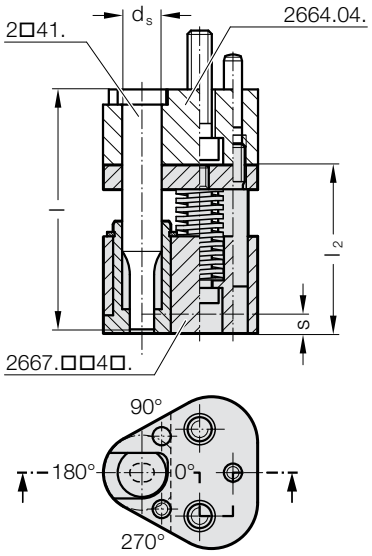
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

Ordering Code (example):

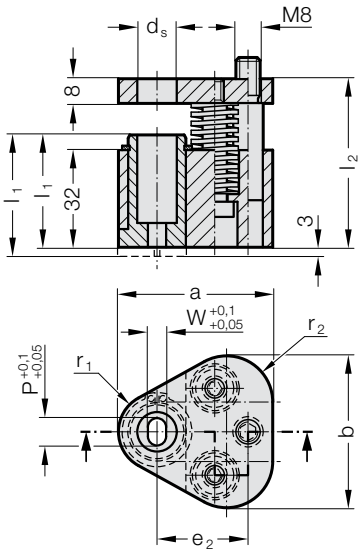
2667.FB3A.0800.0500.A

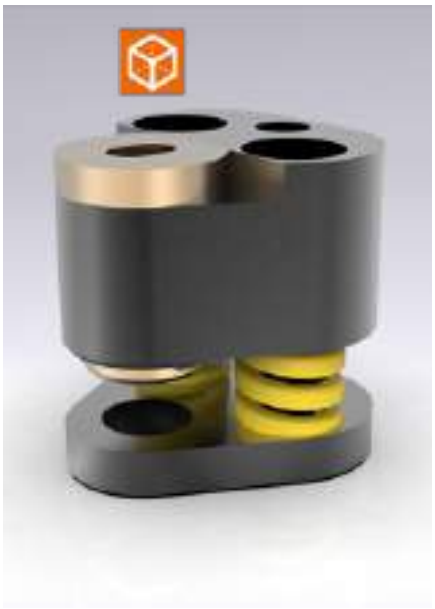
Cutting form position:	0°	**Order Code character** = (A)
Form: Rectangle width W	W = 5,0 mm	= 0500
Form: Rectangle length P	P = 8,0 mm	= 0800
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	rectangular	**Order No** = (3)
Punch type/length: l	ISO / l = 90 mm	**Order Code character** = (B)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP		= 2667

POLY STRIP STRIPPER UNIT, SLOT, FOR ISO 8020 PUNCH



2667.□□4□.





2667.xx4x. POLY STRIP stripper unit, slot, for ISO 8020 punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2	l (Order Code character) / l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) / $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	3.5	9.9	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	10	31.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l / Scraper bush l_1	80 / 37	80 / 40	90 / 37	90 / 40	100 / 37	100 / 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Ordering Code (example):

2667.FB4A.0800.0500.A

Cutting form position:	0°	**Order Code character** = (A)
Form: Slot width W	W = 5,0 mm	= 0500
Form: Slot length P	P = 8,0 mm	= 0800
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	slot	**Order No** = (4)
Punch type/length: l	ISO / l = 90 mm	**Order Code character** = (B)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP		= 2667

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.04.

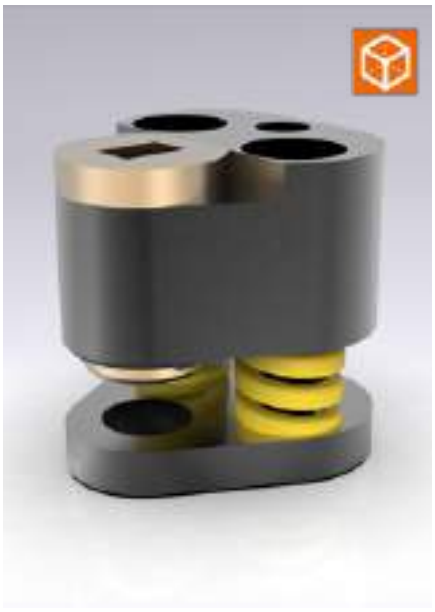
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

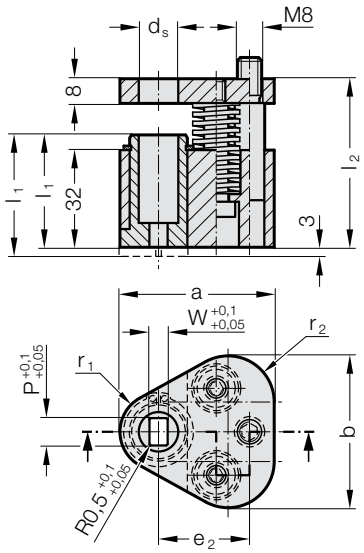
Note:

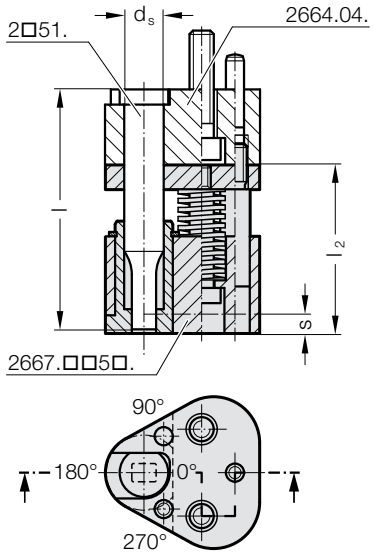
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

POLY STRIP STRIPPER UNIT, RECTANGLE WITH RADIUS, FOR ISO 8020 PUNCH



2667.□□5□.





2667.xx5x. POLY STRIP stripper unit, rectangle with radius, for ISO 8020 punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2	l (Order Code character) l_2	80 (A) 55.5	90 (B) 65.5	100 (C) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	3.5	9.9	44.5	43.7	26.925	9.5	12		●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2		●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8		●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20		●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●
32 / (L)	10	31.9	69.9	69.1	40.64	22.2	24.7		●	●	●		●	●

d_s / (Order Code character)	Punch length l Scraper bush l_1	80 37	80 40	90 37	90 40	100 37	100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368

Description:

The stripper unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for punch ISO 8020 2664.04.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

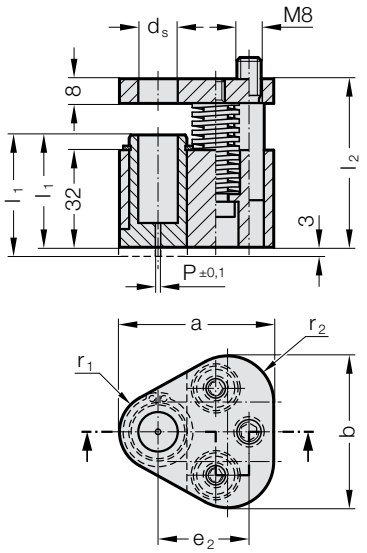
Ordering Code (example):

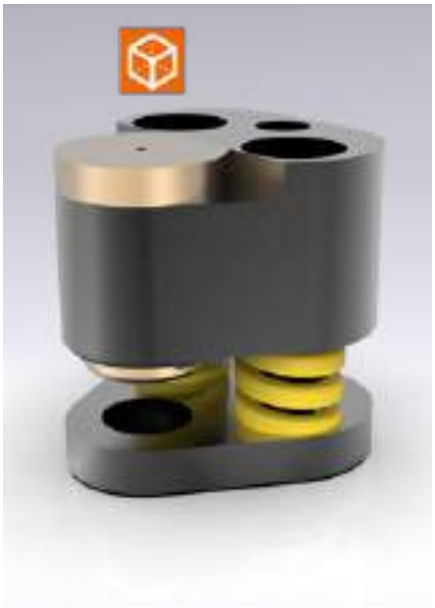
2667.FB5A.0800.0500.A

Cutting form position:	**Order Code character**
0°	= (A)
Shape: rectangle with radiused corners Width W	
W = 5,0 mm	= 0500
Shape: rectangle with radiused corners Length P	
P = 8,0 mm	= 0800
Scraper bush length: l_1	**Order Code character**
Standard	= (A)
Cutting form:	**Order No**
rectangle with radiused corners	= (5)
Punch type/length: l	**Order Code character**
ISO / l = 90 mm	= (B)
Punch diameter: d_1	**Order Code character**
d_1 = 10 mm	= (F)
Stripper unit POLY STRIP	= 2667

POLY STRIP STRIPPER UNIT, WITH START BOREHOLE, FOR BALL-LOCK PUNCH

2667.□□0□.





2667.xx0x. POLY STRIP stripper unit, with start borehole, for ball-lock punch

d_s / (Order Code character)	P	a	b	e_2	r_1	r_2	Punch type l (Order Code character) l_2	SWL 80 (D) 55.5	SWL 90 (E) 65.5	SWS 90 (G) 65.5	SWL 100 (F) 75.5	SWS 100 (H) 75.5	l_1 (Order Code character	37 (A)	40 (B)
10 / (F)	1.5	44.5	43.7	26.925	9.5	12		●	●	●	●	●		●	●
13 / (G)	1.5	50.8	50	29.97	12.7	15.2		●	●	●	●	●		●	●
16 / (H)	1.5	54	53.2	31.75	14.3	16.8		●	●	●	●	●		●	●
20 / (J)	1.5	60.3	59.5	33.53	17.5	20		●	●	●	●	●		●	●
25 / (K)	1.5	69.9	69.1	40.64	22.2	24.7		●	●	●	●	●		●	●
32 / (L)	1.5	69.9	69.1	40.64	22.2	24.7		●	●	●	●	●		●	●
38 / (M)	1.5	77.4	76.6	43.99	26	28.5		●	●		●			●	●
40 / (N)	1.5	77.4	76.6	43.99	26	28.5				●		●		●	●

d_s / (Order Code character)	Punch type Punch length l Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Ordering Code (example):

2667.FE0A.A

Cutting form position:	0°	**Order Code character** = (A)
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	Start borehole	**Order No** = (0)
Punch type/length: l	SWL / l = 90 mm	**Order Code character** = (E)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP		= 2667

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

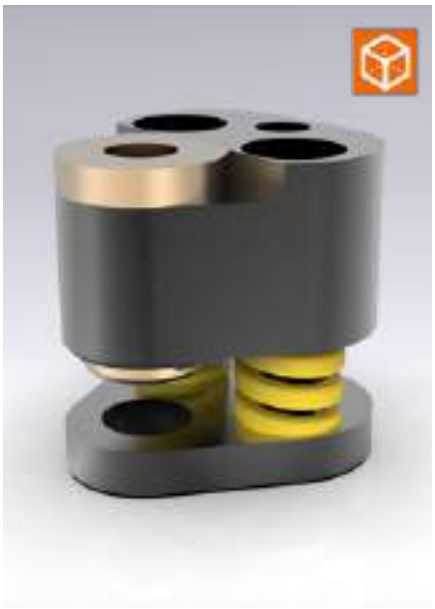
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

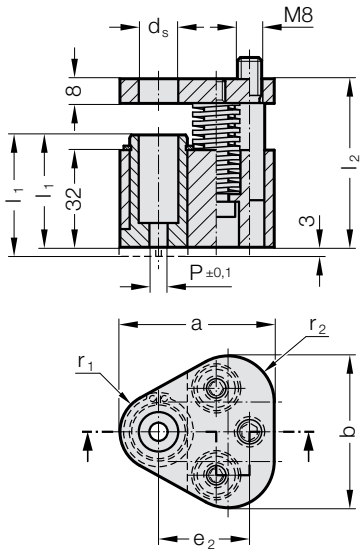
Note:

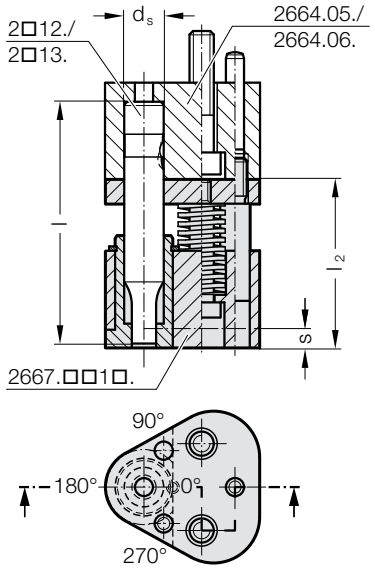
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.

POLY STRIP STRIPPER UNIT, ROUND, FOR BALL-LOCK PUNCH



2667.□□1□.





2667.xx1x. POLY STRIP stripper unit, round, for ball-lock punch

d_s / (Order Code character)	P	a	b	e_2	r_1	r_2	Punch type l (Order Code character) l_2	SWL 80 (D) 55.5	SWL 90 (E) 65.5	SWS 90 (G) 65.5	SWL 100 (F) 75.5	SWS 100 (H) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	1,6 - 9,9	44.5	43.7	26.925	9.5	12		●	●	●	●	●		●	●
13 / (G)	5 - 12,9	50.8	50	29.97	12.7	15.2		●	●	●	●	●		●	●
16 / (H)	8 - 15,9	54	53.2	31.75	14.3	16.8		●	●	●	●	●		●	●
20 / (J)	12 - 19,9	60.3	59.5	33.53	17.5	20		●	●	●	●	●		●	●
25 / (K)	16 - 24,9	69.9	69.1	40.64	22.2	24.7		●	●	●	●	●		●	●
32 / (L)	24 - 31,9	69.9	69.1	40.64	22.2	24.7		●	●	●	●	●		●	●
38 / (M)	30 7,9	77.4	76	43.9	26	28.5		●	●		●			●	●
40 / (N)	30 9,9	77.4	76	43.9	26	28.5				●		●		●	●

d_s / (Order Code character)	Punch type Punch length l Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

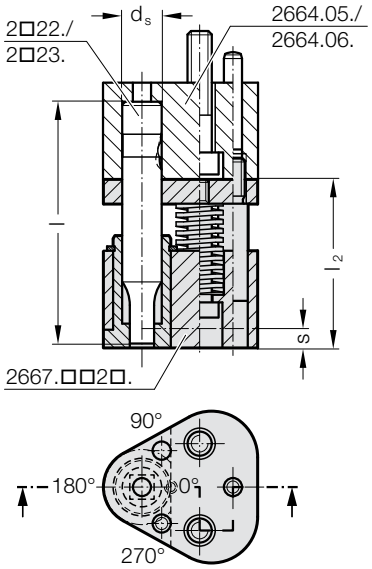
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

Ordering Code (example):

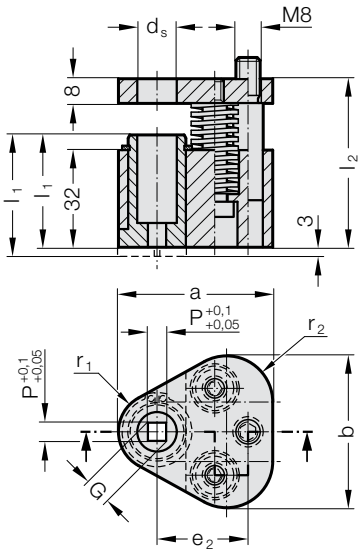
2667.FE1A.0400.A

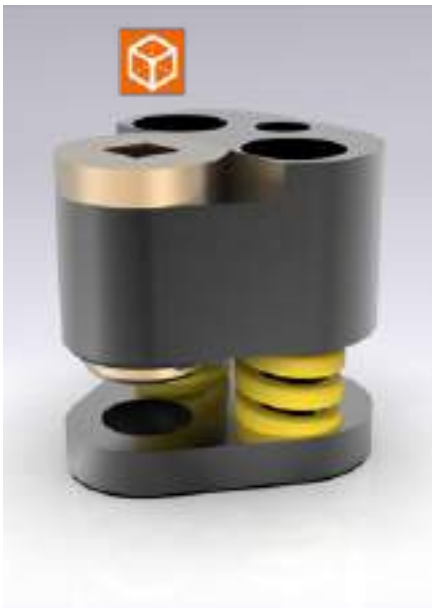
Cutting form position:	0°	**Order Code character** = (A)
Shape: round P	P = ø4,0 mm	= 0400
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	round	**Order No** = (1)
Punch type/length: l	SWL / l = 90 mm	**Order Code character** = (E)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP		= 2667

POLY STRIP STRIPPER UNIT, SQUARE, FOR BALL-LOCK PUNCH



2667.□□2□.





2667.xx2x. POLY STRIP stripper unit, square, for ball-lock punch

d_s / (Order Code character)	P_{min}	G_{max}	a	b	e_2	r_1	r_2	Punch type l (Order Code character) l_2	SWL 80 (D) 55.5	SWL 90 (E) 65.5	SWS 90 (G) 65.5	SWL 100 (F) 75.5	SWS 100 (H) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	1.6	9.9	44.5	43.7	26.925	9.5	12			●	●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2			●	●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8			●	●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20			●	●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
32 / (L)	12.5	31.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
38 / (M)	14	37.9	77.4	76	43.9	26	28.5		●	●		●			●	●
40 / (N)	14	39.9	77.4	76	43.9	26	28.5				●		●		●	●

d_s / (Order Code character)	Punch type Punch length l Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Ordering Code (example):

2667.FE2A.0400.A

	Order Code character
Cutting form position: 0°	= (A)
Form: Square length P P = 4,0 mm	= 0400
Scraper bush length: l_1 Standard	**Order Code character** = (A)
Cutting form: square	**Order No** = (2)
Punch type/length: l SWL / l = 90 mm	**Order Code character** = (E)
Punch diameter: d_1 d_1 = 10 mm	**Order Code character** = (F)
Stripper unit POLY STRIP	= 2667

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

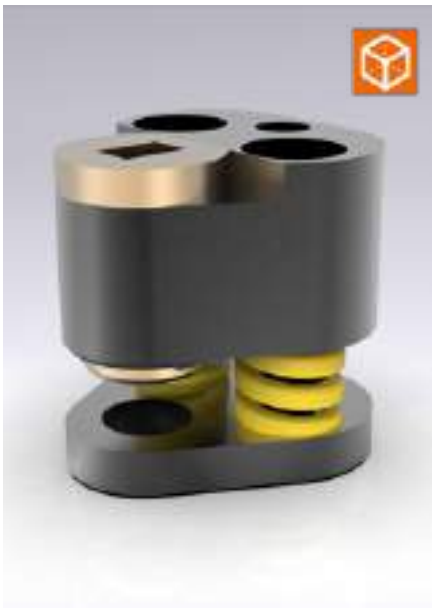
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

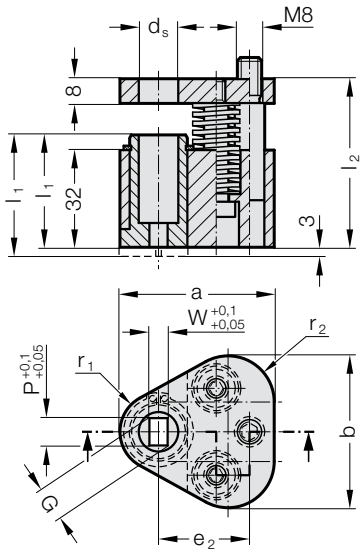
Note:

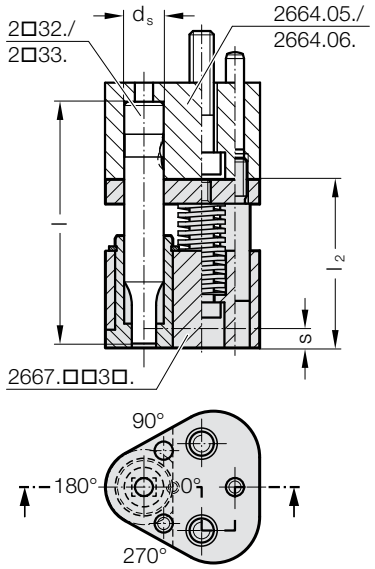
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

POLY STRIP STRIPPER UNIT, RECTANGLE, FOR BALL-LOCK PUNCH



2667.□□3□.





2667.xx3x. POLY STRIP stripper unit, rectangle, for ball-lock punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2	Punch type l (Order Code character) l_2	SWL 80 (D) 55.5	SWL 90 (E) 65.5	SWS 90 (G) 65.5	SWL 100 (F) 75.5	SWS 100 (H) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	1.6	9.9	44.5	43.7	26.925	9.5	12			●	●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2			●	●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8			●	●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20			●	●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
32 / (L)	12.5	31.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
38 / (M)	14	37.9	77.4	76	43.9	26	28.5		●	●		●			●	●
40 / (N)	14	39.9	77.4	76	43.9	26	28.5				●		●		●	●

d_s / (Order Code character)	Punch type Punch length l Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

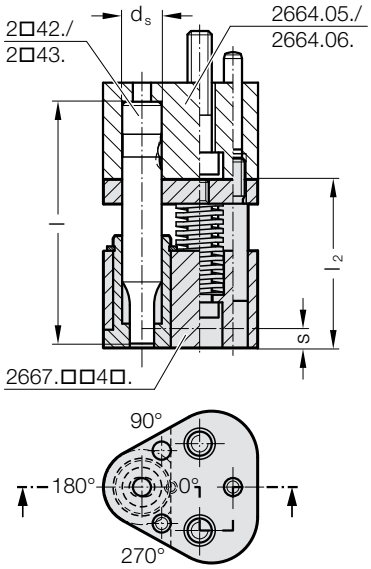
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

Ordering Code (example):

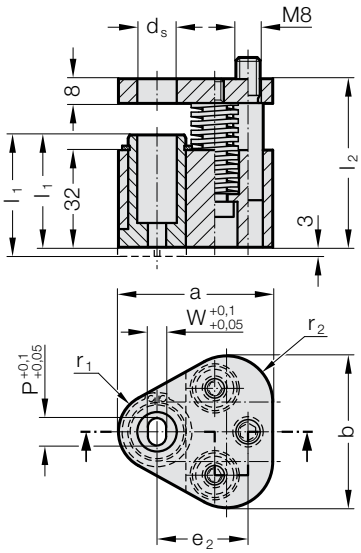
2667.FE3A.0800.0500.A

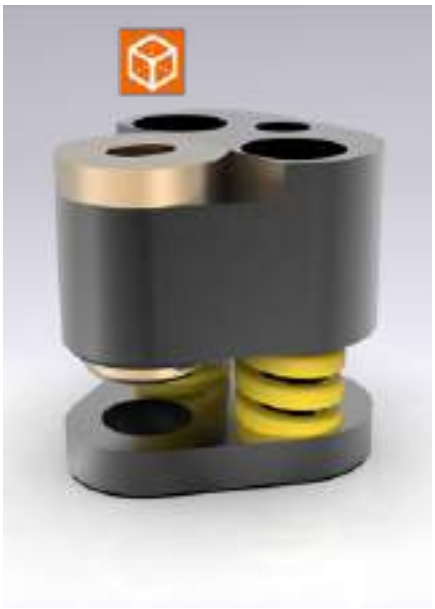
Cutting form position:	**Order Code character**
0°	= (A)
Form: Rectangle width W	
W = 5,0 mm	= 0500
Form: Rectangle length P	
P = 8,0 mm	= 0800
Scraper bush length: l_1	**Order Code character**
Standard	= (A)
Cutting form:	**Order No**
rectangular	= (3)
Punch type/length: l	**Order Code character**
SWL / l = 90 mm	= (E)
Punch diameter: d_1	**Order Code character**
d_1 = 10 mm	= (F)
Stripper unit POLY STRIP	= 2667

POLY STRIP STRIPPER UNIT, SLOT, FOR BALL-LOCK PUNCH



2667.□□4□.





2667.xx4x. POLY STRIP stripper unit, slot, for ball-lock punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2
10 / (F)	1.6	9.9	44.5	43.7	26.925	9.5	12
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7
32 / (L)	12.5	31.9	69.9	69.1	40.64	22.2	24.7
38 / (M)	14	37.9	77.4	76	43.9	26	28.5
40 / (N)	14	39.9	77.4	76	43.9	26	28.5

Punch type	SWL	SWL	SWS	SWL	SWS	l_1	37	40
l	80	90	90	100	100	(Order Code character)	(A)	(B)
(Order Code character)	(D)	(E)	(G)	(F)	(H)	$s_{(max)}$	6.5	9.5
l_2	55.5	65.5	65.5	75.5	75.5			
10 / (F)		●	●	●	●		●	●
13 / (G)		●	●	●	●		●	●
16 / (H)		●	●	●	●		●	●
20 / (J)		●	●	●	●		●	●
25 / (K)		●	●	●	●		●	●
32 / (L)		●	●	●	●		●	●
38 / (M)	●	●		●			●	●
40 / (N)			●		●		●	●

d_s / (Order Code character)	Punch type Punch length l Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Ordering Code (example):

2667.FE4A.0800.0500.A

Cutting form position:	0°	**Order Code character** = (A)
Form: Slot width W	W = 5,0 mm	= 0500
Form: Slot length P	P = 8,0 mm	= 0800
Scraper bush length: l_1	Standard	**Order Code character** = (A)
Cutting form:	slot	**Order No** = (4)
Punch type/length: l	SWL / l = 90 mm	**Order Code character** = (E)
Punch diameter: d_1	d_1 = 10 mm	**Order Code character** = (F)
Stripper unit	**POLY STRIP**	= 2667

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

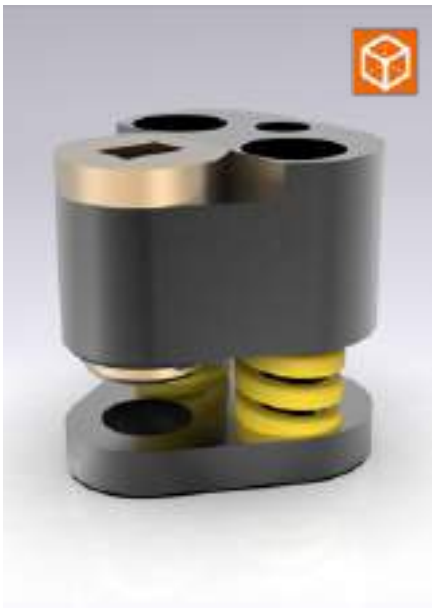
Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

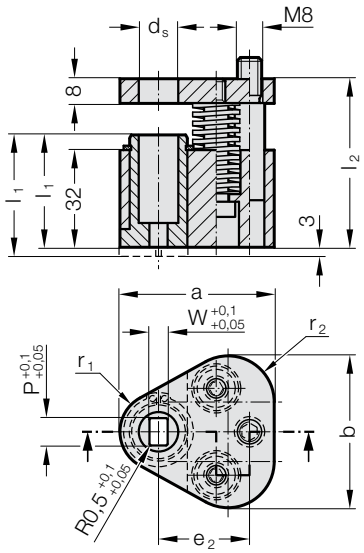
Note:

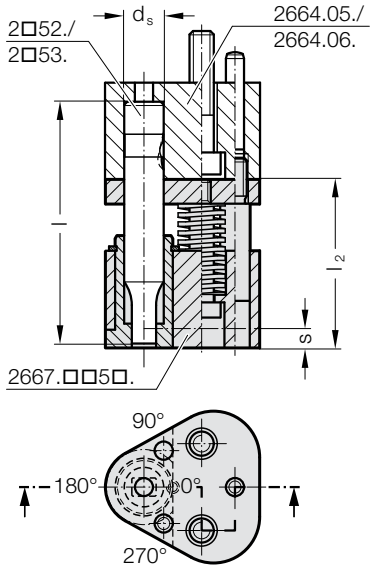
The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

POLY STRIP STRIPPER UNIT, SQUARE WITH RADIUS, FOR BALL-LOCK PUNCH



2667.□□5□.





2667.xx5x. POLY STRIP stripper unit, square with radius, for ball-lock punch

d_s / (Order Code character)	W_{min}	G_{max}	a	b	e_2	r_1	r_2	Punch type l (Order Code character) l_2	SWL 80 (D) 55.5	SWL 90 (E) 65.5	SWS 90 (G) 65.5	SWL 100 (F) 75.5	SWS 100 (H) 75.5	l_1 (Order Code character) $s_{(max)}$	37 (A) 6.5	40 (B) 9.5
10 / (F)	1.6	9.9	44.5	43.7	26.925	9.5	12			●	●	●	●		●	●
13 / (G)	4.5	12.9	50.8	50	29.97	12.7	15.2			●	●	●	●		●	●
16 / (H)	6	15.9	54	53.2	31.75	14.3	16.8			●	●	●	●		●	●
20 / (J)	8	19.9	60.3	59.5	33.53	17.5	20			●	●	●	●		●	●
25 / (K)	10	24.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
32 / (L)	12.5	31.9	69.9	69.1	40.64	22.2	24.7			●	●	●	●		●	●
38 / (M)	14	37.9	77.4	76	43.9	26	28.5		●	●		●			●	●
40 / (N)	14	39.9	77.4	76	43.9	26	28.5				●		●		●	●

d_s / (Order Code character)	Punch type / Punch length l / Scraper bush l_1	SWL 080 37	SWL 080 40	SWL 090 37	SWL 090 40	SWL 100 37	SWL 100 40	SWS 090 37	SWS 090 40	SWS 100 37	SWS 100 40
10 / (F)	Stripping force, max [N]	1022	884	1280	810	786	1098	1280	810	786	1098
13 / (G)		1022	884	1280	810	786	1098	1280	810	786	1098
16 / (H)		2856	1668	3128	1282	1920	2688	3128	1282	1920	2688
20 / (J)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
25 / (K)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
32 / (L)		5049	2714	5124	2180	3120	4368	5124	2180	3120	4368
38 / (M)		5049	2714	5124	2180	3120	4368				
40 / (N)								5124	2180	3120	4368

Description:

The brush cleaner unit is suitable for use with exterior skin panels.
Use with triangular mounting plate, for ball-lock punch 2664.05./06./10.

Material:

Scraper bush: CuZn25Al5 (no. 2.0598)
Scraper plate: 40CrMnMoS8-6 (no. 1.2312)
Pressure plate: 40CrMnMoS8-6 (no. 1.2312)

Note:

The stripper unit is available in 2 variants: Standard (A) and Long (B).
Long variant of the stripper unit with 3 mm projecting edge suitable for retrofitting a contour.
Choose the position of the cutting form in the scraper bush in accordance with the position of the installed punch in the mounting plate.

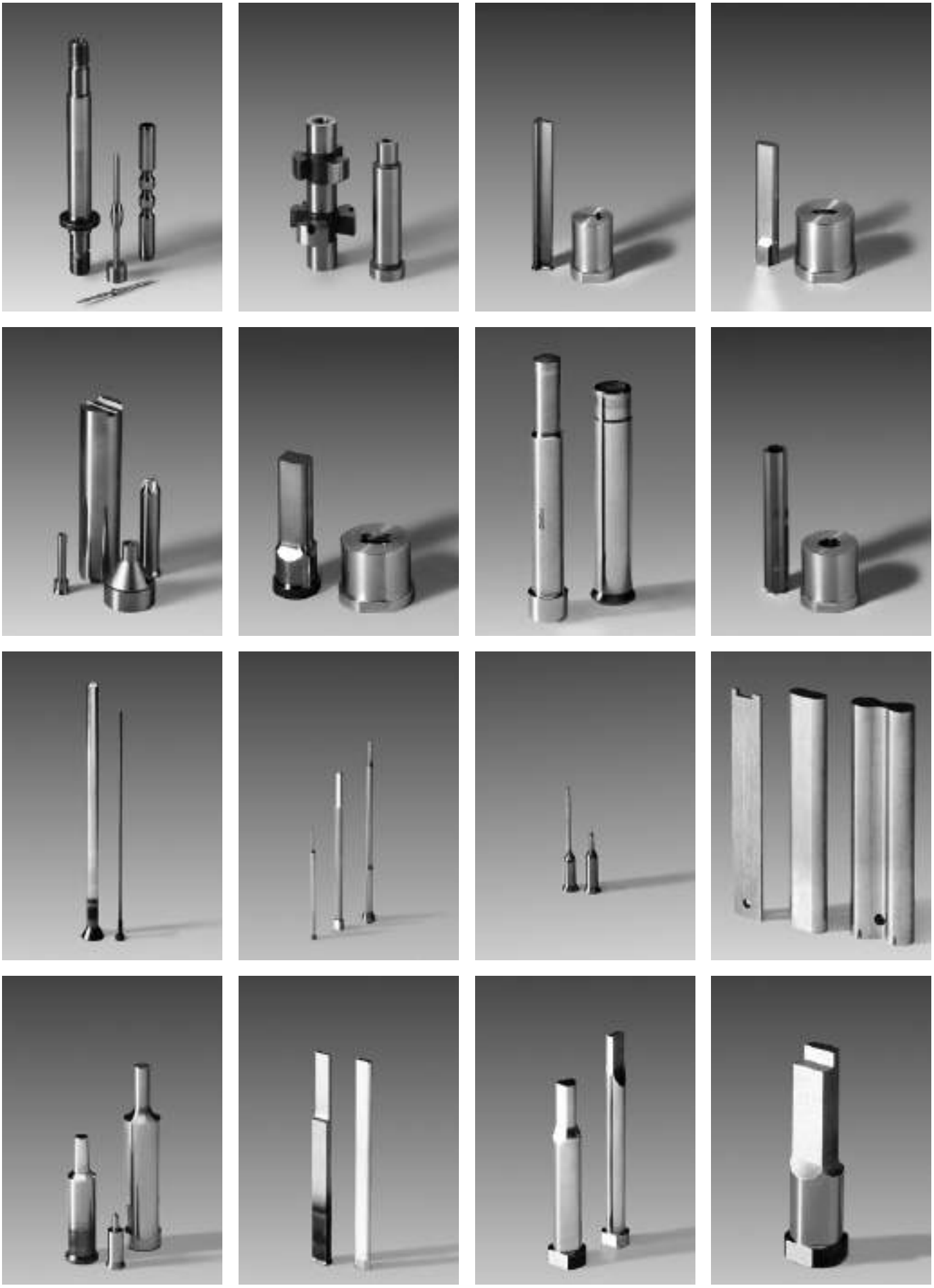
Ordering Code (example):

2667.FE5A.0800.0500.A

Cutting form position:	**Order Code character**
0°	= (A)
Shape: rectangle with radiused corners Width W	
W = 5,0 mm	= 0500
Shape: rectangle with radiused corners Length P	
P = 8,0 mm	= 0800
Scraper bush length: l_1	**Order Code character**
Standard	= (A)
Cutting form:	**Order No**
rectangle with radiused corners	= (5)
Punch type/length: l	**Order Code character**
SWL / l = 90 mm	= (E)
Punch diameter: d_1	**Order Code character**
d_1 = 10 mm	= (F)
Stripper unit POLY STRIP	= 2667

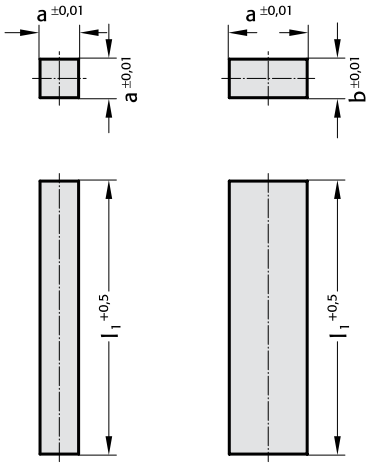
SPECIAL PUNCHES AND MATRIXES TO CUSTOMER´S DRAWINGS

FIBRO manufactures special form punches and -matrices on most modern equipment. Projection form grinding, creep feed grinding, EDM and Wire-EDM are usedvacc. to design details. Many years of experience enable FIBRO to chose best suitable materials and methods. We manufacture to customer´s drawings: Piercing punches, draw punches, form punches, pre-extrusion punches and ejectors for bolt manufacturing, flow-forming punches, punches with 30°–conical heads or other head shapes



PUNCH WITHOUT HEAD, SQUARE / RECTANGULAR, SHAPE A

230.



230. **Punch without head, square / rectangular, Shape A**

a	b	l_1	l*
1 - 8	1	73.5	71
2 - 10	2	73.5	71
3 - 12	3	73.5	71
4 - 12	4	73.5	71
5 - 15	5	73.5	71
6 - 20	6	73.5	71
7 - 24	7	73.5	71
8 - 24	8	73.5	71
9 - 28	9	73.5	71
10 - 34	10	73.5	71
12 - 34	12	73.5	71

*l = Nominal ordering length

Material:
HSS
Order No 230.3.
Hardness:
Shaft 64 ± 2 HRC

☞ Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch shaft precision ground.

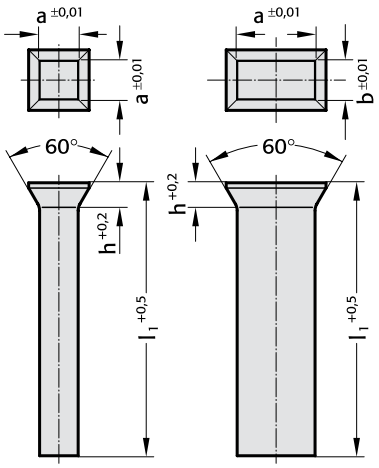
l_1: Stock length of square punches: 73,5 mm
Other materials and dimensions on request.

Ordering Code (example):

Punch without head, square / rectangular, Shape A		=	230.
Material MAT	HSS	=	3.
Cutting length a	6 mm	=	0600.
Cutting width b	6 mm	=	0600.
Nominal order length l	71	=	071
Order No		=	230. 3. 0600. 0600. 071

PUNCH WITH HEAD, SQUARE / RECTANGULAR, SHAPE B

231.



Material:
HSS
Order No 231.3.
Hardness:
Shaft 64 ± 2 HRC
Head 52 ± 3 HRC

Description of FIBRO materials for tool and die components see at the beginning of Chapter E.

Execution:
Punch shaft precision ground.
Heads hot upset forged - ground on special request.

l_1: Stock length of square punches: 71 mm
Other materials and dimensions on request.

231. Punch with head, square / rectangular, Shape B

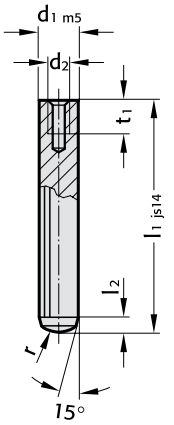
a	b	h	l_1
1 - 8	1	1.2	71
2 - 10	2	1.4	71
3 - 12	3	1.8	71
4 - 12	4	1.8	71
5 - 15	5	1.8	71
6 - 20	6	2	71
7 - 24	7	2.8	71
8 - 24	8	2.8	71
9 - 28	9	2.8	71
10 - 34	10	2.8	71
12 - 34	12	2.8	71

Ordering Code (example):

Punch with head, square / rectangular, Shape B		=	231.
Material MAT	HSS	=	3.
Cutting length a	6 mm	=	0600.
Cutting width b	6 mm	=	0600.
Length l_1	71 mm	=	071
Order No		=	231.3.0600. 0600. 071

DOWEL PIN WITH INTERNAL EXTRACTING THREAD, SIMILAR TO DIN EN ISO 8735

236.1.



Material:
Steel
Hardness 60 ± 2 HRC

Execution:
hardened and ground to finest finish
FIBRO Dowel Pins are manufactured with the exacting requirements of high class diemaking in mind. Whereas DIN EN ISO 8735 stipulates ISO Class 6 for dowels, we produce our pins to m5.

236.1. Dowel pin with internal extracting thread, similar to DIN EN ISO 8735

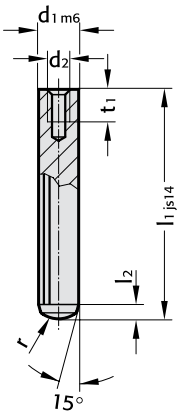
d_1	d_2	t_1	l_2	r	l_1	16	18	20	24	28	32	36	40	45	50	55	60	70	80	90	100	120
6	M4	6	2.1	6		●	●	●	●	●	●	●	●	●	●	●	●					
8	M5	8	2.6	8				●	●	●		●	●	●	●	●	●	●	●	●	●	
10	M6	10	3	10					●	●	●	●	●	●	●	●	●	●	●	●	●	
12	M6	12	3.8	12						●	●	●	●	●	●	●	●	●	●	●	●	●
14	M8	12	4	16							●	●	●	●	●	●	●	●	●	●	●	●
16	M8	16	4.7	16							●	●	●	●	●	●	●	●	●	●	●	●
20	M10	20	6	20								●	●	●	●	●	●	●	●	●	●	●
25	M16	24	6	25										●	●	●	●	●	●	●	●	●

Ordering Code (example):

Dowel pin with internal extracting thread, similar to DIN EN ISO 8735		=	236.1.
Diameter d_1	14 mm	=	1400.
Length l_1	32 mm	=	032
Order No		=	236.1. 1400. 032

DOWEL PIN WITH INTERNAL EXTRACTING THREAD, ACCORDING TO DIN EN ISO 8735

2361.1.



Material:
Steel
Hardness 60 ± 2 HRC

Execution:
hardened and ground to finest finish

2361.1. Dowel pin with internal extracting thread, according to DIN EN ISO 8735

d_1	d_2	t_1	l_2	r	l_1	8	10	12	14	16	18	20	22	24	26	28	30	32	36	40	45	50	55	60	70	80	90	100	120
4	M2,5	4.5	1.3	4			●	●	●	●	●	●		●		●	●	●	●	●		●							
5	M3	5	1.7	5		●	●	●	●	●	●	●		●		●	●	●	●	●	●	●	●	●					
6	M4	6	2.1	6				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
8	M5	8	2.6	8						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10	M6	10	3	10						●	●	●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
12	M6	10	3.8	12								●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
14	M8	12	4	14												●		●	●	●	●	●	●	●	●	●	●	●	●
16	M8	12	4.7	16														●	●	●	●	●	●	●	●	●	●	●	●
20	M10	16	6	20															●	●	●	●	●	●	●	●	●	●	●

Ordering Code (example):

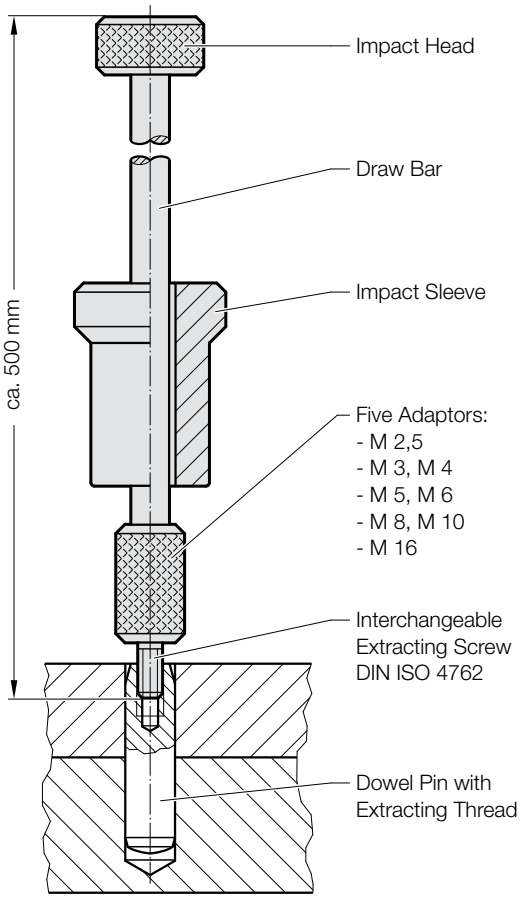
Dowel pin with internal extracting thread, according to DIN EN ISO 8735		=	2361.1.
Diameter d_1	10 mm	=	1000.
Length l_1	16 mm	=	016
Order No		=	2361.1. 1000. 016

FIBROZIPP

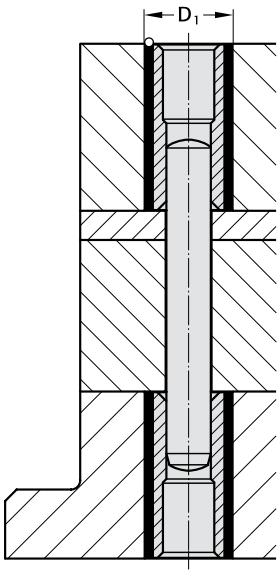
236.001 FIBROZIPP

Extraction tool for the fast and convenient removal of dowels with internal extracting thread – also for shafts, plugs and other machine components. The tool comes with interchangeable adaptors and screws, to fit all threads from M3 to M16.

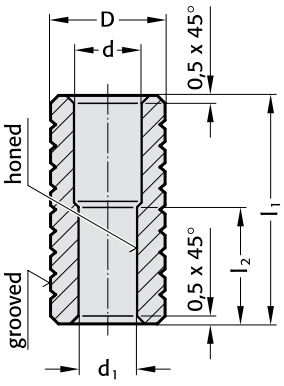
236.001



LINER BUSH FOR DOWEL PIN, FOR BONDING



265.1.



Description:
Dowel liner bushes are used where precisely positioned, unhardened parts are often changed or must be replaced, e.g. in precision tool construction.

Material:
WS
Hardness 54 ± 2 HRC

Epoxy-Bonding:
The jig-ground pin holes of the hardened matrix are joined with the dowel liner bush by means of a dowel pin 235.1. Retainer holes for dowel liner bushes should be approximately 2 mm larger in diameter than the bush O.D. – a coarse finish is desirable. Following exact positioning/aligning, FIBROLIT® ZWO or FIBROFIX® SECHS is used for bonding.

265.1. Liner bush for dowel pin, for bonding

d_1	d	D	D_1	l_1	l_2
6	7	10	12	25	12
8	9	12	14	30	16
10	11	16	18	36	20

Ordering Code (example):

1 Dowel Liner Bush – only –

Dowel Liner Bush	= 265.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 1	= 1
Order No	= 265.1.0800.1

Ordering Code (example):

1 Dowel Liner Bush + 1 Dowel pin

Dowel Liner Bush	= 265.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 1	= 1.
Dowel length = 40 mm	= 040
Order No	= 265.1.0800.1.040

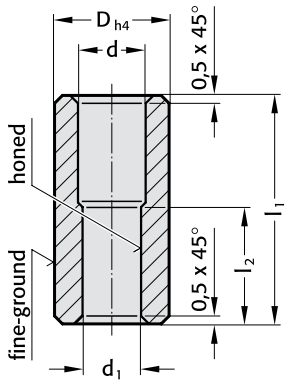
Ordering Code (example):

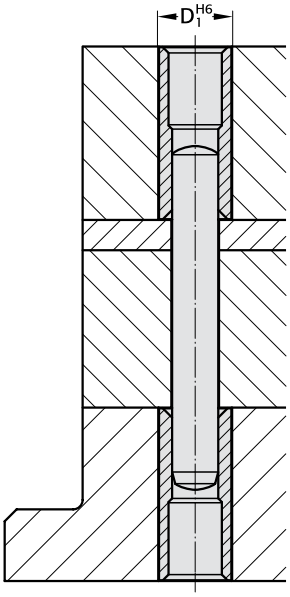
2 Dowel Liner Bushes + 1 Dowel pin

Dowel Liner Bush	= 265.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 2	= 5.
Dowel length = 50 mm	= 050
Order No	= 265.1.0800.2.050

LINER BUSH FOR DOWEL PIN, FOR PUSH FIT

2650.1.





Description:
Dowel liner bushes are used where precisely positioned, unhardened parts are often changed or must be replaced, e.g. in precision tool construction.

Material:
WS
Hardness 54 ± 2 HRC

Slip-Fit Bonding:
The position of the bush is given by push fit hole tolerance H6. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit bushings.

2650.1. Liner bush for dowel pin, for push fit

d_1	d	d_2	l_1	l_2
6	7	10	25	12
8	9	12	30	16
10	11	16	36	20

Ordering Code (example):

1 Dowel Liner Bush – only –

Dowel Liner Bush	= 2650.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 1	= 1
Order No	= 2650.1.0800.1

Ordering Code (example):

1 Dowel Liner Bush + 1 Dowel pin

Dowel Liner Bush	= 2650.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 1	= 1.
Dowel length = 40 mm	= 040
Order No	= 2650.1.0800.1.040

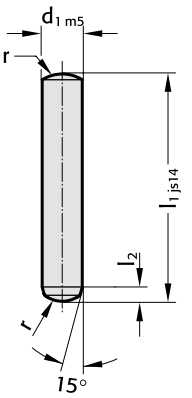
Ordering Code (example):

2 Dowel Liner Bushes + 1 Dowel pin

Dowel Liner Bush	= 2650.
Material WS	= 1.
d_1 = ø 8,0 mm	= 0800.
Quantity – 2	= 2.
Dowel length = 50 mm	= 050
Order No	= 2650.1.0800.2.050

DOWEL PIN SIMILAR TO DIN EN ISO 8734

235.1.



Material:
Steel
Hardness 60 ± 2 HRC

Execution:
hardened and ground to finest finish
FIBRO Dowel Pins are manufactured with the exacting requirements of high class diemaking in mind. Whereas DIN EN ISO 8734 stipulates ISO Class 6 for dowels, we produce our pins to m5.

235.1. Dowel pin similar to DIN EN ISO 8734

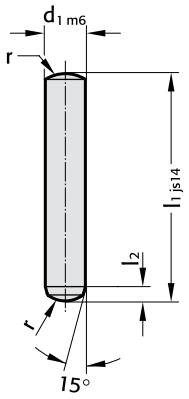
d_1	l_2	r	l_1	6	8	10	12	14	16	18	20	24	28	32	36	40	45	50	55	60	70	80	90	100	120	130	140
1	0.48	1			●	●	●																				
1.5	0.62	1.6		●	●	●	●	●	●																		
2	0.78	2		●	●	●	●	●	●	●	●	●	●	●													
2.5	0.95	2.5		●	●	●	●	●	●	●	●	●	●	●	●												
3	1.1	3		●	●	●	●	●	●	●	●	●	●	●	●	●	●										
4	1.4	4		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							
5	1.7	5			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
6	2.1	6				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
8	2.6	8				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
10	3	10							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
12	3.8	12									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
14	3.8	16													●	●	●	●	●	●	●	●	●	●	●		
16	4.7	16														●	●	●	●	●	●	●	●	●	●		●
20	6	20																	●	●	●	●	●	●	●		●

Ordering Code (example):

Dowel pin similar to DIN EN ISO 8734		=	235.1.
Diameter d_1	6 mm	=	0600.
Length l_1	10 mm	=	010
Order No		=	235.1. 0600. 010

DOWEL PIN ACCORDING TO DIN EN ISO 8734

2351.1.



Material:
Steel
Hardness 60 ± 2 HRC

Execution:
hardened and ground to finest finish

2351.1. Dowel pin according to DIN EN ISO 8734

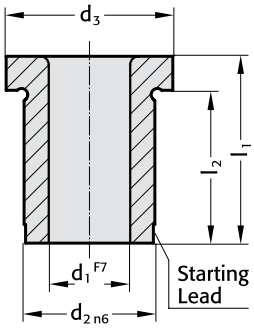
d_1	l_2	r	l_1	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	36	40	45	50	55	60	70	80	90	100	120
1	0.4	1		●	●	●	●	●	●																					
1.5	0.5	1.6		●	●	●	●	●	●	●	●		●	●	●															
2	0.6	2		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●									
2.5	0.7	2.5			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●											
3	0.8	3			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
4	1	4				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●			
5	1.2	5					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
6	1.5	6					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
8	1.8	8								●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
10	2	10									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
12	2.5	12											●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14	2.5	16													●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
16	3	16													●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
20	4	20																		●	●	●	●	●	●	●	●	●	●	●

Ordering Code (example):

Dowel pin according to DIN EN ISO 8734		=	2351.1.	
Diameter d_1	6 mm	=	0600.	
Length l_1	8 mm	=		008
Order No		=	2351.1.	0600. 008

DRILL BUSH WITH COLLAR, DIN 172 SHAPE A

276.



Material:
Case hardened steel
Hardness 740 ± 40 HV 10

Execution:
Diameters d_1, d_2 and shoulder precision ground.

Other diameters and lengths on request.

276. Drill bush with collar, DIN 172 Shape A

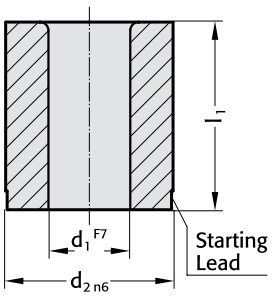
d_1	d_2	d_3	Gradation	l_1	6	8	9	10	12	16	20	25	28	30	36	45	56	67
0,9 - 1	3	6	0.1	l_2	4		7											
1,1 - 1,8	4	7	0.1		4		7											
1,9 - 2,6	5	8	0.1		4		7											
2,7 - 3,3	6	9	0.1			5.5			9.5	13.5								
3,4 - 4	7	10	0.1			5.5			9.5	13.5								
4,1 - 5	8	11	0.1			5.5			9.5	13.5								
5,1 - 6	10	13	0.1					7		13	17							
6,1 - 8	12	15	0.1					7		13	17							
8,1 - 10	15	18	0.1						9		17	22						
10,1 - 12	18	22	0.1						8		16	21						
12,1 - 15	22	26	0.1							12			24		32			
15,5 - 18	26	30	0.5							12			24		32			
18,5 - 22	30	34	0.5								15				31	40		
22,5 - 26	35	39	0.5								15				31	40		
26,5 - 30	42	46	0.5									20				40	51	
30,5 - 35	48	52	0.5									20				40	51	
35,5 - 42	55	59	0.5											25			51	62

Ordering Code (example):

Drill bush with collar, DIN 172 Shape A		=	276.1.
Diameter of conduit d_1	12.1 mm	=	1210.
Length l_1	16 mm	=	016
Order No		=	276.1. 1210.016

DRILL BUSH WITHOUT COLLAR, DIN 179 SHAPE A

277.



Material:
Case hardened steel
Hardness 740 ± 40 HV 10

Execution:
Diameters d_1 and d_2 precision ground.

Other diameters and lengths on request.

277. Drill bush without collar, DIN 179 Shape A

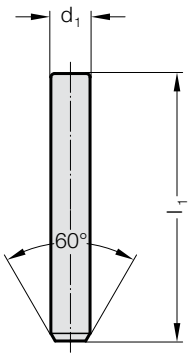
d_1	d_2	Gradation	l_1	6	8	9	10	12	16	20	25	28	30	36	45	56	67
0,9 - 1	3	0.1		●		●											
1,1 - 1,8	4	0.1		●		●											
1,9 - 2,6	5	0.1		●		●											
2,7 - 3,3	6	0.1			●			●	●								
3,4 - 4	7	0.1			●			●	●								
4,1 - 5	8	0.1			●			●	●								
5,1 - 6	10	0.1					●		●	●							
6,1 - 8	12	0.1					●		●	●							
8,1 - 10	15	0.1						●		●	●						
10,1 - 12	18	0.1						●		●	●						
12,1 - 15	22	0.1							●			●		●			
15,5 - 18	26	0.5							●			●		●			
18,5 - 22	30	0.5								●				●	●		
22,5 - 26	35	0.5								●				●	●		
26,5 - 30	42	0.5									●				●	●	
30,5 - 35	48	0.5									●				●	●	
35,5 - 42	55	0.5											●			●	●
42,5 - 48	62	0.5											●			●	●

Ordering Code (example):

Drill bush without collar, DIN 179 Shape A		=	277.1.
Diameter of conduit d_1	12.1 mm	=	1210.
Length l_1	16 mm	=	016
Order No		=	277.1. 1210.016

GAUGE PIN DIN 2269

240.1./2.



Material:
Alloy tool steel, hardened and tempered.
Age-treated repeatedly.
Hardness 60 ± 2 HRC

Execution:
precision ground
Quality class I: diameter tolerance ±0,001
Quality class II: diameter tolerance ±0,002

Single pins:
Quality class I 240.1.
Quality class II 240.2.

240.1./2. Gauge pin DIN 2269

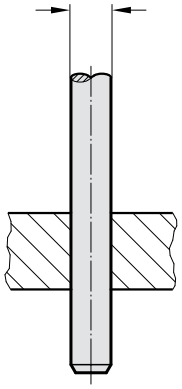
d_1	l_1
0,1 - 0,99	40
1 - 20	70

Ordering Code (example):

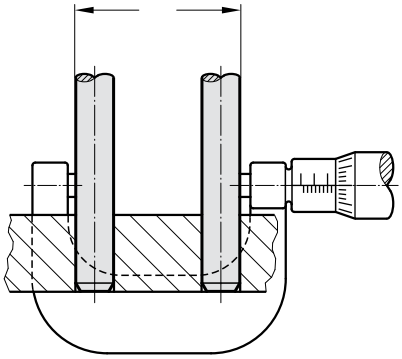
Gauge pin DIN 2269		= 240.	
quality class KL	1	= 1.	
Diameter d_1	1,29 mm	= 0129.	
Length l_1	70 mm	= 070	
Order No		= 240. 1. 0129. 070	

EXAMPLE APPLICATIONS FOR CHECK PINS

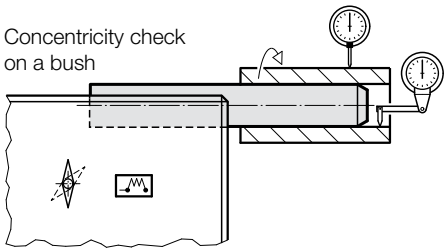
Direct gauging of bore diameters



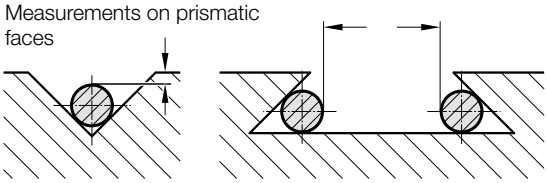
Measurement of centre-distance between two bores



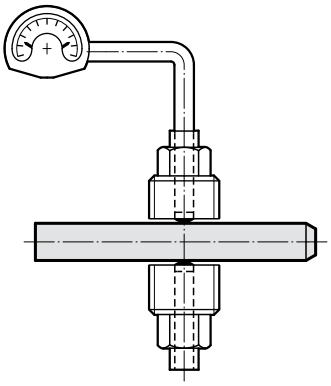
Concentricity check on a bush



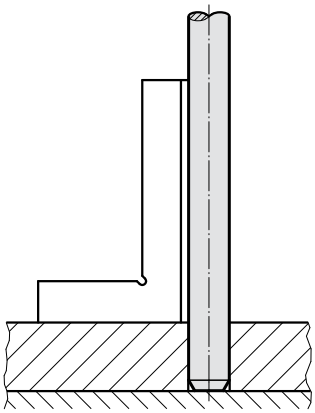
Measurements on prismatic faces



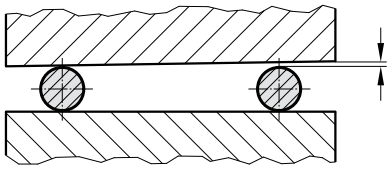
Calibration of a comparator



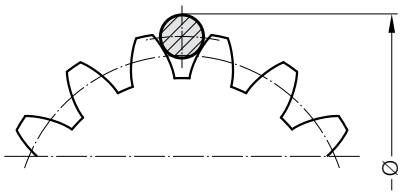
Inspection for squareness of a bore



Check on parallelism



Measuring of gear teeth, threads etc.



GAUGE PIN HOLDERS
WOODEN BOXES

240.45. Gauge Pin Holders

Gauge Pin Holders are double-ended, to carry two pins e.g. for go – no go measurements etc.

(without pins)	for diameters	Order No
	of 1–2	240.45.1
	of 2–4	240.45.2
	of 4–6	240.45.3
	of 6–8	240.45.4
	of 8–10	240.45.5

240.51/.52 Range of check pins, small, in storage box

91 check pins, DIN 2269, from ø 1-10 mm increasing by 0.1 mm, complete set in storage box with drilled inserts and measurement markings.
From ø 3 mm the check pins are marked with the measurements.

	Order No
quality class I	240.51.
quality class II	240.52.

240.41/.42 Range of check pins, large, in storage box

273 check pins, DIN 2269, from ø 1-10 mm increasing by 0.1 mm. Each check pin size is each expanded once again with a -0.01 mm undersize and a +0.01 mm oversize, complete set in storage box with drilled inserts and measurement markings.
From ø 3 mm the check pins are marked with the measurements.

	Order No
quality class I	240.41.
quality class II	240.42.

Custom ranges:
Available in quality classes I and II according to your specifications. From ø 3 mm the check pins are marked with the measurements.

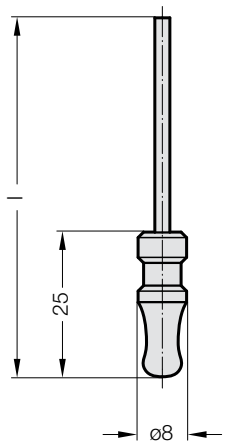
240.91/.92 Wooden boxes:, no content

Wooden storage boxes for protected and tidy storage of check pins.
Without check pins. Without drilled insert and measurement markings.

(no content)	Order No
For large set of approx. 270 items with approx. external dimensions 250×90×390	240.91
For small set of approx. 90 items with approx. external dimensions 155×90×285	240.92

GAUGE PIN WITH HANDLE, DIN 2269

240.11./22.



240.11./22. Gauge pin with handle, DIN 2269

The Gauge Pins are firmly fixed to the handle. Each Pin is marked with its true diameter.

Single Gauge Pins:	ø 0.5 – 3.0 mm, increasing in diameter by 0.01	Order No.	
	quality class I	240.11.	
	quality class II	240.22.	

d_1	l
0,5 - 0,99	58
1 - 3	88

Material:

Alloy tool steel, hardened and repeatedly age-treated.
Hardness 60 ± 2 HRC
Extremely finely ground
Quality class I ±0.001
Quality class II ±0.002
Conforming to DIN 2269

Ordering Code (example):

Gauge pin with handle, DIN 2269 quality class I	= 240.11.	
d_1 = 1,5 mm	=	0150
Order No	= 240.11.0150	

PUNCHING AND EMBOSSING UNIT WITH MATRIX FOR PUNCHED HOLES AND SELF TAPPING SCREWS

Material:
HSS

Execution:
The punching and embossing unit with matrix consists of:
1 x embossing die
1 x punch die
1 x matrix

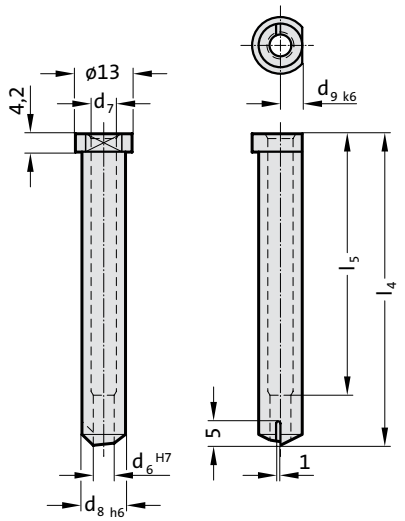
Sheet metal thickness:
max. 0,6 mm = 2282.01.035/039
max. 0,8 mm = 2282.01.042
max. 0,9 mm = 2282.01.048
max. 1,0 mm = 2282.01.055/063

2282.01. Punching and embossing unit with matrix for punched holes and self tapping screws

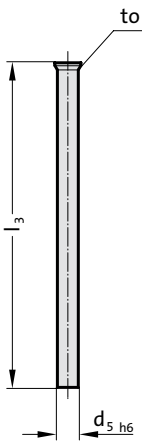
Order No	Nominal-∅ = Thread size	d_1	d_2	d_{3h6}	d_{4k6}	d_{5h6}	d_6	d_7	d_{8h6}	d_{9k6}	l_1	l_2	l_3	l_4	l_5
2282.01.035	B 3,5	2.75	3.2	7.5	3.75	2.7	2.7	3.1	7.5	3.75	31.3	28	74.5	71.5	60
2282.01.039	B 3,9	3.05	3.4	7.5	3.75	3	3	3.6	7.5	3.75	31.3	28	74.5	71.5	60
2282.01.042	B 4,2	3.15	3.5	8.5	4.25	3.1	3.1	3.7	8	4	31.3	28	74.5	71.5	60
2282.01.048	B 4,8	3.85	4.2	9	4.5	3.8	3.8	4.5	8	4	31.3	28	74.5	71.5	60
2282.01.055	B 5,5	4.35	4.8	9	4.5	4.3	4.3	5	8	4	31.3	28	74.5	71.5	60
2282.01.063	B 6,3	4.85	5.3	10.5	5.25	4.8	4.8	5.5	10	5	31.3	28	74.5	71.5	60

2282.01.xxx

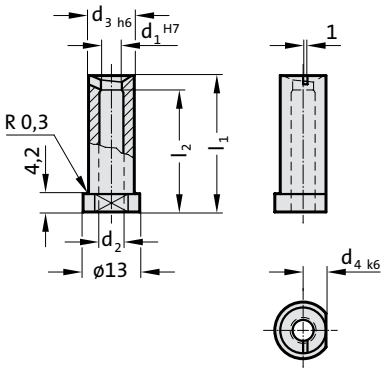
2282.01.xxx.1 Embossing die



2282.01.xxx.2 Punch die



2282.01.xxx.3 Bottom die



Example of application: