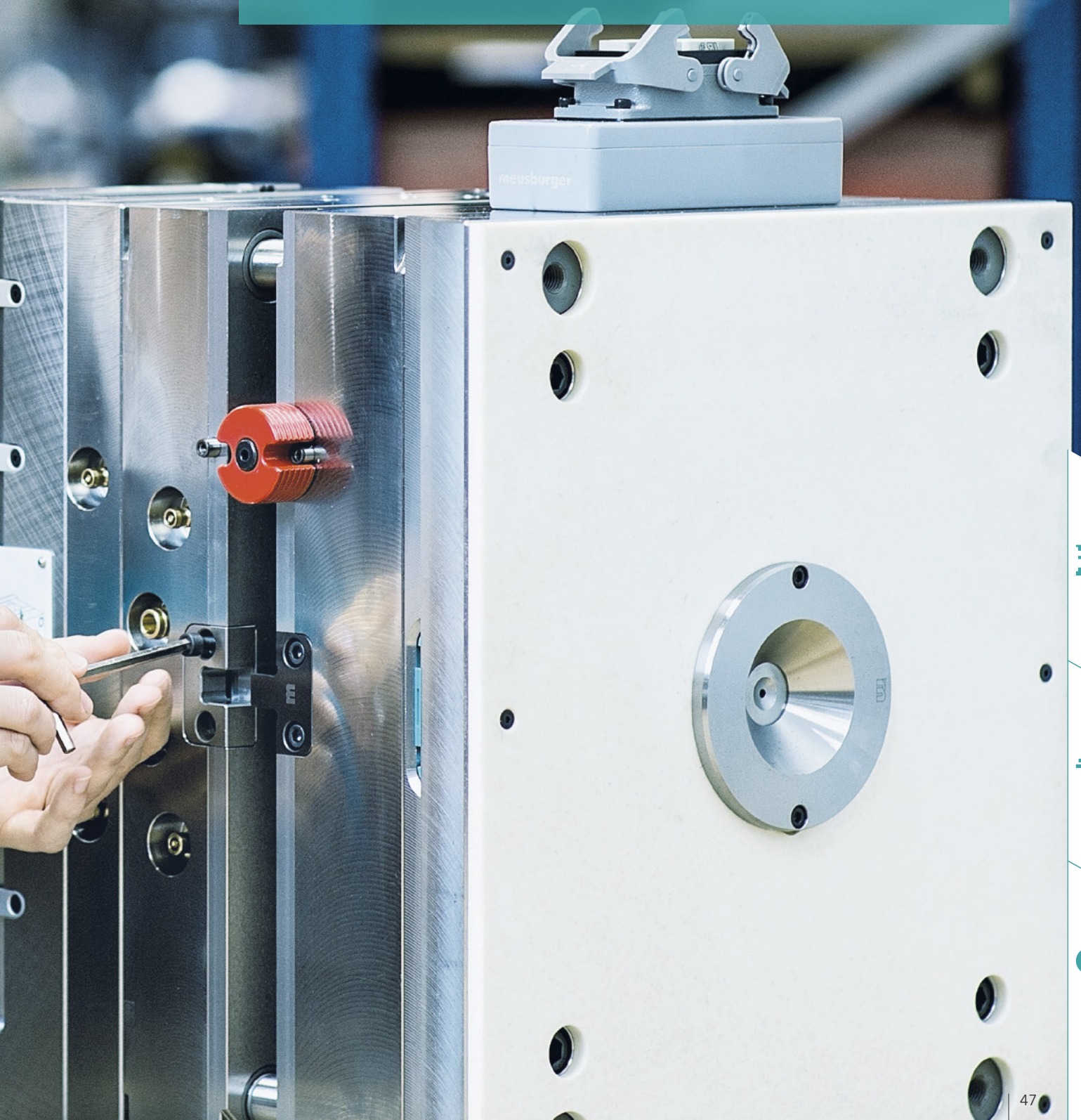


FERTIGUNGSSTANDARDS
FORMENBAU
MANUFACTURING STANDARDS
FOR MOULD MAKING



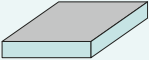
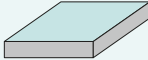
















FERTIGUNGSSTANDARDS FORMENBAU

MANUFACTURING STANDARDS FOR MOULD MAKING













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AUSFÜHRUNGEN FÜR STAHL VARIATIONS FOR STEEL

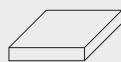
 B/L	 S	Ausführung Variation	Max. Fertigungsgrößen [mm] Max. dimensions for machining [mm]			Gewicht [kg] Weight [kg]
			B	L	S	
 gesägt sawn  gebrannt flame-cut	 roh not machined	1	2000	6000	350	17000
	 6.3/ gefräst milled	2	1500	6000	346	6000
	 1.6/ kreuzgeschliffen segment ground	3	900	3000	346	3000
	 0.8/ längsgeschliffen precision ground	4	1500	3000	346	3000
 3.2/ gefräst milled	 6.3/ gefräst milled	5	< 400 ≥ 400	1800  2100 ¹⁾	396	3500 3500
	 1.6/ feingefräst precision milled	6	< 400 ≥ 400	1800  2100 ¹⁾	396	3500 3500
	 1.6/ kreuzgeschliffen segment ground	7	< 900 ≥ 900	 2100 ¹⁾  1480 ¹⁾	396	3000 3000
	 0.8/ längsgeschliffen precision ground	8	< 400 ≥ 400	1800  2100 ¹⁾	396	3000 3000

1) diagonal / diagonal

 Ø	 S	Ausführung Variation	Fertigungsgrößen [mm] Dimensions for machining [mm]		Gewicht [kg] Weight [kg]
			max. Ø	max. S	
 gebrannt flame-cut	 roh not machined	1	2000	300	6000
	 6.3/ gefräst milled	2	1500	296	6000
	 1.6/ kreuzgeschliffen segment ground	3	1500	296	3000
	 0.8/ längsgeschliffen precision ground	4	1500	296	3000
 3.2/ gedreht turned	 6.3/ gefräst milled	5	1490	296	1500
	 1.6/ feingefräst precision milled	6	1490	296	1500
	 1.6/ kreuzgeschliffen segment ground	7	1490	296	1500
	 0.8/ längsgeschliffen precision ground	8	1490	296	1500



BESTELLBEISPIEL ORDERING EXAMPLE



Artikel Item	B	L	S	Werkstoff Material grade	Ausführung Variation
PS	370	745 /	90 /	2312 /	7



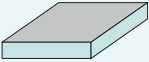
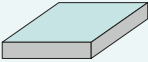








BESTELLBEISPIEL ORDERING EXAMPLE



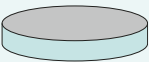
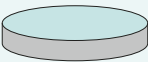








Artikel Item	Ø	S	Werkstoff Material grade	Ausführung Variation
PRS	1200 /	50 /	1730 /	7

AUSFÜHRUNGEN FÜR ALUMINIUM

VARIATIONS FOR ALUMINIUM

 B/L	 S	Ausführung <i>Variation</i>	Max. Fertigungsgrößen [mm] <i>Max. dimensions for machining [mm]</i>			Gewicht [kg] <i>Weight [kg] ¹⁾</i>
			B	L	S	
  gesägt <i>sawn</i>	  roh <i>not machined</i>	1	1500	3000	160	6000
		2	850	1750	156	6000
		4	850	1750	156	3000
  3.2 / gefräst <i>milled</i>	  6.3 / gefräst <i>milled</i>	5	850	1750	246	5000
		6	850	1750	246	5000
		8	850	1750	246	3000

1) ab 100 kg werden seitliche Transportgewinde angebracht
 1) plates weighing more than 100 kg are equipped with lateral eye bolt threads

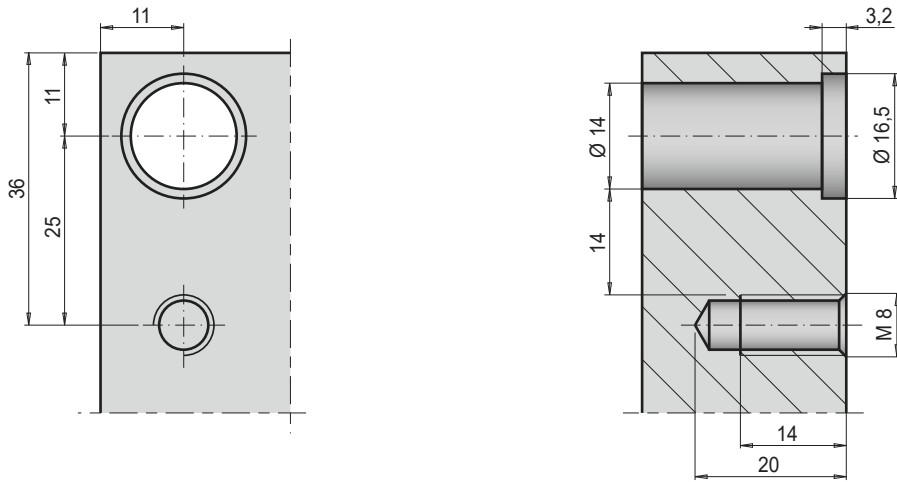
 Ø	 S	Ausführung <i>Variation</i>	Fertigungsgrößen [mm] <i>Dimensions for machining [mm]</i>		Gewicht [kg] <i>Weight [kg] ¹⁾</i>
			max. Ø	max. S	
  roh <i>not machined</i>	  roh <i>not machined</i>	1	120	1500	1500
		2	120	120	1500
		4	120	120	1500
  3.2 / gedreht <i>turned</i>	  6.3 / gefräst <i>milled</i>	5	740	200	1500
		6	740	200	1500
		8	740	200	1500

1) ab 100 kg werden seitliche Transportgewinde angebracht
 1) plates weighing more than 100 kg are equipped with lateral eye bolt threads

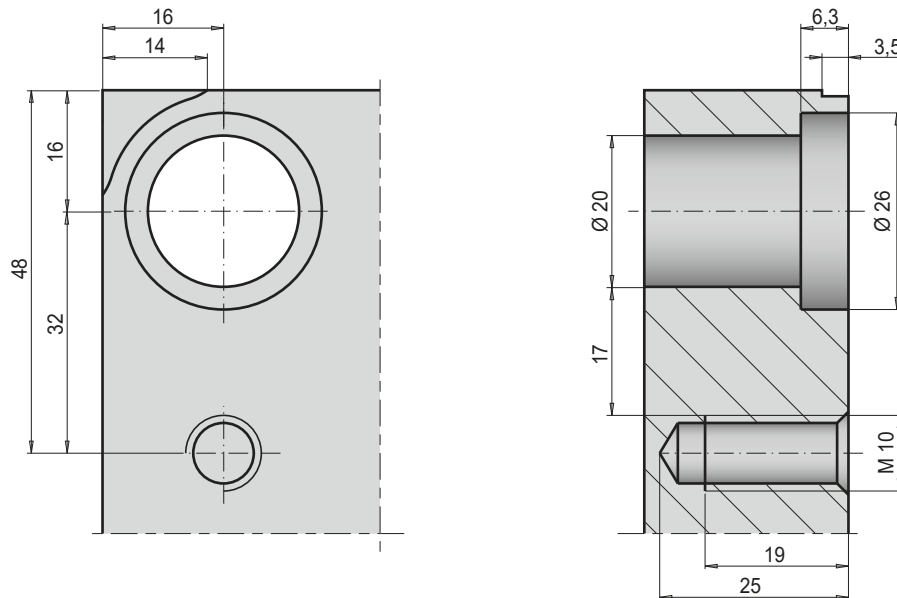


STICHMASS FORMENBAU
BORE PATTERN FOR MOULDS

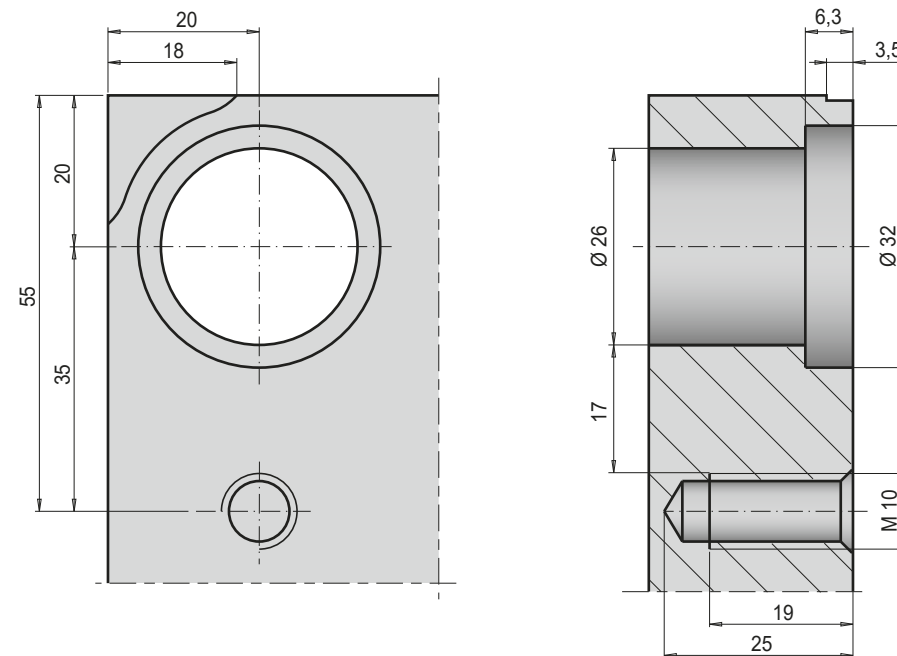
Ø 14 / M 8



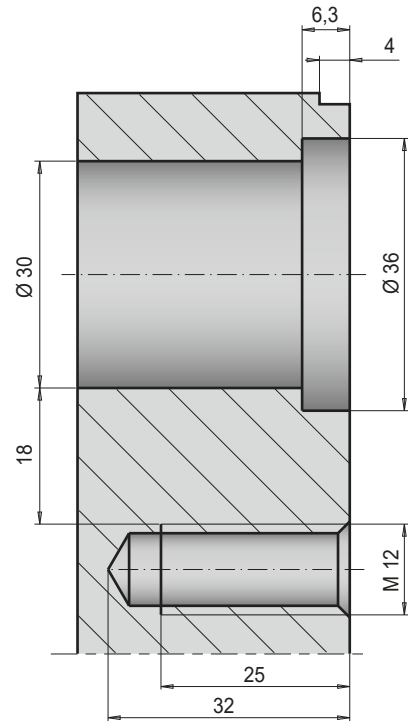
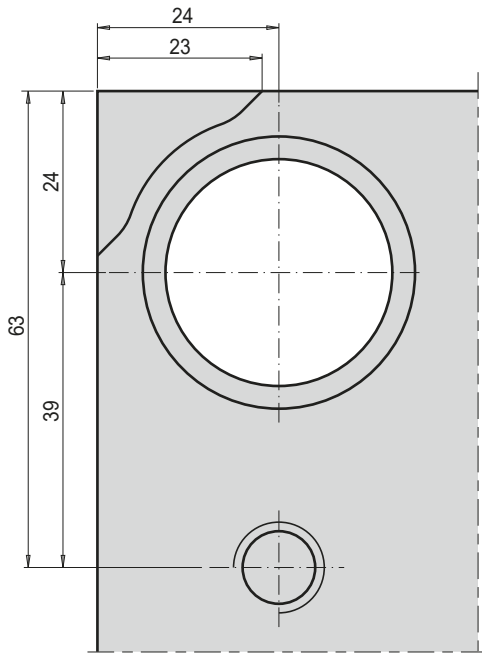
Ø 20 / M 10



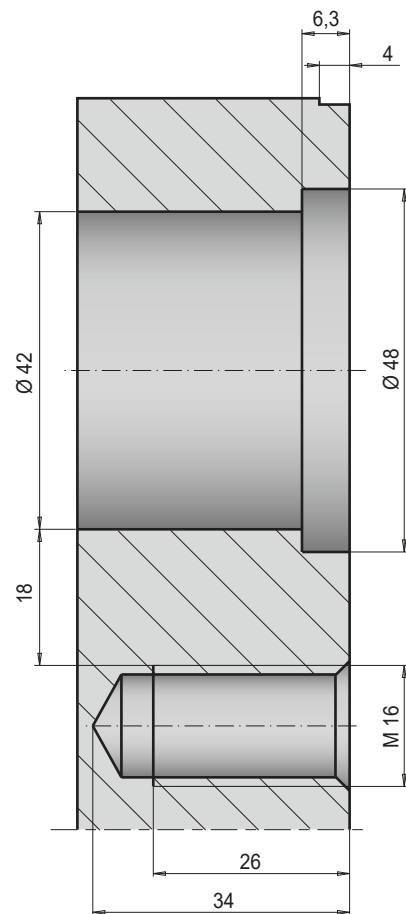
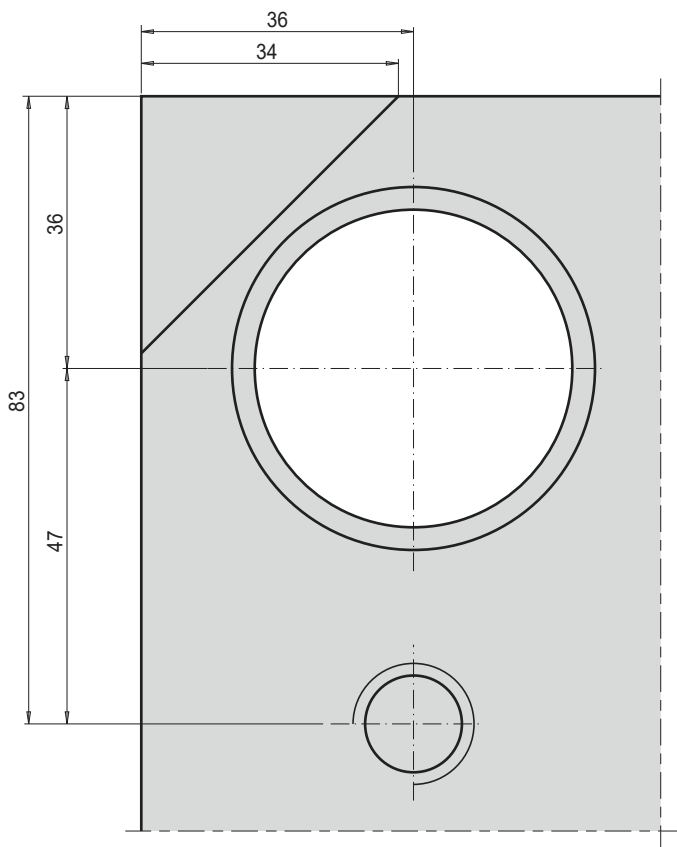
Ø 26 / M 10



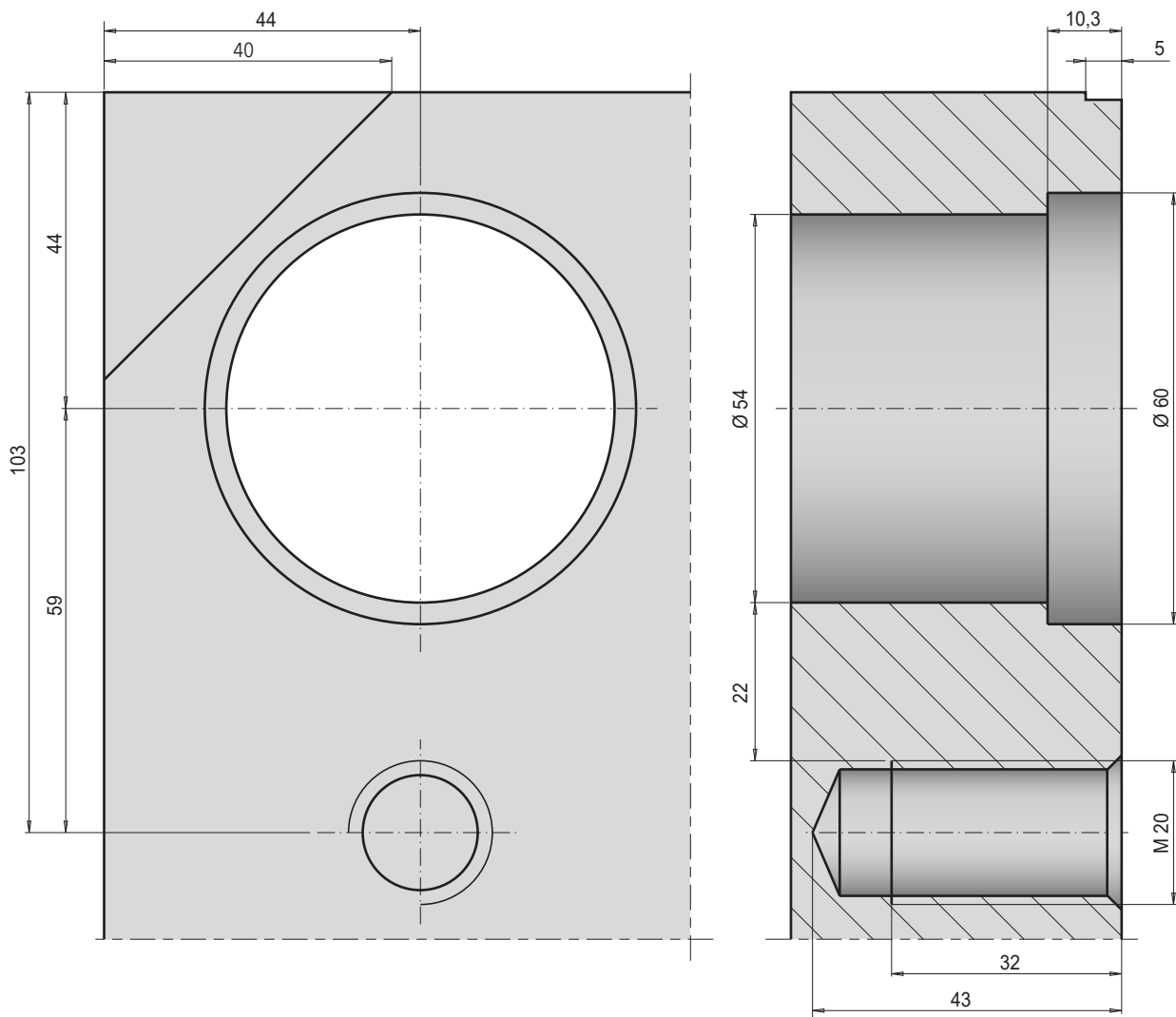
Ø 30 / M 12



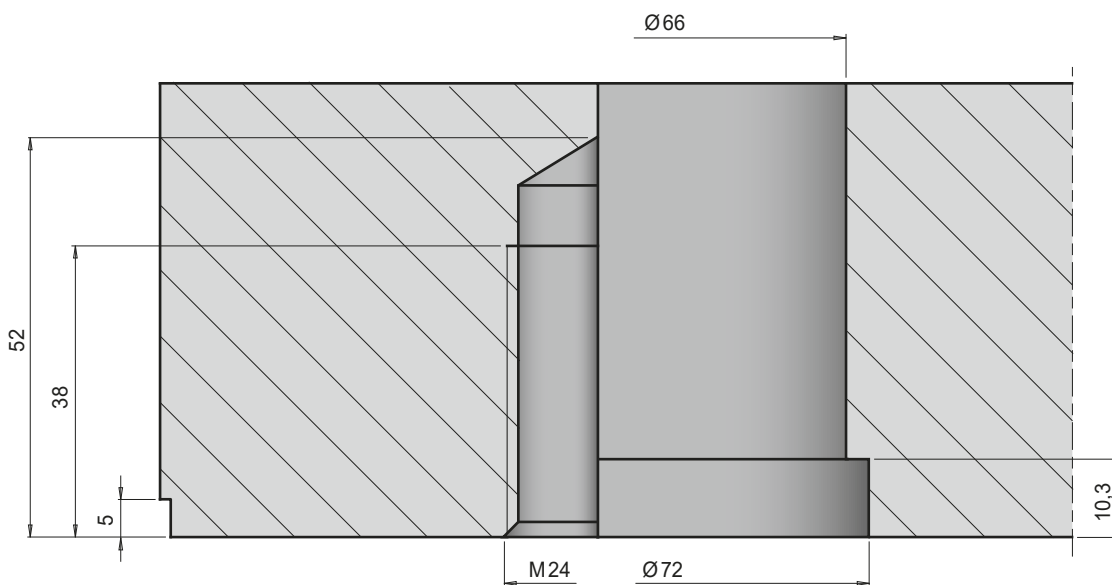
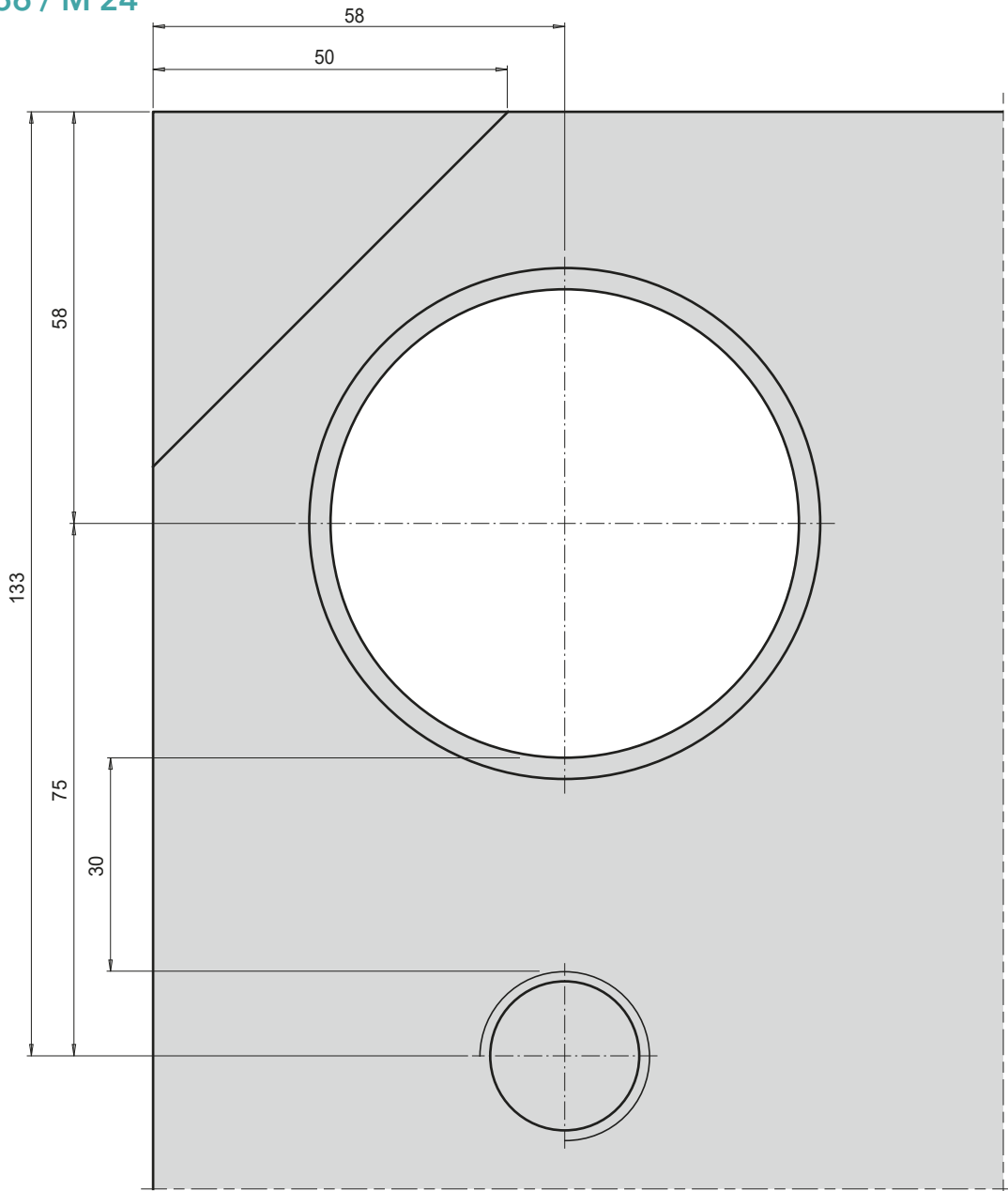
Ø 42 / M 16



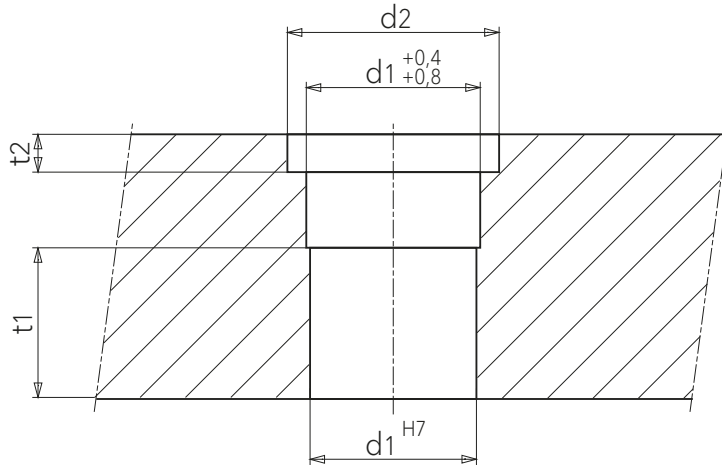
Ø 54 / M 20



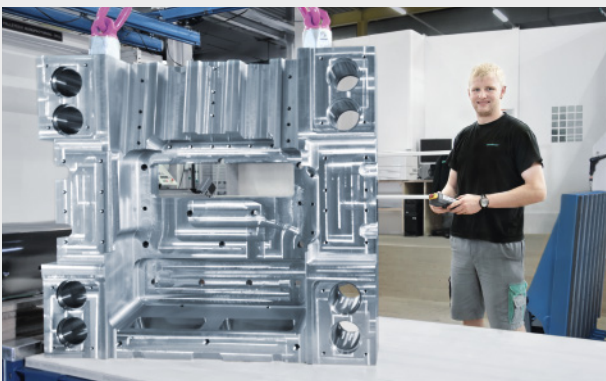
Ø 66 / M 24



BOHRUNGSGRÖSSEN SONDERSTICHMASS
HOLE SIZES – SPECIAL BORE PATTERN



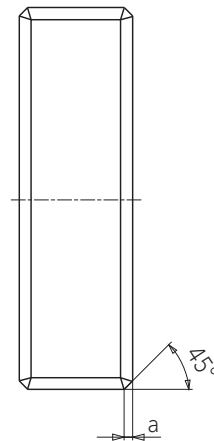
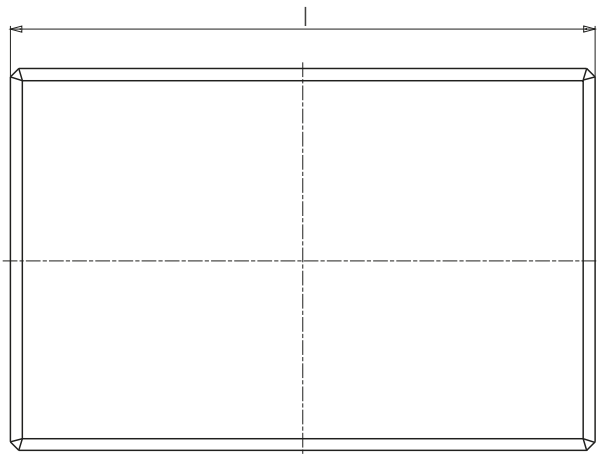
d1	t1	d2	t2
Ø 20	96	Ø 26	6,3
Ø 26	136	Ø 32	
Ø 30	156	Ø 36	
Ø 42	196	Ø 48	10,3
Ø 54	216	Ø 60	
Ø 66	296	Ø 72	
Ø 80		Ø 86	



FACETTEN CHAMFERS

F / P – PLATTEN UND LEISTEN F / P – PLATES AND RISERS

FACETTENGRÖSSEN / NORM CHAMFER SIZES / STANDARD

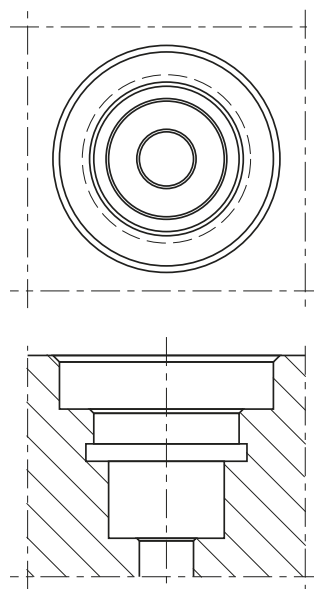
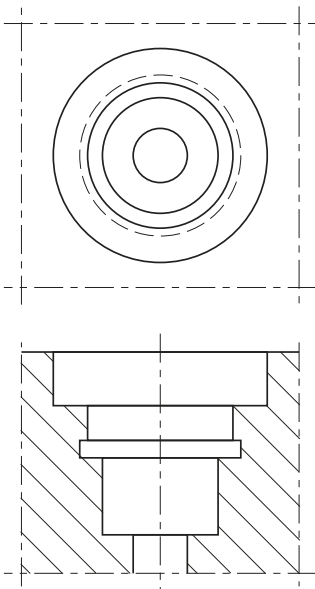


l	a min.	a max.
≤ 126	0,8	1,0
≤ 396	1,0	1,2
≤ 596	1,4	1,6
> 596	1,8	2,0

Um eine bessere Erkennung von Bohrungen im CAM-System zu gewährleisten, sollten diese ohne Facetten ausgeführt werden.
In order to ensure a clear recognition of holes by the CAM system, these should be drawn without a chamfer

BEVORZUGTE VARIANTE PREFERRED GRAPHICAL DISPLAY

UNZUREICHENDE CAM - ERKENNUNG BAD GRAPHICAL DISPLAY BECAUSE OF DIFFICULT CAM RECOGNITION



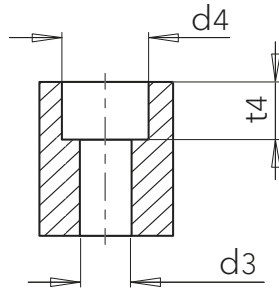
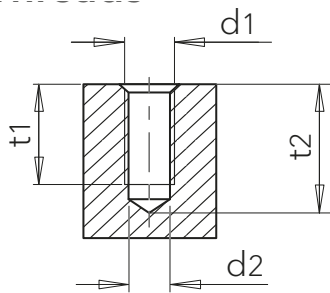
STANDARD-FACETTENGRÖSSEN: (sofern keine Angaben oder scharfe Kante gewünscht)
STANDARD CHAMFER SIZES: (unless otherwise stated or if sharp edges are required)

∅	s
alle /all	0,3 - 0,5

Scharfe Kanten sind entsprechend auszuweisen!
Sharp edges must be clearly marked!



GEWINDE THREADS



METRISCHE GEWINDE METRIC THREADS

d1	P in mm	d2	t1	t2	d3	d4	t4
M 3	0,50	2,5	6	10	3,5	6,5	3,5
M 4	0,70	3,3	8	12	4,5	8,0	4,5
M 5	0,80	4,2	10	14	5,5	10,0	6,0
M 6	1,00	5,0	11	15	6,6	11,0	7,0
M 8	1,25	6,8	14	20	9,0	15,0	9,0
M10	1,50	8,5	19	25	11,0	18,0	11,0
M12	1,75	10,2	25	32	14,0	20,0	13,0
M14	2,00	12,0	25	32	16,0	24,0	15,0
M16	2,00	14,0	28	34	18,0	26,0	17,0
M18	2,50	15,5	32	40	20,0	29,0	19,5
M20	2,50	17,5	33	42	22,0	32,0	21,5
M22	2,50	19,5	37	48	24,0	35,0	23,5
M24	3,00	21,0	38	52	26,0	38,0	25,5
M27	3,00	24,0	46	60	29,0	42,0	28,5
M30	3,50	26,5	55	70	32,0	48,0	32,0
M36	4,00	32,0	65	85	39,0	57,0	38,0
M42	4,50	37,5	75	95	45,0	66,0	44,0
M48	5,00	43,0	85	110	52,0	76,0	50,0

ZOLLGEWINDE IMPERIAL THREADS

d1	P	P in mm	d2
G 1/8"	28G/"	0,91	8,70
G 1/4"	19G/"	1,34	11,60
G 3/8"	19G/"	1,34	15,00
G 1/2"	14G/"	1,81	19,00
G 3/4"	14G/"	1,81	24,25
G 7/8"	14G/"	1,81	28,00
G 1"	11G/"	2,31	30,00
G 1 1/4"	11G/"	2,31	39,00
G 1 1/2"	11G/"	2,31	45,00

P ... STEIGUNG / PITCH

FEINGEWINDE FINE THREADS

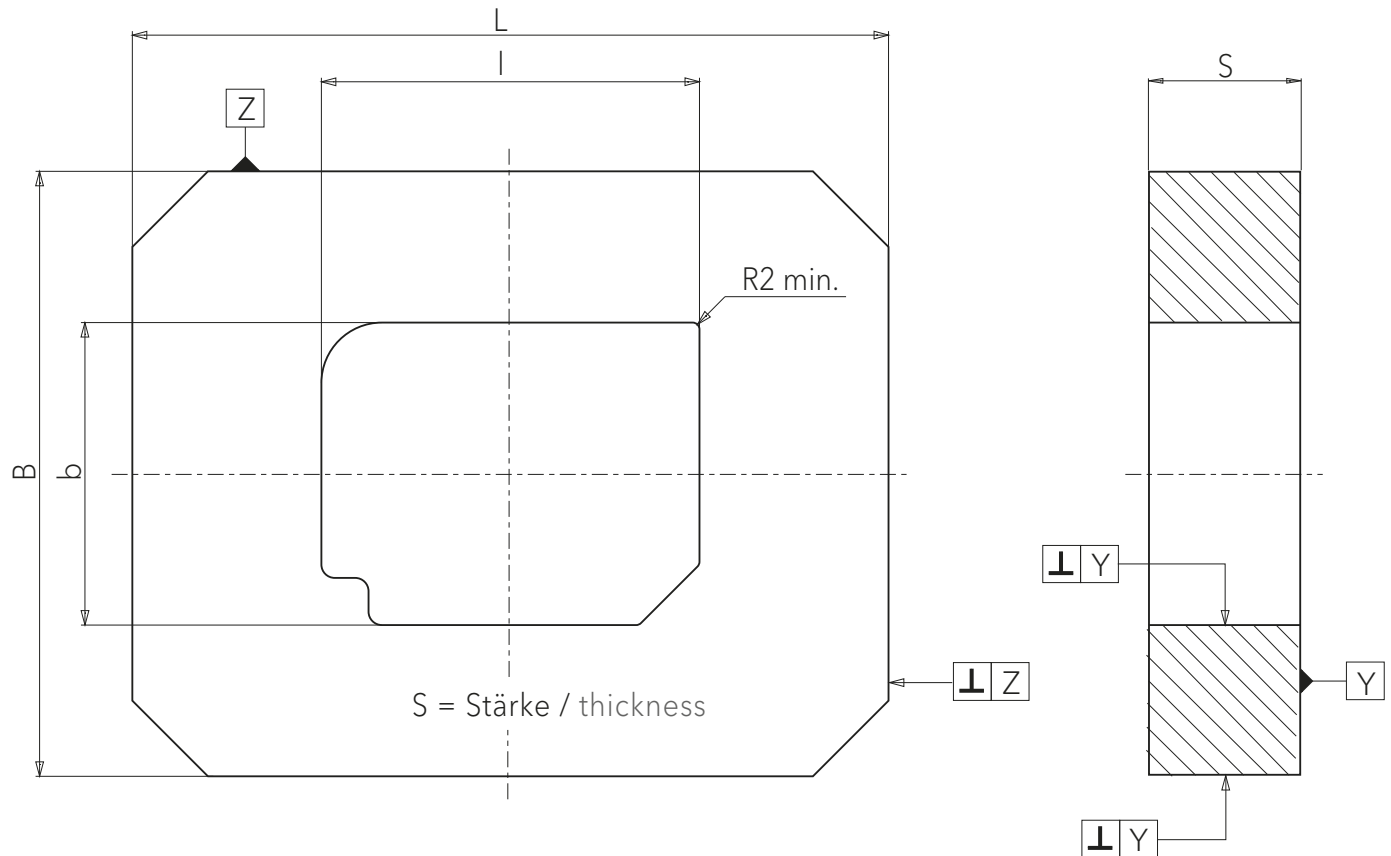
d1	d2	d1	d2
M 4x0,5	3,5	M 14x1,5	12,5
M 5x0,5	4,5	M 16x1	15,5
M 6x0,5	5,5	M 16x1,5	14,5
M 6x0,75	5,2	M 18x1,5	16,5
M 8x0,5	7,5	M 20x1,5	18,5
M 8x0,75	7,2	M 22x1	21,0
M 8x1	7,0	M 22x1,5	20,5
M 9x1	8,0	M 24x1	23,0
M 10x1	9,0	M 24x1,5	22,5
M 10x1,25	8,8	M 24x2	22,0
M 10x1,5	8,5	M 26x1,5	24,5
M 11x1	10,0	M 27x1,5	25,5
M 12x1	11,0	M 27x1	25,0
M 12x1,25	10,8	M 28x1,5	26,5
M 12x1,5	10,5	M 30x1	29,0
M 14x1	13,0	M 30x1,5	28,5

WEITERE MÖGLICHE GEWINDEARTEN OTHER POSSIBLE THREAD TYPES

- » UNC
- » UNF
- » NPT
- » PG

d1	d2
M 30x2	28,0
M 32x1,5	30,5
M 33x2	31,0
M 34x1,5	32,5
M 35x1,5	33,5
M 36x1,5	34,5
M 36x2	34,0
M 38x1,5	36,5
M 40x1,5	38,5
M 42x1,5	40,5
M 42x2	40,0
M 48x2	46,0
M 48x3	45,0
M 50x1,5	48,5
M 52x2	50,0

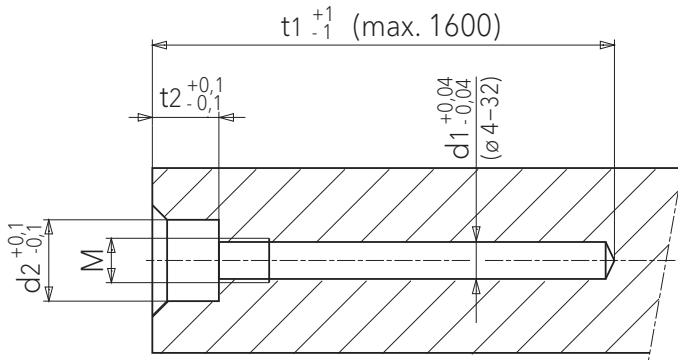
BRENNSCHNEIDEN FLAME CUTTING



Klasse 2: Werkstückdicke / Class 2: part thickness	Nennmaße (mm) / Nominal size (mm)							
	> 0 < 3	≥ 3 < 10	≥ 10 < 35	≥ 35 < 125	≥ 125 < 315	≥ 315 < 1000	≥ 1000 < 2000	≥ 2000 < 4000
	Grenzmaße (ersetzt DIN 2310 Kl. IIB) / Tolerance limits (replaces DIN 2310 Kl. IIB)							
> 0 ≤ 1	± 0,1	± 0,3	± 0,4	± 0,5	± 0,7	± 0,8	± 0,9	± 0,9
> 1 ≤ 3,15	± 0,2	± 0,4	± 0,5	± 0,7	± 0,8	± 0,9	± 1,0	± 1,1
> 3,15 ≤ 6,3	± 0,5	± 0,7	± 0,8	± 0,9	± 1,1	± 1,2	± 1,3	± 1,3
> 6,3 ≤ 10	-	± 1,0	± 1,1	± 1,3	± 1,4	± 1,5	± 1,6	± 1,7
> 10 ≤ 50	-	± 1,8	± 1,8	± 1,8	± 1,9	± 2,3	± 3,0	± 4,2
> 50 ≤ 100	-	-	± 2,5	± 2,5	± 2,6	± 3,0	± 3,7	± 4,9
> 100 ≤ 150	-	-	± 3,2	± 3,3	± 3,4	± 3,7	± 4,4	± 5,7
> 150 ≤ 200	-	-	± 4,0	± 4,0	± 4,1	± 4,5	± 5,2	± 6,4
> 200 ≤ 250	-	-	-	-	-	± 5,2	± 5,9	± 7,2
> 250 ≤ 300	-	-	-	-	-	± 6,0	± 6,7	± 7,9

$\perp Y$	1,0 / 100
$\perp Z$	0,2 / 100

TIEFLOCHBOHRUNGEN DEEP HOLE DRILLING

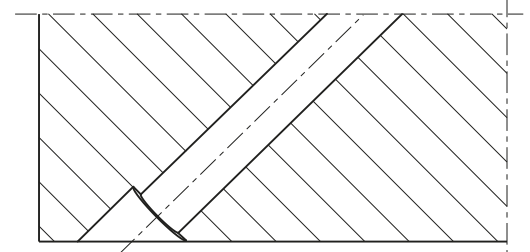
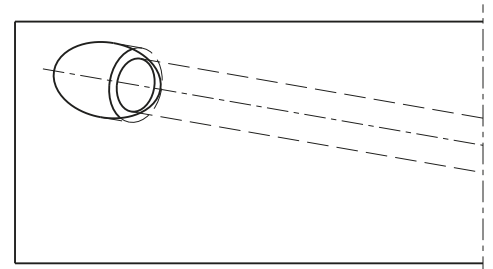


DURCHMESSER UND TIEFEN DIAMETERS AND DEPTHS

d1	t1 max.
4	460
< 6	860
< 8	1060
< 10	1260
< 12	1360
> 14	1600

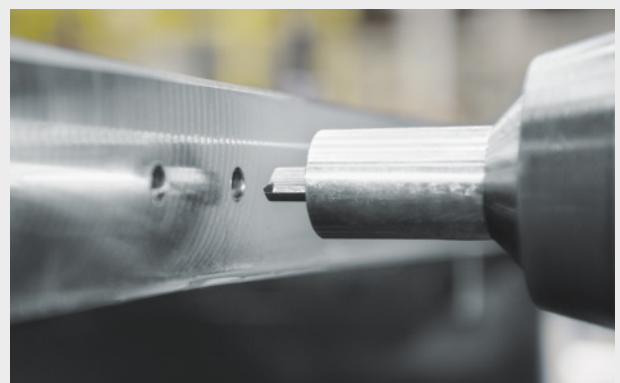
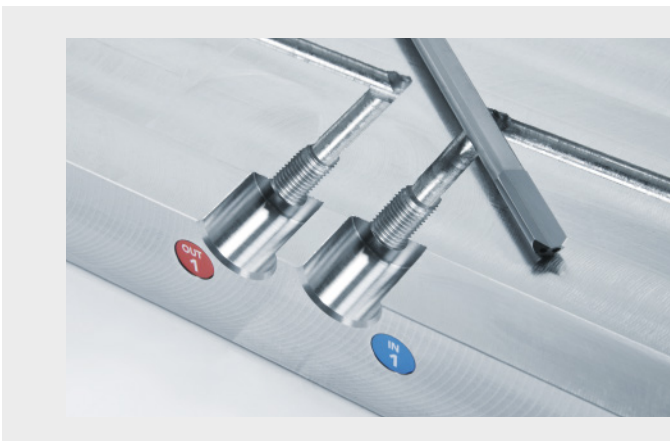
WEITERE MÖGLICHE GEWINDEARTEN OTHER POSSIBLE THREAD TYPES

- » UNC
- » UNF
- » NPT
- » PG



Standard-Bearbeitung von zwei Seiten
(Bearbeitung von einer Seite für Heizpatronen)
Standard machining from two sides
(Machining for heat cartridges from one side)

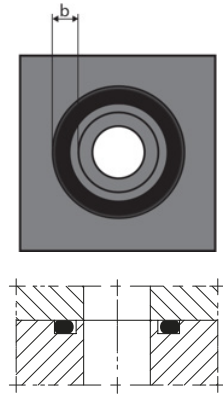
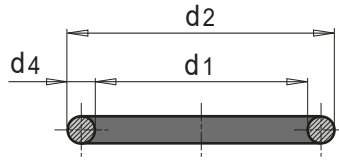
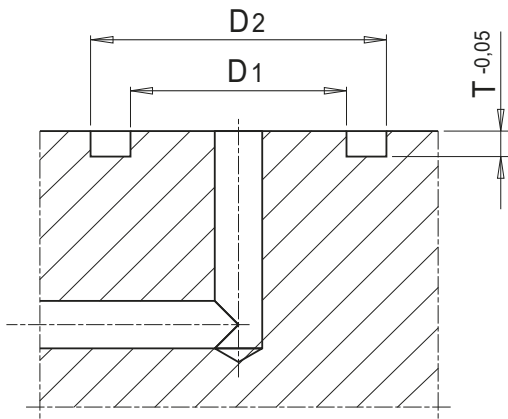
Auch zweiachsig schräge Bohrungen können problemlos gefertigt werden.
Drilling of biaxially inclined holes is also possible.



O-RINGE – SENKUNGEN

COUNTERBORES FOR O-RING SEALS

O-Ring liegt außen an (Optimal)
O-ring touches the outer diameter of the groove



Senkung / counterbore			O-Ring / O-ring seal						d2 - D2	d2 - D2
D1	D2	T	E2130	E21311	Größe / Size	d1	d2	d4	anliegend fitted	vorgespannt tightly fitted
6,2	11,8	1,6	x	x	8 x 2	8,0	12,0	2,0	x	x
7,0	11,0	1,2	x	x	7,5 x 1,5	7,5	10,5	1,5		
7,5	12,5	1,2	x	x	8 x 1,5	8,0	11,0	1,5		
		1,6	x	x	8 x 2	8,0	12,0	2,0		
8,15	13,75	1,6	x	x	8,5 x 2	8,5	12,5	2,0	x	
		1,2	x	x	10 x 2	10,0	14,0	2,0	x	x
9,3	15,5	1,6	x	x	10 x 2	10,0	14,0	2,0		
		1,9	x	x	10 x 2,4	10,0	14,8	2,4		
		2,0	x	x	10 x 2,5	10,0	15,0	2,5		
		1,6	x		11,5 x 2	11,5	15,5	2,0	x	
		1,6	x		12 x 2	12,0	16,0	2,0	x	x
10,15	15,75	1,9	x	x	11,8 x 2,4	11,8	16,6	2,4		
		1,6	x	x	12 x 2	12,0	17,0	2,5		
		2,0	x	x	12,5 x 2,5	12,5	17,5	2,5	x	x
		1,6	x	x	13 x 2	13,0	17,0	2,0		
		1,6	x	x	14 x 2	14,0	18,0	2,0	x	x
13,2	19,5	1,9	x	x	13,9 x 2,4	13,9	18,7	2,4		
		2,0	x	x	14 x 2,5	14,0	19,0	2,5		
		x			15 x 2,5	15,0	20,0	2,5	x	x
		1,6	x		15,5 x 2	15,5	19,5	2,0	x	
14,5	20,8	1,9	x	x	15,3 x 2,4	15,3	20,1	2,4		
		1,6	x	x	16 x 2	16,0	20,0	2,0		
		2,0	x	x	16 x 2,5	16,0	21,0	2,5	x	x
		1,6	x	x	17 x 2	17,0	21,0	2,0	x	x
16,8	23,0	1,9	x	x	17,5 x 2,4	17,5	22,3	2,4		
		2,0	x	x	18 x 2,5	18,0	23,0	2,5	x	
		1,6	x		19 x 2	19,0	23,0	2,0	x	
18,5	24,8	1,9	x	x	19,3 x 2,4	19,3	24,1	2,4		
		2,0	x	x	20 x 2,5	20,0	25,0	2,5	x	x
20,5	26,8	1,9	x	x	21,3 x 2,4	21,3	26,1	2,4		
		2,0	x		22 x 2,5	22,0	27,0	2,5	x	x
		1,9	x		22,3 x 2,4	22,3	27,1	2,4	x	x
22,5	28,8	1,9	x	x	23,3 x 2,4	23,3	28,1	2,4		
		2,0	x		24 x 2,5	24,0	29,0	2,5	x	x
24,5	30,8	1,9	x	x	25,3 x 2,4	25,3	30,1	2,4		
		2,0	x		26 x 2,5	26,0	31,0	2,5	x	x
26,5	32,8	1,9	x	x	27,3 x 2,4	27,3	32,1	2,4		
		2,0	x		28 x 2,5	28,0	33,0	2,5	x	x

Weitere Infos finden Sie unter:
www.meusburger.com/fertigungsstandards-formenbau

Further information at:
www.meusburger.com/manufacturing-standards-for-mould-making

E 2130
 Mat.: FKM



100°C Wasser / Water
 180°C Öl / Oil

E 21311
 Mat.: FKM plus

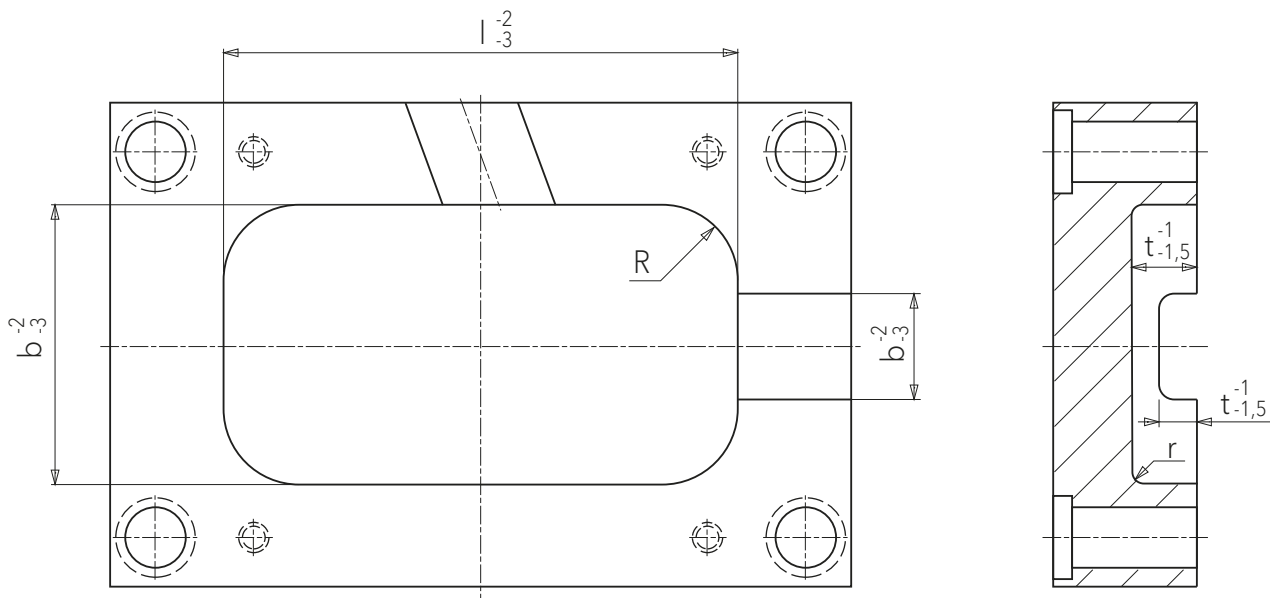


180°C (200°C) Wasser / Water
 180°C (200°C) Öl / Oil



SCHRUPPEN ROUGHING

AUSFRÄSUNG MIT RUNDPLATTENFRÄSER POCKET MILLED WITH INSERT CUTTERS



ECKENRADIUS / TIEFE CORNER RADIUS / DEPTH

R	max. t
17,5	- 140
26	- 310

max. t = Maximale Tiefe (t) wenn möglich vermeiden (Bearbeitungsaufwand höher)
 max. t = Avoid max. depth if possible (higher machining costs)

Bodenradius $r = 3$ mm bis 6 mm je nach Werkzeugwahl
 Bottom radius $r = 3$ mm - 6 mm depending on the tool used

Bei aufwendigen Konturen:

- Schruppzeichnung
- 2D-Daten: DXF oder DWG
- 3D-Daten: stp/x_t/Catia/Pro-E/Unigraphics/sat/SLDPRT

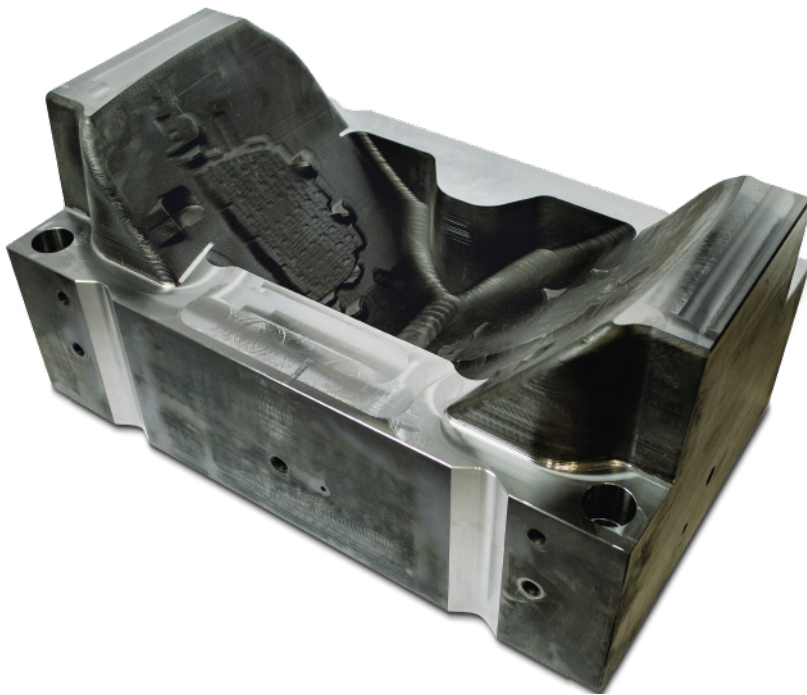
For complex forms provide:

- pre-work drawing
- 2D data: DXF, DWG
- 3D data: stp/x_t/Catia/Pro-E/Unigraphics/sat/SLDPRT

SCHRUPPEN 3D

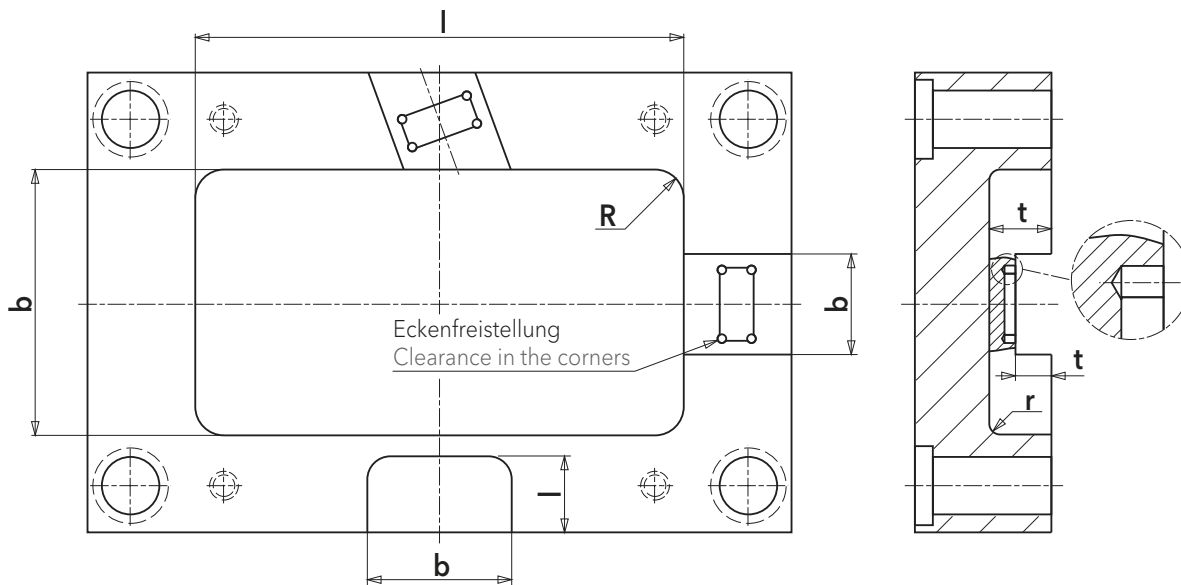
ROUGHING 3D

Max. Größe Bearbeitung	Breite: 1.346 mm, Länge: 1.646 mm, Gewicht: 3.500 kg Standardaufmaß 1-2 mm Kleinst möglicher Fräser Ø: 35 mm (R 17,5) Bodenradius (Taschenboden): mind. R3
Zwischenglühen Datenexport	Nach massiver Schruppbearbeitung wird nochmals gegläht. Falls erwünscht, werden für die Weiterbearbeitung STL-Daten beigestellt.
<i>Max. size Machining</i>	<i>Width: 1.346 mm, length: 1.646 mm, weight: 3.500 kg Standard allowance is 1-2 mm Smallest possible tool Ø: 35 mm (R 17,5) Minimum bottom radius (pocket bottom) is R3</i>
<i>Intermediate</i>	<i>Any plate which has been intensively roughed will be stress-relieved heat treatment again.</i>
<i>Data export</i>	<i>We provide STL files for subsequent editing, if requested.</i>



Werkstück 3D-geschruppt und zwischengeglüht
Workpiece after 3D roughing and intermediate heat treatment

SCHLICHTEN FINISHING



Bei Eckfreistellungen mit kleinem Radius werden die Ecken tiefer als die Grundfläche freigebohrt.
In case of small radii the corners are drilled deeper than the pocket bottom.

ECKENRADIUS / TIEFE CORNER RADIUS / DEPTH

max. Tiefe (t) maximum depth (T)	min. Eckenradius (R) minimum corner radius (R)
35	4
70	5
105	6
105	8
130	10
130	12,5
180	16
180	20
200	25
310	28

Maximale Tiefe (t) wenn möglich vermeiden (Bearbeitungsaufwand höher)
Avoid max. depth if possible (higher machining costs)



PLATTENBESCHRIFTUNG

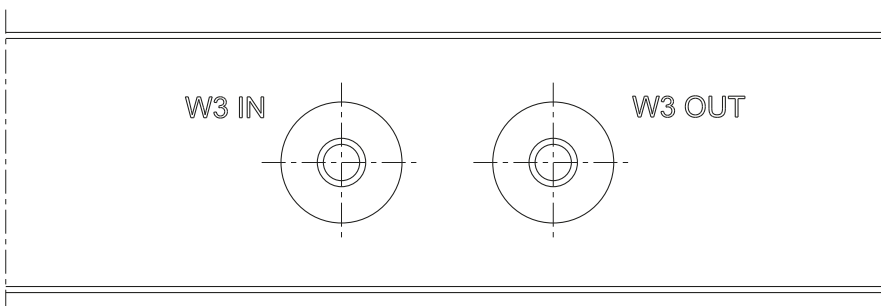
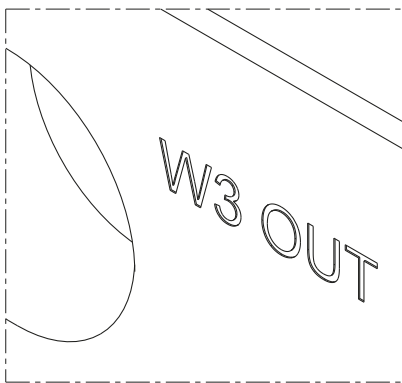
LABELLING OF PLATES

Daten
Bearbeitung

Auf dem Solid richtig skaliert, platziert und 0,2 mm vertieft
Kugelfräser Ø2 mm; 0,2 mm tief

Data
Machining

Properly placed, scaled and sunken in 0.2 mm
Ball-nose milling cutter Ø2 mm; 0.2 mm deep



KENNZEICHNUNGSPLÄTTCHEN

MARKING CHIPS

Die Kennzeichnungsplättchen eignen sich optimal zum eindeutigen Kennzeichnen von Kühlkreisläufen oder anderen Anschlüssen. Diese sind in den Durchmessern 15 mm und 18 mm erhältlich.

The marking chips are ideally suited for clear marking of cooling circuits and other connectors. These are available in diameters of 15 mm and 18 mm.



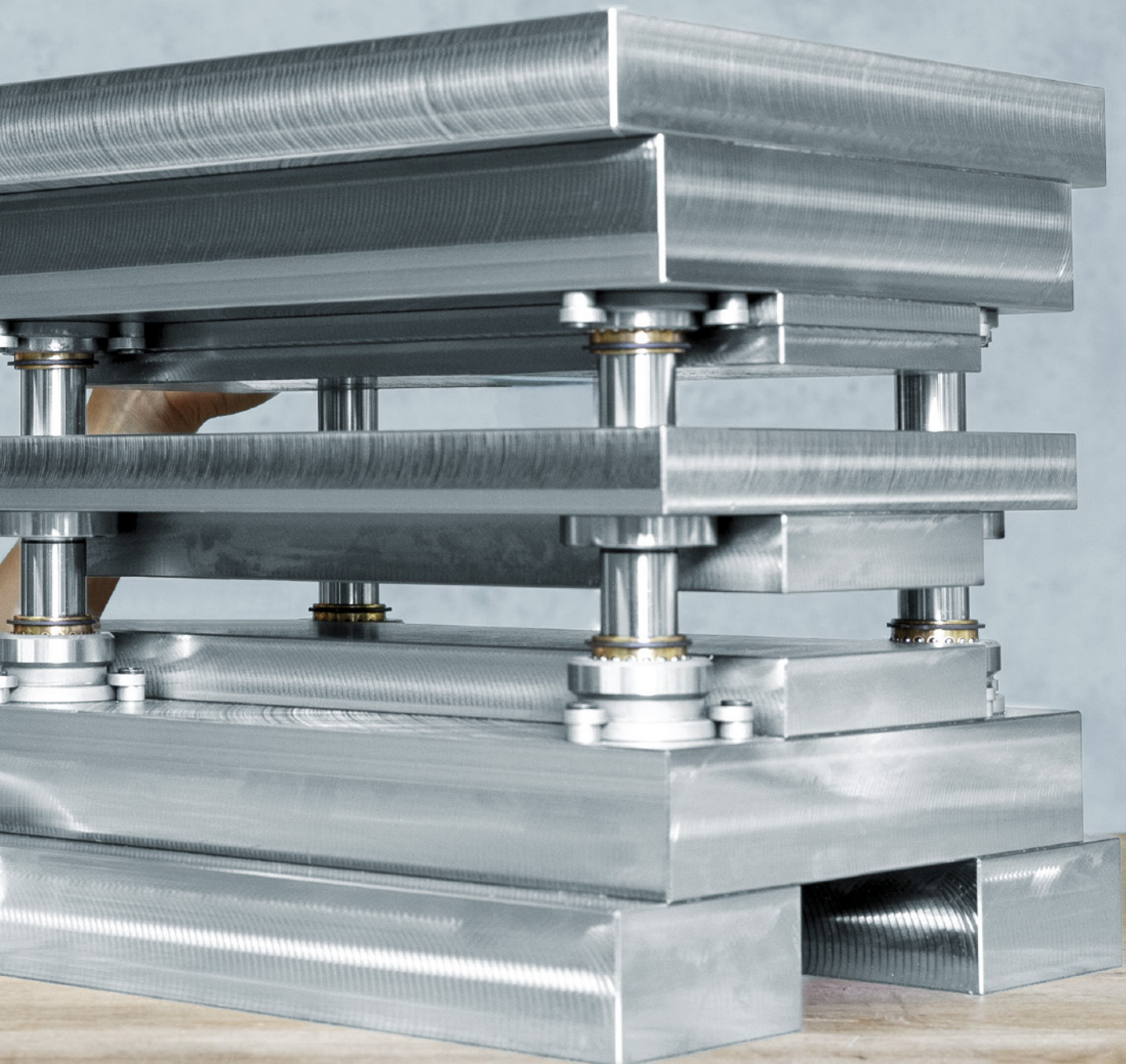
E 2030



E 2030 S
Individuell bedruckbar
Individually printable



FERTIGUNGSSTANDARDS
STANZWERKZEUGBAU
*MANUFACTURING STANDARDS
FOR DIE MAKING*



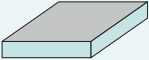
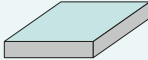











FERTIGUNGSSTANDARDS STANZWERKZEUGBAU

MANUFACTURING STANDARDS FOR DIE MAKING













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AUSFÜHRUNGEN FÜR STAHL VARIATIONS FOR STEEL

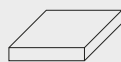
 B/L	 S	Ausführung Variation	Max. Fertigungsgrößen [mm] Max. dimensions for machining [mm]			Gewicht [kg] Weight [kg]
			B	L	S	
 gesägt sawn  gebrannt flame-cut	 roh not machined  6.3 / gefräst milled  1.6 / kreuzgeschliffen segment ground  0.8 / längsgeschliffen precision ground	1	2000	6000	350	17000
		2	1500	6000	346	6000
		3	900	3000	346	3000
		4	1500	3000	346	3000
 3.2 / gefräst milled	 6.3 / gefräst milled  1.6 / feingefräst precision milled  1.6 / kreuzgeschliffen segment ground  0.8 / längsgeschliffen precision ground	5	< 400 ≥ 400	1800 2100 ¹⁾	396	3500 3500
		6	< 400 ≥ 400	1800 2100 ¹⁾	396	3500 3500
		7	< 900 ≥ 900	2100 ¹⁾ 1480 ¹⁾	396	3000 3000
		8	< 400 ≥ 400	1800 2100 ¹⁾	396	3000 3000

1) diagonal / diagonal

 Ø	 S	Ausführung Variation	Fertigungsgrößen [mm] Dimensions for machining [mm]		Gewicht [kg] Weight [kg]
			max. Ø	max. S	
 gebrannt flame-cut	 roh not machined  6.3 / gefräst milled  1.6 / kreuzgeschliffen segment ground  0.8 / längsgeschliffen precision ground	1	2000	300	6000
		2	1500	296	6000
		3	1500	296	3000
		4	1500	296	3000
 3.2 / gedreht turned	 6.3 / gefräst milled  1.6 / feingefräst precision milled  1.6 / kreuzgeschliffen segment ground  0.8 / längsgeschliffen precision ground	5	1490	296	1500
		6	1490	296	1500
		7	1490	296	1500
		8	1490	296	1500



BESTELLBEISPIEL ORDERING EXAMPLE



Artikel Item	B	L	S	Werkstoff Material grade	Ausführung Variation
PS	370	745 /	90 /	2379 /	7



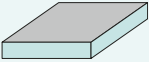
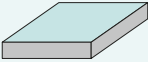








BESTELLBEISPIEL ORDERING EXAMPLE



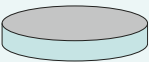
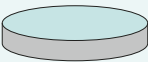








Artikel Item	Ø	S	Werkstoff Material grade	Ausführung Variation
PRS	1200 /	50 /	2379 /	7

AUSFÜHRUNGEN FÜR ALUMINIUM

VARIATIONS FOR ALUMINIUM

 B/L	 S	Ausführung Variation	Max. Fertigungsgrößen [mm] Max. dimensions for machining [mm]			Gewicht [kg] Weight [kg] ¹⁾	
			B	L	S		
 gesägt sawn	 roh not machined	1	1500	3000	160	6000	
		 6.3 gefräst milled	2	850	1750	156	6000
			 0.8 längsgeschliffen precision ground	4	850	1750	156
 3.2 gefräst milled	 6.3 gefräst milled	5	850	1750	246	5000	
		 1.6 feingefräst precision milled	6	850	1750	246	5000
		 0.8 längsgeschliffen precision ground	8	850	1750	246	3000

1) ab 100 kg werden seitliche Transportgewinde angebracht
 1) plates weighing more than 100 kg are equipped with lateral eye bolt threads

 Ø	 S	Ausführung Variation	Fertigungsgrößen [mm] Dimensions for machining [mm]		Gewicht [kg] Weight [kg] ¹⁾	
			max. Ø	max. S		
 roh not machined	 roh not machined	1	120	1500	1500	
		 6.3 gefräst milled	2	120	120	1500
			 0.8 längsgeschliffen precision ground	4	120	120
 3.2 gedreht turned	 6.3 gefräst milled	5	740	200	1500	
		 1.6 feingefräst precision milled	6	740	200	1500
		 0.8 längsgeschliffen precision ground	8	740	200	1500

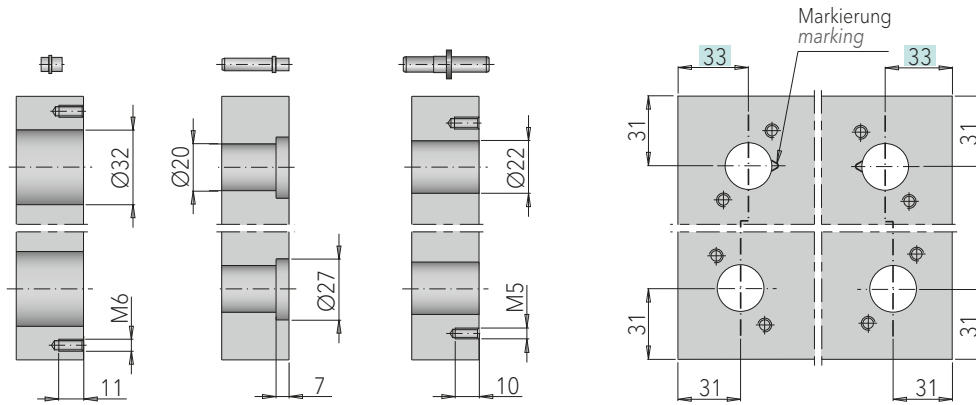
1) ab 100 kg werden seitliche Transportgewinde angebracht
 1) plates weighing more than 100 kg are equipped with lateral eye bolt threads



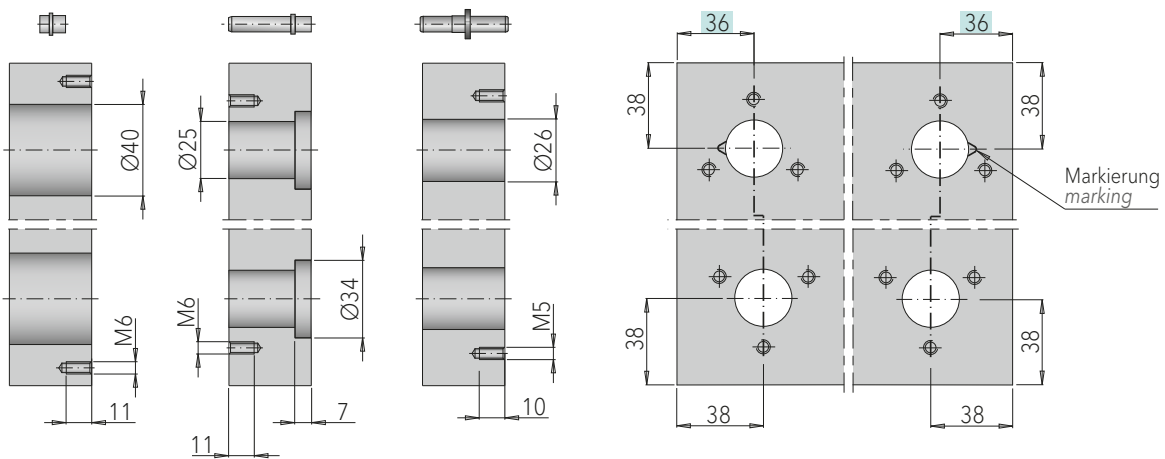
STICHMASS STANZWERKZEUGBAU

BORE PATTERN FOR PUNCHING TOOLS

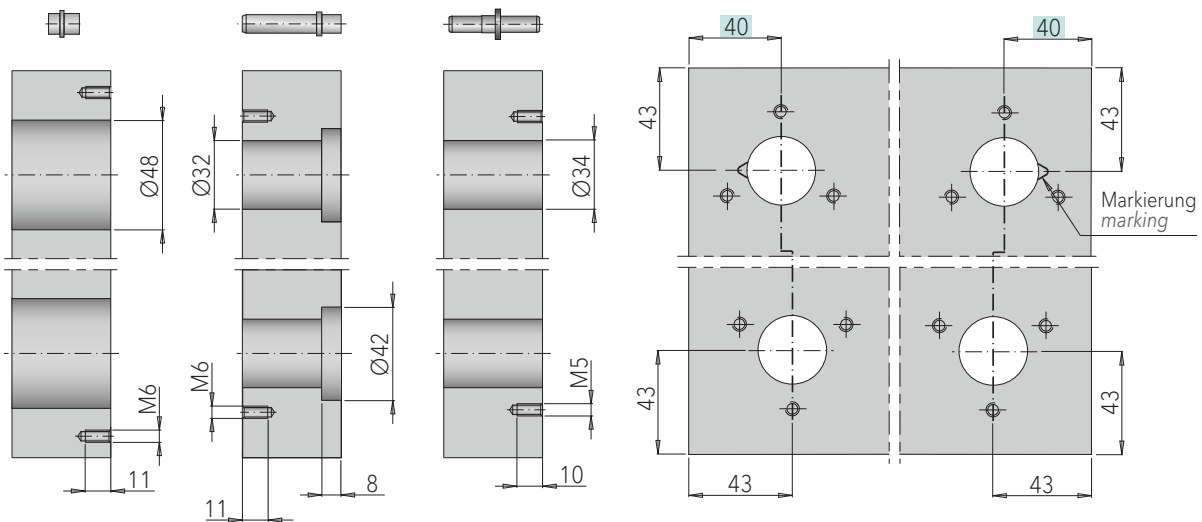
Ø 20



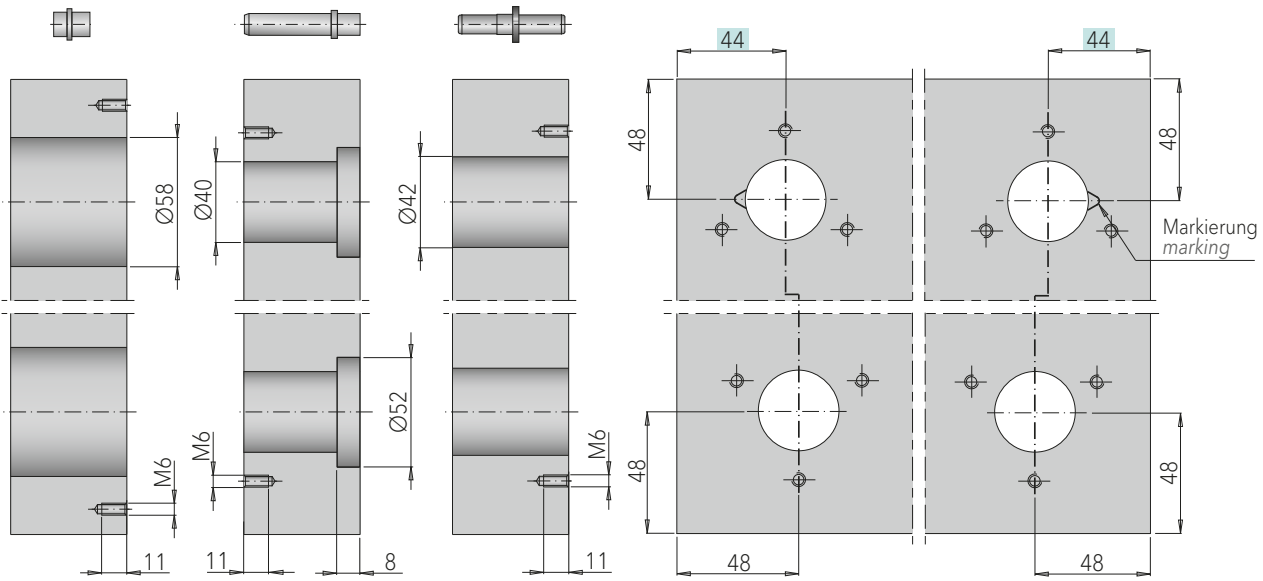
Ø 25



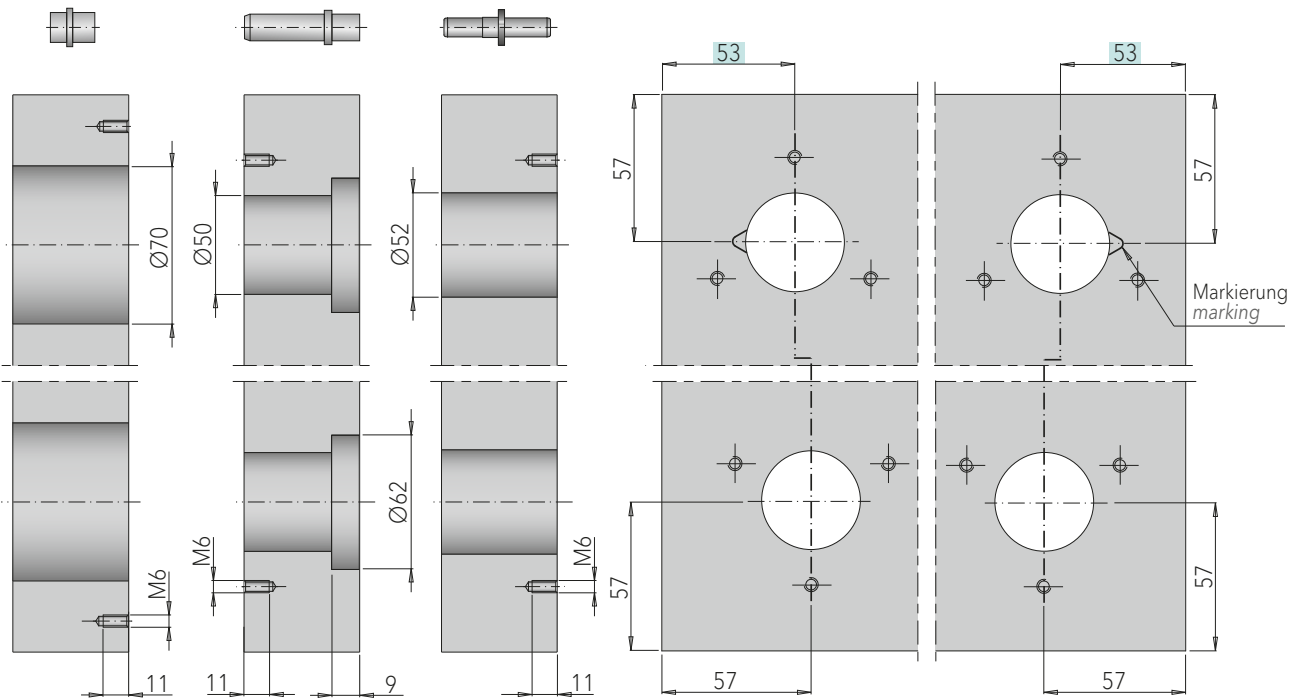
Ø 32



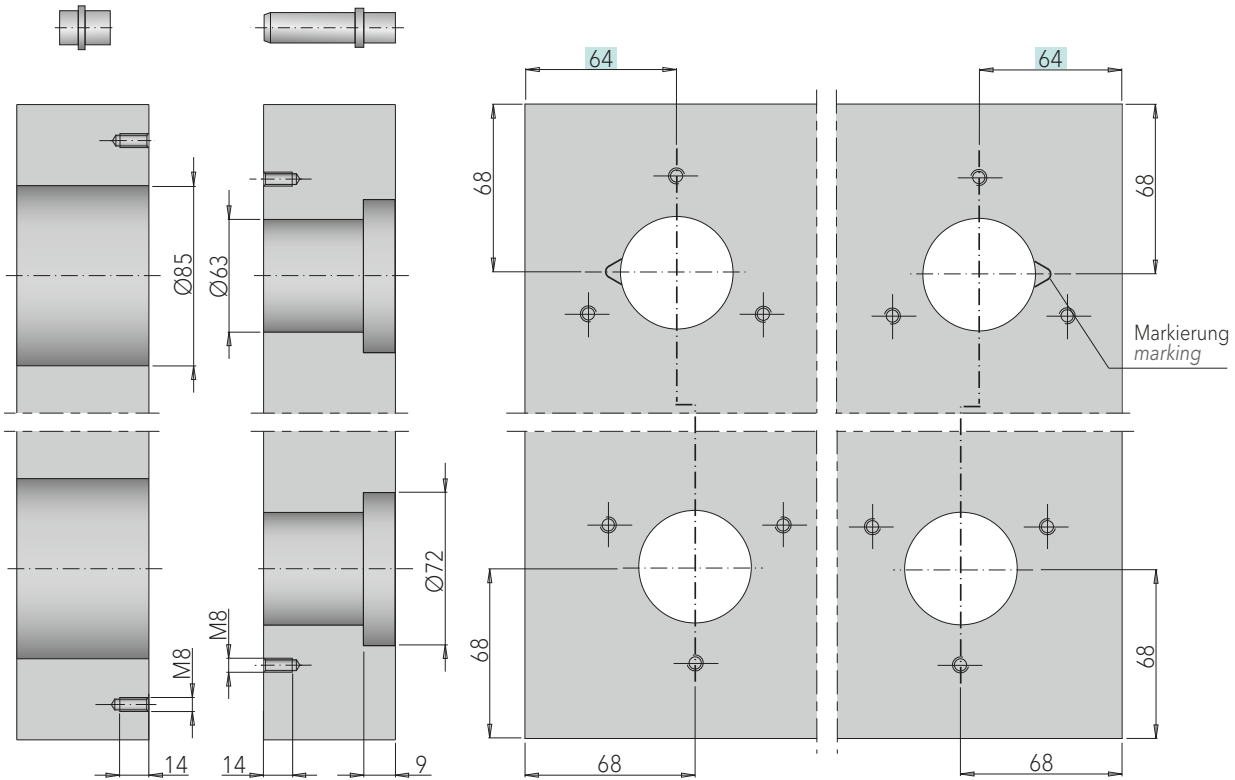
Ø 40



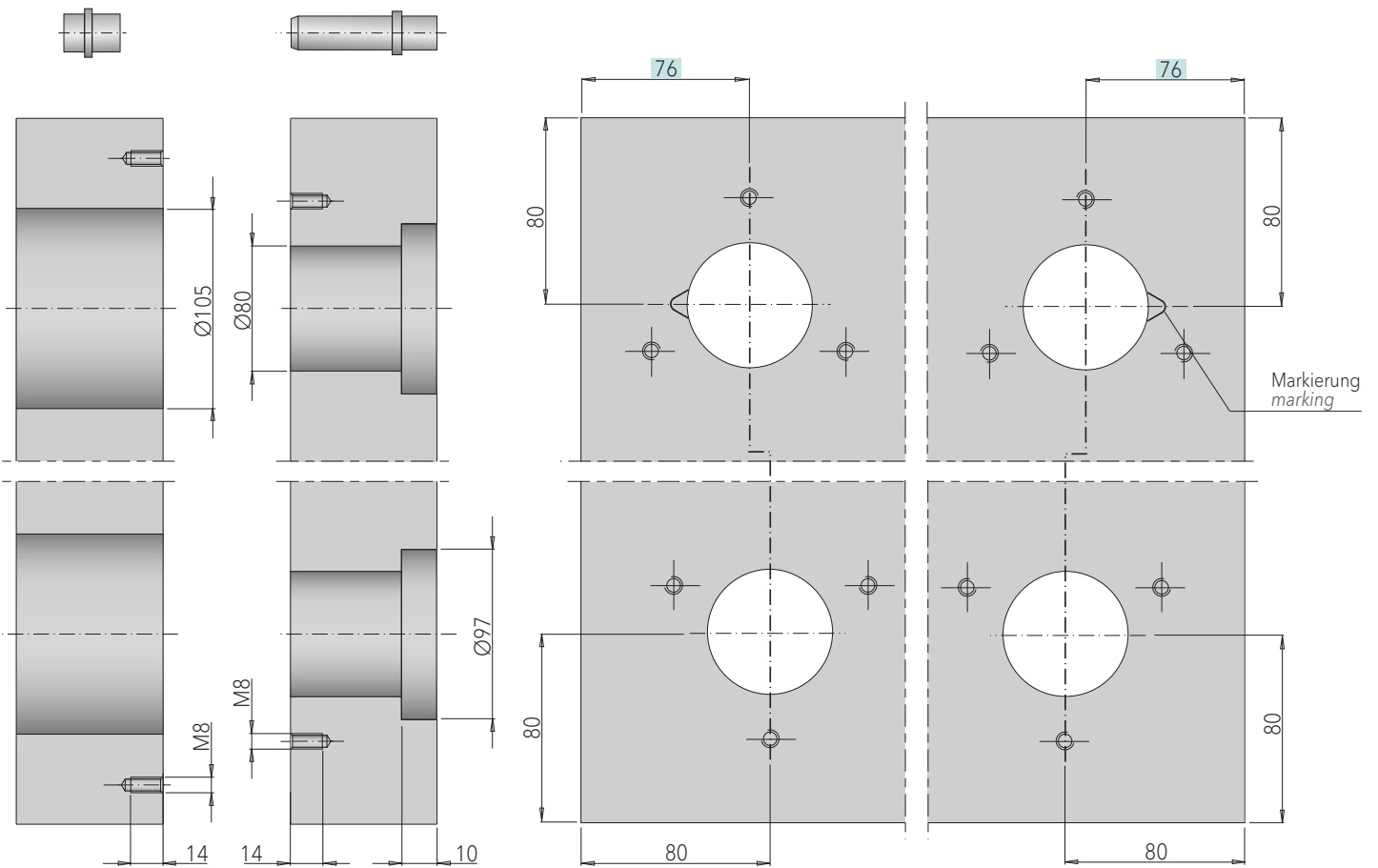
Ø 50



Ø 63



Ø 80



BOHRUNGSDIMENSIONEN SONDERSTICHMASS

HOLE SIZES – SPECIAL BORE PATTERN

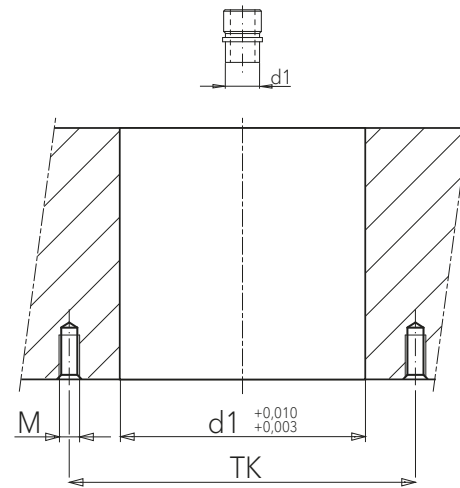
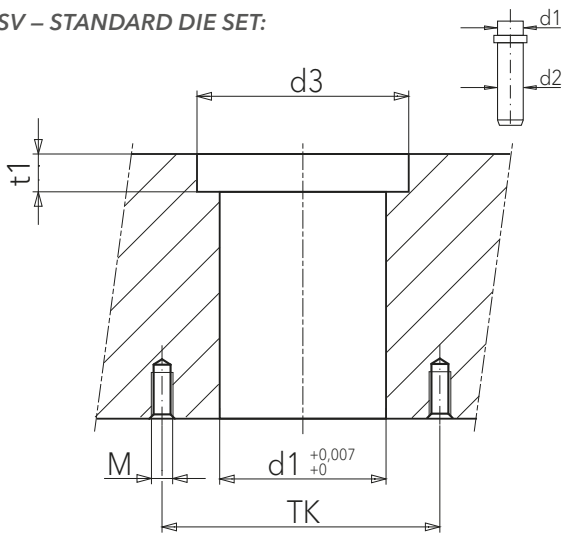
SÄULEN:
PILLARS:

BUCHSEN:
BUSHES:

SV – STANDARDGESTELL:
SV – STANDARD DIE SET:

E 5000 / E 5010

E 5120 / E 5122 / E 5124 / E 5126 / E 5212

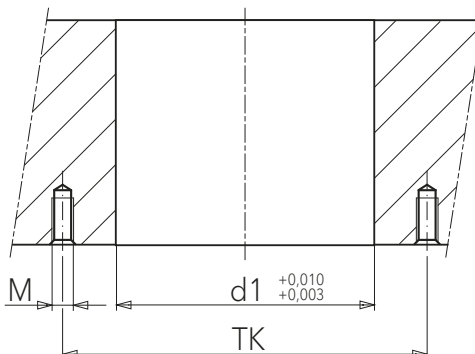
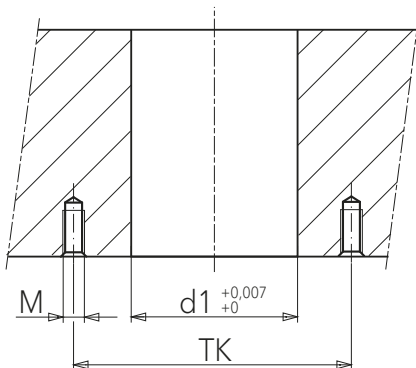
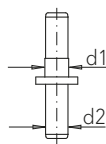


d2	d1	TK	d3	t1	M
19/20	19/20	36	27	7	M 6
24/25	24/25	43	34	7	M 6
30/32	30/32	51	42	8	M 6
38/40	38/40	61	52	8	M 6
50	50	74	62	9	M 6
63	63	94	72	9	M 8
80	80	110	97	10	M 8

d2	TK	M
32	52	M 6
40	60	M 6
48	67	M 6
58	77	M 6
70	91	M 6
85	110	M 8
105	133	M 8

SP – PRÄZISIONSGESTELL:
SP – PRECISION DIE SET:

E 5080

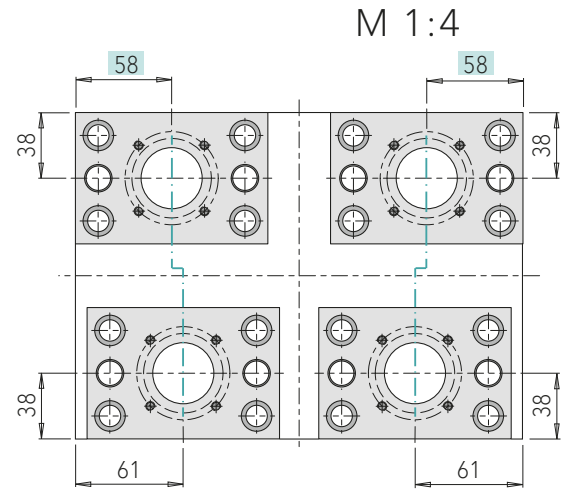
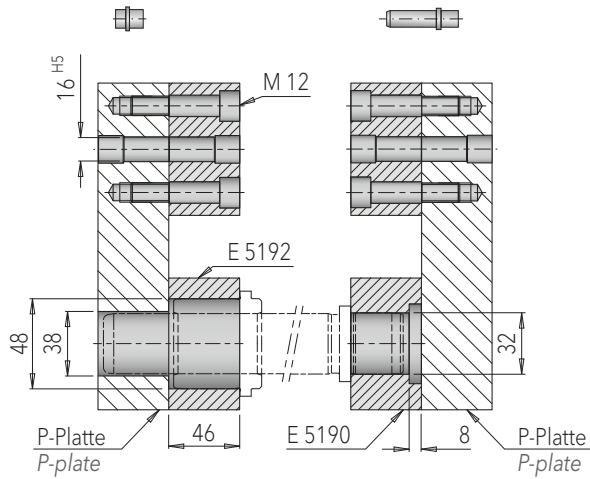


d2	d1	TK	M
20	22	33	M 5
25	26	38	M 5
32	34	48	M 5
40	42	56	M 6
50	52	66	M 5

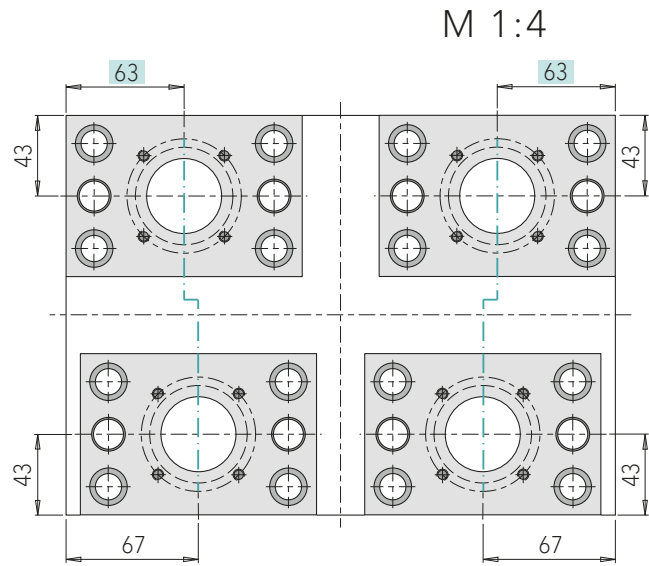
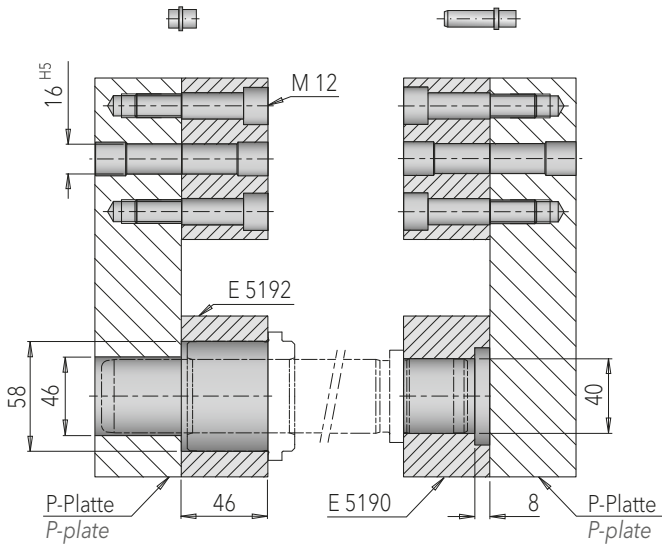
d1	TK	M
32	52	M 6
40	60	M 6
48	67	M 6
58	77	M 6
70	91	M 6

STICHMASS FÜHRUNGS- UND SÄULENLAGER
BORE PATTERN – PILLAR/BUSH RETAINER PLATES

Ø 32

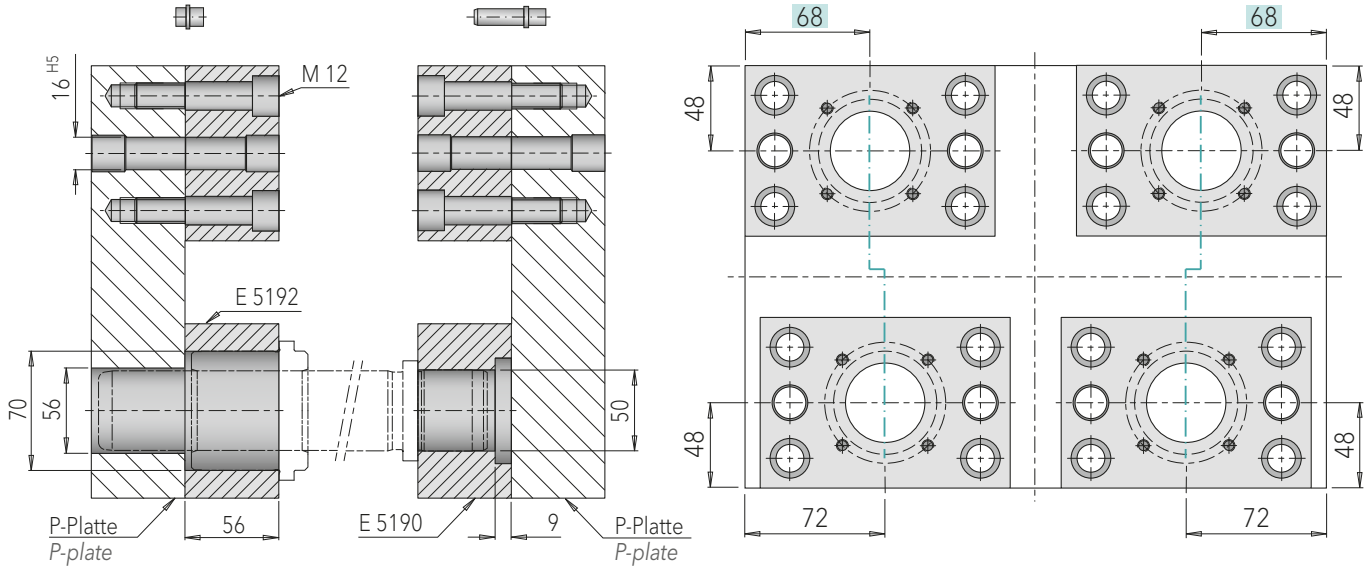


Ø 40



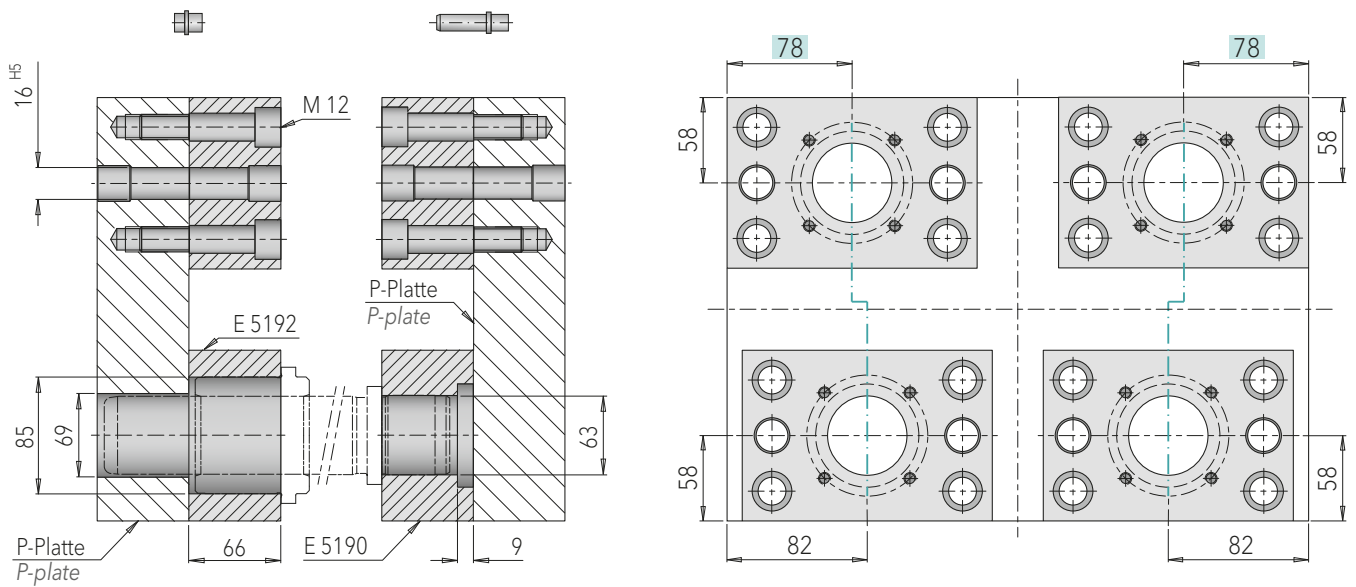
Ø 50

M 1:5

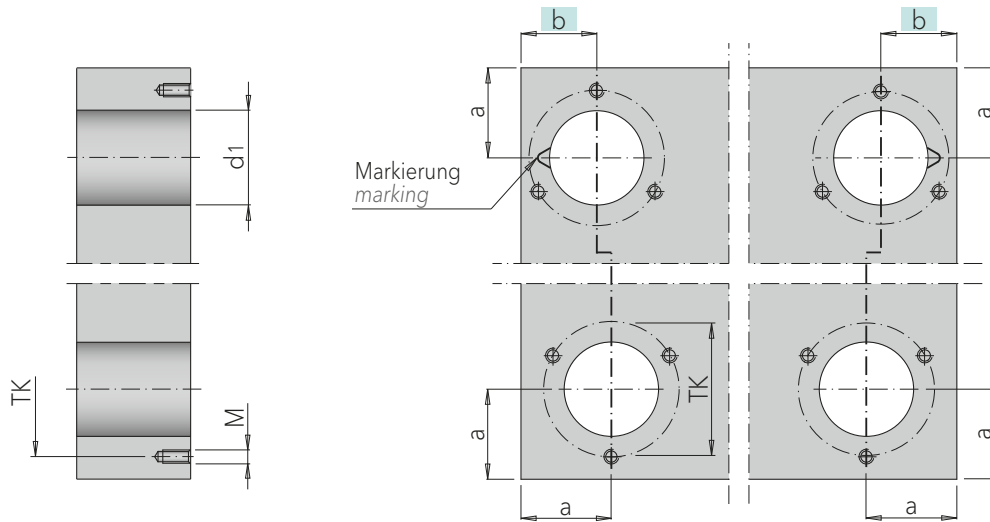


Ø 63

M 1:6

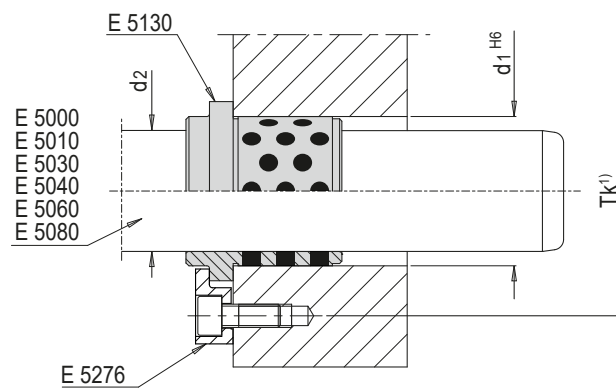


EINBAU GLEITFÜHRUNGSBUCHSE MIT FESTSCHMIERSTOFF INSTALLATION OF SLIDING GUIDE BUSH WITH SOLID LUBRICANT



a	b	M	d1	d2	Tk ¹⁾
35	37	M 6	28	20	54
38	36	M 6	32	25	58
43	40	M 6	40	32	66
48	44	M 6	50	40	79
57	53	M 6	63	50	89
76	72	M10	80	63	123
86	82	M10	100	80	143
100	95	M10	125	100	168

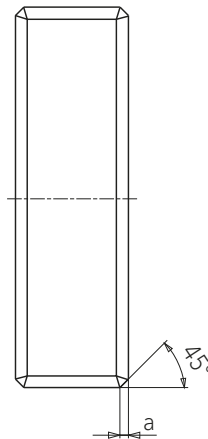
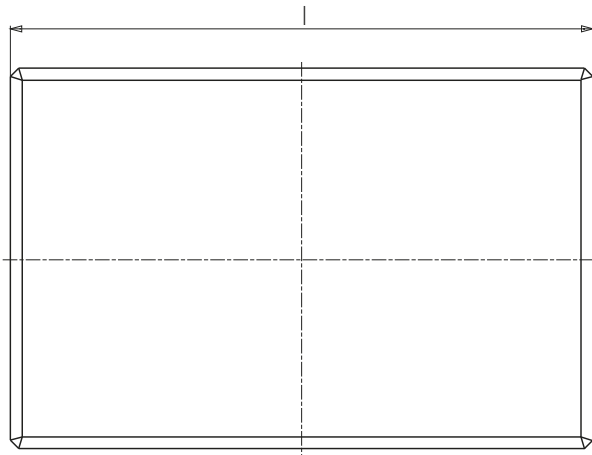
1) Tk: Teilkreis Gewinde / Tk: pitch diameter threads



FACETTEN CHAMFERS

F / P – PLATTEN UND LEISTEN F / P – PLATES AND RISERS

FACETTENGRÖSSEN / NORM CHAMFER SIZES / STANDARD

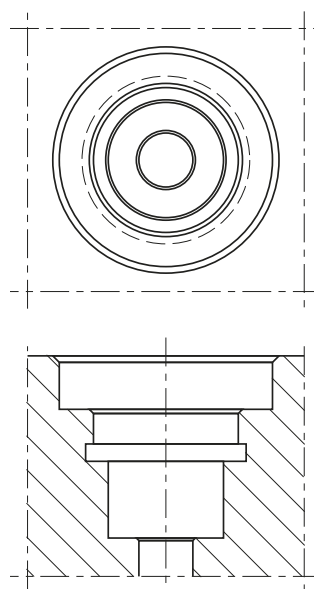
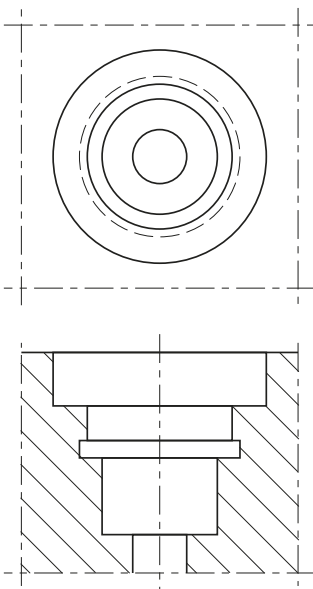


l	a min.	a max.
≤ 126	0,8	1,0
≤ 396	1,0	1,2
≤ 596	1,4	1,6
> 596	1,8	2,0

Um eine bessere Erkennung von Bohrungen im CAM-System zu gewährleisten, sollten diese ohne Facetten ausgeführt werden.
In order to ensure a clear recognition of holes by the CAM system, these should be drawn without a chamfer

BEVORZUGTE VARIANTE PREFERRED GRAPHICAL DISPLAY

UNZUREICHENDE CAM - ERKENNUNG BAD GRAPHICAL DISPLAY BECAUSE OF DIFFICULT CAM RECOGNITION

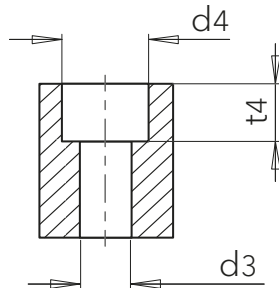
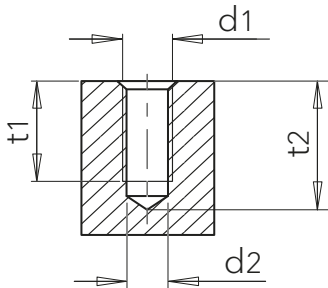


STANDARD-FACETTENGRÖSSEN: (sofern keine Angaben oder scharfe Kante gewünscht)
STANDARD CHAMFER SIZES: (unless otherwise stated or if sharp edges are required)

Ø	s
alle / all	0,3 - 0,5

Scharfe Kanten sind entsprechend auszuweisen!
Sharp edges must be clearly marked!

GEWINDE THREADS



METRISCHE GEWINDE METRIC THREADS

d1	P in mm	d2	t1	t2	d3	d4	t4
M 3	0,50	2,5	6	10	3,5	6,5	3,5
M 4	0,70	3,3	8	12	4,5	8,0	4,5
M 5	0,80	4,2	10	14	5,5	10,0	6,0
M 6	1,00	5,0	11	15	6,6	11,0	7,0
M 8	1,25	6,8	14	20	9,0	15,0	9,0
M10	1,50	8,5	19	25	11,0	18,0	11,0
M12	1,75	10,2	25	32	14,0	20,0	13,0
M14	2,00	12,0	25	32	16,0	24,0	15,0
M16	2,00	14,0	28	34	18,0	26,0	17,0
M18	2,50	15,5	32	40	20,0	29,0	19,5
M20	2,50	17,5	33	42	22,0	32,0	21,5
M22	2,50	19,5	37	48	24,0	35,0	23,5
M24	3,00	21,0	38	52	26,0	38,0	25,5
M27	3,00	24,0	46	60	29,0	42,0	28,5
M30	3,50	26,5	55	70	32,0	48,0	32,0
M36	4,00	32,0	65	85	39,0	57,0	38,0
M42	4,50	37,5	75	95	45,0	66,0	44,0
M48	5,00	43,0	85	110	52,0	76,0	50,0

ZOLLGEWINDE IMPERIAL THREADS (INCHES)

d1	P	P in mm	d2
G 1/8"	28G/"	0,91	8,70
G 1/4"	19G/"	1,34	11,60
G 3/8"	19G/"	1,34	15,00
G 1/2"	14G/"	1,81	19,00
G 3/4"	14G/"	1,81	24,25
G 7/8"	14G/"	1,81	28,00
G 1"	11G/"	2,31	30,00
G 1 1/4"	11G/"	2,31	39,00
G 1 1/2"	11G/"	2,31	45,00

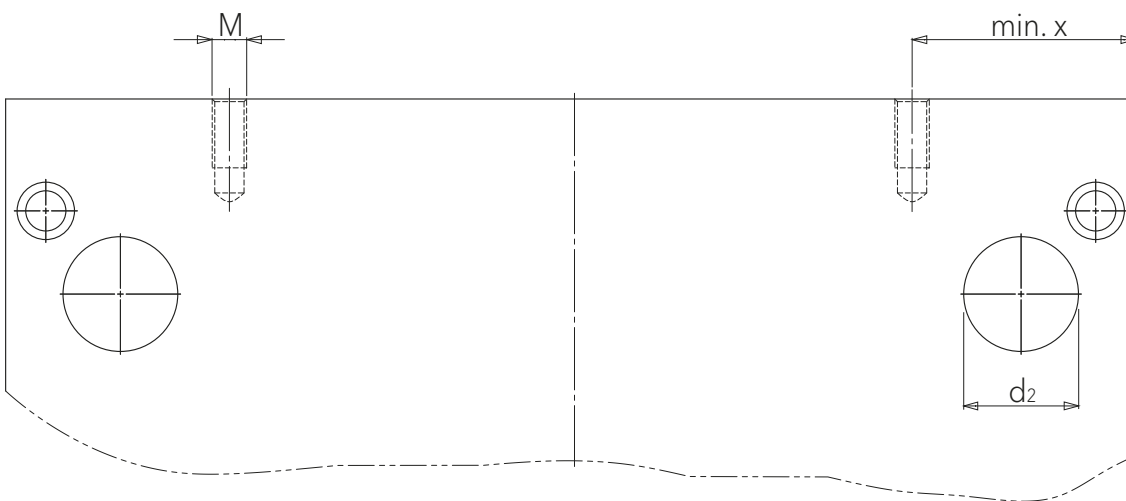
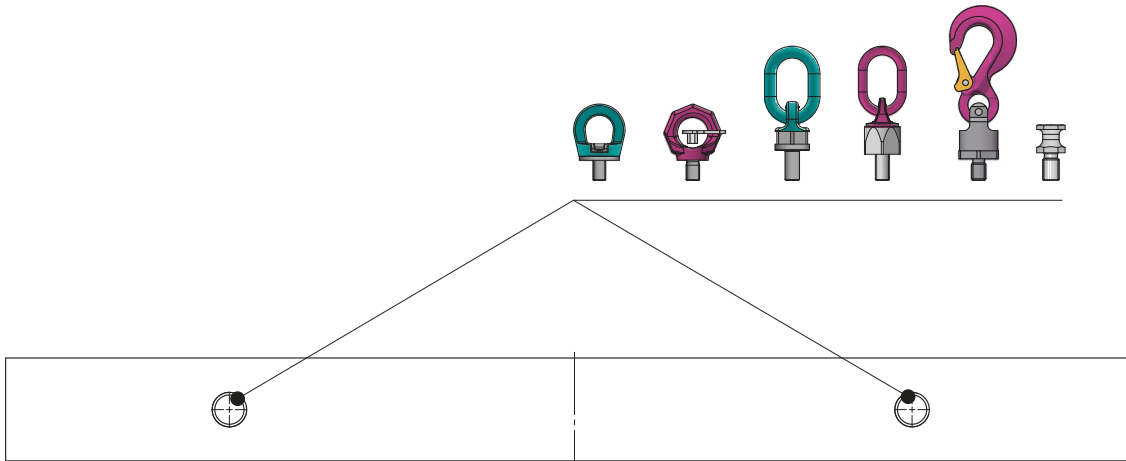
P ... Steigung / pitch

FEINGEWINDE FINE THREADS

d1	d2	d1	d2	d1	d2
M 4x0,5	3,5	M 14x1,5	12,5	M 30x2	28,0
M 5x0,5	4,5	M 16x1	15,5	M 32x1,5	30,5
M 6x0,5	5,5	M 16x1,5	14,5	M 33x2	31,0
M 6x0,75	5,2	M 18x1,5	16,5	M 34x1,5	32,5
M 8x0,5	7,5	M 20x1,5	18,5	M 35x1,5	33,5
M 8x0,75	7,2	M 22x1	21,0	M 36x1,5	34,5
M 8x1	7,0	M 22x1,5	20,5	M 36x2	34,0
M 9x1	8,0	M 24x1	23,0	M 38x1,5	36,5
M 10x1	9,0	M 24x1,5	22,5	M 40x1,5	38,5
M 10x1,25	8,8	M 24x1	22,0	M 42x1,5	40,5
M 10x1,5	8,5	M 26x1,5	24,5	M 42x2	40,0
M 11x1	10,0	M 27x1,5	25,5	M 48x2	46,0
M 12x1	11,0	M 27x1	25,0	M 48x3	45,0
M 12x1,25	10,8	M 28x1,5	26,5	M 50x1,5	48,5
M 12x1,5	10,5	M 30x1	29,0	M 52x2	50,0
M 14x1	13,0	M 30x1,5	28,5		

TRANSPORTBOHRUNGEN EYE BOLT HOLES

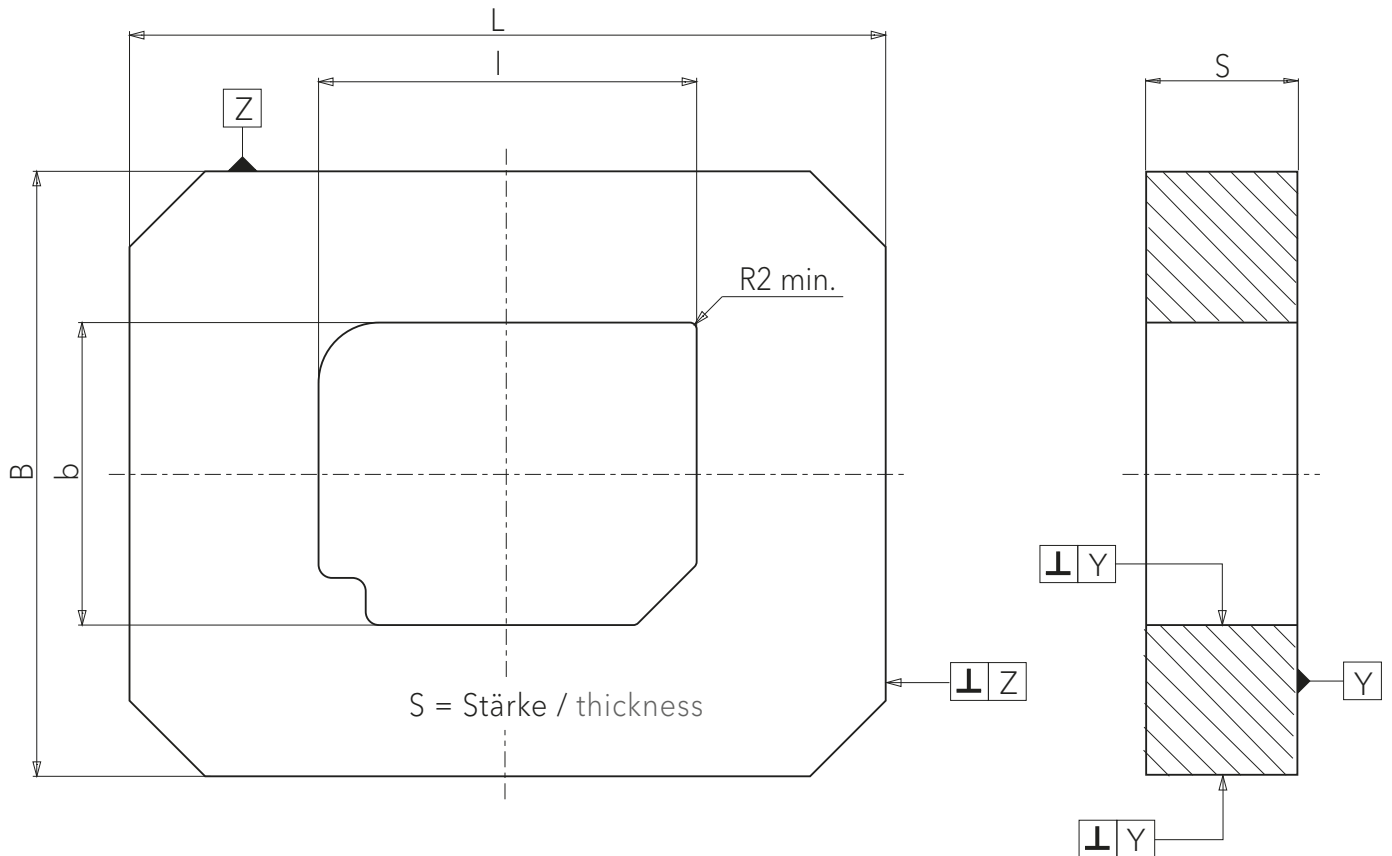
E 1272 M / E 1272 / E 1274 M / E 1274 / E 1276 / E 1280



d2	min. x	M
Ø 20	68	M 12
Ø 25	78	M 12
Ø 32	88	M 16
Ø 40	98	M 16
Ø 50	118	M 16
Ø 63	138	M 20
Ø 80	158	M 20



BRENNSCHNEIDEN FLAME CUTTING

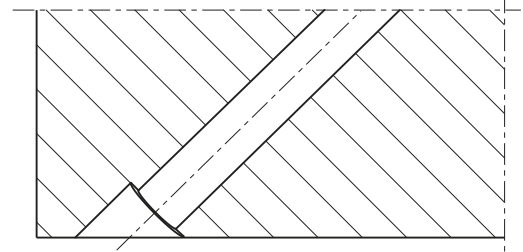
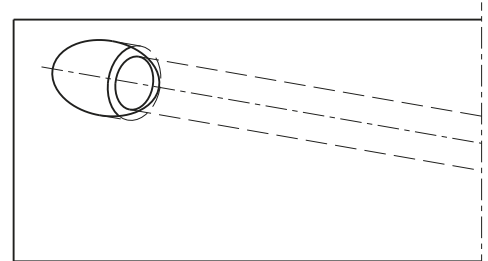
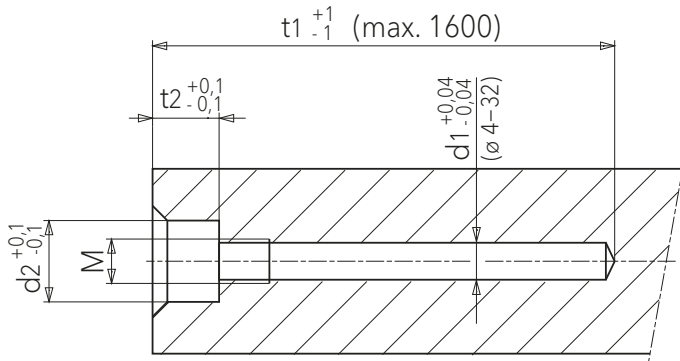


Klasse 2: Werkstückdicke / Class 2: part thickness	Nennmaße (mm) / Nominal size (mm)							
	> 0 < 3	≥ 3 < 10	≥ 10 < 35	≥ 35 < 125	≥ 125 < 315	≥ 315 < 1000	≥ 1000 < 2000	≥ 2000 < 4000
	Grenzmaße (ersetzt DIN 2310 Kl. IIB) / Tolerance limits (replaces DIN 2310 Kl. IIB)							
> 0 ≤ 1	± 0,1	± 0,3	± 0,4	± 0,5	± 0,7	± 0,8	± 0,9	± 0,9
> 1 ≤ 3,15	± 0,2	± 0,4	± 0,5	± 0,7	± 0,8	± 0,9	± 1,0	± 1,1
> 3,15 ≤ 6,3	± 0,5	± 0,7	± 0,8	± 0,9	± 1,1	± 1,2	± 1,3	± 1,3
> 6,3 ≤ 10	-	± 1,0	± 1,1	± 1,3	± 1,4	± 1,5	± 1,6	± 1,7
> 10 ≤ 50	-	± 1,8	± 1,8	± 1,8	± 1,9	± 2,3	± 3,0	± 4,2
> 50 ≤ 100	-	-	± 2,5	± 2,5	± 2,6	± 3,0	± 3,7	± 4,9
> 100 ≤ 150	-	-	± 3,2	± 3,3	± 3,4	± 3,7	± 4,4	± 5,7
> 150 ≤ 200	-	-	± 4,0	± 4,0	± 4,1	± 4,5	± 5,2	± 6,4
> 200 ≤ 250	-	-	-	-	-	± 5,2	± 5,9	± 7,2
> 250 ≤ 300	-	-	-	-	-	± 6,0	± 6,7	± 7,9

$\perp Y$	1,0 / 100
$\perp Z$	0,2 / 100

TIEFLOCHBOHRUNGEN

DEEP HOLE DRILLING



DURCHMESSER UND TIEFEN

DIAMETERS AND DEPTHS

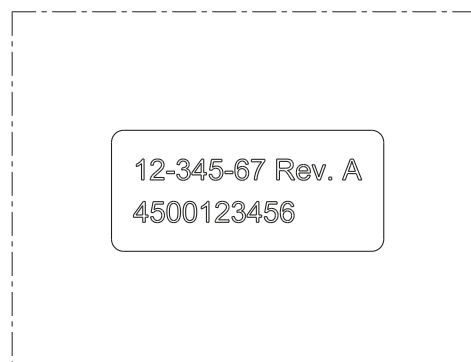
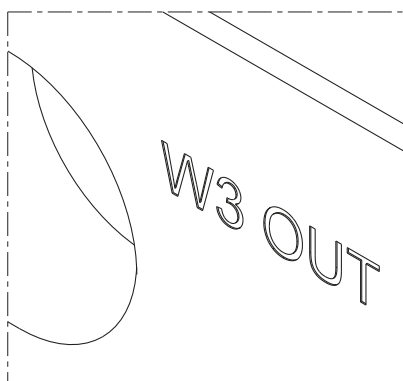
d1	t1 max.
4	460
< 6	860
< 8	1060
< 10	1260
< 12	1360
> 14	1600

Standard-Bearbeitung von zwei Seiten
Standard machining from two sides

Auch zweiachsig schräge Bohrungen
können problemlos gefertigt werden.
Drilling of biaxially inclined holes is
also possible.

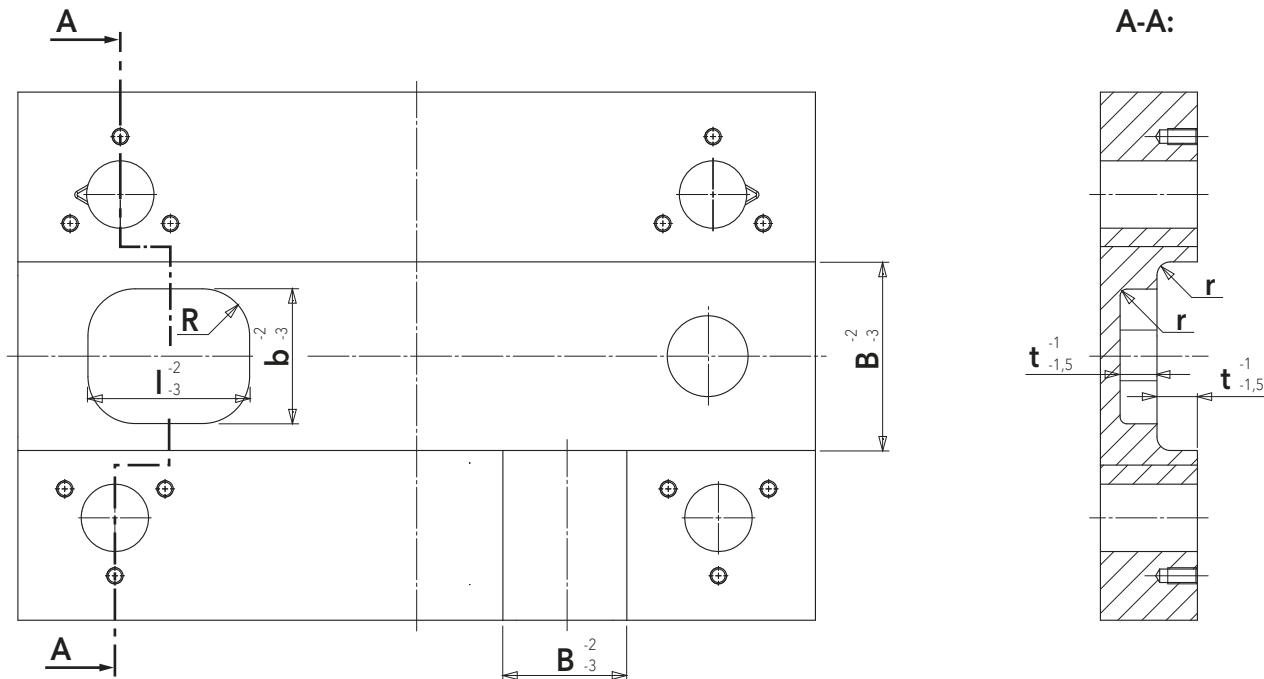
Daten Auf dem Solid richtig skaliert, platziert und 0,2 mm vertieft
Bearbeitung Kugelfräser Ø2 mm; 0,2 mm tief

Data Properly placed, scaled and sunken in 0.2 mm
Machining Ball-nose milling cutter Ø2 mm; 0.2 mm deep



SCHRUPPEN ROUGHING

AUSFRÄSUNG MIT RUNDPLATTENFRÄSER POCKET MILLED WITH INSERT CUTTERS



ECKENRADIUS / TIEFE CORNER RADIUS / DEPTH

R	max. t
17,5	- 140
26	- 310

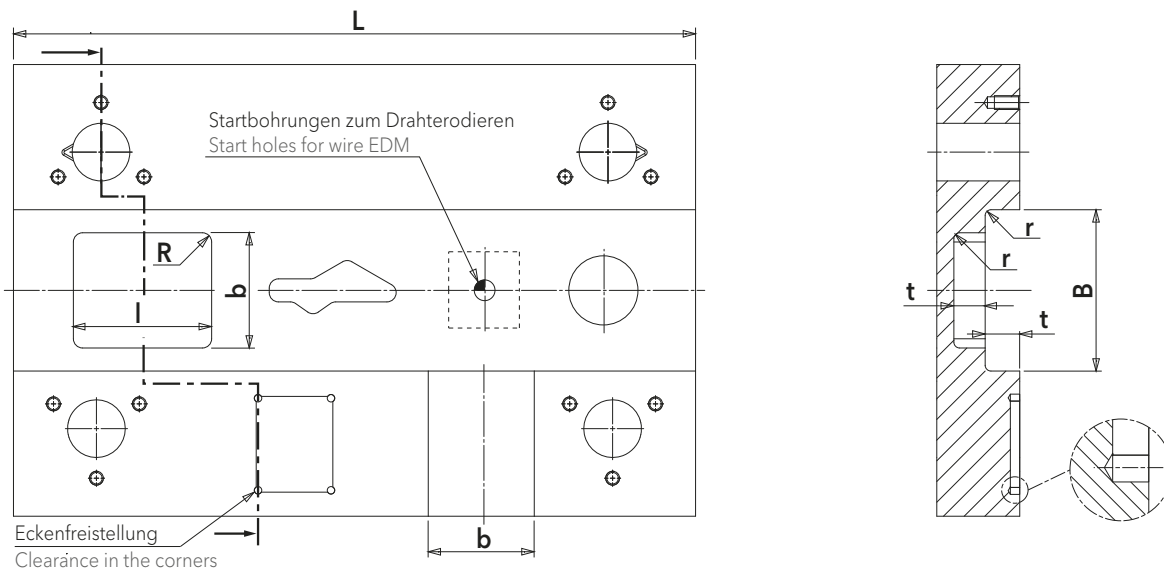
max. t = Maximale Tiefe (t) wenn möglich vermeiden (Bearbeitungsaufwand höher)
 max. t = Avoid max. depth if possible (higher machining costs)

Bodenradius $r = 3$ mm bis 6 mm je nach Werkzeugwahl
 Bottom radius $r = 3$ mm - 6 mm depending on the tool used

Bei aufwendigen Konturen:
 - Schruppzeichnung
 - 2D-Daten: DXF oder DWG
 - 3D-Daten: Step oder Parasolid (Bevorzugt)

For complex forms provide:
 - pre-work drawing
 - 2D data: DXF, DWG
 - 3D data: Parasolid, STEP

SCHLICHTEN FINISHING



Bei Eckfreistellungen mit kleinem Radius werden die Ecken tiefer als die Grundfläche freigebohrt.
In case of small radii the corners are drilled deeper than the pocket bottom.

ECKENRADIUS / TIEFE CORNER RADIUS / DEPTH

max. Tiefe (t) maximum depth (T)	min. Eckenradius (R) minimum corner radius (R)
35	4
70	5
105	6
105	8
130	10
130	12,5
180	16
180	20
200	25
310	28

Maximale Tiefe (t) wenn möglich vermeiden (Bearbeitungsaufwand höher)
Avoid max. depth if possible (higher machining costs)

AUSFRÄSUNG POCKET

b / l	Tol. b / l	Tol. l
≤200	+0,04 +0,01	+0 -0,02
≤400	+0,05 +0,01	
≤600	+0,06 +0,01	+0 -0,02
≥600	+0,07 +0,01	

BAHN-AUSFRÄSUNG CHANNEL

b / l	Tol. b / l	Tol. l
≤400	+0,02 +0	+0 -0,02
≤600	+0,03 +0	+0 -0,02

