

Design Guideline

for Injection Moulds



meusburger®

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1 Project range

1.1 Title

1.2 Customer

1.3 Contacts

1.4 Schedule

1.5 Target

1.6 Liabilities

The design guidelines are part of the contract and mandatory for the manufacturer. The injection mould must meet the requirements of the mould specification (specification sheet). The design should be fundamentally geared to a maintenance friendly mould. The authorized manufacturer is solely responsible for the data conversion in the CAD system. He is responsible for possible conversion mistakes.

2 Mould design

The guidelines of the customer must be observed for the mould design. All drawings and dimensions must meet these requirements. If no particular specifications are given then design according to DIN standards. Fundamentally all drawings are performed with 3D CAD models and allowance for shrinkage is taken into account.

3 Mould base

3.1 General information

Always use mould bases and standard parts from Meusburger.

You can quickly and easily create a mould base using the Meusburger Mould Base Wizard. Simply select the desired plate size and the mould concept online. The finished mould base can then be immediately exported in your CAD program.

3.2 Material selection

Component	Material grade	Hardness in HRC	Characteristics
Cavity plates Inserts	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
Slides	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
Locking plates, guiding plates, etc.	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
Cores/ inserts/ slides	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
The surface hardness of components which execute a movement and rub against each other must be adjusted.			

Material no.	Designation	Chemical composition	Strength	Character
1.0577	DIN: S 355 J2 (St 52-3) AFNOR: A 52 FP AISI: A738	C - 0.22 Si - 0.55 Mn - 1.60	≅ 550 N/mm ²	Structural steel unalloyed
1.1730	DIN: C 45 U AFNOR: XC 48 AISI: 1045	C - 0.45 Si - 0.30 Mn - 0.70	≅ 640 N/mm ²	Tool steel unalloyed, suitable for flame hardening
1.2083 ESR	DIN: X 42 Cr 13 AFNOR: Z 40 C 14 AISI: 420	C - 0.42 Si - 0.40 Mn - 0.30 Cr - 13.00	≅ 780 N/mm ²	Steel for through hardening low corrosion
1.2085	DIN: X 33 CrS 16 AFNOR: Z 35 CD 17.S AISI: ≅ 422+S	C - 0.33 Si - 0.30 Mn - 0.80 Cr - 16.00 Mo - 1.20 S - 0.06 Ni - 0.30	≅ 1080 N/mm ²	Tool steel pre-hardened, corrosion resistant, with good machinability
1.2162	DIN: 21 MnCr 5 AFNOR: 20 MC 5 AISI: 5120	C - 0.21 Si - 0.25 Mn - 1.25 Cr - 1.20	≅ 660 N/mm ²	Steel for case-hardening alloyed
1.2210	DIN: 115 CrV3 AFNOR: 100 C3 UNI: 107 CrV3 KU AISI: L2	C - 1.28 Si - 0.25 Mn - 0.30 Cr - 0.70 Ni - 0.10 Ti - 0.20	≅ 740 N/mm ²	Cold-work steel alloyed, wear resistant
1.2311	DIN: 40 CrMnMo 7 AFNOR: 40 CMD 8 UNI: 35 CrMo 8 KU AISI: P20	C - 0.40 Si - 0.40 Mn - 1.50 Cr - 1.90 Mo - 0.20	≅ 1080 N/mm ²	Tool steel alloyed, hardened and tempered, suitable for flame hardening, nitriding and polishing
1.2312	DIN: 40 CrMnMoS 86 AFNOR: 40 CMD 8.S AISI: P20+S	C - 0.40 Si - 0.40 Mn - 1.50 Cr - 1.90 Mo - 0.20 S - 0.06	≅ 1080 N/mm ²	Tool steel Alloyed, hardened and tempered, good machinability, suitable for flame hardening
1.2316	DIN: X 38 CrMo 16 AFNOR: Z 35 CD 17 UNI: X 38 CrMo 16 KU AISI: ≅ 422	C - 0.36 Cr - 16.00 Mo - 1.20	≅ 1010 N/mm ²	Tool steel hardened and tempered, corrosion resistant, polishable
1.2343	DIN: X 38 CrMoV 51 AFNOR: Z 38 CDV 5 UNI: X 37 CrMoV 51 KU AISI: H11	C - 0.38 Si - 1.00 Mn - 0.40 Cr - 5.30 Mo - 1.20 V - 0.40	≅ 780 N/mm ²	Hot-work steel alloyed
1.2343 ESR	DIN: X 38 CrMoV 51 AFNOR: Z 38 CDV 5 UNI: X 37 CrMoV 51 KU AISI: H11 ESR	C - 0.38 Si - 1.00 Mn - 0.40 Cr - 5.30 Mo - 1.20 V - 0.40	≅ 780 N/mm ²	Hot-work steel alloyed, suitable for mirror polishing, electrically remelted
1.2344 ESR	DIN: X 40 CrMoV 5-1 AFNOR: Z 40 CDV 5 UNI: X 40 CrMoV 5-1 KU AISI: H13	C - 0.40 Si - 1.00 Cr - 5.30 Mo - 1.40 V - 1.00	≅ 780 N/mm ²	Hot-work steel heat-resistant, high temperature wear resistant, very good thermal conductivity
1.2363	DIN: X 100 CrMoV 5 AFNOR: Z 100 CDV 5 UNI: X 100 CrMoV 5-1 KU	C - 1.00 Si - 0.30 Mn - 0.50 Cr - 5.20	≅ 810 N/mm ²	Special cold work steel wear resistant, low deformation,

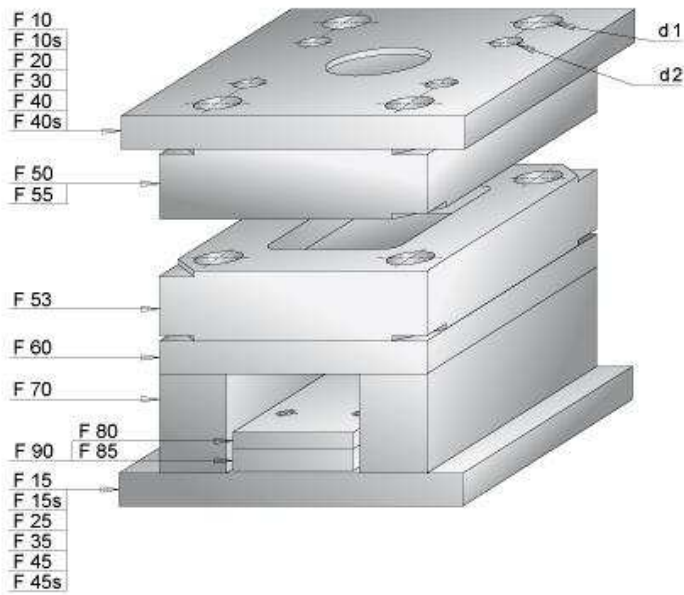
	AISI: A2	Mo - 1.10 V - 0.20		good toughness and hardenability
1.2379	DIN: X 155 CrVMo 121 AFNOR: Z 160 CDV 12 UNI: X 155 CrVMo 12 1 KU AISI: \cong D2	C - 1.53 Si - 0.30 Mn - 0.35 Cr - 12.00 Mo - 0.80 V - 0.80	\cong 850 N/mm ²	Steel for through hardening wear-resistant cold-work steel
1.2714 1.2714HH	DIN: 56 NiCrMoV 7 AFNOR: 55 NCDV 7 AISI: L6	C - 0.56 Cr - 1.10 Mo - 0.50 Ni - 1.70 V - 0.10	\cong 850 N/mm ² HH vorvergütet 1350 N/mm ²	Steel for through hardening good high-temperature resistance and toughness
1.2738	DIN: 40 CrMnNiMo 8-6-4 AFNOR: 40 CMND 8 AISI: \sim P20 + Ni / \sim P20 + Ni mod.	C - 0.40 Mn - 1.50 Cr - 2.00 Mo - 0.20 Ni - 1.10	\cong 1080 N/mm ² TSHH \cong 1200 N/mm ²	Mould steel hardened and tempered, uniform strength even on plates with maximum dimensions
1.2767	DIN: X 45 NiCrMo 4 AFNOR: 45 NCD 16 UNI: 40 NiCrMoV 16 KU AISI: 6F7	C - 0.45 Si - 0.25 Mn - 0.40 Cr - 1.35 Mo - 0.25 Ni - 4.00	\cong 830 N/mm ²	Steel for through hardening special alloy suitable for polishing, with high resistance to pressure and good flexural strength
1.2842	DIN: 90 MnCrV 8 AFNOR: 90 MV 8 UNI: 90 MnVCr 8 KU AISI: \cong O2	C - 0.90 Si - 0.20 Mn - 2.00 Cr - 0.40 V - 0.10	\cong 760 N/mm ²	Steel for through hardening dimensional stability and high hardenability; wear-resistant, cold-work steel with very good cutting properties
1.7131	DIN: 16 MnCr 5 AFNOR: 16 MC 5 AISI: 5115	C - 0.16 Si - 0.25 Mn - 1.15 Cr - 0.95	\cong 660 N/mm ²	Steel for case-hardening alloyed
3.3547 (AW-5083)	DIN: AlMg4,5Mn AFNOR: A - G4,5MC UNI: 7790	Si - 0.40 Fe - 0.40 Cu - 0.10 Mn - 0.40-1.00 Mg - 4.00-4.90 Cr - 0.05-0.25 Zn - 0.25 Ti - 0.15	\cong 230 - 290 N/mm ²	Aluminium alloy very good machining characteristics
3.4365 (AW-7075)	DIN: AlZnMgCu 1.5 EN: ISO 7075 AFNOR: A-Z5GU UNI: 9007/2	Si - 0.40 Fe - 0.50 Cu - 1.60 Mn - 0.30 Mg - 2.40 Cr - 0.23 Zn - 5.60 Ti - 0.20	\leq 540 N/mm ² (depending on thickness)	Aluminium zinc alloy high strength, hardened

All steel grades are heat treated for stress relief to reduce plate warping during machining.
For more information go to www.meusburger.com in portal under Downloads - Poster Material grades.

3.3 Mould base

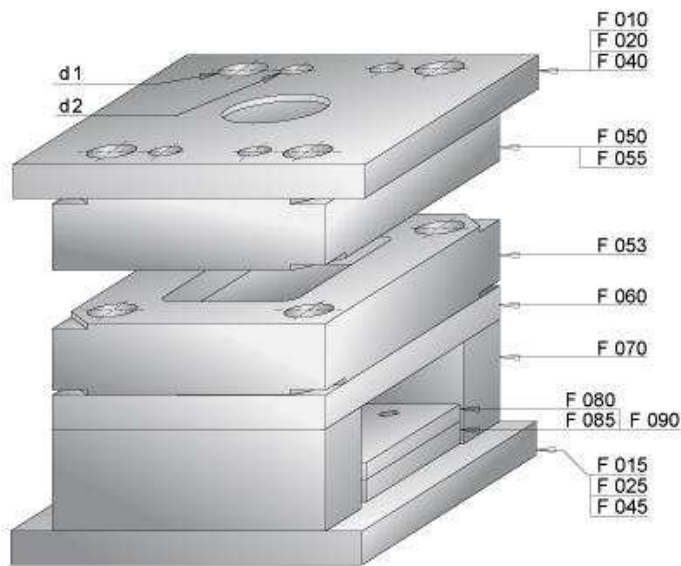
3.3.1 F-Mould base lengthwise

High-precision mould bases made of quality steel, heat treated for stress relief, in sizes from 96 x 96 to 996 x 1196 mm.



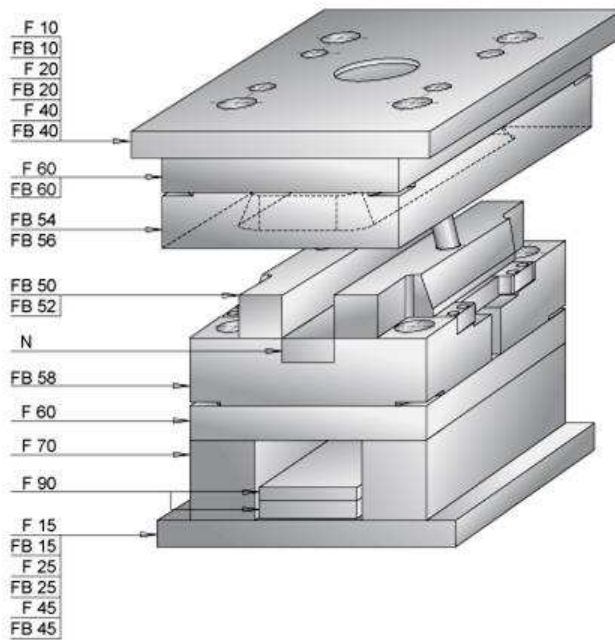
3.3.2 F-Mould base crosswise

Almost square space utilization in the mould base, saves in many cases the use of a larger mould.



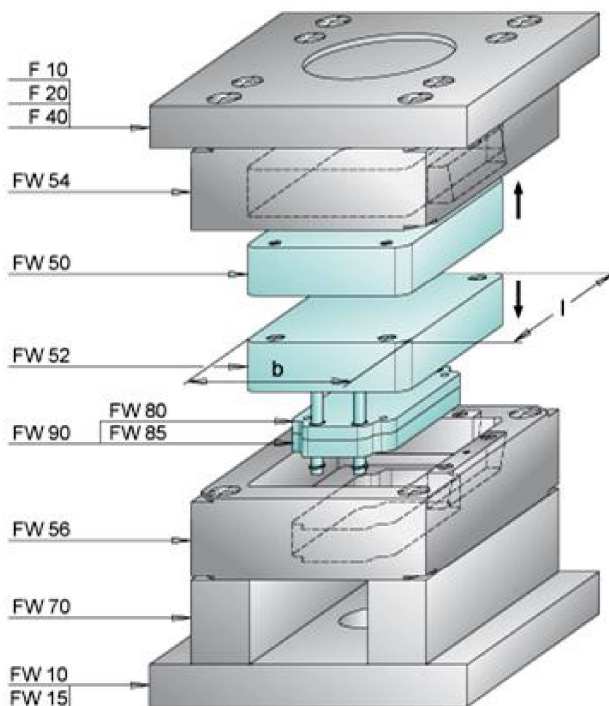
3.3.3 FB-Sliding core mould

Ready-to-use sliding core moulds with optimal guiding and transmission of the force onto the sliding cores. For easy demoulding of undercuts. The hole pattern is 100% compatible with the F-Plates.



3.3.4 FW-Change mould

Modular design in 7 different mould sizes for fast production of prototypes and small series. Change the ready-to-use inserts with the ejector set on the injection moulding machine.



3.4 Clamp plates

3.4.1 Clamp plates dimension

Machine type	b	l
<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>

3.4.2 Clamping with clamping claws

- It should be preferred to use clamping plates that allow mounting from the operator side and from opposite of the operator side.
- Always ensure that the fixing on the machine is not hindered by the attachments.

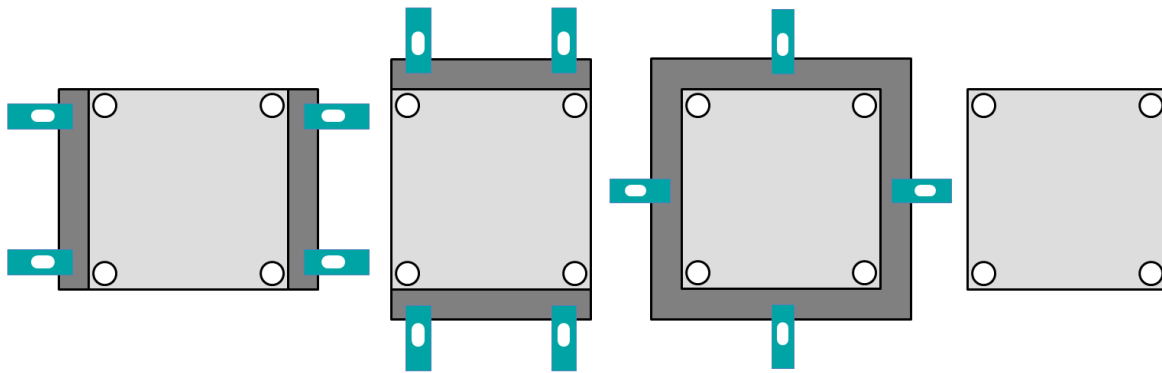
3.4.3 Clamping with clamping screws

- If flush clamping plates are used, there should be a minimum distance between the screw heads and the clamping screws. Influencing factors such as the hole pattern on the machine and the diameter of the screw heads should be used to calculate these distances.

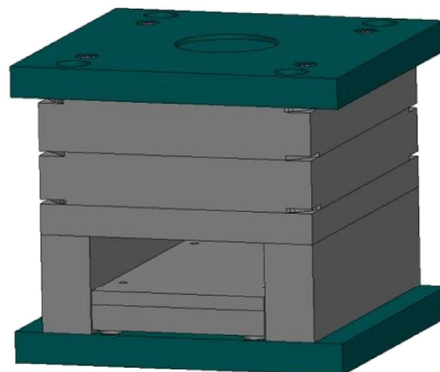
3.4.4 Clamping with a clamping system

- If a magnetic, mechanic, or hydraulic quick clamping system is available on the machine, the clamping plates have to be machined accordingly.

3.4.5 Clamp plates versions

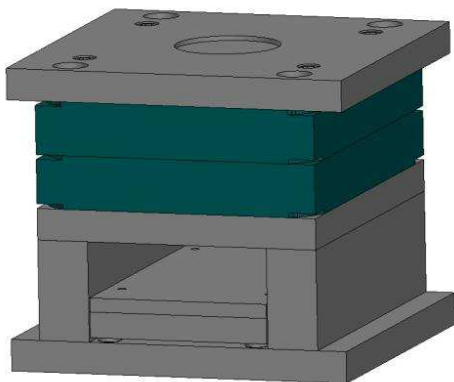


Please note – the designation of the mould size (for example: Fxx/126 126/...) always indicates the size of cavity plate. The actual dimensions of the clamp plates F10 (length, width, salient) can vary from the dimensions of the designation.



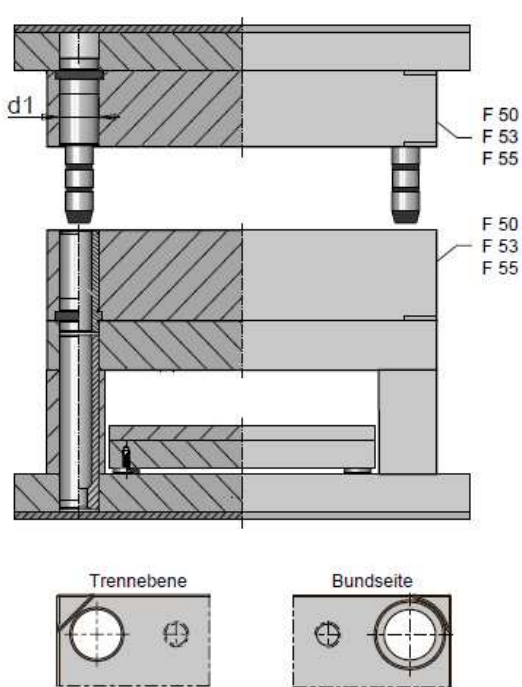
3.5 Cavity plates




The cavity plates F50 / F55 / F53 are all made of quality steel that has been heat treated for stress relief. This results in the ideal conditions for an economic and mould and machine friendly further subsequent machining.

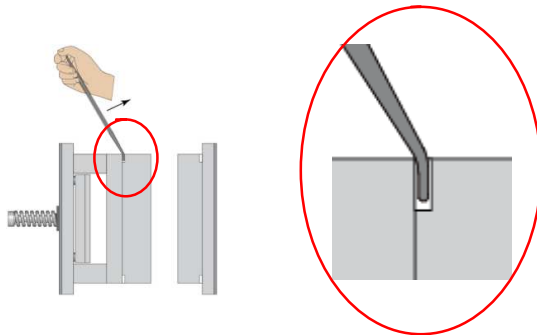


3.5.1 Lever slots

All cavity plates from guiding diameter $d_1=20/26$ are equipped with 2 to 6 lever slots. Easy removal is possible through these lever slots.

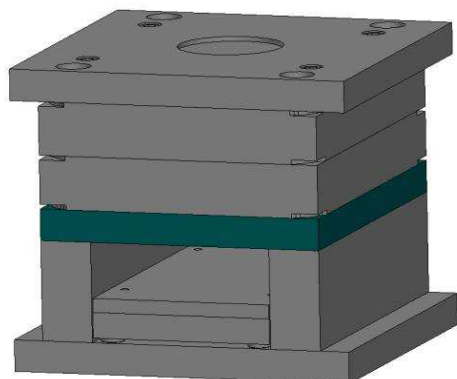


	d1		
	Ø 14	Ø 20 , 26	Ø 30,42,54,66
F 50 	-	2x Trennebene 2x Bundseite diagonal	2x Trennebene diagonal 4x Bundseite
F 53 	-	2x Trennebene 2x Bundseite diagonal	2x Trennebene diagonal 4x Bundseite
F 55 	-	2x Bundseite diagonal	4x Bundseite



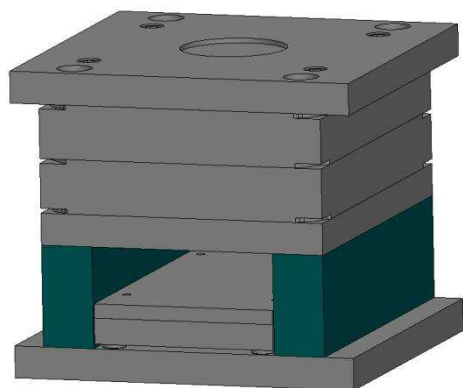
3.6 Backing plates

Meusburger F60 can be used as a backing plate.



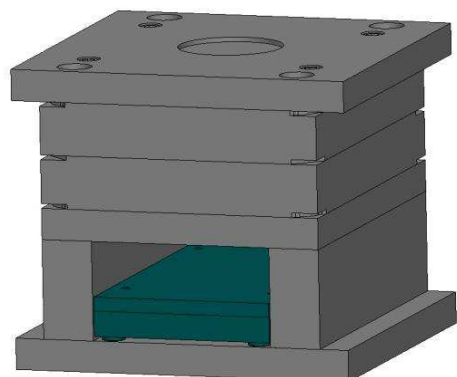
3.7 Risers

The F70 risers enable the movement of the ejector set. From the mould size 196/196 on, wide risers (F+P) are available to reduce sagging.



3.8 Ejector set

The F90 Ejector set consists of the F 80 Ejector retaining plate and F 85 Ejector base plate.

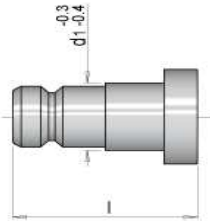


3.8.1 Transfer ejector set - machine coupling

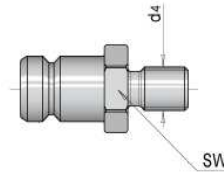
Injection moulding machine with Meusburger E 1804 Ejector set coupling

Here you can choose between the E 1517 Dowel for direct installation or the 1518 Dowel for screwing in.

E 1517



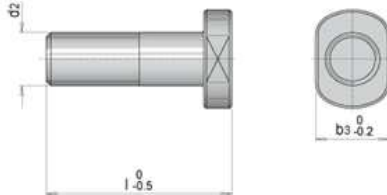
E 1518



Injection moulding machine with thread on the mould side

E 1514 Threaded bolt can be installed here.

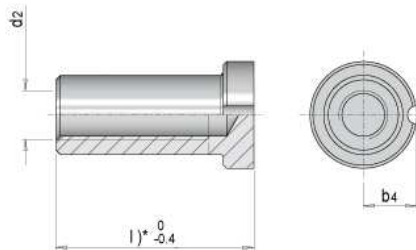
E 1514



Injection mould with thread on the machine side

If there is thread on the machine side, the thread inserts E 1515 or E 1516 can be used.

E 1516

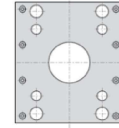


3.9 Tolerances

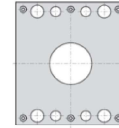
3.10 Insulation board

The mould should be provided with insulation boards to insulate both sides of the machine. The insulation boards are available in 2 different strengths (330 N/mm² / 600N/mm²).

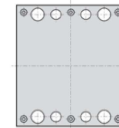
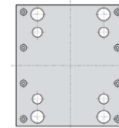
E 1402 Insulation board with mounting holes with locating ring hole – for F lengthwise



E 1403 Insulation board with mounting holes with locating ring hole – for F crosswise



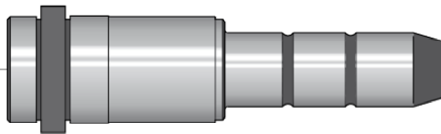
E 1407 Insulation board with mounting holes without locating ring hole – for F lengthwise



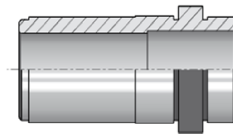
3.11 Guide pillars and bushes

Combination possibilities

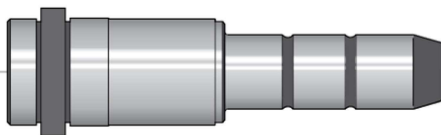
Guide pillar out of steel for case-hardening 1.7131



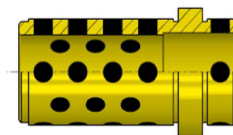
Guide bush out of steel for case-hardening 1.7131



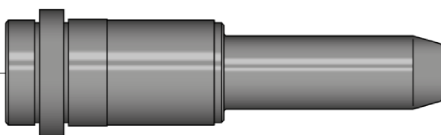
Guide pillar out of steel for case-hardening 1.7131



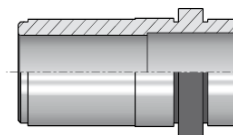
Self lubricating guide bush out of bronze 2.0975 with graphite inserts



Guide pillar out of steel for case hardening 1.7131 with DLC coating, without oil groove



Guide bush out of steel for case-hardening 1.7131



3.12 Marking:

Markings are put on the mould, so they are easily readable from the operator side.
Ideally suited for uniform and clean marking of moulds are customisable labels (E 191xx).

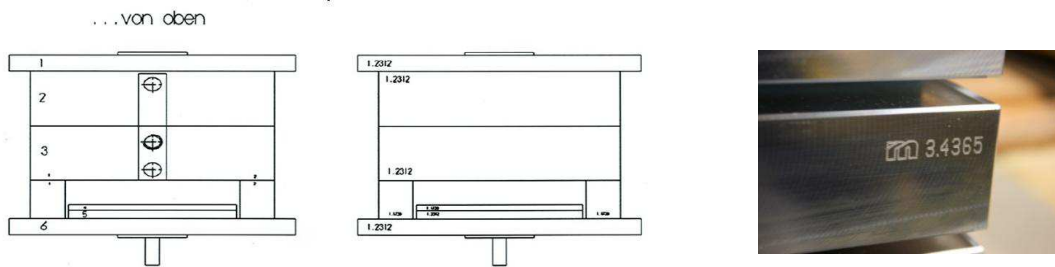
Mould plates are always provided with a material marking and plate numbering as well as the size of the mould base.

Further there are markings for 'TOP' or 'BOTTOM' to indicate the required mounting position.

Cooling connections:

The cooling circuits are marked with 'IN' or 'OUT' and the corresponding circuit number. Use Meusburger E 3020.

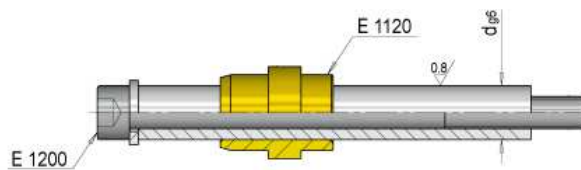
All attachments must be marked with a mould number (transport and mould protection, ejector rods, location rings, etc.)



4 Demoulding

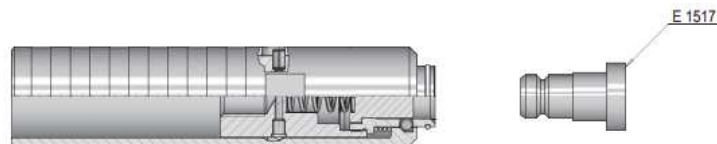
E 1064 Guiding unit for FW 90 ejector set

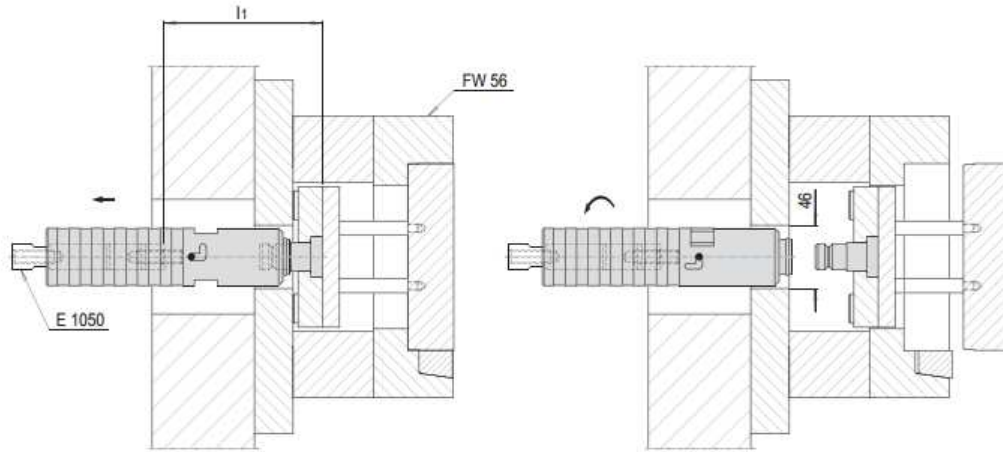
For the precise guiding of the ejector set at high forces.



E 1804 Ejector set coupling

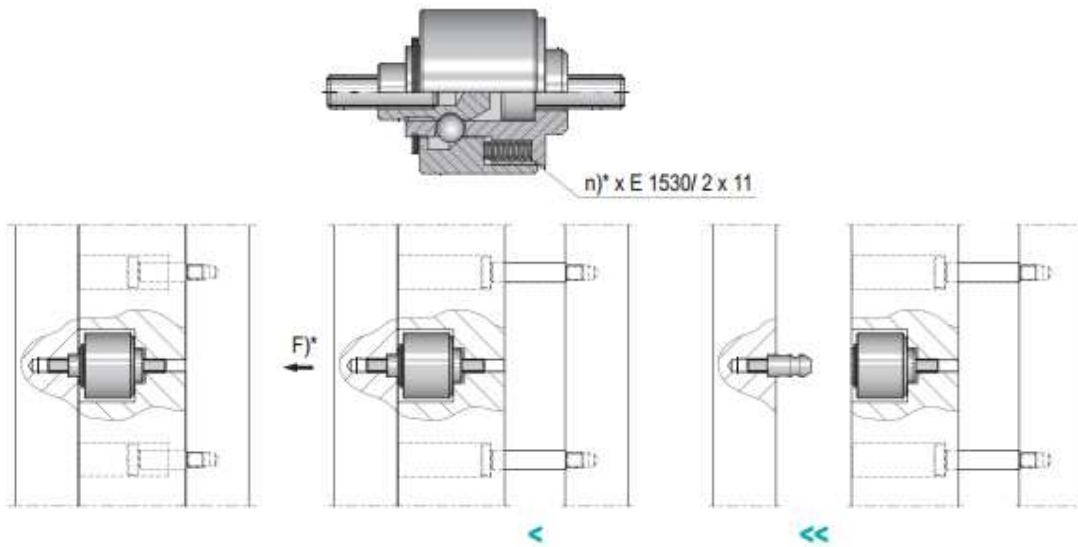
The simple manual and fast operation enables a minimization of machine down time through very short changeover times.





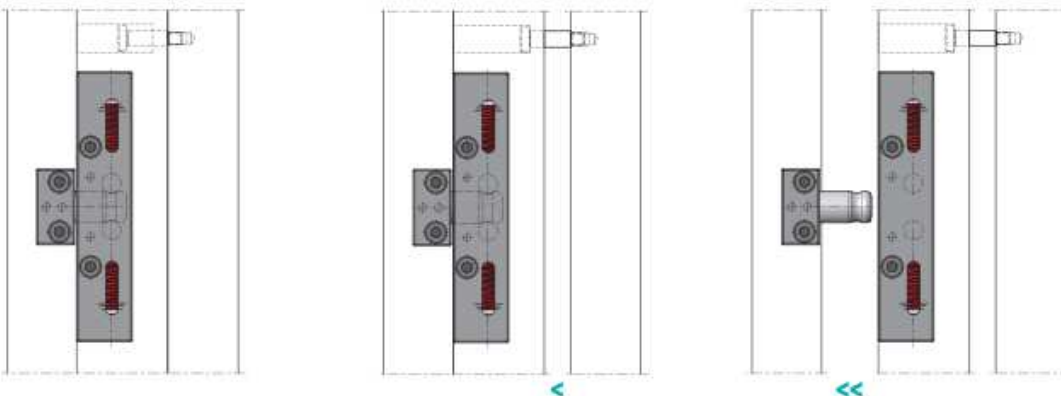
E 1807 Ball-actuated puller

Ideal for practical installation in the plate. The release force can be regulated through a variable number of springs.



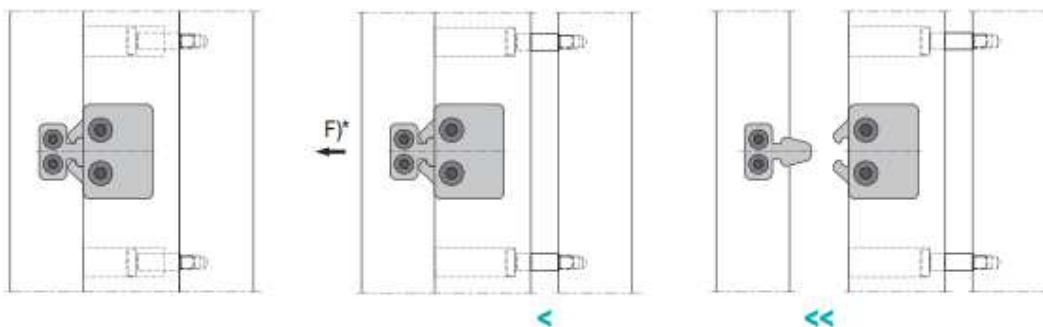
E 1808 Roller puller

Attached to the mould, release force be can regulated through a variety of springs.



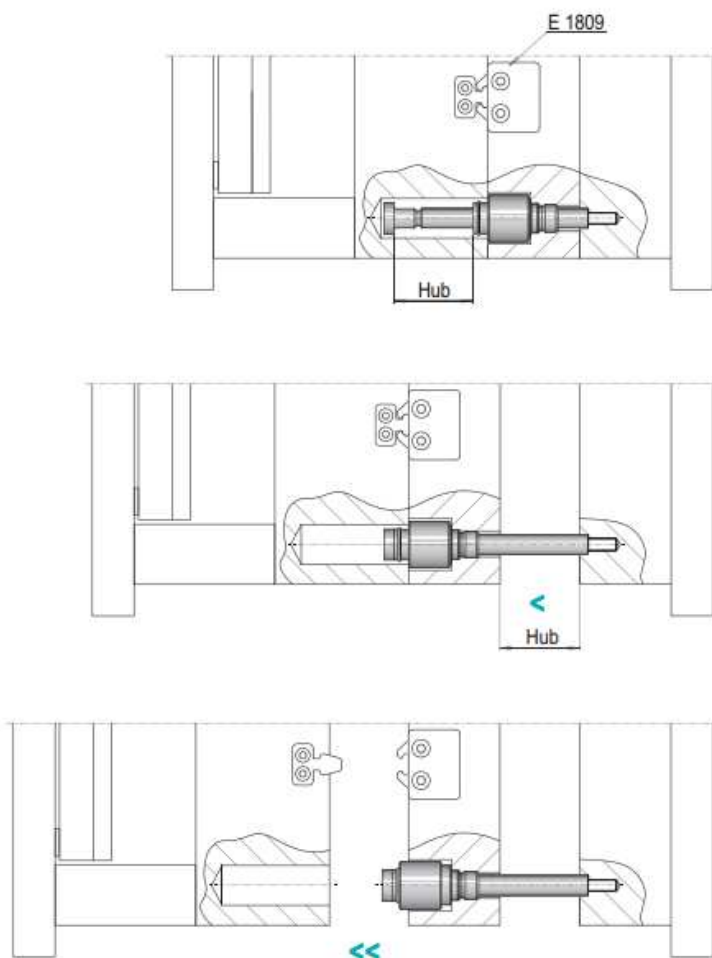
E 1809 Claw puller

Similar to E 1808, release force can regulated through a variety of springs.



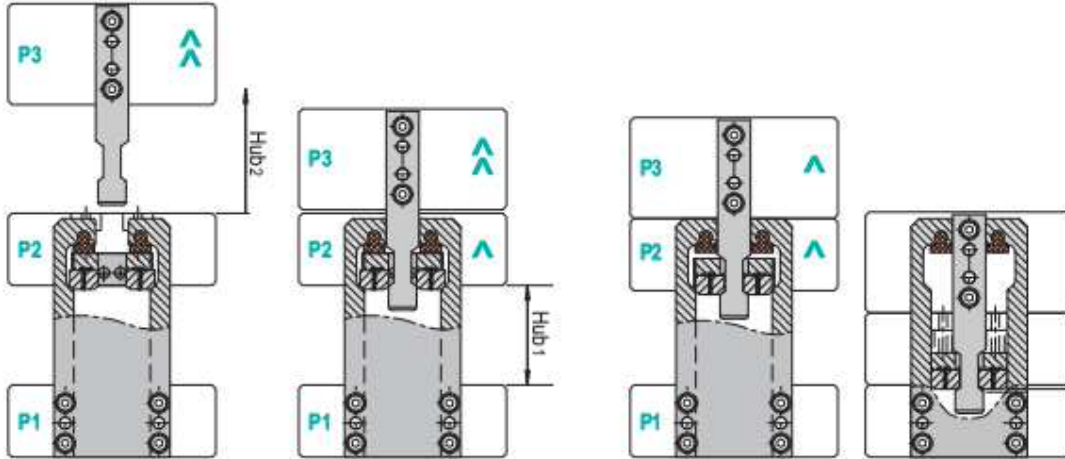
E 1815 Stopper with locking mechanism

Space-saving installation through combination of stopper and locking. The perfect complement for the E 1809 Claw puller.



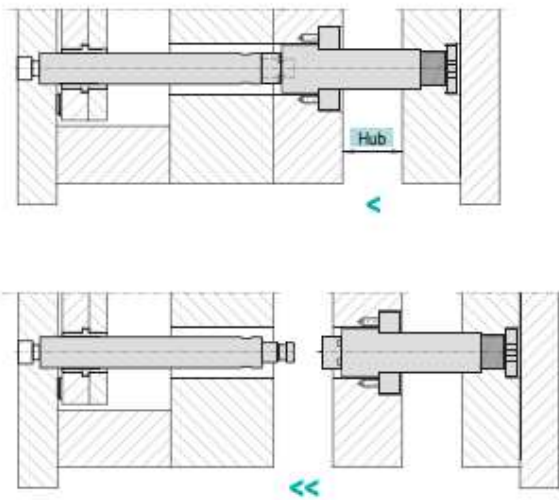
E 1820 Flat latch lock

Sturdy design and large surface latches allow for precise guide curves.



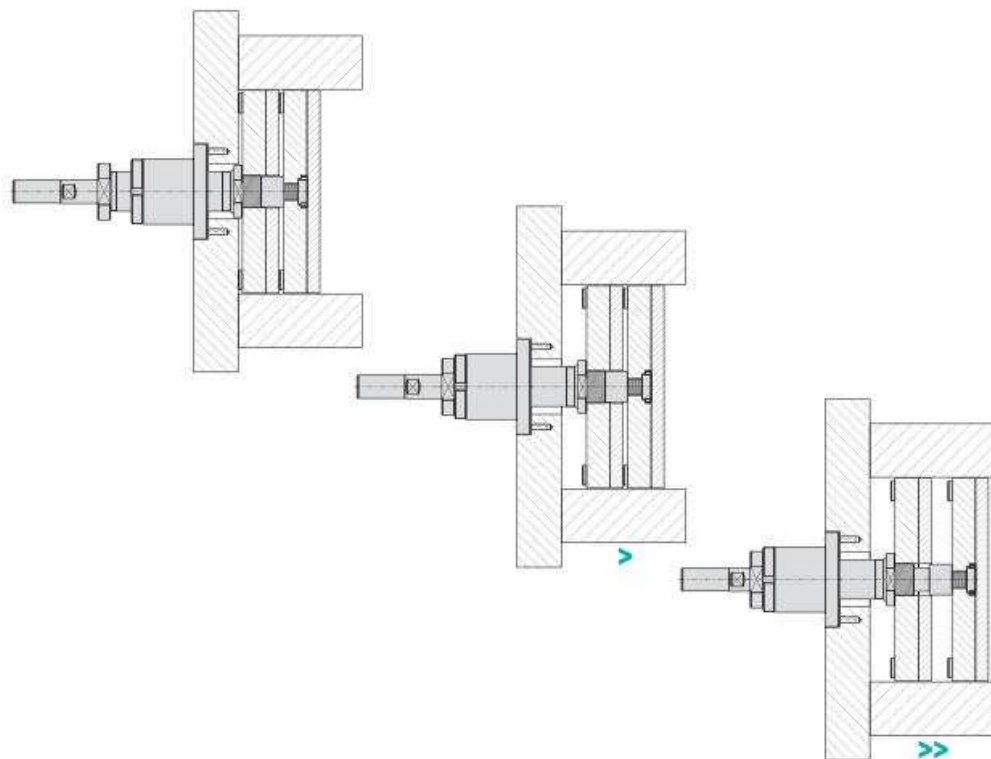
E1840 Round latch lock

For installation in the mould plate with locking of the floating plate.



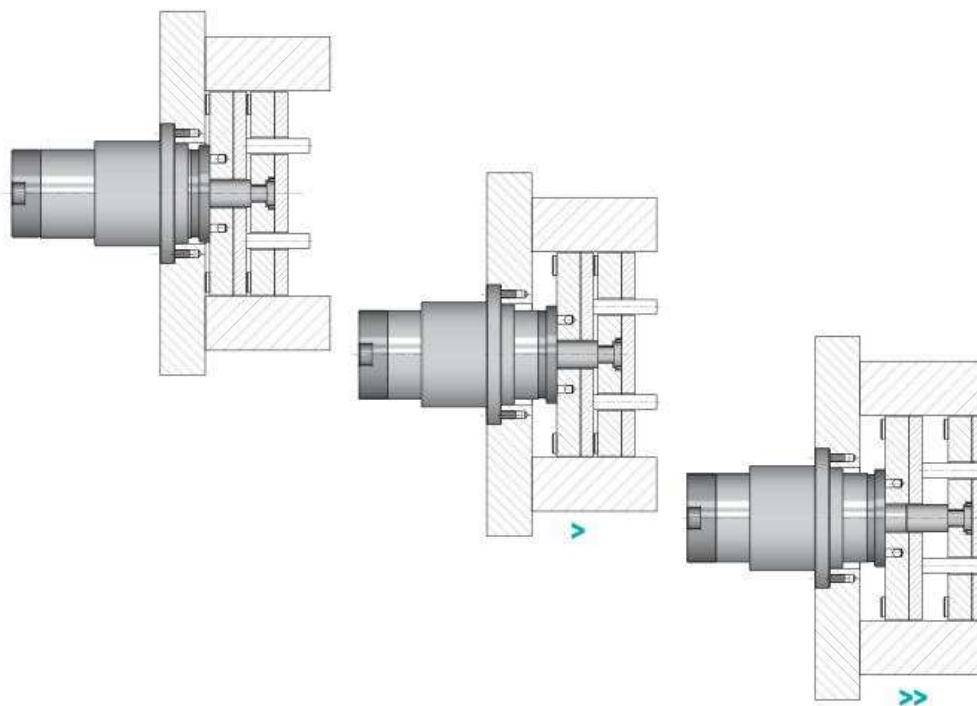
E 1860 Two-stage ejector

Control of demoulding process with 2 ejector strokes. Available in leading and trailing type.



E 1880 Two-stage ejector, hydraulic

Functionally the same as E 1860 only in hydraulic version.

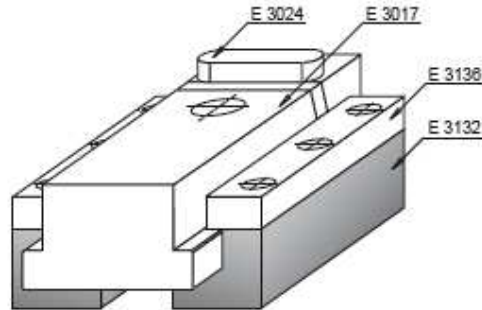


5 Slide system

5.1 Modular system

If possible, a complete slide unit (E 3130, E 3011, E 3012) should be used here.

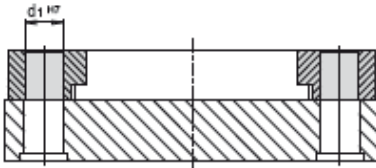
E 3130



- » Through the modular system the risers, stoppers, guiding elements, slides etc. can be individually assembled or ordered as ready-to-use unit (E 3130, E 3011, E 3012).
- » Various installation types
- » Depending on the case, the inclined pin E 1030, E 1032, or E 1034 can be used.
- » Self lubricating or DLC coated guiding rails.
- » Easy exchange of standard parts.

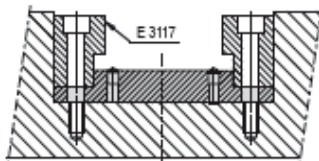
5.2 Types of installation

E 3100

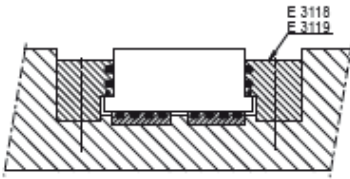


E 3116

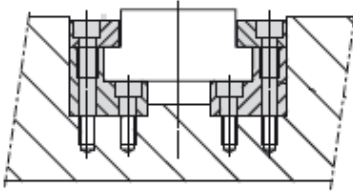
E 3117



E 3118
E 3119

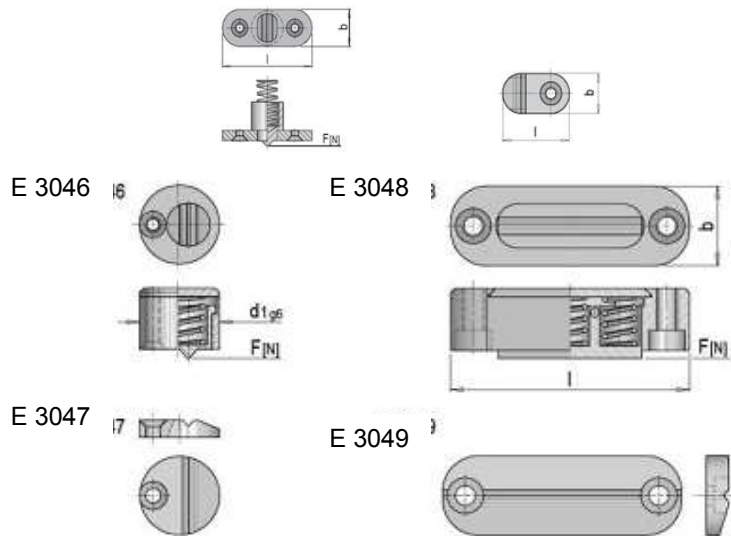


E 31300
E 3132
E 3136



5.3 Positioning and fixing

The slides can be easily fixed and positioned by a slide stopper or slide stopper device.

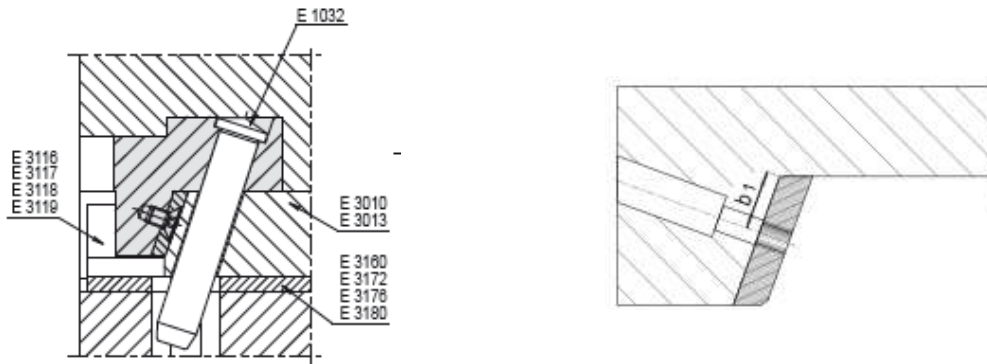


5.4 Wear plate

If shear forces occur through the geometry of the component wear plates can be used to absorb them. If possible, the wear plates should be uniformly distributed and easily installable in the mould. The length of the wear plates should not exceed 200 mm.

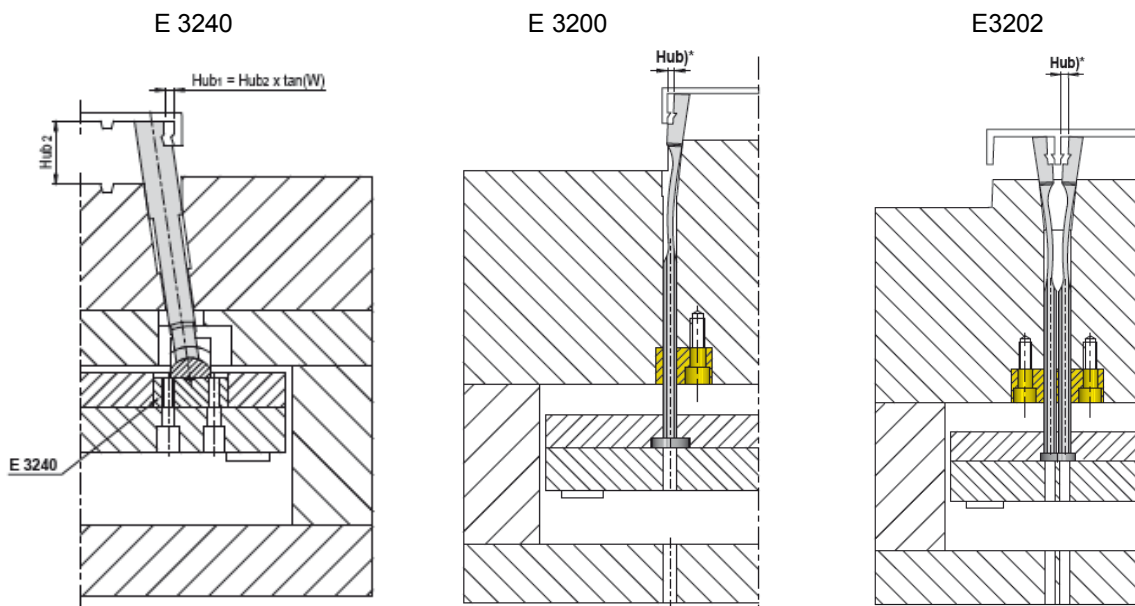
Installation from the front side with hole and counterbore for fastening screws (E 3030, E 3036).

Installation from the back side by means of a thread in the wear plate (E 3031, E 3032, E 3034)



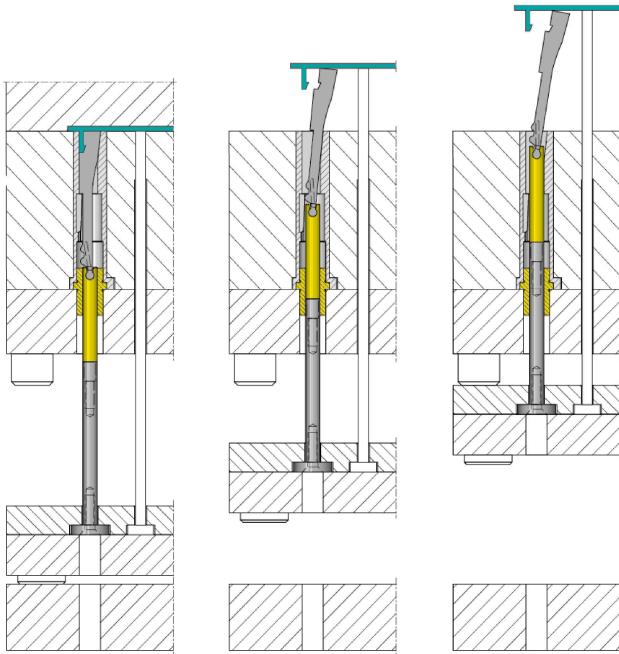
5.5 Ejector for inclined ejection unit and flexible ejection unit

If for structural reasons the demoulding of an undercut must be provided in the mould by means of an ejector for inclined ejection unit or a flexible ejection unit, this can be easily implemented using the E 3200, E 3202, E 3220 or E 3240.



5.6 Ejector with mechanically controlled undercut

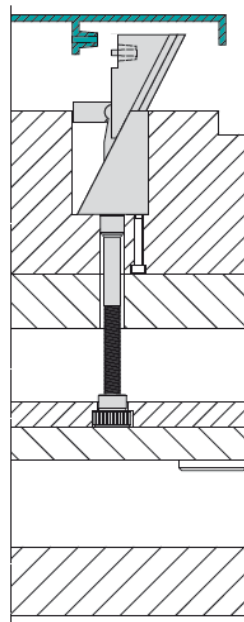
The mechanically controlled guide track enables reliable demoulding of the undercut. The motion is carried out by the ejector set. (E 3260)



5.7 Ejection sliding unit

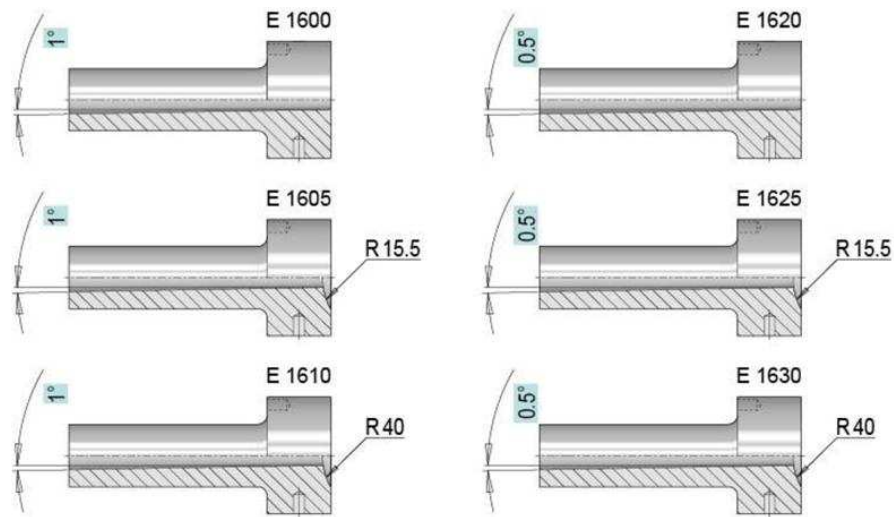
Guided ejection for safe demoulding of internal undercuts. Long ejection distance through a very compact design

- E 3250
- E 3252



6 Sprues

6.1 Sprue bush



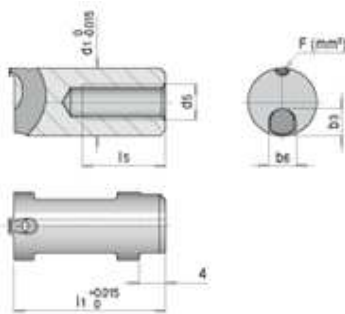
The size of the sprue bush must be chosen so the required mass flow rate for the injection mould is guaranteed and fits to the used production machine. The surface volume ratio should be as small as possible with regard to the heat loss. The nozzle radius must be smaller than the sprue bush radius. A filling simulation is recommended for the sprue bush design.

Hot runner variants are agreed on with the customer, use only when required.

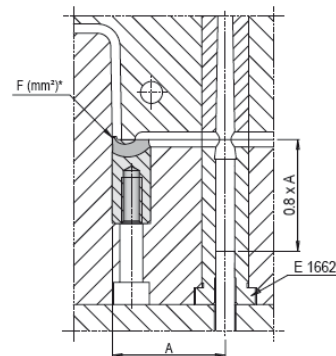
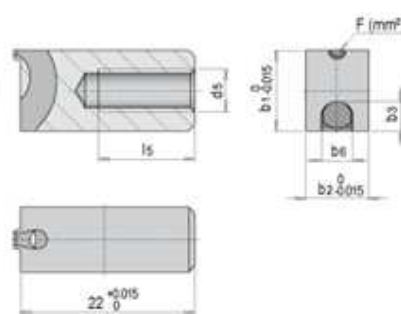
6.2 Tunnel gate inserts

6.2.1 With finished contours

E 1680, round



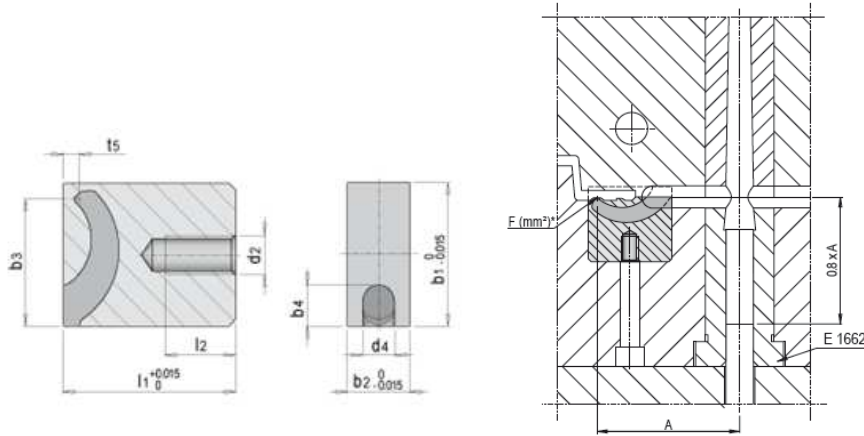
E 1685, rectangular



6.2.2 Contourable

E 1690 60 HRC

E 1692 40 HRC



6.3 Sprue retainer

The sprue retainers are available in standard version (E 1660), long version (E 1662), or without undercut for introducing a customised undercut (E 1663), as well as in a long version without undercut (E 1664).



7 Ejector system

7.1 Ejector pins

The selection of ejector pins should be based on the component geometry and application. If a form cut is required at the end of the ejector it must have an anti-rotation protection (E 1702 or E 1712). If the aperture for a blade ejector becomes eroded, a blade ejector with angle radii (E 1727) or a blade ejector with 4 angle radii (E 1728) may be used. The DLC coated ejector can be used without any lubrication or with just minimal lubrication. When possible always provide compulsory ejector retraction in the design, this should be flush on a flat surface.



2

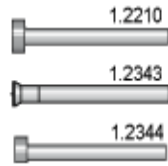
7.2 Selection of ejectors

Material grades:

1.2210

1.2343

1.2343



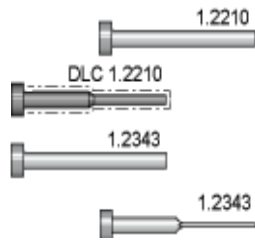
Treatment:

Hardened

DLC coated

Nitrided and oxidised

Nitrided



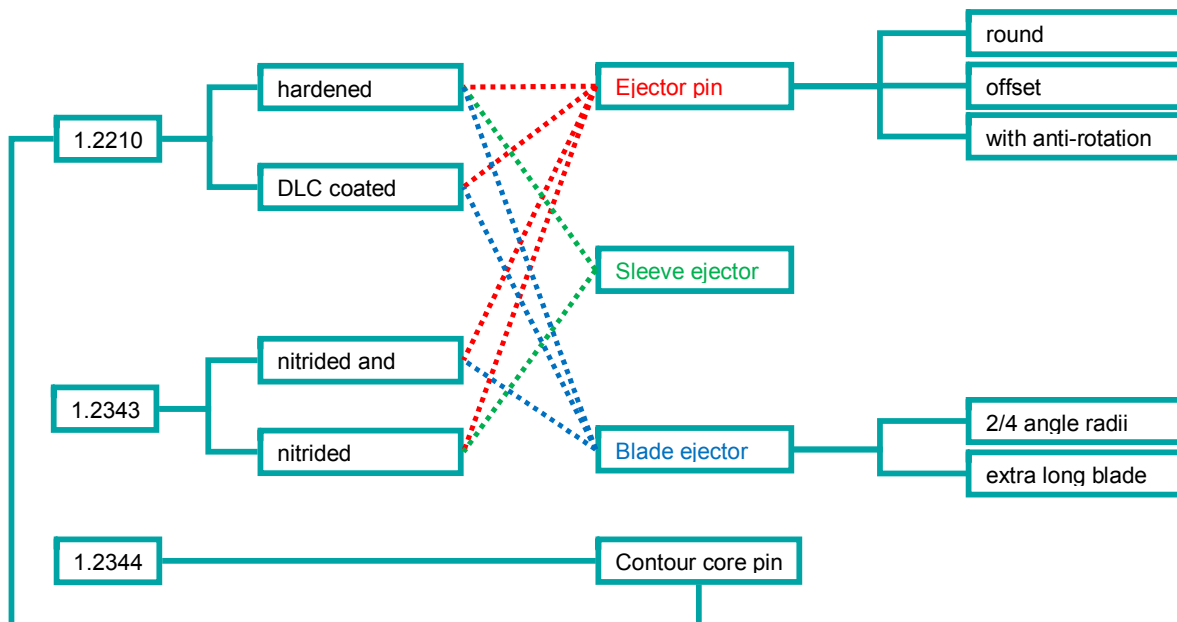
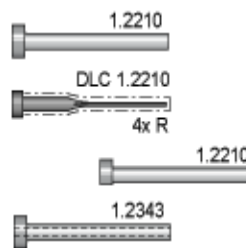
Version:

Ejector pin

Blade ejector pin

Contour core pin

Sleeve ejector



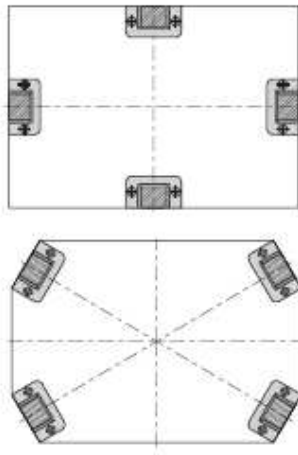
8 Centring elements

Additional centring elements are required for very precise, high-temperature, and at risk of warping moulds.

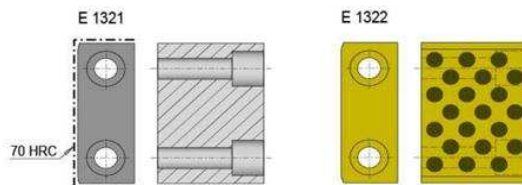
8.1 Positioning elements

8.1.1 Flat guiding unit

- » Flat guiding units should be used to support the guide pillars and to simplify the centring of large and very precise moulds.
- » Due to heat expansion, four guides should be attached to the mould, centred on the side or diagonal on the mould.
- » The guides must not interfere with the removal of parts. This means that the flat guiding rail should be mounted in such a way that picker or robot arms, including their components, are not disturbed.
- » In an adjusted state, the guide clearance should not exceed a few hundredths per side.
- » Oil grooves on the guiding surfaces are required for flat guiding units without self lubrication.

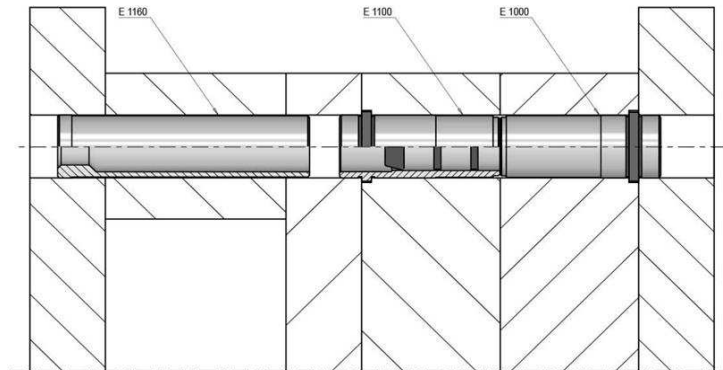


The Meusburger E 1320 already includes an oil groove. For self-lubricating guiding plates please use the E 1322.



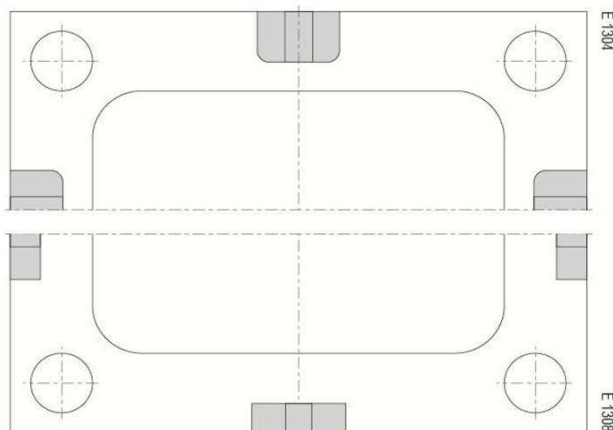
8.1.2 Pillar guides with centring

- » The cavity plates must be positioned on top of each other by the guide pillar and the guide bush. An E 1000, E 1010 or E 1020 can be used accordingly as guide pillar. Alternatively, self lubricating guiding bushes could be used here.
- » The backing plate must be aligned with a centring bush (E 1160) through the riser on the clamp plate.
- » The right length is to be selected for all components. Here the Mould Base Wizard in the Meusburger digital catalogue can help.

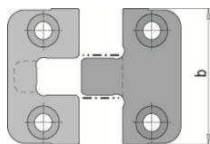


8.1.3 Top lock

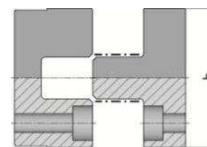
- » Must be used for components with high precision.
- » Depending on space requirements top locks (E 1304) for vertical installation or side locks (E 1308) for horizontal installation can be used. The pocket can be milled in the same clamping with the machining.



E 1304 horizontal



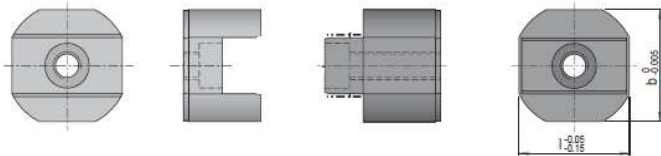
E 1308 vertical



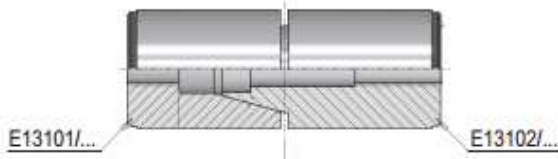
8.1.4 Centring unit

The E 1306 Fine centring unit or E 1310 centring unit can be used for an installation in the mould.

- E 1306

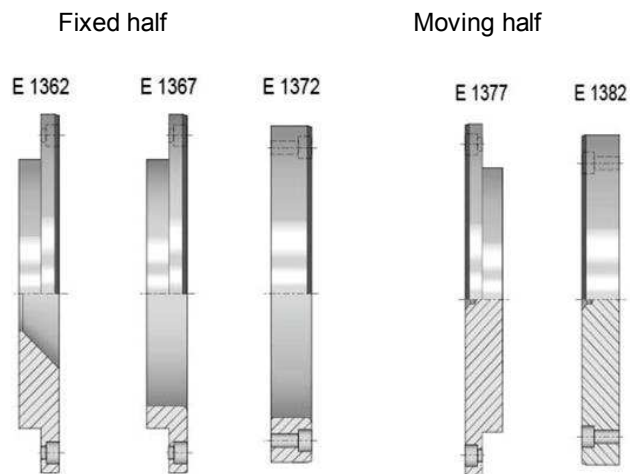


- E 1310



8.2 Locating rings

The mould must be provided with a locating ring on the fixed half, as well as the moving half. The locating ring diameter defines the mould specification. A chamfer must be provided on the locating ring. The location rings are to be provided with 2 holes and 2 screws so they can be screwed to the mould.















9 Temperature regulation

The temperature regulation must be designed so an optimal temperature distribution is guaranteed in the mould and the product. When possible, connectors are installed flush. The couplers must correspond with the company's internal system. Slides, cores, and other critical areas must be tempered separately. The cooling circuits are labelled with IN 1, IN 2, OUT 1, OUT 2. (E 2030)

Temperature regulation components:

The items no. E 2000 to E 2258 from Meusburger are equipped with the EU connector system (EU).

The items no. E 2300 to E 2398 from Meusburger are equipped with the American connector system (USA).

E 2000	Fitting	
E 2040	Hose nozzle	
E 2075	Screw plug, cylindrical	
E 2088	Swivel coupling 90°	
E 2102	Spiral baffle	
E 2110	Fountain	
E 2120	Spiral core	
E 2137	Deflection element	
E 2180	Coolant hose	
E 2200	Coupler	
E 2350	Coupler with hose nozzle USA system	
E 2030	Marking chips for cooling connections	

You can find more temperature regulation components on www.meusburger.com and in the catalogue.

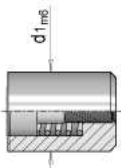
10 Marking of the work piece

All stamps are available in standard and short version and with fixed height.

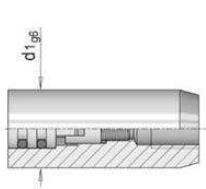
10.1.1 Marking stamps

The marking stamps must be installed near the part designation.

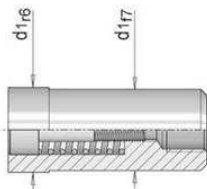
E 2426 E2427



E 2246 E 2247



E 2406 E 2407



E 2406



E 2407



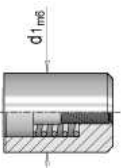
E 2430



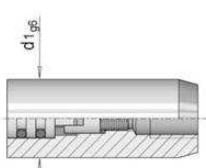
10.1.2 Date stamps

The date stamps must also be installed near the part designation.

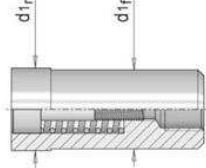
E 2420 E 2424



E 2440 E 2444



E 2400 E 2404



E 2400



E 2410/.../..

E 2400



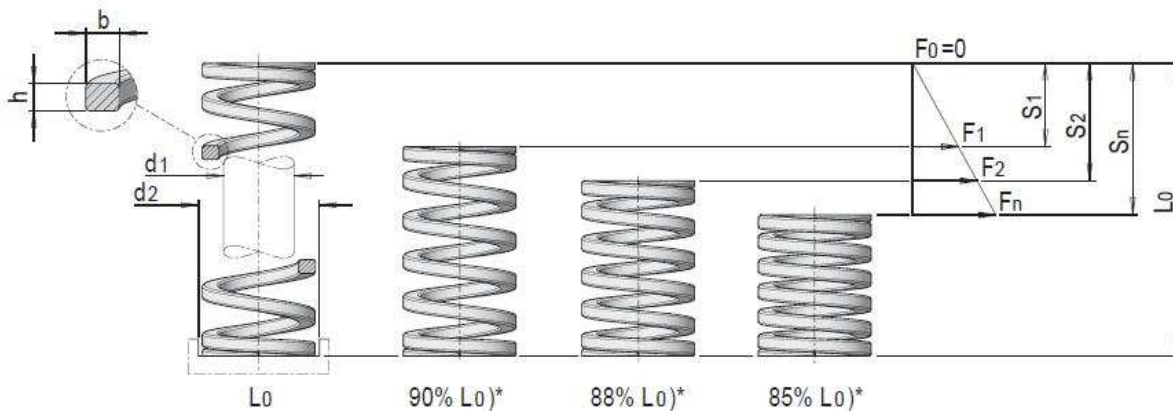
E 2410/.../..

E 2404



11 Springs

Use system compression springs (E 1530 – 1546) or elastomer springs (E 1556 E 1558).



12 Hydraulic cylinders

The double-acting hydraulic cylinders are especially designed and adapted for mould making.

Areas of application:

- » Movements of slides and core pullers
- » Control of the ejection sliding unit
- » Movement of movable cavity plates


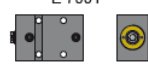


The hardened, ground piston rod offers optimal protection against damage.

Avoid shear forces otherwise the slides and core pullers must be positively locked.

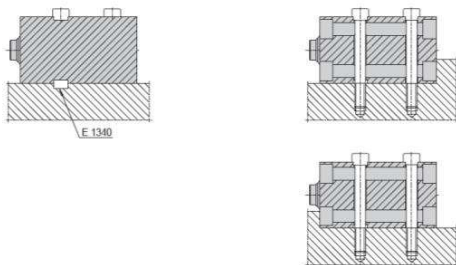
The double seal piston rod with additional rod wiper ensures a clean operation.

When coupling the piston rod a coupling pin must be used for misalignment compensation. End positions should be checked by means of sensors.

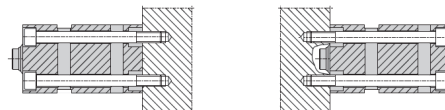


	E 7000 	E 7001 	E 7020 	E 7050 
Bauform Type	Blockzylinder compact cylinder	Blockzylinder compact cylinder	Blockzylinder compact cylinder	Einschraubzylinder threaded-body cylinder
Material Material	Stahl brüniert steel with black oxide finish	Stahl brüniert steel with black oxide finish	Aluminium hartcoatiert hard coated aluminium	Stahl brüniert steel with black oxide finish
Max. Druck Maximum pressure	500 bar	500 bar	160 bar	250 bar
Max. Temperatur Maximum temperature	180 °C	180 °C	150 °C	180 °C
Kolbengeschwindigkeit Piston speed	0,1 m/s (0,5* m/s)	0,1 m/s (0,5* m/s)	0,1 m/s (0,5* m/s)	0,1 m/s (0,5* m/s)
Befestigungsmöglichkeit Fixing options	vorne, hinten, seitlich front, rear, side	seitlich side	vorne, hinten, seitlich front, rear, side	Einbau built-in
Anschluss Hydraulik Hydraulic connections	Verschraubungen fittings	O-Ring, Anbau O-ring seal, attached	Verschraubungen fittings	über Platte via plate
Sensoranbau Sensor attachment	nein no	nein no	ja yes	nein no

Fixing option via across holes

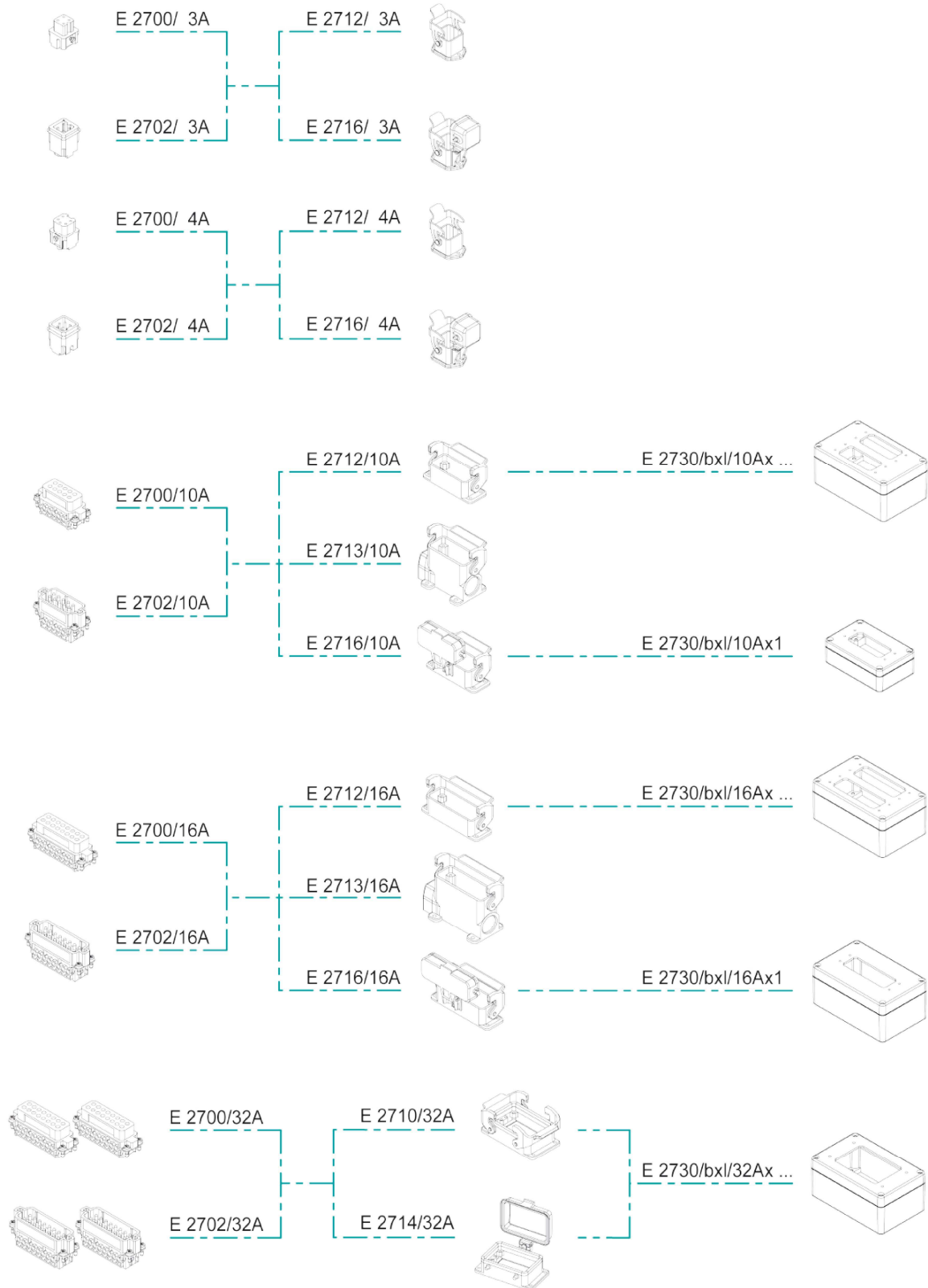


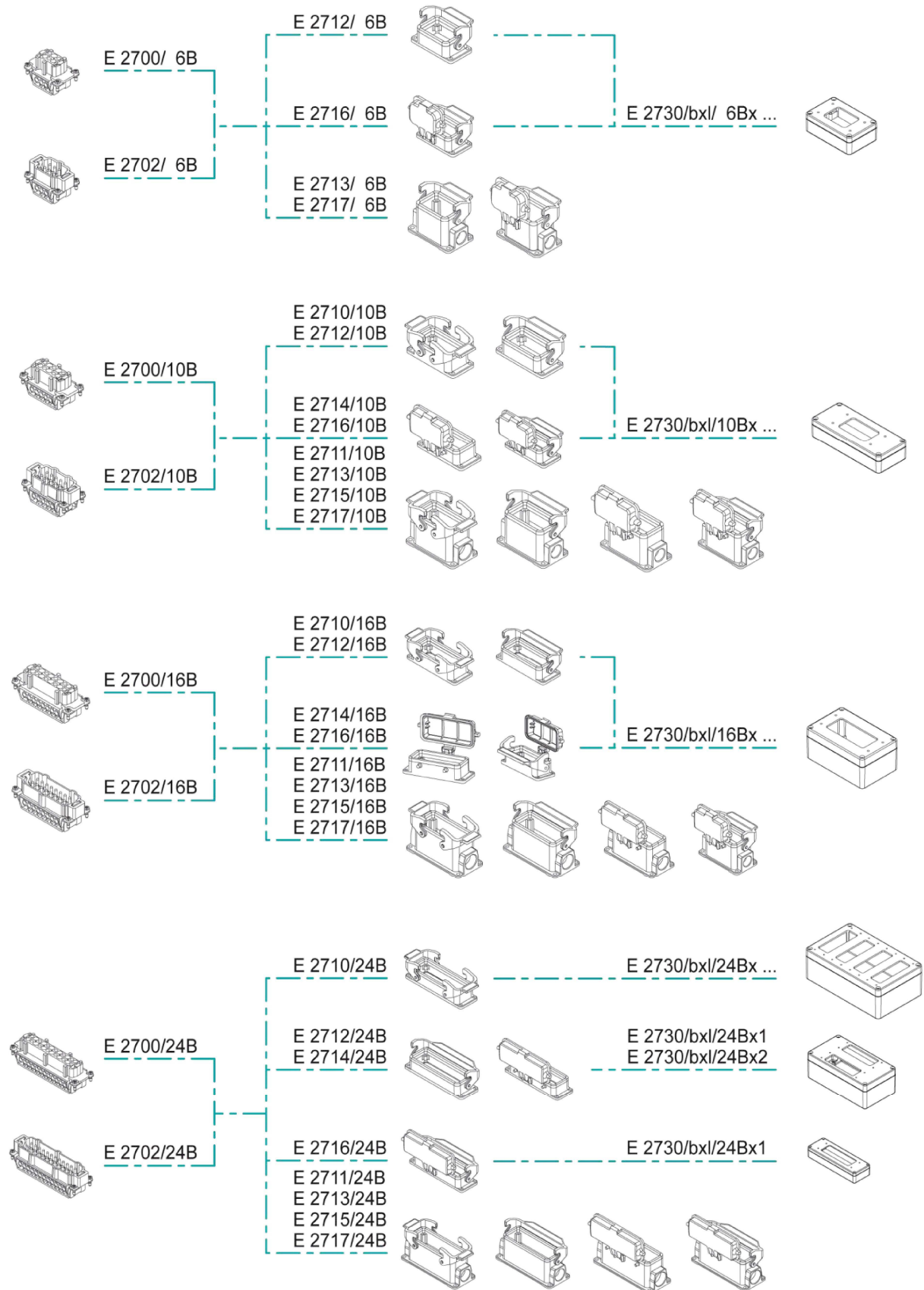
Fixing option via lengthwise holes



13 Electrical components

13.1 Male connectors





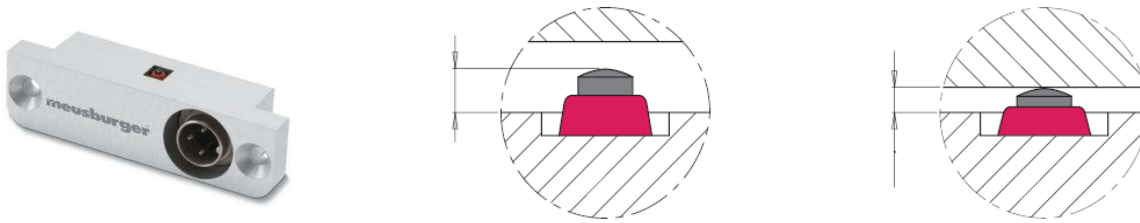
13.2 Sensors

Should be provided in the mould to protect the mould against damage. Generally, sensors should be attached to all moving parts as stop position indicators. This is required for core pullers, slides, or mobile inserts. The position of the ejector set can also be monitored through sensors.

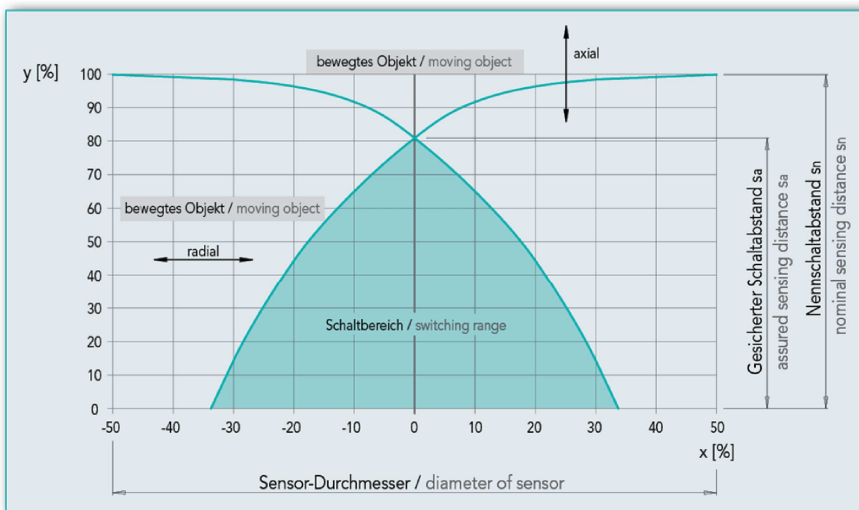
13.2.1 Limit switches

Depending on the installation option, limit switches with vertical or horizontal installation positions can be used with a male or female connector. Depending on the version, release occurs through contact or mechanical release or by passing a magnetic field.

Mechanical limit switches E 650x



Inductive limit switches E 6502



13.2.2 Proximity switches

Various types of proximity switches in PNP normally open contact version.

E 6551



E 6555



E 6560



14 Attachments

14.1 Means of transport

Transport and mounting threads are used for all heavy parts and assemblies.

14.1.1 Eye bolt and transport lock

Each mould must be equipped with a transport lock, which prevents the accidental opening of the mould during transport. This transport lock must have an eye bolt for connection to transport hooks.

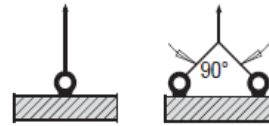
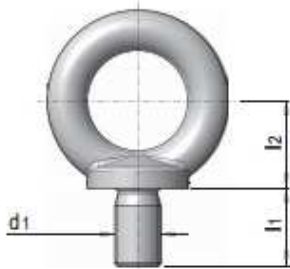
Please note the following:

- » The weight of the mould is to be calculated and the thread for fixing the eye bolt must be designed accordingly.
- » A thread must be provided in every mould half so that the transport lock can effectively prevent the mould halves from opening.
- » The eye bolt must be attached over the mould's centre of gravity.
- » Specially manufactured transport locks need to be marked by colour and be labelled with the mould number.



Weight	[kg]	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
B	[mm]	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
S	[mm]	<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>
Steel grade		<i>Company-specific entry!!</i>	<i>Company-specific entry!!</i>

14.1.2 Eye bolt E 1270

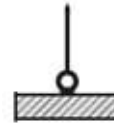
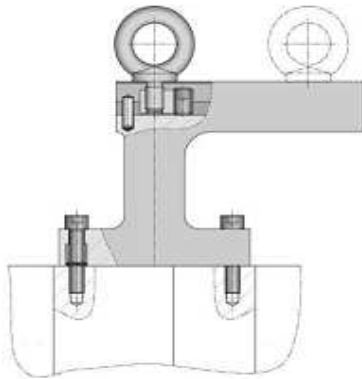


Order no.:	d1	max. kg)*	max. kg)*
E 1270/ 8	M8	140	100
E 1270/ 10	M10	230	170
E 1270/ 12	M12	340	240
E 1270/ 16	M16	700	500
E 1270/ 20	M20	1200	830
E 1270/ 24	M24	1800	1270
E 1270/ 30	M30	3600	2600
E 1270/ 36	M36	5100	3700

* load bearing capacity

14.1.3 Transport bar E 1930

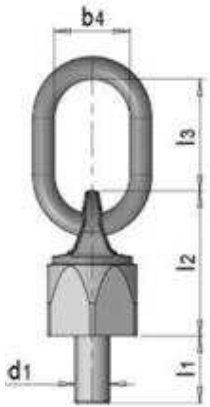
Transport bar E 1930: A fully adapted component which includes an eye bolt and fastening screws for the easy and safe transport of moulds. The bracket must be mounted so that the fixed half and the moving half stay together during transport. The adjustable eye bolt can be positioned and fixed over the mould's centre of gravity. Due to the increased distance between the eye bolt to the mould, the risk of damage from the protruding parts is reduced.



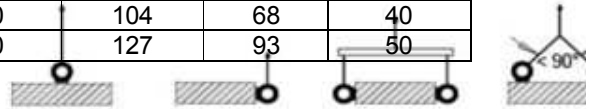
Order no.:	d1 (Eye bolt)	max. kg
E 1930/ 44	M10	150
E 1930/ 64	M10	230
E 1930/ 82	M16	700
E 1930/ 100	M20	1200

If the weight of the mould requires a higher load-carrying capacity, the load can be doubled through the use of safety eye bolts (E 1272 / E 1274).

14.1.4 Revolvable and tiltable eye bolt



Order no.:	d1	l1	l2	l3	b4
E 1274/ 10	M10	17	45	33	29
E 1274/ 12	M12	21	54	51	35
E 1274/ 16	M16	30	65	47	38
E 1274/ 20	M20	33	79	56	35
E 1274/ 24	M24	40	104	68	40
E 1274/ 30	M30	50	127	93	50

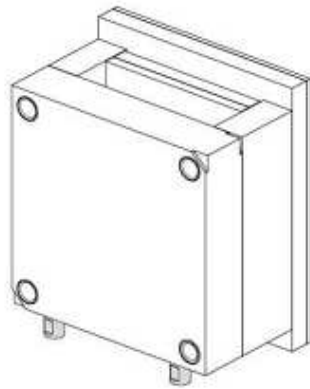


d1	max. kg	max. kg	max. kg	max. kg
M10	900	450	900	630
M12	1200	600	1200	840
M16	2600	1300	2600	1820
M20	4000	2000	4000	2800
M24	7000	3500	7000	4900
M30	10000	5000	10000	7000

14.1.5 Support bolt

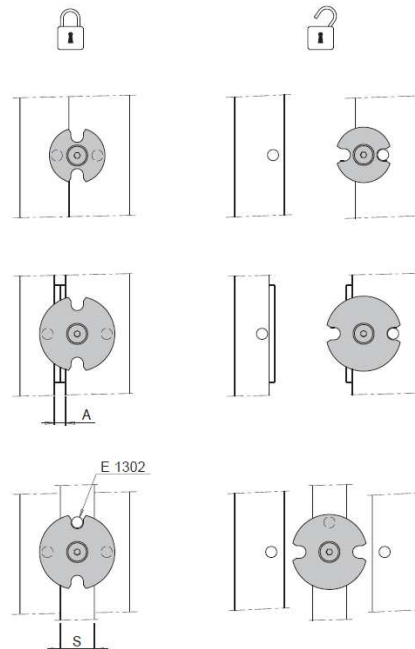
In the case of salient clamp plates or protruding attachments, support bolts must be mounted on the underside of the moulds (fixed half and moving half). These prevent damage to the protruding attachments and protect against dirt and corrosion. (E 1928)

- For salient clamp plates two support bolts per mould half must be used.
- The height of the support bolts must be adjusted to the mould.
- The support bolts stay mounted on the mould.



14.2 Transport lock

To secure the mould halves. Can be operated without tools.



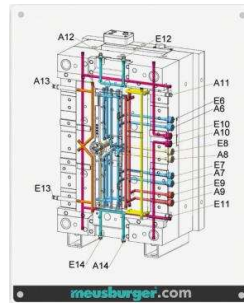
14.3 Cycle counter

For effective monitoring of quantities and maintenance intervals.
Two designs: For installation in the mould (E 2484 / E 2485) and for attachment to the mould (E 2480 / E 2482).



14.4 Labels

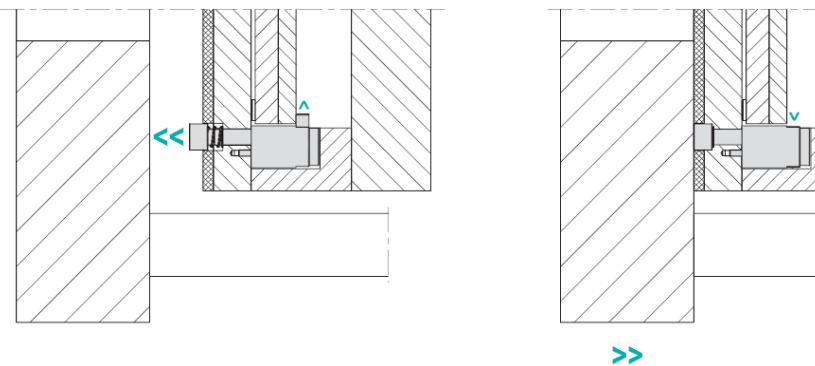
For identifying the moulds you can use the customisable labels from Meusbürger. These are made of aluminium or robust polyamide. They are also ideal for the graphic representation of cooling circuits and for cavity assignment.
Only available for online orders.



14.5 Ejector set coupling

100% protection against unwanted movement of the ejector set during handling and servicing (E 1940).

Automatic locking and unlocking



4. Parts list

The following parts list contains the main components of a mould base according to the Meusbürger Mould Base Wizard. The parts list must still be supplemented with all other individual parts (Ejectors, fasteners, locks, sprues, demoulding, temperature regulation components, inserts, slide system, attachments, electrical components, etc.). These simply can be added to the parts list by double clicking on the price in the catalogue. The parts list can then be exported to various programs.

Mould size 396 x 446 mm

		Part designation:		Mould no.:		
No.	Quantity	Part designation:	Designation	Material	Manufacturer	Comment
		Clamp plate	F 10 /396 446/ 36/1730		Meusbürger	
		Backing plate	F 60 /396 446/ 46/2085		Meusbürger	
		Cavity plate	F 50 /396 446/ 46/2312		Meusbürger	
		Cavity plate	F 50 /396 446/ 96/2312		Meusbürger	
		Backing plate	F 60 /396 446/ 46/2085		Meusbürger	
		Riser	F 70 /396 446/ 62/116/1730		Meusbürger	
		Ejector set	F 90 /396 446/ 268/1730		Meusbürger	
		Clamp plate	F 10 /396 446/ 36/1730		Meusbürger	
		Guide pillar	E 1000/30- 96/ 75 1.7131			
		Guide pillar	E 1000/32- 96/ 75 1.7131		Meusbürger	
		Guide bush	E 1100/30- 46	1.7131	Meusbürger	
		Guide bush	E 1100/32- 46	1.7131	Meusbürger	
		Centring bush	E 1160/42 x 160	1.7131	Meusbürger	
		Centring bush	E 1160/42 x 60	1.7131	Meusbürger	
		Cylinder head screw	E 1200/16 x 90	DIN912	Meusbürger	
		Cylinder head screw	E 1200/16 x 200	DIN912	Meusbürger	
		Insulation board	E 1402/446 446/324/280/374		Meusbürger	
		Transport bar	E 1930/ 64/ 97		Meusbürger	
Symbol of mould manufacturer		Part designation:	Drawing number:		Name:	Date:

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Meusburger Georg GmbH & Co. KG | Kesselstr. 42 | 6960 Wolfurt | Austria
T 00 43 (0) 55 74 / 67 06-0 | F -11 | sales@meusburger.com | www.meusburger.com