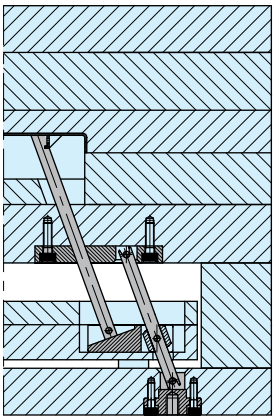
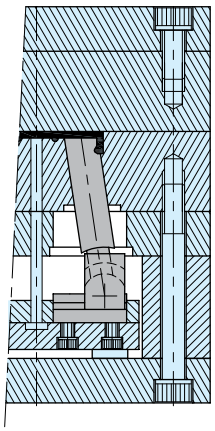
Info VF-ULB/ULC/ULG-AW275/282

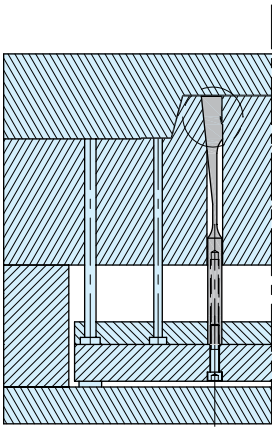


DME has a wealth of solutions for undercut applications:
3 options for straight-line “snap” or “hook” features:

Vectorform VF: unprecedented design flexibility allowing designers to incorporate undercuts that are twice as deep as previously possible. Alternatively, mold designers can cut their ejector stroke in half while maintaining existing undercut geometries



Unilifter ULB-ULC-ULG: back by popular demand, this sliding system can release undercut angles up to 10°



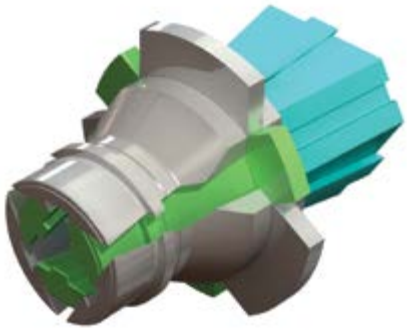
Flexible ejectors AW275/AW280: an inexpensive component used for small, simple undercuts.

Info: CC - Multiform

2 options for internal undercuts (collapsible cores):

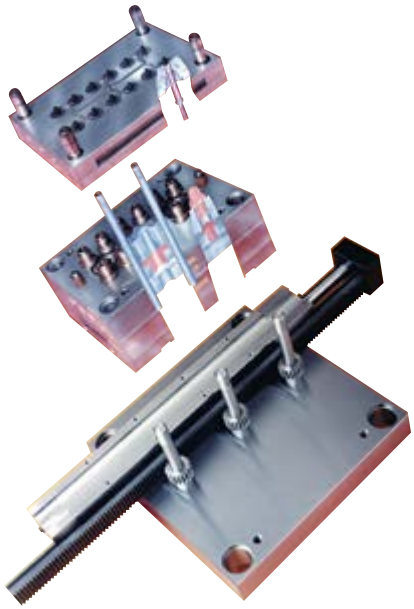
Collapsible Core CC: the global standard for a collapsible core, CC's have been successfully used for over 30 years to mold simple parts like caps as well as more complicated technical fittings. Once installed, CC's offer trouble free operation for millions of cycles.

Multiform: when nothing else will work, Multiform offers unrivalled undercut possibilities and sophisticated 3D part geometries. Precision machined to extremely high tolerances to give the highest quality plastic parts.



Info - EXP - CC

External undercuts using the Expandable cavity/core.
Uses the same high-quality technology from **DME** CC collapsible cores. Custom designed for each application to suit space and build-in requirements.



Unscrewing device ZG for threaded parts. Used worldwide for over 30 years this simple yet unique system employs a hydraulic cylinder to actuate a gear-rack.

- Thickness of Hydraulic cylinders chosen to match standard plate thicknesses
- Square cross section and 4 precision ground surfaces means the cylinder can be conveniently incorporated inside the mold, for example as risers
- Possibility to use rack or cam on all 4 sides of cylinder
- End caps can be rotated allowing flexibility for oil feed
- Cam ramp ZL allows actuation of stripper plate after unscrewing without a second ejector stroke
- Rod seal includes “casing wiper” to prevent dirt entering inside of cylinder
- Optional limit switch with high accuracy micro switches, easily accessible for fine adjustment

Vectorform - Lifter System

VF-SS - VF-JS - VF-US

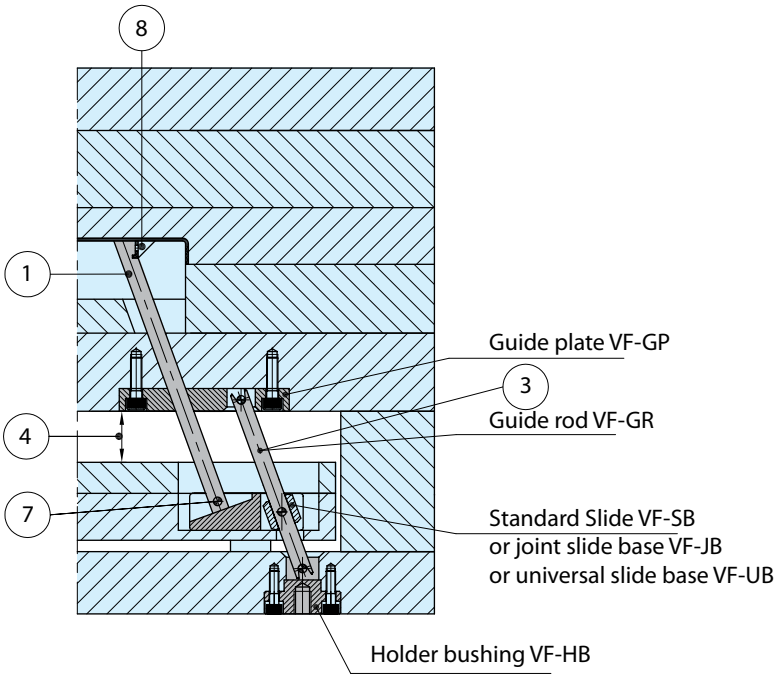
VectorForm Lifter Sets include:
Holder bushing - VF-HB
Guide Rod - VF-GR
Guide Plate - VF-GP
Slide Base:
Standard - VF-SB,
or Joint - VF-JB,
or Universal - VF-UB

REF	Includes	Includes	Includes	Includes	Set
VF 06-SS	VF 06-HB	VF 06-GR	VF 06-GP	VF 06-SB	Standard
VF 08-SS	VF 08-HB	VF 08-GR	VF 08-GP	VF 08-SB	Standard
VF 10-SS	VF 10-HB	VF 10-GR	VF 10-GP	VF 10-SB	Standard
VF 13-SS	VF 13-HB	VF 13-GR	VF 13-GP	VF 13-SB	Standard
VF 16-SS	VF 16-HB	VF 16-GR	VF 16-GP	VF 16-SB	Standard
VF 20-SS	VF 20-HB	VF 20-GR	VF 20-GP	VF 20-SB	Standard
VF 06-JS	VF 06-HB	VF 06-GR	VF 06-GP	VF 06-SB	Joint
VF 08-JS	VF 08-HB	VF 08-GR	VF 08-GP	VF 08-SB	Joint
VF 10-JS	VF 10-HB	VF 10-GR	VF 10-GP	VF 10-SB	Joint
VF 13-JS	VF 13-HB	VF 13-GR	VF 13-GP	VF 13-SB	Joint

REF	Includes	Includes	Includes	Includes	Set
VF 16-JS	VF 16-HB	VF 16-GR	VF 16-GP	VF 16-SB	Joint
VF 20-JS	VF 20-HB	VF 20-GR	VF 20-GP	VF 20-SB	Joint
VF 06-US	VF 06-HB	VF 06-GR	VF 06-GP	VF 06-SB	Universal
VF 08-US	VF 08-HB	VF 08-GR	VF 08-GP	VF 08-SB	Universal
VF 10-US	VF 10-HB	VF 10-GR	VF 10-GP	VF 10-SB	Universal
VF 13-US	VF 13-HB	VF 13-GR	VF 13-GP	VF 13-SB	Universal
VF 16-US	VF 16-HB	VF 16-GR	VF 16-GP	VF 16-SB	Universal
VF 20-US	VF 20-HB	VF 20-GR	VF 20-GP	VF 20-SB	Universal

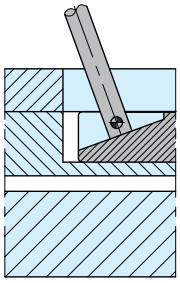
Features & Benefits

1. Moves freely at angles up to 30°. For angles greater than 30° please contact **DME** Technical Service for design guidance.
2. Plate machining is significantly simplified as no diagonal hole machining is required in order to install the VectorForm Lifter System.
3. Maximum lifter angle is greatly improved with VectorForm Lifter System. Lifter cores may be installed at any given angle up to 30°.
4. The robust design and construction of the VectorForm Lifter System ensures that it is secure at any given ejector stroke regardless of angle used.
5. The compact design of the VectorForm Lifter System minimizes potential for interference with other components within the mold.
6. VectorForm Lifter System components are engineered for the common injection molding environment. No special coatings are necessary.
7. The lifter core assembly may be secured to the Slide Base in a variety of ways, maximizing design flexibility.
8. Maximizes allowable undercut space.



VF-SB

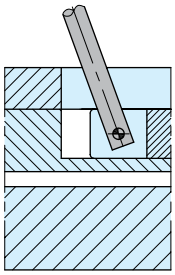
Standard Slide SB



The Standard Slide Base is the most flexible and the most economical slide base. The Standard Slide Base can be custom machined by the mold builder to meet specialized application requirements. The Standard Slide Base is also the most robust slide base with respect to loads and forces.

VF-JB

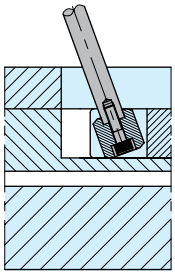
Joint Slide Base JB



Joint Slide Base permits the lifter core assembly to be retained with a single pin.

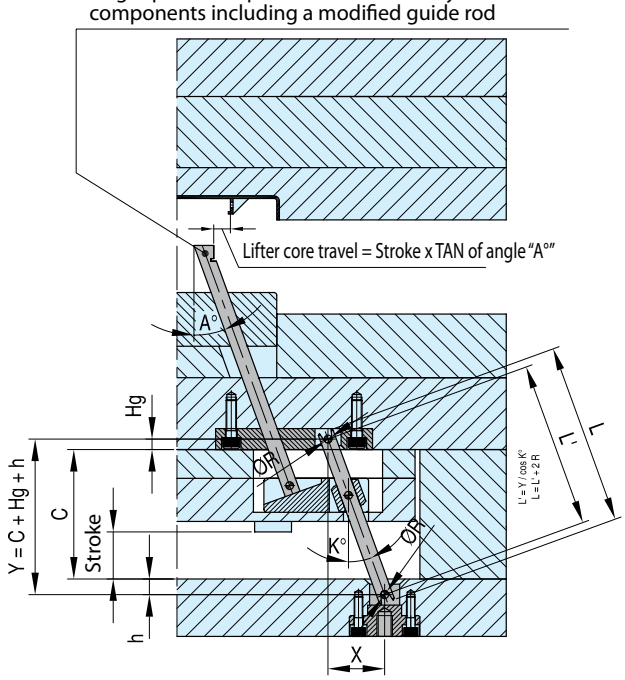
VF-UB

Universal Slide Base UB



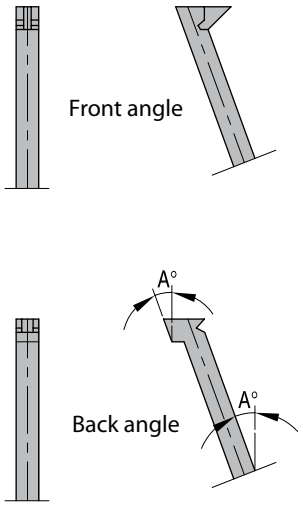
The universal Slide Base is similar to the Joint Slide Base, although the single pin is replaced by a universal joint which offers greater flexibility than the Joint Slide Base while still requiring only one screw to retain the lifter core assembly.

The lifter core (supplied) by moldmaker) may be a single-piece component or an assembly of several components including a modified guide rod



C - Ejector box height
I - Ejector retainer plate height
J - Bottom clamp height

Locking Angles

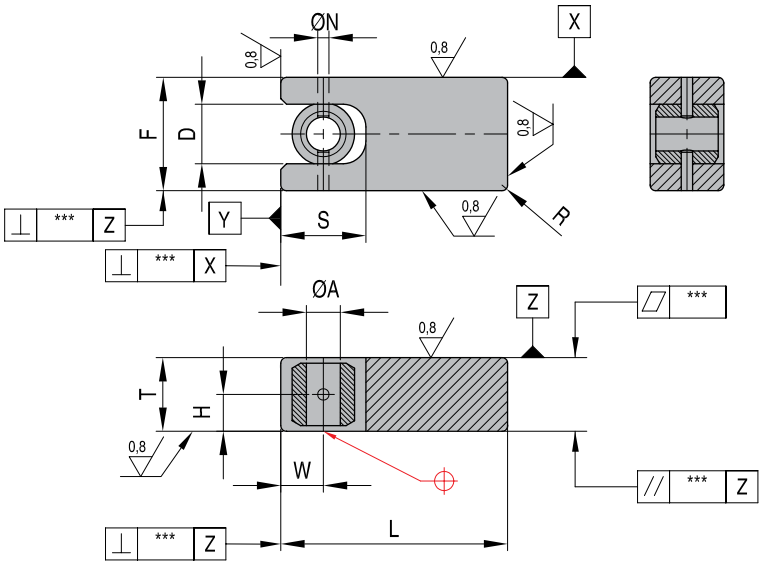


Installation instructions

1. General Installation
It is recommended that the VectorForm Lifter System be installed as shown. For each given VectorForm set, all components MUST be of the same size. However, separate sets of different sizes may be installed in the same mold. Actuation of VectorForm Lifter Systems can be accelerated or decelerated by an inclined sliding surface on the ejector plate and ejector retainer plate.
2. Angles
The VectorForm Lifter System may be used with angles ranging from 5° (min) to 30° (max). Deep undercuts in the molded part can be obtained by using a larger angle in the lifter core and by increasing the ejector plate stroke.
3. Lifter Core Guidance
The lifter core must have sufficient guidance in the tool. For multiple lifter cores installed in tandem in the tool, additional guidance in the core inserts is recommended. If resistance in actuation is great, an additional Guide Plate may be placed directly below the core insert.
4. Guided Ejection
Guided ejection is recommended for all designs.
5. Fit and Finish
Standard component dimensions and Rockwell hardness are provided in the component specifications section. Should the standard components need to be modified, additional performance can be obtained by treating after finish machining (TiN coating, flash-chrome, etc.). Component installations can be fitted to suit. Ensure a loose fit on the Holder Bushing and Guide Plate installation. Ensure a precise fit between the lifter core and Guide Plate. The Holder Bushing will automatically align prior to bolting the bushing to the clamp plate. Lubrication is not generally required nor recommended. If lubrication is used, it should be low-viscosity.
6. Locking Angles/ Component Back-up
Locking angles may be designed to provide a locking surface to counter against molding pressure. A block construction using a square lifter core can also allow the resin pressure to be backed up by the core insert. If the axial load acting on the lifter core exceeds the limit allowed for the slide base pin (used in VF-JB and VF-UB Slide Bases), use a Standard (VF-SB) Slide Base and back the lifter core on the slide by machining a ledge that is perpendicular to the axis of the lifter core. The lifter core must then seat firmly against the angled face of the Slide Base.
7. Non-Standard Shapes/Materials
Lifter core blocks may be machined to any desired shape and size, provided the chosen number and size of the VectorForm Lifter System core standard components will support the lifter core blocks. Lifter core blocks are to be supplied by the moldmaker.

VF-SB

Standard Slide Base Mat.: DIN 1.7225/30-33 HRC

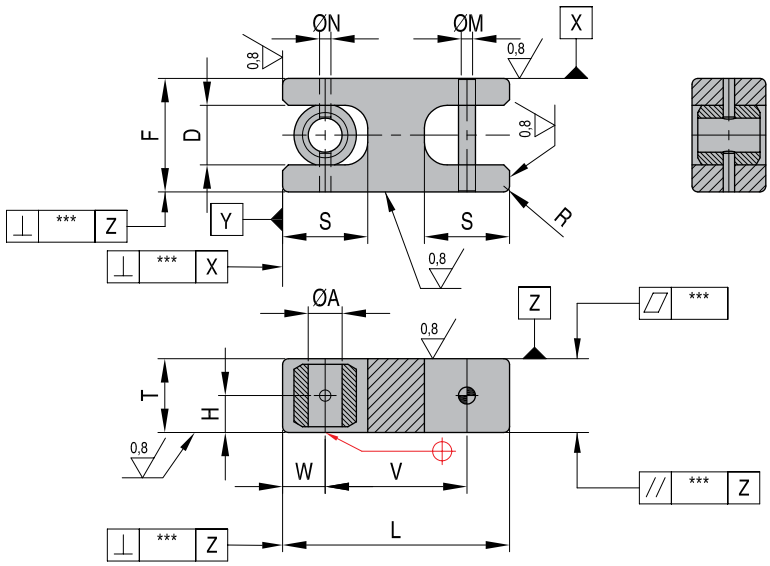


Additional Machining:
Retaining bolt installation on lifter core rod or assembly.
Heat Treatment:
Gas nitriding is permissible after additional machining has been performed.

REF	A	L	F	T	D	H	W	S	N	R	▱	//	⊥
VF 06 SB	6	40 $^{0}_{-0,10}$	20 $^{0}_{-0,02}$	13 $^{0}_{-0,02}$	10,5	6,5	7,5	15	2	1	0,010	0,01-0,02	0,02
VF 08 SB	8	50 $^{0}_{-0,10}$	25 $^{0}_{-0,02}$	15 $^{0}_{-0,02}$	13,5	7,5	10,0	20	3	1	0,010	0,01-0,02	0,02
VF 10 SB	10	60 $^{0}_{-0,20}$	32 $^{0}_{-0,03}$	20 $^{0}_{-0,03}$	17,0	10,0	12,5	25	4	2	0,015	0,02-0,03	0,03
VF 13 SB	13	80 $^{0}_{-0,20}$	40 $^{0}_{-0,03}$	25 $^{0}_{-0,03}$	22,0	12,5	15,0	30	5	2	0,015	0,02-0,03	0,03
VF 16 SB	16	100 $^{0}_{-0,30}$	50 $^{0}_{-0,05}$	30 $^{0}_{-0,05}$	27,0	15,0	20,0	40	6	3	0,020	0,02-0,05	0,05
VF 20 SB	20	130 $^{0}_{-0,30}$	60 $^{0}_{-0,05}$	40 $^{0}_{-0,05}$	33,0	20,0	25,0	50	7	3	0,020	0,02-0,05	0,05

VF-JB

Joint Slide Base Mat.: DIN 1.7225/DIN 1.1213/60-66HRC



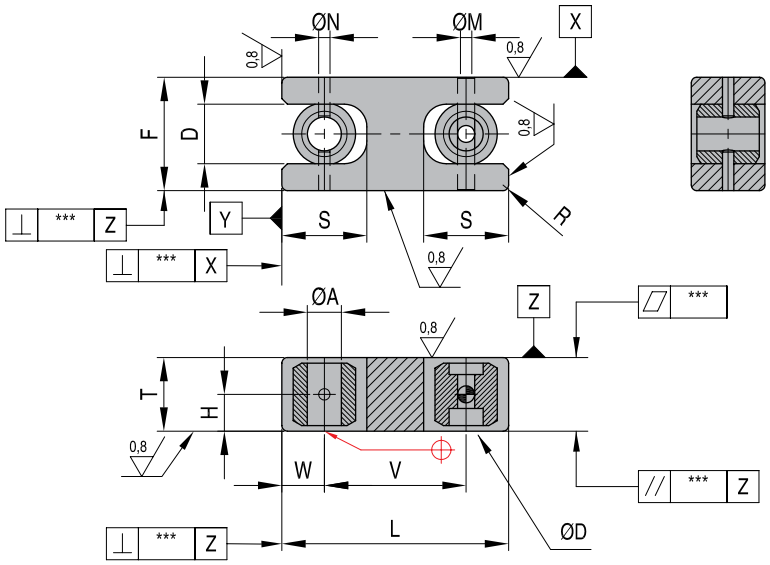
Attachment: Joint Pin
Heat Treatment: Gas nitriding is permissible; during nitriding, use a pin finer (-0.01) than the attached joint pin.
Joint Pin material:
DIN1.1213
Hardness: HRC 60-66
Tempering temperature: 600°C

REF	A	L	F	T	D	H	W	S	V	N	M	R	▱	//	⊥
VF 06 JB	6	40 $^{0}_{-0,10}$	20 $^{0}_{-0,02}$	13 $^{0}_{-0,02}$	10,5	6,5	7,5	15	25	2	3	1	0,01	0,01-0,02	0,02
VF 08 JB	8	50 $^{0}_{-0,10}$	25 $^{0}_{-0,02}$	15 $^{0}_{-0,02}$	13,5	7,5	10	20	30	3	4	1	0,01	0,01-0,02	0,02
VF 10 JB	10	60 $^{0}_{-0,20}$	32 $^{0}_{-0,03}$	20 $^{0}_{-0,03}$	17	10	12,5	25	35	4	5	2	0,015	0,02-0,03	0,03
VF 13 JB	13	800 $^{0}_{-0,20}$	40 $^{0}_{-0,03}$	25 $^{0}_{-0,03}$	22	12,5	15	30	50	5	6	2	0,015	0,02-0,03	0,03
VF 16 JB	16	100 $^{0}_{-0,30}$	50 $^{0}_{-0,05}$	30 $^{0}_{-0,05}$	27	15	20	40	60	6	8	3	0,02	0,02-0,05	0,05
VF 20 JB	20	130 $^{0}_{-0,30}$	60 $^{0}_{-0,05}$	40 $^{0}_{-0,05}$	33	20	25	50	80	7	10	3	0,02	0,02-0,05	0,05

Universal Slide Base

Mat.: DIN 1.7225/30-33 HRC

VF-UB



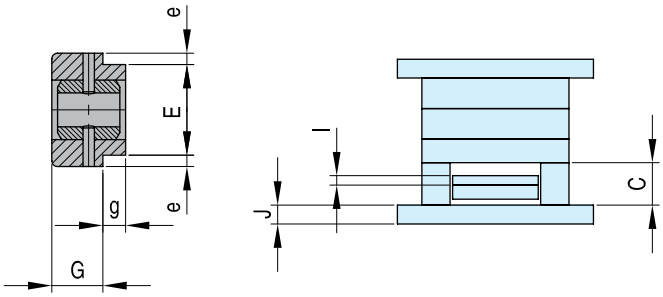
Attachment: None
Heat Treatment:
Nitriding is permissible.

REF	A	L	F	T	D	H	W	S	V	N	M	ØD	R	▱	//	⊥
VF 06 UB	6	40 $^{0}_{-0,10}$	20 $^{0}_{-0,02}$	13 $^{0}_{-0,02}$	10,5	6,5	7,5	15	25	2	3	M3x10	1	0,010	0,01-0,02	0,02
VF 08 UB	8	50 $^{0}_{-0,10}$	25 $^{0}_{-0,02}$	15 $^{0}_{-0,02}$	13,5	7,5	10,0	20	30	3	4	M4x12	1	0,010	0,01-0,02	0,02
VF 10 UB	10	60 $^{0}_{-0,20}$	32 $^{0}_{-0,03}$	20 $^{0}_{-0,03}$	17,0	10,0	12,5	25	35	4	5	M5x15	2	0,015	0,02-0,03	0,03
VF 13 UB	13	80 $^{0}_{-0,20}$	40 $^{0}_{-0,03}$	25 $^{0}_{-0,03}$	22,0	12,5	15,0	30	50	5	6	M6x20	2	0,015	0,02-0,03	0,03
VF 16 UB	16	100 $^{0}_{-0,30}$	50 $^{0}_{-0,05}$	30 $^{0}_{-0,05}$	27,0	15,0	20,0	40	60	6	8	M8x25	3	0,020	0,02-0,05	0,05
VF 20 UB	20	130 $^{0}_{-0,30}$	60 $^{0}_{-0,05}$	40 $^{0}_{-0,05}$	33,0	20,0	25,0	50	80	7	10	M10x35	3	0,020	0,02-0,05	0,05

Additional machining - Installation classification

VF-SB VF-JB VF-UB

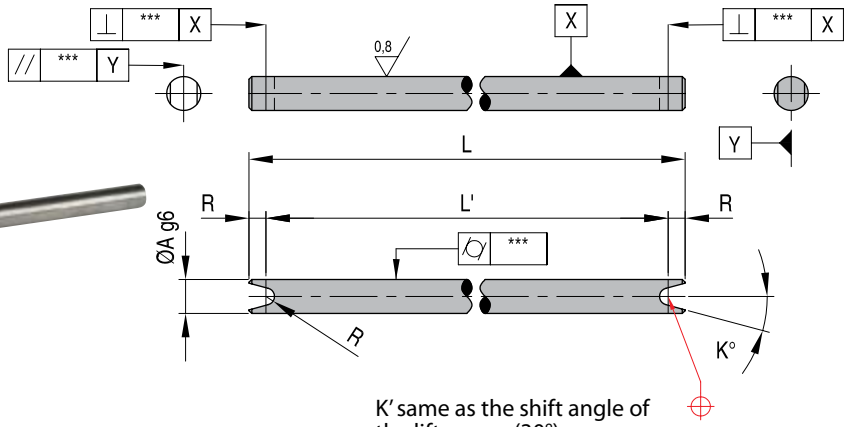
*These are retention grooves used to retain the slide base in the ejector plates. They need to be machined by the customer.



REF	E	e	G	g	I	J	C
VF 06 SB/JB/UB	16	2,0	9	4	13	20	50-120
VF 06 SB/JB/UB	20	2,5	11	4	15	25	50-150
VF 06 SB/JB/UB	26	3,0	14	6	20	30	70-200
VF 06 SB/JB/UB	33	3,5	17	8	25	35	100-250
VF 06 SB/JB/UB	42	4,0	22	8	30	40	120-300
VF 06 SB/JB/UB	50	5,0	28	12	35	50	120-400

VF-GR

Guide rod Mat.: DIN 1.3505 - 58-60HRC



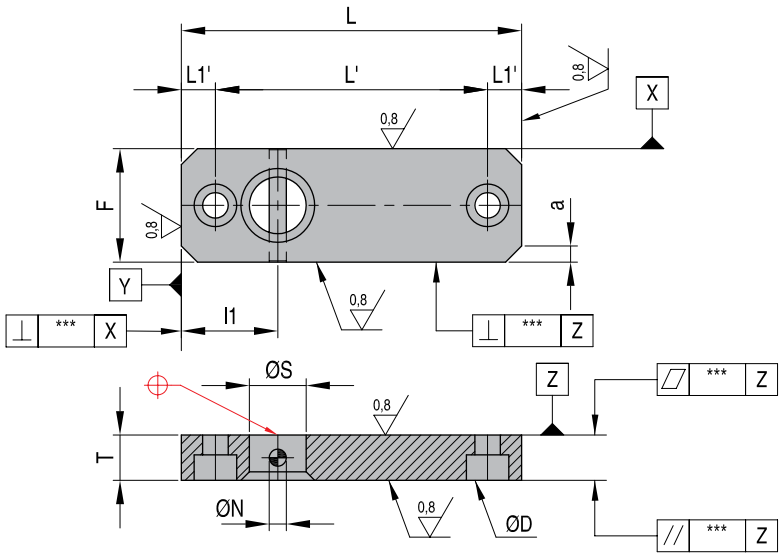
K' same as the shift angle of the lifter core (30°)

Note: Moldmaker to add grooves and chamfers per specification shown.

REF	A	L	L' = L-2R	R	▱ // ⊥
VF 06 GR	6	150	148 $^{-0,05}_{-0,1}$	1,0 $^{+0,02}_{0}$	0,02
VF 08 GR	8	190	187 $^{-0,05}_{-0,1}$	1,5 $^{+0,02}_{0}$	0,02
VF 10 GR	10	250	246 $^{-0,1}_{-0,2}$	2,0 $^{+0,03}_{0}$	0,03
VF 13 GR	13	310	305 $^{-0,1}_{-0,2}$	2,5 $^{+0,03}_{0}$	0,03
VF 16 GR	16	370	364 $^{-0,2}_{-0,4}$	3,0 $^{+0,05}_{0}$	0,05
VF 20 GR	20	500	493 $^{-0,2}_{-0,4}$	3,5 $^{+0,05}_{0}$	0,05

VF-GP

Guide plate Mat.: 1.1213 - 22-25HRC

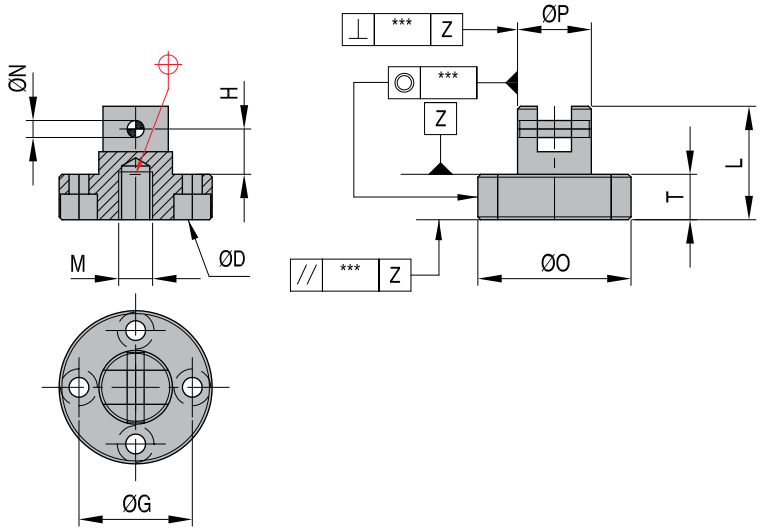


REF	L	F	T	S	N	L'	L1'	l1	ØD	//	⊥	▱	a
VF 06 GP	60 $^{0}_{-0,04}$	20 $^{0}_{-0,02}$	8 $^{0}_{-0,02}$	10	2	50	5	17,5	M3x10	0,01	0,01-0,02	0,01-0,02	4,0
VF 08 GP	70 $^{0}_{-0,04}$	25 $^{0}_{-0,02}$	10 $^{0}_{-0,02}$	13	3	60	5	20	M4x12	0,01			5,0
VF 10 GP	90 $^{0}_{-0,06}$	32 $^{0}_{-0,03}$	12 $^{0}_{-0,03}$	16	4	75	7,5	25	M5x15	0,01	0,02-0,03	0,02-0,03	6,0
VF 13 GP	120 $^{0}_{-0,06}$	40 $^{0}_{-0,03}$	15 $^{0}_{-0,03}$	20	5	105	7,5	30	M6x12	0,01			7,5
VF 16 GP	150 $^{0}_{-0,1}$	50 $^{0}_{-0,05}$	20 $^{0}_{-0,05}$	25	6	130	10	40	M8x25	0,01	0,02-0,05	0,02-0,05	10,0
VF 20 GP	180 $^{0}_{-0,1}$	60 $^{0}_{-0,05}$	25 $^{0}_{-0,05}$	30	7	155	12,5	45	M10x30	0,01			12,2

Holder bushing

Mat.: 1.1213 - 15-20HRC

VF-HB



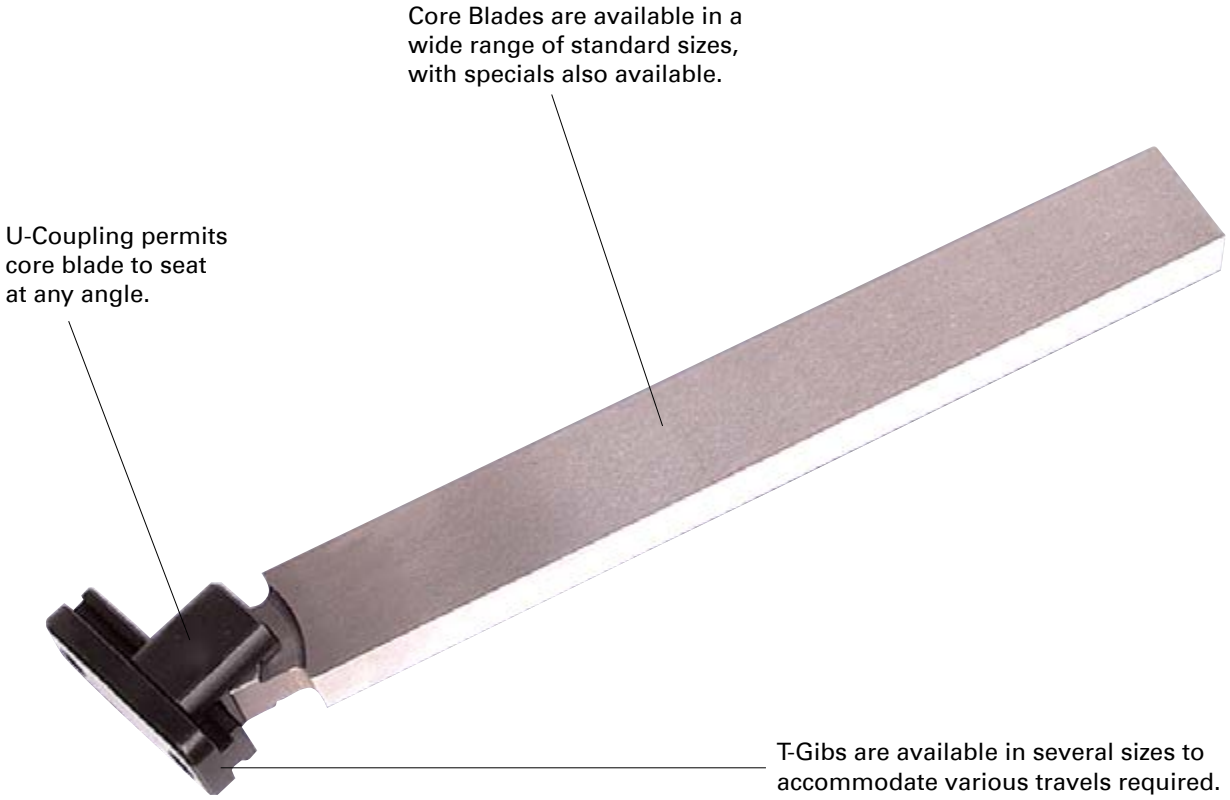
REF	P	L	O	T	G	OD	H	M	N	//	⊥	○
VF 06 HB	13 $^{0}_{-0,05}$	20 $^{-0,1}_{-0,2}$	27 $^{0}_{-0,2}$	8 $^{-0,1}_{-0,2}$	19	M3x10	8,0	M3x6	2	0,05	0,04	0,02
VF 08 HB	16 $^{0}_{-0,05}$	25 $^{-0,1}_{-0,2}$	34 $^{0}_{-0,2}$	10 $^{-0,1}_{-0,2}$	24	M4x12	10,0	M4x8	3	0,05	0,04	0,02
VF 10 HB	20 $^{0}_{-0,07}$	30 $^{-0,1}_{-0,3}$	42 $^{0}_{-0,3}$	12 $^{-0,1}_{-0,3}$	30	M5x15	12,0	M5x10	4	0,07	0,06	0,03
VF 13 HB	25 $^{0}_{-0,07}$	35 $^{-0,1}_{-0,3}$	51 $^{0}_{-0,3}$	15 $^{-0,1}_{-0,3}$	37	M6x12	12,5	M6x12	5	0,07	0,06	0,03
VF 16 HB	30 $^{0}_{-0,1}$	40 $^{-0,1}_{-0,5}$	65 $^{0}_{-0,5}$	20 $^{-0,1}_{-0,5}$	47	M8x25	12,0	M8x15	6	0,10	0,10	0,05
VF 20 HB	40 $^{0}_{-0,1}$	50 $^{-0,1}_{-0,5}$	80 $^{0}_{-0,5}$	25 $^{-0,1}_{-0,5}$	58	M10x30	15,5	M10x20	7	0,10	0,10	0,05

ULB-ULC-ULG

Unilifter

Unilifter - Undercut releasing system

- Standard components simplify mold design and construction for release of molded undercuts.
- Radiused dovetail design lets core blade seat automatically at the required angle.
- Smooth travel of U-Coupling in T-Gib eliminates heel binding often encountered in other fixed angle designs.
- Wide size selection covers more applications than similar standardized systems.
- **DME** steel 5 (1.2344) Core blades for easy conventional machining.
- Each Unilifter assembly is comprised of a Core blade, U-Coupling and T-Gib.



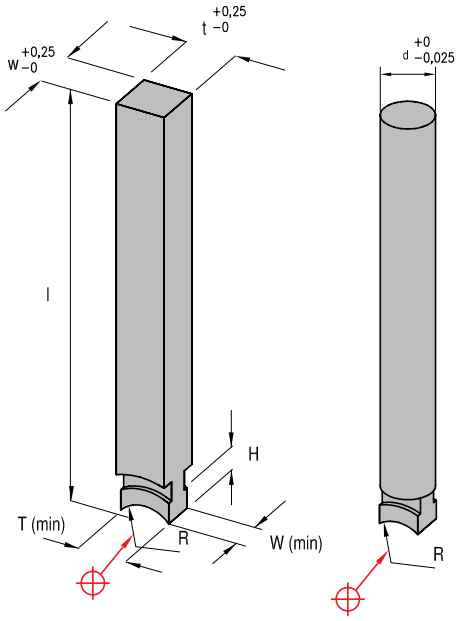
The UniLifter undercut releasing system incorporates a three piece set: Core Blade, U-Coupling, and T-Gib.

Core blades

Mat.: 1.2344, 38-42 HRC

ULB

REF	Old REF	W min	R	H	T min	t	w	l	d
ULBMM10x10L250	**ULB-1001**	10	10	5	10	10	10	250	-
ULBMM15x15L250	**ULB-1002**				15	15	15	250	-
ULBMM10x20L250	**-**				10	20	10	250	-
ULBMM20x10L250	**-**				15	10	20	250	-
ULBMM15x30L400	**-**				15	30	15	400	-
ULBMM30x15L400	**-**				15	15	30	400	-
ULBMM20x20L400	**ULB-1003**				15	20	20	400	-
ULBMM15DL250	**ULB-1101**				10	-	-	250	15
ULBMM10DL250	**-**				10	-	-	250	10

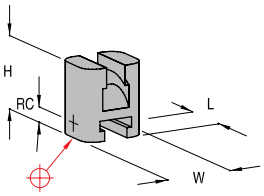


U-Couplings

Mat.: 1.2344, Surface 60-70 HRC, Core 38-42 HRC

ULC

REF	Old REF	W	L	H	RC	R
ULCMM22	**ULC-1001**	22	18	25	6	10



RC: Radius center for radius R

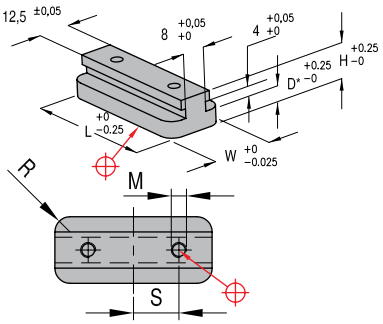
T-Gibs

Mat.: 1.2344, Surface 60-70 HRC, Core 38-42 HRC

ULG

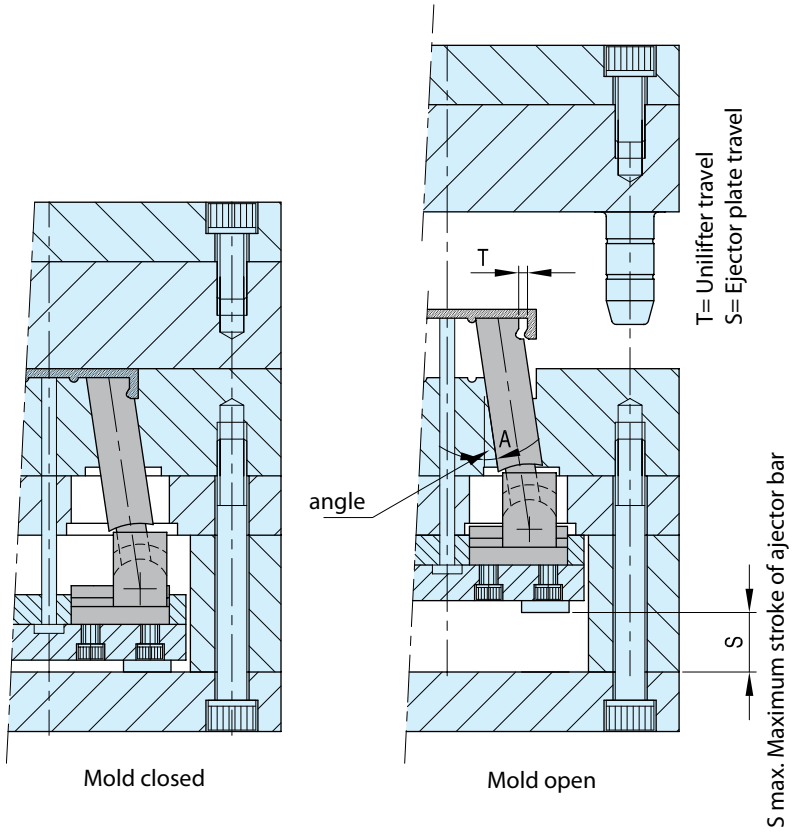
REF	Old REF	W	D*	H	R	M	S	L	Travel allowed
ULGMM10	**ULG-1001**	22	6	13	5	M5x20	10	33	10
ULGMM30	**ULG-1002**	22	6	13	5	M5x20	15	52	30

*0,25mm oversize



ULB-ULC-ULG

Typical application



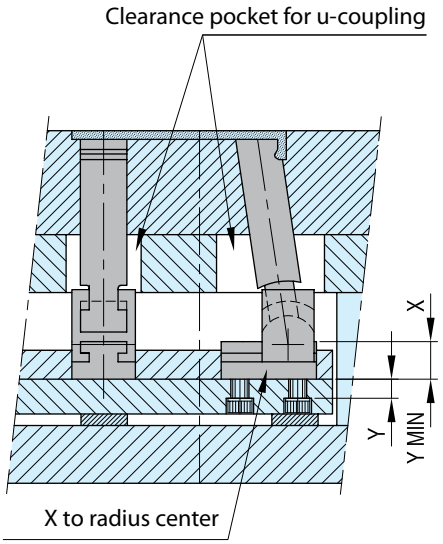


Fig. 1

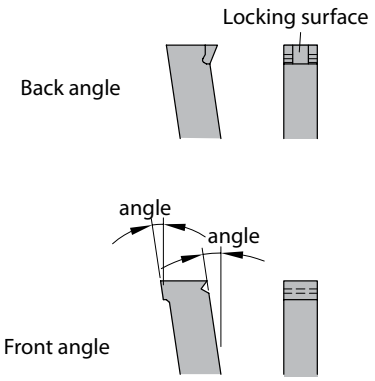
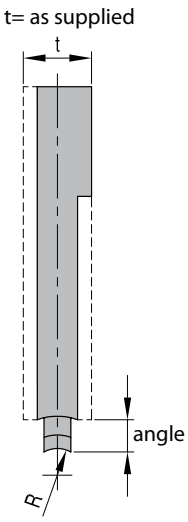


Figure 2



Example

1. General installation
It is recommended that lifters be installed as shown in Fig. 1, with T-Gib mounted to top of ejector plate. The appropriate X and Y dimensions are as follows: X = 12 mm, Y = min 11 mm (min Y dimension prevents mounting screws from interfering with U-Coupling travel).
2. Angles
Designs using angles from 5 to 10° will typically yield the best results. Angles up to 15° are permissible by using lifter guides in the bottom of the support plate. (Lifter guides to be made by moldmaker).
3. Lifter guides
Lifter guides are recommended for designs with angles of 15° (see 2 above) or whenever less than half of the Core blade is bearing in the core insert.
4. Guided ejection
It is recommended that guided ejection be used in all designs.
5. Fit
Recommended clearance for Core blade is 0,025/0,040 mm where permissible.
6. Locking angles
Locking angles (see Fig. 2) may be designed in if required to provide a locking surface to counter against molding pressure.
7. Other dimensions upon request.

MILACRON®

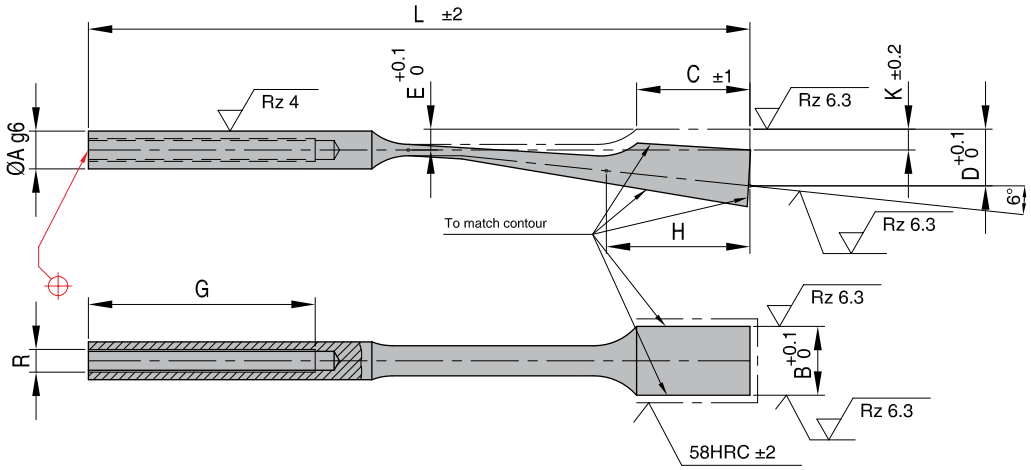
Flexible Cores

Manufactured from spring steel this unit allows the release of small undercuts. It is activated by the ejector plates as a standard ejector. They come with a reference plane and a conical fixing system, which saves cutting the flexible core to fix it.

DME
Every step of the way

Info AW275

Flexible ejector (with mounting thread)



L = Length
G = Shoulder length + head thickness
Standard: DIN16756/ISO8405
Mat.: 1.8159 - 45 ±3 HRC
Max. Temp: 500-550 °C

REF A - B	C	D	E	G	H	K	L	R
AW275 06 - 6,2	22	9	3,5	15	25	3,5	125	M4
AW275 06 - 8,2	22	9	3,5	15	25	3,5	125	M4
AW275 08 - 8,2	25	11,5	4,5	15	30	4,5	140	M5
AW275 08 - 10,2	25	11,5	4,5	15	30	4,5	140	M5
AW275 08 - 12,2	25	11,5	4,5	15	30	4,5	140	M5
AW275 10 - 14,2	30	15	5,5	15	38	5,5	175	M6
AW275 10 - 16,2	30	15	5,5	15	38	5,5	175	M6
AW275 10 - 18,2	30	15	5,5	15	38	5,5	175	M6

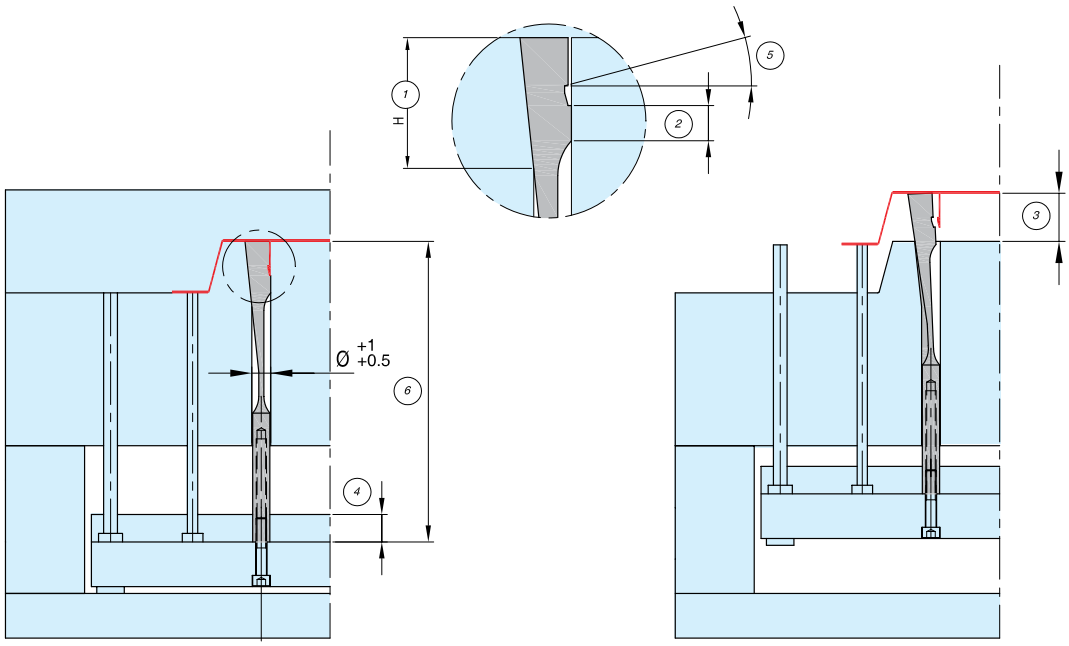
Frequently Asked Questions (FAQ)

1 How many shots do the Flexible Cores stand?
As any mobile element, their lifetime depends essentially on their adjustment, as well as the tolerances used (which might be H7/g6). Flexible cores not being properly installed, may last a short period, but if they are installed as they should, they might produce more than 2 million pieces. Please, read our instructions for installation.

2 How is a Flexible Core correctly installed?
Please, carefully read the instructions for installation. Furthermore, we want to stress that it is very important to correctly calculate the Flexible Cores length. If this is machined shorter than its emplacement, once the Flexible Core gets attached to the ejector plates, the central part gets elongated, bringing weakness.

3 What would happen if the ejection stroke is more than C-dimension?
When the Flexible Core head goes free out of its emplacement, due to the rounded shaft and screw attachment, this is prone to twist. This torsionnal movement affects to the thinnest zone which could, after several shots, break. A solution is to use our Keyed Flexible Cores, which have a flat on the shaft that prevents the rotation to occur. You could also make a flat on the rear zone of the Flexible Core shaft yourself, placing a cotter pin to hold it.

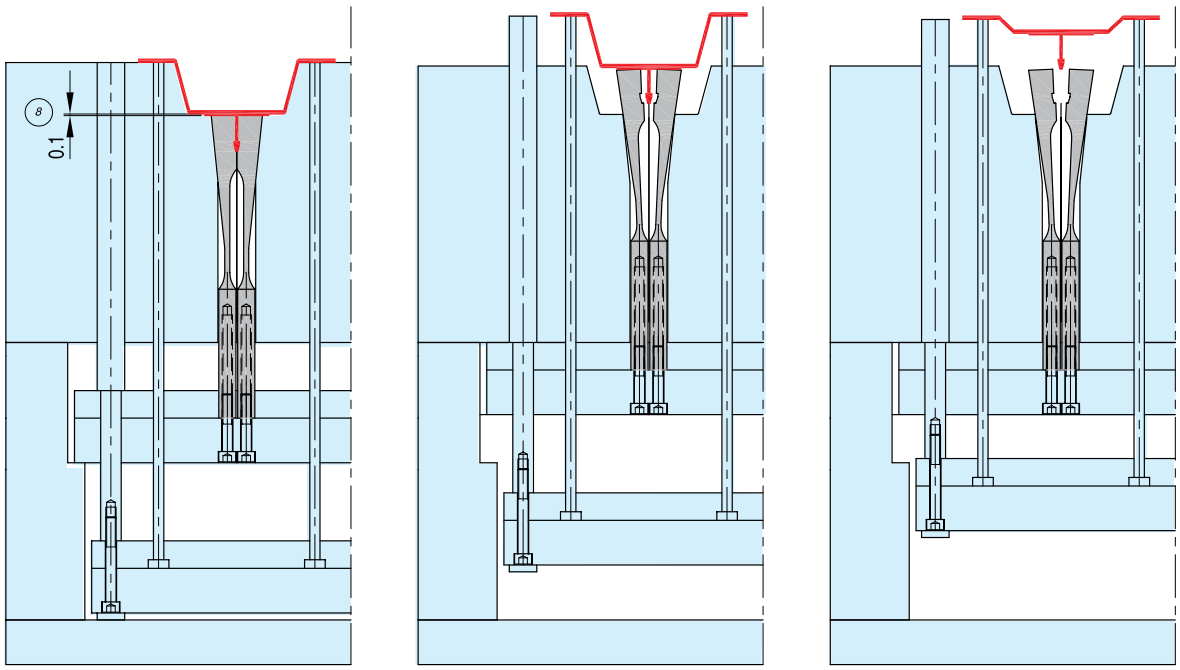
Simple Ejection



1. This area of support must be the same length as dimension H on the Sprung Core.
2. The adjustment area must be at least 1/3 of the dimension C.
3. The stroke of the sprung Core must be the same or smaller than the dimension C.
4. The plate that houses the shaft of the core must be minimum 15 mm in all cases.
5. The draft angle must be minimum 5°.
6. The core length must be 0,02-0,05 larger than its own hole.
7. After the core is adjusted, remove 0,1 to ensure smooth ejection.

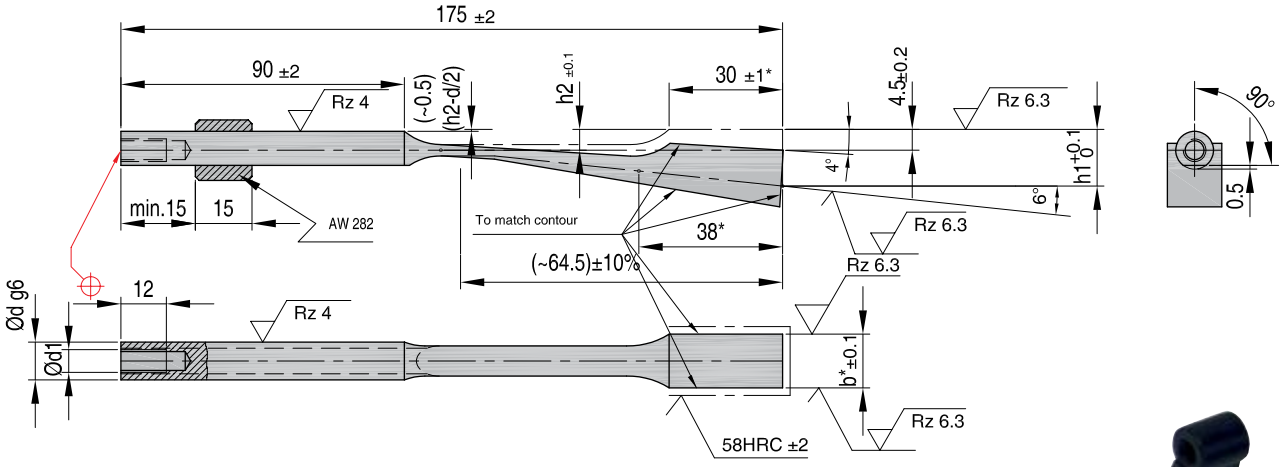
General tolerance of adjustment H7/g6

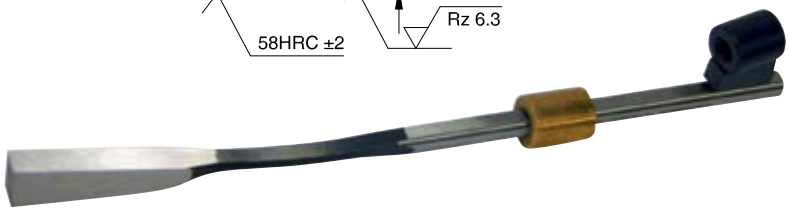
Ejection With Double Plate



Info AW280

Flexible ejector (with fixing key)

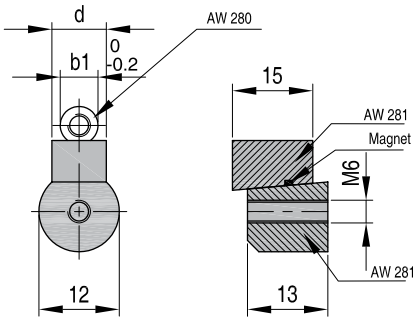




L = Length
G = Shoulder length + head thickness
Standard: DIN16756/ISO8405
Mat.: 1.8159 - 45 ±3 HRC

REF d - b*	d1	h1	h2	incl.	incl.
AW280 06 - 6,2	M4	10,0	3,5	AW282 06	AW281 06
AW280 06 - 8,2	M4	10,0	3,5	AW282 06	AW281 06
AW280 08 - 8,2	M5	11,2	4,5	AW282 08	AW281 11
AW280 08 - 12,2	M5	11,2	4,5	AW282 08	AW281 08
AW280 10 - 15,2	M6	13,6	5,5	AW282 10	AW281 10
AW280 10 - 18,2	M6	13,6	5,5	AW282 10	AW281 10

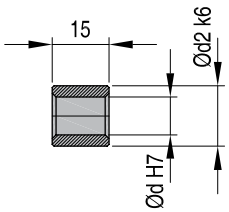
AW281



Mat.: 1.8159 - 45 ±3 HRC

REF d	b1	l3
AW281 06	6	13,5
AW281 08	8	14,5
AW281 10	10	15,5

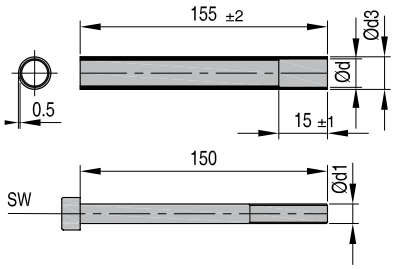
AW282



Mat.: Brons

REF d	d2
AW282 06	12
AW282 08	12
AW282 10	16

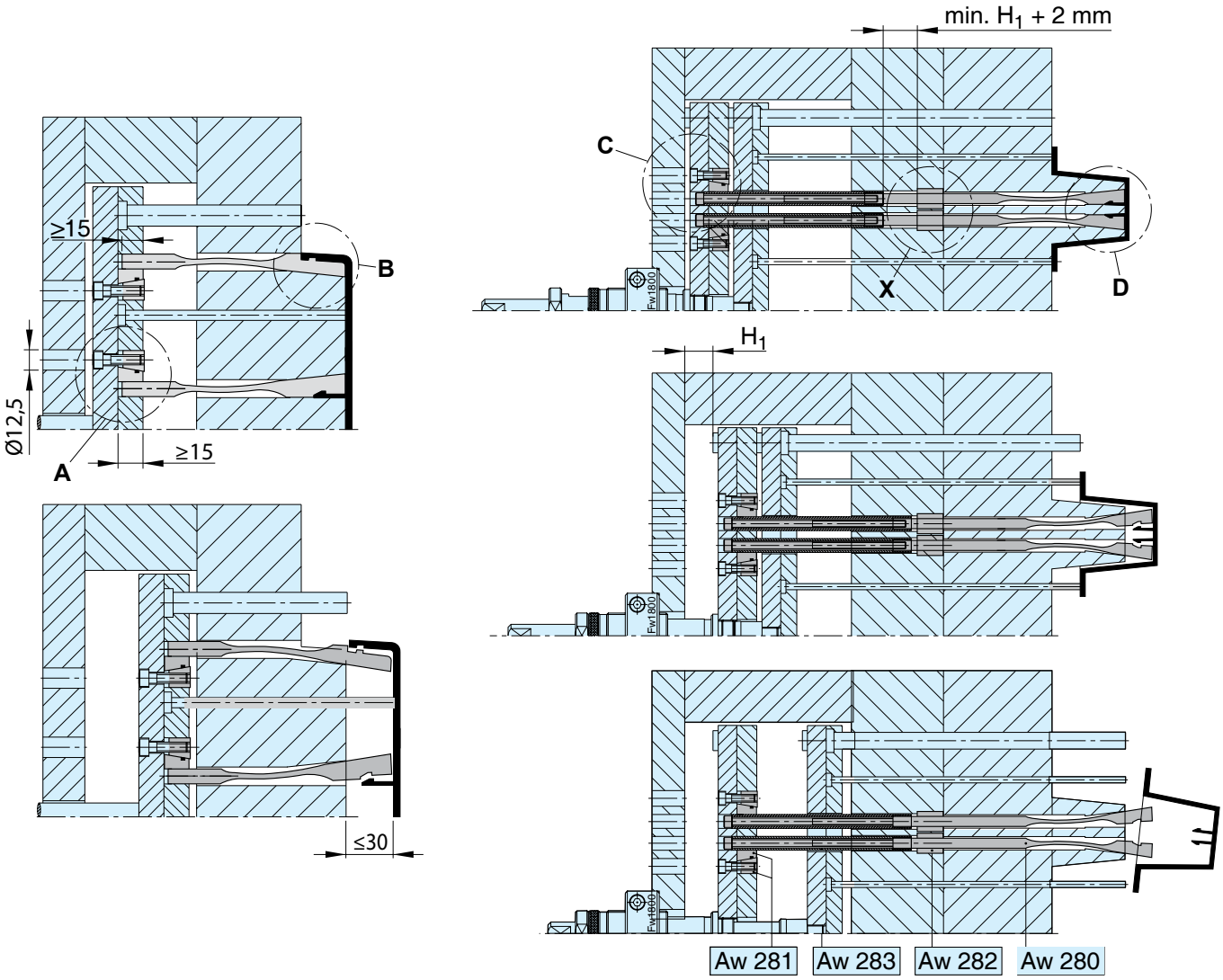
AW283

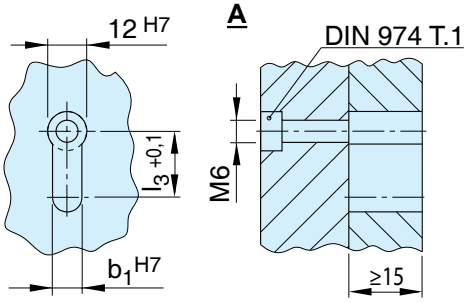


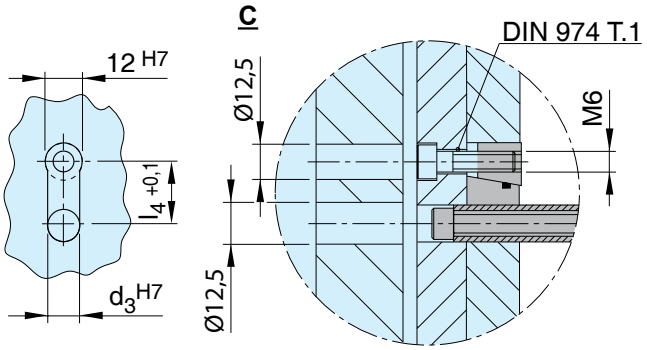
Mat.: 1.7225 - 50 ±3 HRC

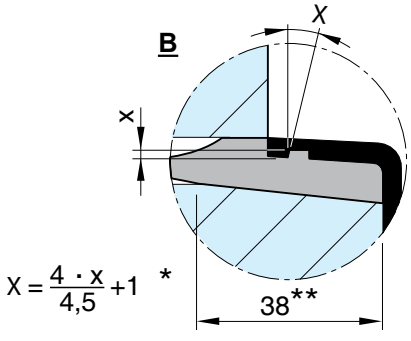
REF d	d1	sw	d3	l4
AW283 06	M4	3	08	13,5
AW283 08	M5	4	10	14,5
AW283 10	M6	5	12	15,5

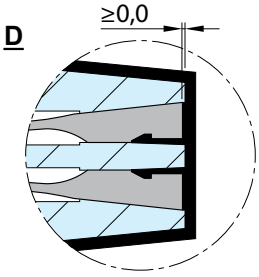
Installation Instructions











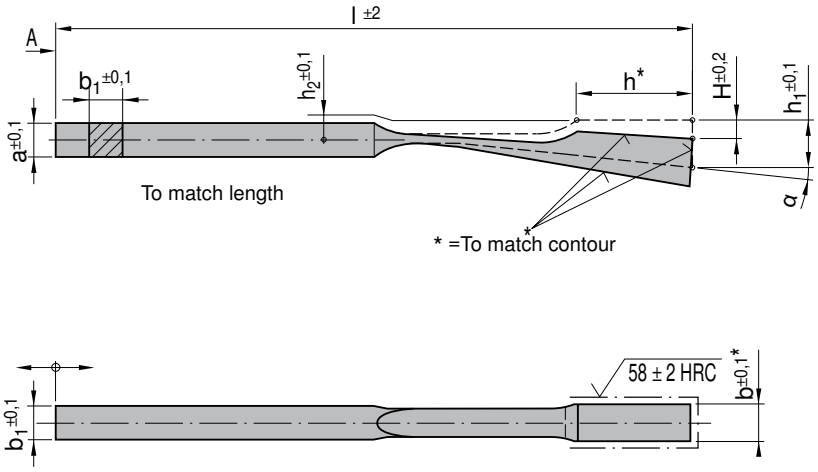
X

For large buckling lengths, please use guide bushes **AW 282**

* = Depending on surface roughness
** = To match the contour

1/10/2007

Special applications require perhaps deviations from the listed standard components **AW 275** and **AW 280**. Please fill your desired dimensions into the chart below. In order to maintain quality features (Service life tec.) the dependency of particular parameters in relation to eachother have to be observed. Agreement between customer and supplier in regard to dimensions or requirements (by example spring travel in relation to spring length) form the basis of well-performing parts.
Mat.: 1.8159 - 45 ±3 HRC



Step 1: Photocopy this form. **Step 2**: Specify required tolerances on all dimensions. **Step 3**: Contact **DME**

Item prefix	a	b	b1	h	h1	h2	H	l	⍰	Quantity	Delivery
AW285											

Special Ejectors

Comments:

.....

.....

.....

Company: .....

Contact:.....

Tel.:.....

Fax:.....

Quantity:.....

Mat.:.....

Hardness:..... HRC

Delivery date: .....

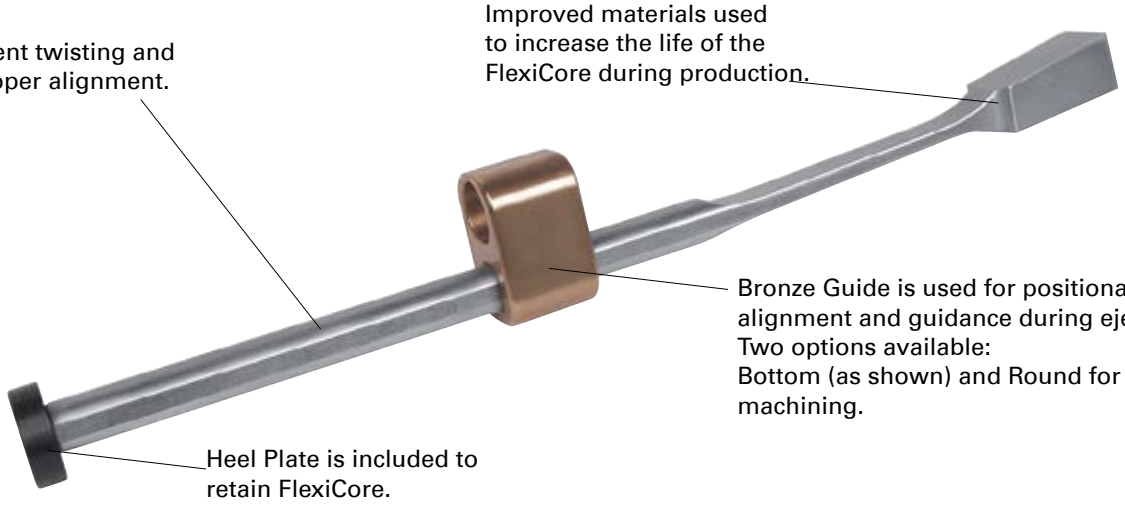
Nitrite: ☐Yes

Signature:.....

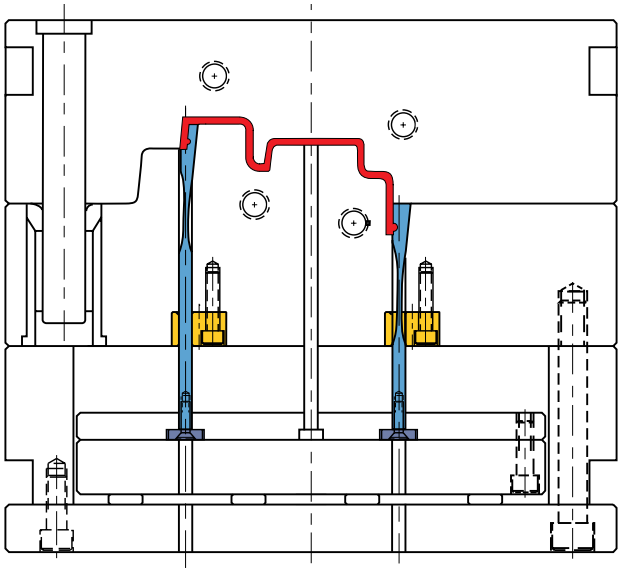
Order Number:.....

Flexicore® undercut releasing system

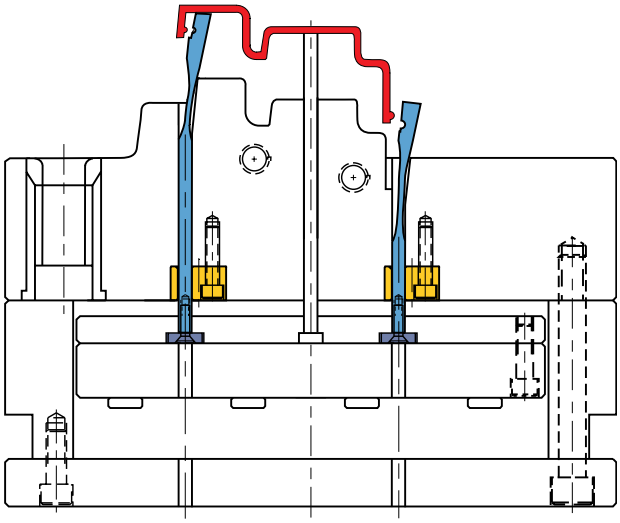
Info



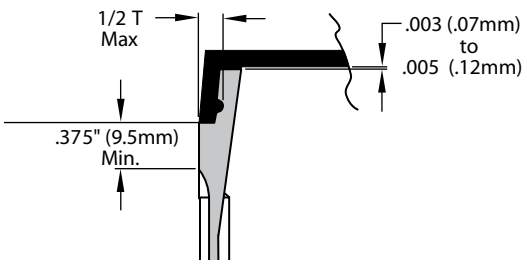
FlexiCore Assembly includes: FlexiCore, Bronze Guide (Bottom or Round), Heel Plate, and Flat Head Cap Screw.



Mold closed



Mold open

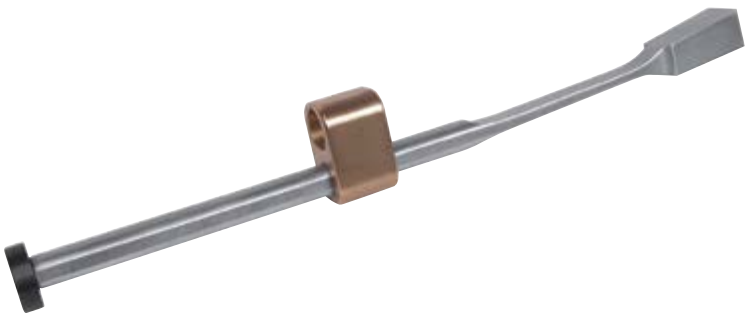


Application Guidelines:

The FlexiCore diameter (D) must be within the Guide prior to ejection as shown above.
Only surface treatments applied at low temperatures such as Electroless Nickel-based or chromium deposition treatments are permitted.
Maximum temperature is 125° C.
Please contact Engineering to review any designs if questions arise or if your application differs from the examples shown.

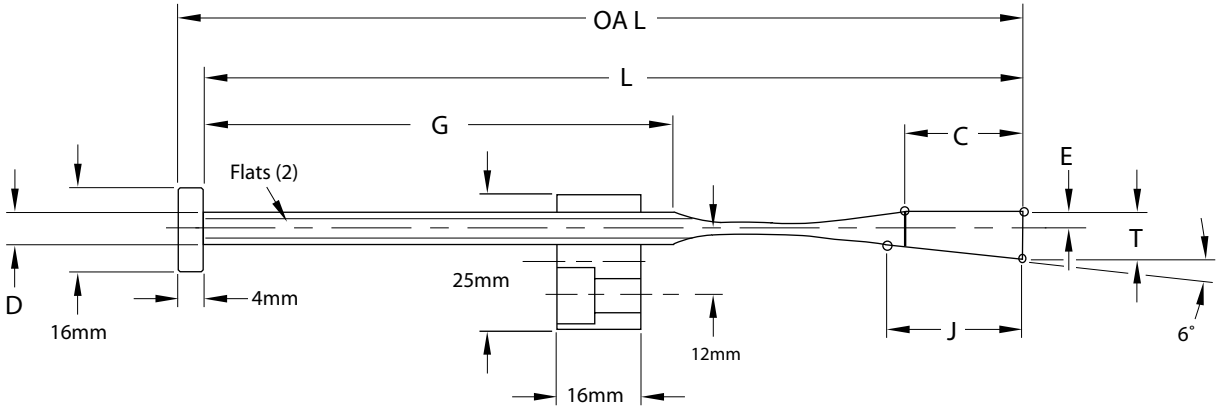
FLXA

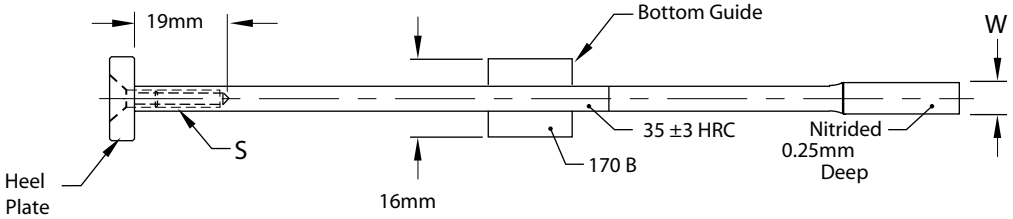
Flexicore® bottom guide assembly

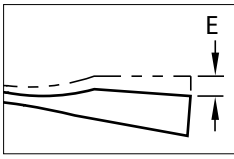


FlexiCore: AISI 4340 with thin, dense Chromium treatment
Guide: CA954 Solid Bronze
Heel Plate: AISI 1018

Assemblies include: FlexiCore, Bottom Guide, Heel Plate, and Flat Head Cap Screw. Assembly components also sold individually.







"E"= maximum travel at the top of the FlexiCore. Expected travel is reduced by the tangent of 6° along the "C" dimension.

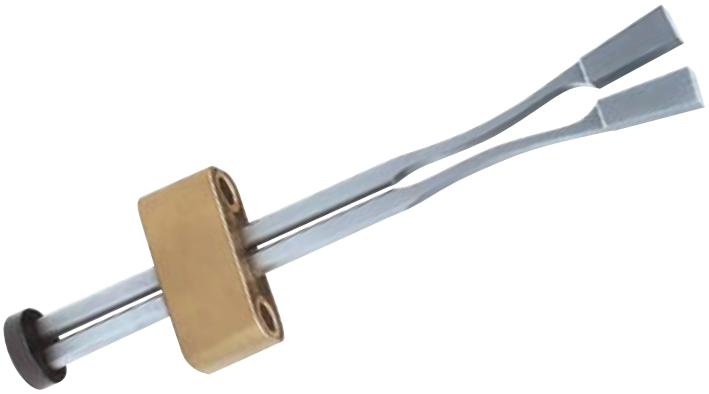
REF	T +0,05 -0,00	W ±0,25 -0,00	L +0,25 -0,00	OAL REF	D +0,00 -0,25	C ±0,35	E	G +0,25 -0,00	J	S
FLXA9x6L160	9	6,2	162,5	166,5	5,94	22	3,5	88,6	24,3	M4-0,7x20
FLXA9x8L160	9	8,2	162,5	166,5	6,35	22	3,5	88,4	24,3	M4-0,7x20
FLXA11x10L200	11,5	10,2	200,0	204,0	7,92	26	4,5	111,2	26,0	M5-0,8x20
FLXA11x12L200	11,5	12,2	200,0	204,0	7,92	26	4,5	111,2	26,0	M5-0,8x20
FLXA12x14L200	12,5	14,2	200,0	204,0	7,92	30	4,5	107,2	28,5	M5-0,8x20
FLXA12x16L200	12,5	16,2	200,0	204,0	7,92	30	4,5	107,2	28,5	M5-0,8x20

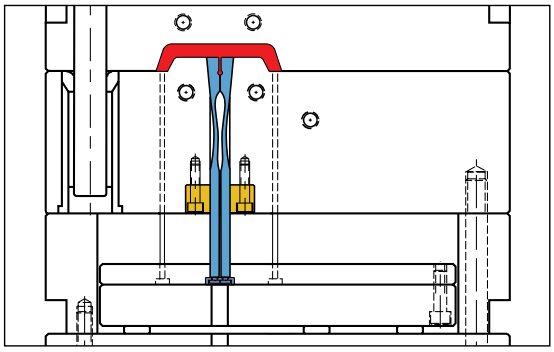
Flexicore® double actuation

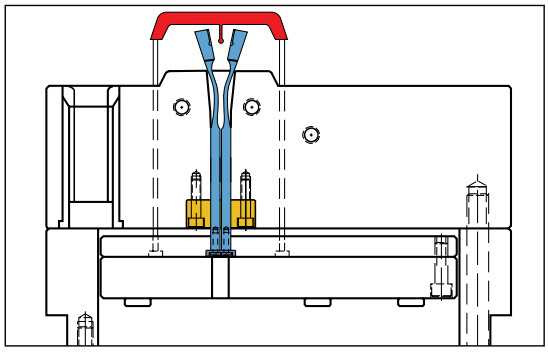
FLXDA

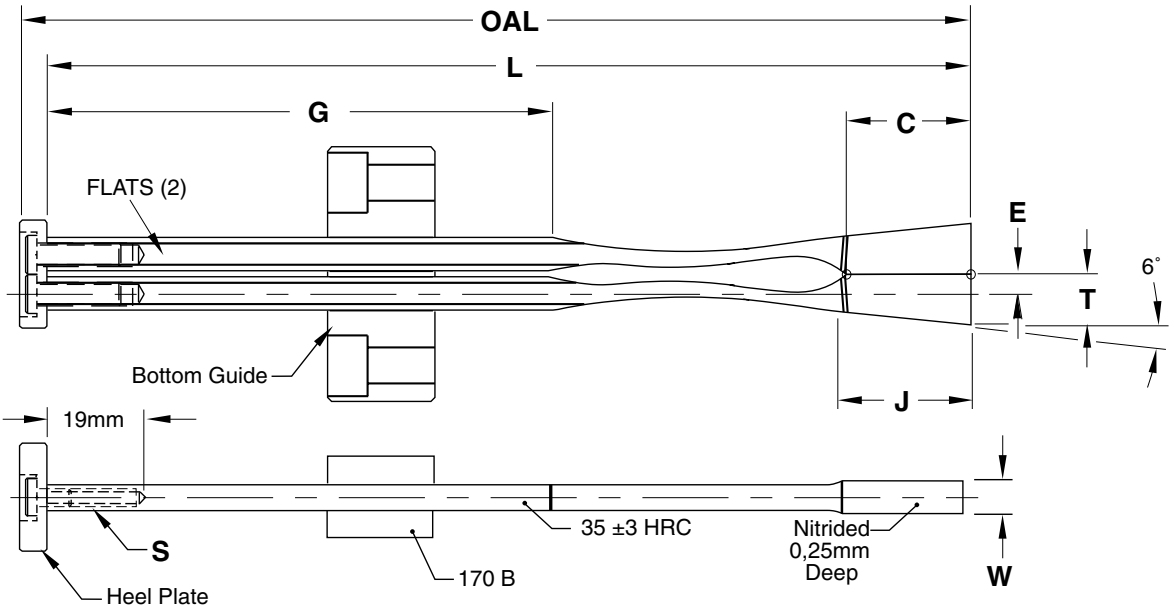
FlexiCore: AISI 4340 with thin, dense Chromium treatment
Guide: CA954 Solid Bronze
Heel Plate: AISI 1018

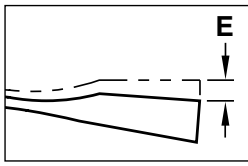
The double action bottom guide allows the FlexiCore System to be used to release boss details with undercuts. FlexiCore Double Assembly includes: two FlexiCores, one Bottom Guide, one Heel Plate, and two Low Head Cap Screws.







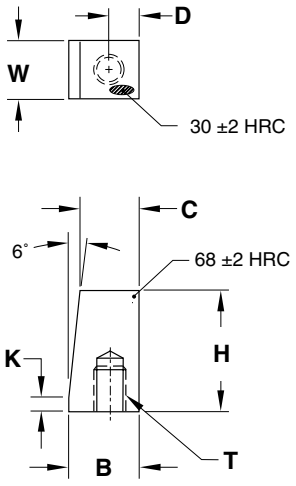


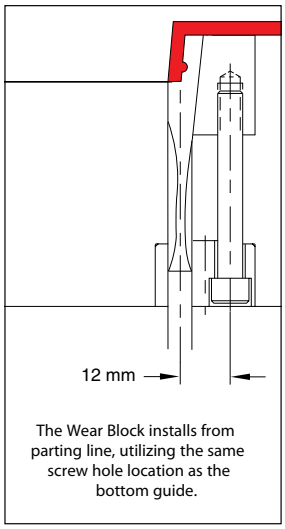


"E"= maximum travel at the top of the FlexiCore. Expected travel is reduced by the tangent of 6˚ along the "C" dimension.

REF	T +0,05 -0,00	W ±0,25 -0,00	L +0,25 -0,00	OAL REF	D +0,00 -0,25	C ±0,35	E	G +0,25 -0,00	J	S
FLXDA9x6L160	9	6,2	162,5	166,5	5,94	22	3,5	88,6	24,3	M4-0,7x20
FLXDA11x12L200	11,5	12,2	200,0	204,0	7,92	26	4,5	111,2	26,0	M5-0,8x20
FLXDA12x14L200	12,5	14,2	200,0	204,0	7,92	30	4,5	107,2	28,5	M5-0,8x20
FLXDA12x16L200	12,5	16,2	200,0	204,0	7,92	30	4,5	107,2	28,5	M5-0,8x20

FLXWBM





The Wear Block installs from parting line, utilizing the same screw hole location as the bottom guide.

Wear blocks

Mat.: P-20 Pre-Hard, Nitrided

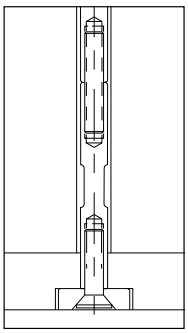
REF	W +0,05 -0,00	D ±0,25	B +0,25 -0,00	C +0,25 -0,00	H	K	T Thread
FLXWBM-6	6,2	7,2	15,9	13,55	25,4	2,9	M5-0,8
FLXWBM-8	8,2	7,2	15,9	13,55	25,4	2,9	M6-1,0
FLXWBM-10	10,2	7,2	14,4	12,05	25,4	2,9	M6-1,0
FLXWBM-12	12,2	7,2	14,4	12,05	25,4	2,9	M6-1,0
FLXWBM-14	14,2	7,2	15,2	12,11	33,2	3,5	M6-1,0
FLXWBM-16	16,2	7,2	15,2	12,11	33,2	3,5	M6-1,0

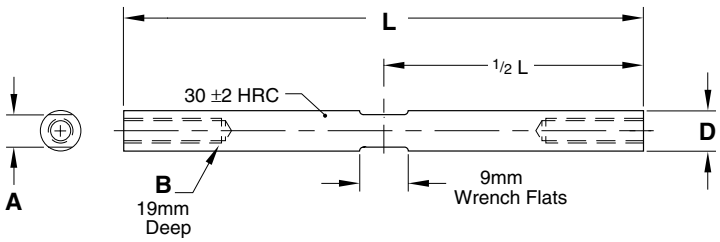
FLXXM

Extensions

Mat.: 4140 Pre-Hard

REF	L (mm) +0,25 -0,00	D +0,00 -0,12	B	A
FLXXM4L50	50	6	M4-0,7	4,8
FLXXM4L100	100	6	M4-0,7	4,8
FLXXM5L50	50	8	M5-0,8	6,3
FLXXM5L100	100	8	M5-0,8	6,3



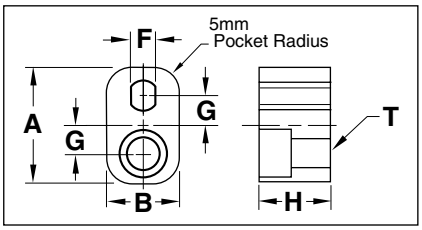


FLXBG - FLXRG

Replacement guides

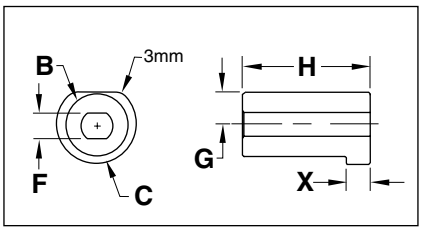
Mat.: CA954 Solid Bronze

FLXBG



REF	A	B	H	F	G	T
FLXBG-6	25	16	16	4,8	6	M5-SBLT
FLXBG-8	25	16	16	5,0	6	M6-1
FLXBG-10	25	16	16	7,3	6	M6-1

FLXRG



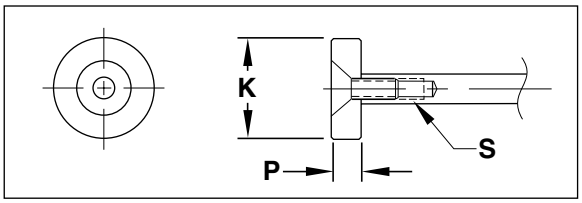
REF	B	C	H	F	X	G
FLXRG-6	12	16	25	4,8	5	6
FLXRG-8	12	16	25	5,0	5	6
FLXRG-10	16	20	25	7,3	5	8

Replacement heel plates

Mat.: AISI 1018 Black Oxided

FLXHP

REF	K	P	S
FLXHP-4	16	4	M4-0,7
FLXHP-5	16	4	M5-0,8



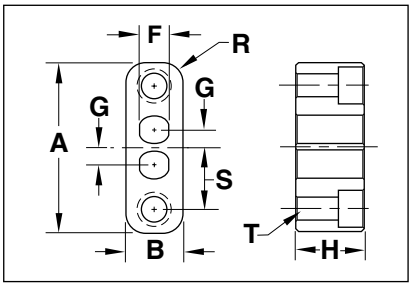
Screw included.

Replacement guides: double actuation

Mat.: CA954 Solid Bronze

FLXDBG

REF	A	B	H	F	G	R	S	T
FLXDBG-6	45	16	20	1,8	3,5	5	16,2	M6-1
FLXDBG-12	48	16	20	7,3	4,5	5	17,2	M6-1

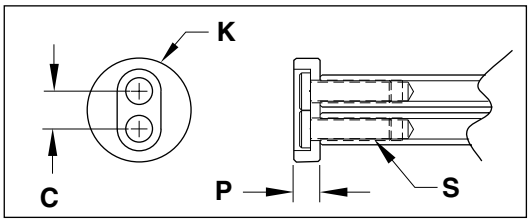


Replacement heel plates: double actuation

Mat.: AISI 1018 Black Oxided

FLXDHP

REF	C	K	P	S
FLXDHP-4	7	20	6	M4-0,7
FLXDHP-5	9	22	6	M5-0,8



Screws included.

MILACRON®

Collapsible Cores

DME

Every step of the way

Info CCM-CC

General description of the Collapsible Cores

It is over 30 years since DME first introduced the Collapsible Core and today it still continues to be a major influence for molding plastic parts requiring internal threads, undercuts, cut-outs etc. During this time a lot of technical knowledge and experience has been gained from many applications tackled, some of which have been very complicated. This "Know how" has been constantly passed on to the user, either through new developments, application improvements or suggestions for new applications. One such development is the new range smaller diameters which complete the series of Collapsible Cores. The Collapsible Cores now range from 18 mm to 107 mm, for the outer diameters with the corresponding inner diameter ranging from 16 mm to 85 mm. The effective collapse ranges from 1.1 mm to 4,2 mm per side at the tip of the Core, depending on the diameter of the Core.

Operation

After cooling, the mold opens and the ejector plate assembly moves forward as far as the stop. This causes the core sleeve to move away from the centre pin and the positive collapsed sleeve to engage, which ensures that all segments have collapsed. However, the molded part remains or hangs until the stripper plate is moved forward to eject the components. This is usually carried out by the activation of two double acting air cylinders mounted on the ejector plates and connected to the stripper plate on the outside of the mold. The stripper plate is then retracted using the two air cylinders before the mold is closed. When closing the mold, one has to ensure that the ejector plates are returned before the mold is fully closed. This can be achieved by the use of early ejector returns. The core sleeve is returned to the molding position thus preventing damage to the Collapsible Cores. When the mold is fully closed the next cycle can begin. When using Collapsible Cores the designer has a product which offers many opportunities for producing many variations of molded caps. The result is a mold which functions reliably and economically irrespective of whether it concerns a single or multiple cavity mold. Parts with internal protrusions, dimples, interrupted threads and cut-outs can be economically produced on a high or low volume basis. It should be noted that due to the design of the Mini Collapsible Core only interrupted threads and undercuts can be produced. The interruptions consist of three small slots with width "J" (See table), but in most cases this does not imply any technical disadvantages.

Design Procedure

The following steps are used to determine if a part can be molded on the Mini or Standard Collapsible Core:

a) Calculate the expected actual shrinkage "S" = part Ø x shrinkage (%) "S1" = part length x shrinkage (%)

b) Determine that the part minor diameter "A" is not less than "A min" (See table and Fig 1)

c) Determine that the part major diameter "B" is not greater than "B max" (See table and Fig 1)

d) Determine that thread depth or part undercut at "L" does not exceed the calculated dimension "C" (see Table and Fig.1). The collapse available decreases from the front of the core at a rate of 0,02 mm/mm. When the amount of collapse "C" of the Mini or Standard Collapsible Cores is insufficient, Collapsible Cores of the same size but with a greater collapse can be obtained.

Type	CK Max.
CCM-0001	1.45 mm/side
CCM-0002	1.60 mm/side
CCM-0003	1.80 mm/side
CC 125 PC	0.80 mm/side
CC 150 PC	1.07 mm/side
CC 175 PC	1.20 mm/side
CC 250 PC	1.20 mm/side

Type	CK Max.
CC 252 PC	1.60 mm/side
CC 352 PC	2.10 mm/side
CC 402 PC	2.65 mm/side
CC 502 PC	3.20 mm/side
CC 602 PC	3.75 mm/side
CC 652 PC	4.06 mm/side
CC 702 PC	4.32 mm/side

CK = Collapse per side at top of core.

e) Determine that part depth "D" (Fig 1) does not exceed the value "D" given in the table. Dimension "K min" of the table must be equal to or larger than "K min".

Material and hardness

a) The centre pin is manufactured from high quality alloy steel 1.2436, hardened to 60-65 HRC. Centre pins for Standard as well as for Mini Collapsible Cores are fitted to a specific core and cannot be interchanged. This is due to the centre pin and core sleeve being assembled and ground together.

b) Core sleeves are manufactured in a 1.2363 steel (AISI 01) and hardened to 55-60 HRC. All centre pins and core sleeves carry a serial number. Always verify the serial number prior to grinding or final assembly.

c) The positive collapse sleeve is manufactured in tool steel and hardened to 55 ± 5 HRC. It is designed to function when the Collapsible Core fails to collapse independently upon withdrawal of the centre pin. Its aim is an additional and necessary safety factor.

What materials can be molded?

All commonly used thermoplastic molding resins. For many years filled and non-filled molding resins have been successfully molded. Special requirements have to be taken into consideration when PVC is processed. When using the Mini or Standard Collapsible Cores for processing this material it is recommended you contact **DME**.

Part design - special requirements

For successful operation the design of the part must fulfil the following requirements:

a) In contrast with the Standard Collapsible Core it is not possible to mold parts with full threads with the Mini Collapsible Core. The three remaining "marks" on the part result from the three interrupted areas with width "J" of the non-collapsing centre pin blades. Make sure that the top of the centre pin protrudes beyond the top of the core sleeve.

b) The centre pin must protrude beyond the core face by at least the distance "F". Protrusions down to "F min" are acceptable but "F max" is recommended. For "F min" and "F max" see Table or Collapsible Core dimensions leaflet. Radius "R" is most important. For "R min" and "R max" see Collapsible Core dimension drawing.

c) There must be no undercuts on the face of the core segments. This will prevent the Collapsible Core from functioning.

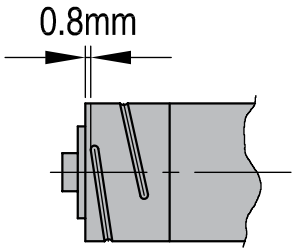
d) Undercuts on the face of the pin must not interfere with full radial movement of the core. They must be located either forward of the core face or within a diameter smaller than "G" (see Table, Fig 3; max 4 mm - see Collapsible Core dimension drawing). In no case should the undercuts be so deep that they come close to the cooling lines in the centre pin. For special requirements please contact **DME**.

e) The core face must have a draft of at least 3° starting no further than 0.8 mm from the top of the pin. A greater draft is desirable when "B" is near "B max" (ex. 4-5°).

f) All undercuts should be drafted. A minimum draft of 5° is required (see Table, fig 3), more is recommended. Interrupted undercuts also require a side draft of at last 5°.

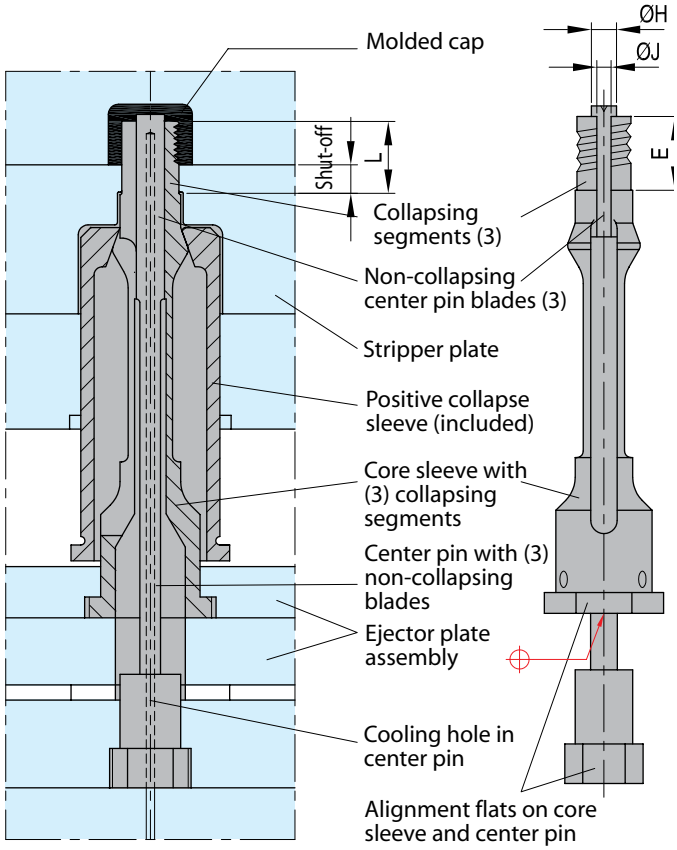
g) Means must be provided for carrying the molded part off of the collapsed core at the completion of the ejection stroke. This is normally done by providing a ring projection (0.25 x 0.25 mm) on the face of the stripper stroke. The part must not drag over the core (see detail Y on Collapsible Core dimensions leaflet).

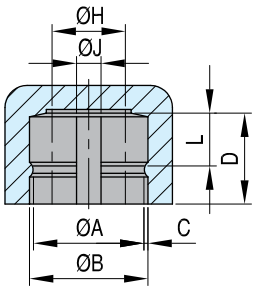
h) As in conventional practice, sharp interior corners must be avoided to prevent stress concentration in the steel. Never permit a ground thread to run out through the face of the core. This leaves a knife edge of steel that will break off in time.

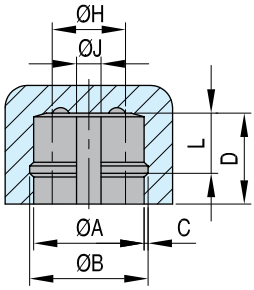


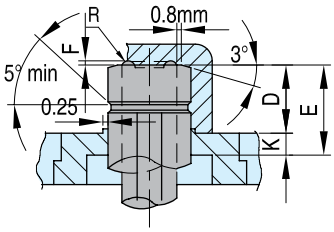
CCM

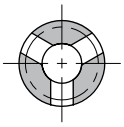
Collapsible mini-cores

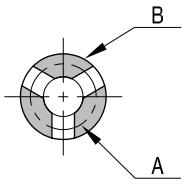


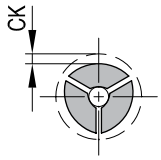








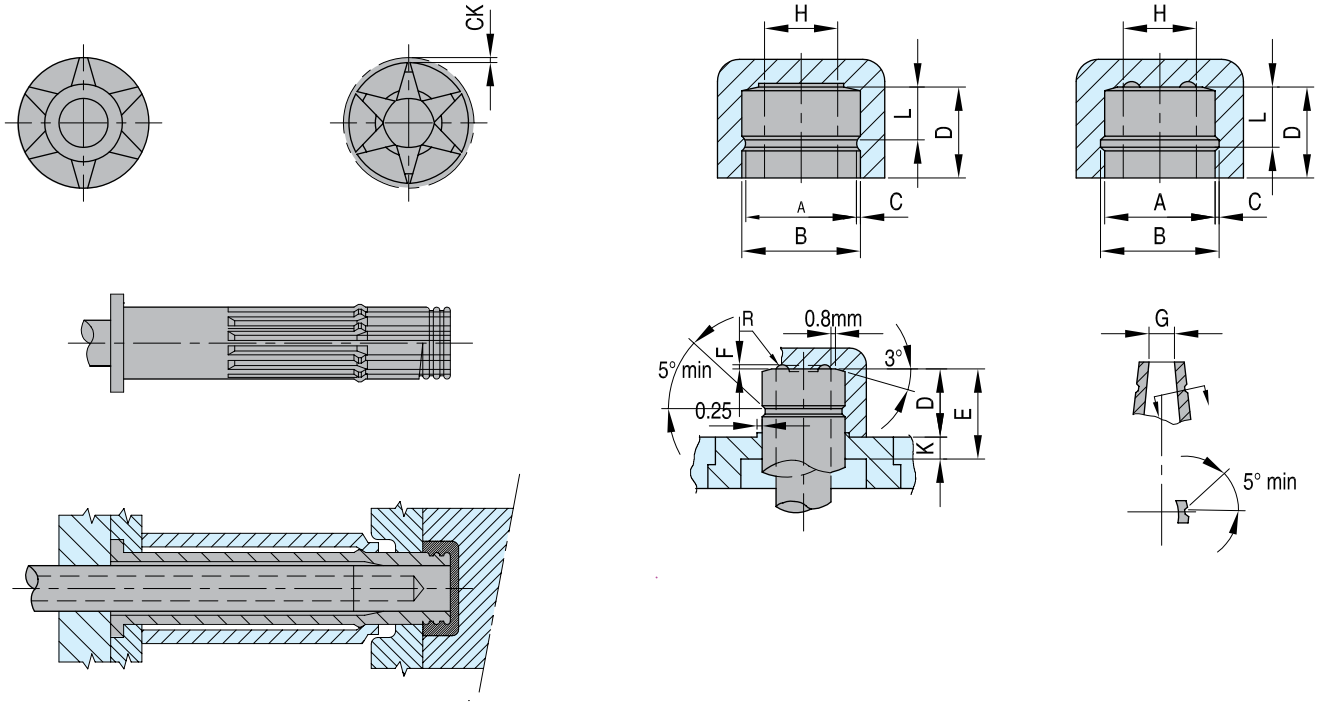




REF	A. Part Minor Ø (min.)	B. Part Major Ø (max.)	C. Maximum part undercut at L	D. Maximum part depth	E. Length of fitted surface on core	F. Pin protrusion, min.	G. Inside diameter collapsed core nom	H. Pin diameter at face (nominal)	K. Stripper bushing shut-off	J. Width of non-collapsing	R. Pin tip radius	S. Material shrinkage
CCM 0001	10,80-S	16,38-S	1,30-(0,02L+0,5S)	21,60-S1-K	21,60	0,4 (0,8 max)	2,30	7,60	4,00	4	0,20	S= Shrinkage factor (%) x Part diameter (mm) S1= Shrinkage factor (%) x Part length (mm)
CCM 0002	14,22-S	20,45-S	1,45-(0,02L+0,5S)	21,60-S1-K	21,60	0,4 (0,8 max)	4,60	10,70	4,83	4	0,20	
CCM 0003	18,03-S	24,51-S	1,50-(0,02L+0,5S)	25,40-S1-K	25,40	0,4 (0,8 max)	7,90	14,20	5,08	4	0,20	

Collapsible cores

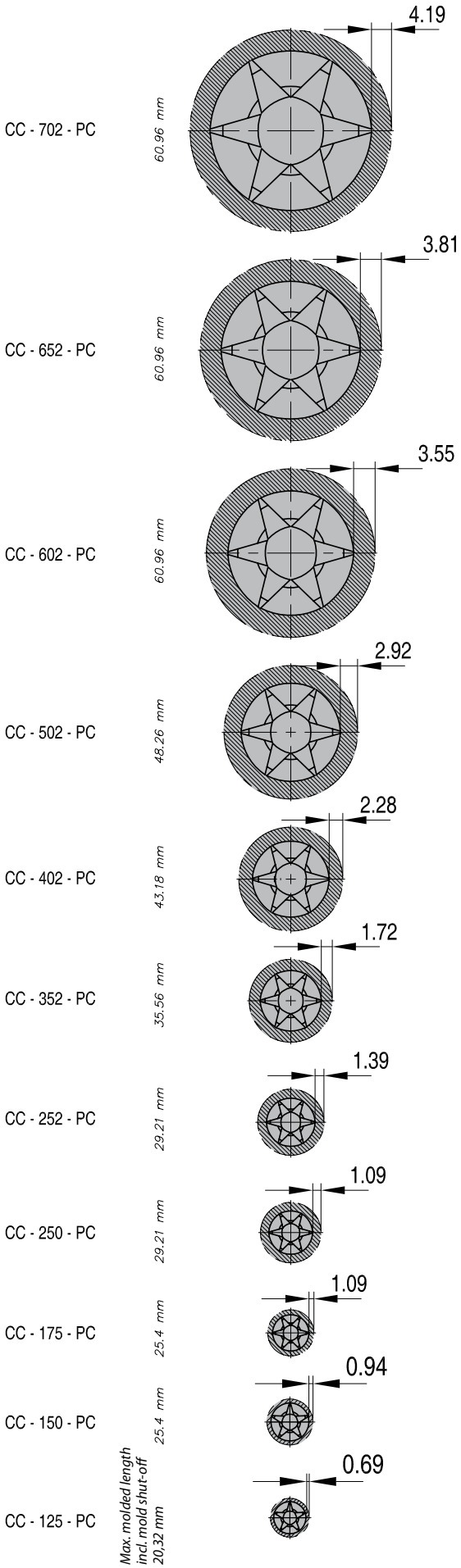
CC

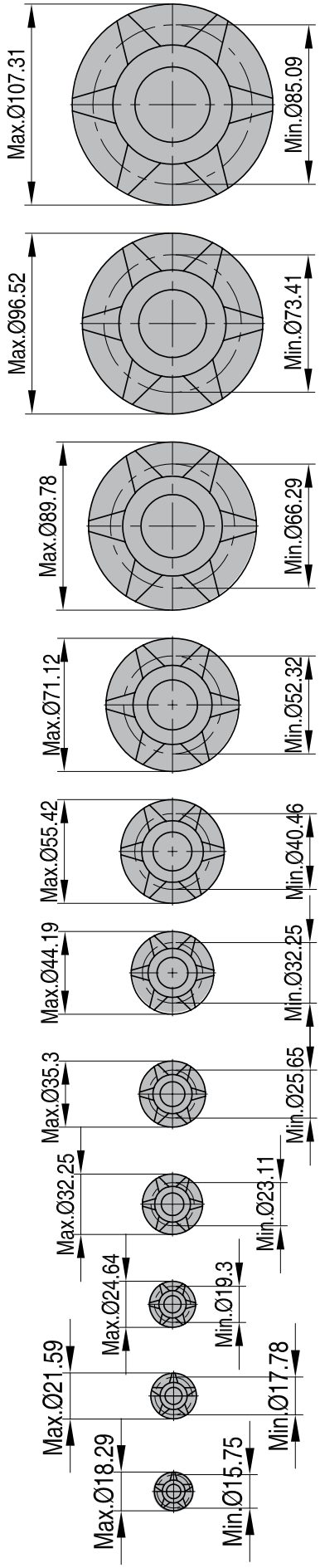


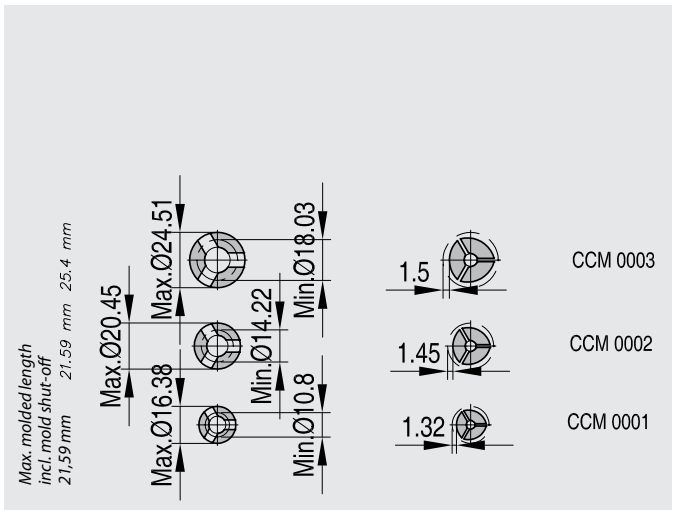
REF	A. Part Minor Ø (min.)	B. Part Major Ø (max.)	C. Maximum part under-cut at L	D. Max. part depth	E Max. molded length	F. Pin protru-sion, min.	G. Inside diameter collapsed core nom	H. Pin diam-eter at face (nominal)	K. Stripper bushing shut-off	R. Pin tip radius	S. Material shrinkage
CC 125 PC	15,75-S	18,29-S	0,69 - (0,02L+0,5S)	E-K	20,30	0,4	5,3	12,45	4	0,20-0,25	S= Shrinkage factor (%) x Part diam-eter (mm) S1= Shrinkage factor (%) x Part length (mm)
CC 150 PC	17,78-S	21,59-S	0,94 - (0,02L+0,5S)	E-K	25,40	0,4	5,8	14,73	4	0,20-0,25	
CC 175 PC	19,30-S	24,64-S	1,09 - (0,02L+0,5S)	E-K	25,40	0,4	7,4	16,26	4	0,20-0,25	
CC 250 PC	23,10-S	32,25-S	1,09 - (0,02L+0,5S)	E-K	29,21	0,4 (1,9 max)	10,2	19,9	4	0,20-0,25	
CC 252 PC	25,65-S	35,30-S	1,40 - (0,02L+0,5S)	E-K	29,21	0,4 (1,9 max)	11,9	22,5	4	0,25-0,30	
CC 352 PC	32,26-S	44,19-S	1,73 - (0,02L+0,5S)	E-K	35,56	0,5 (1,9 max)	15,0	28,1	4	0,25-0,35	
CC 402 PC	40,46-S	55,42-S	2,29 - (0,02+0,5S)	E-K	43,18	0,8 (1,9 max)	18,4	35,25	5	0,30-0,35	
CC 502 PC	52,32-S	71,12-S	2,92 - (0,02L+0,5S)	E-K	48,26	0,9 (2 max)	24,0	44,45	6 (min.4)	0,35-0,40	
CC 602 PC	66,29-S	89,78-S	3,55 - (0,02L+0,5S)	E-K	60,96	1,1 (2,0 max)	30,5	55,25	6,5	0,50-0,60	
CC 652 PC	73,41-S	96,52-S	3,81 - (0,02L+0,5S)	E-K	60,96	1,5	34,3	62,23	7	0,60-0,70	
CC 702 PC	85,09-S	107,31-S	4,19 - (0,02L+0,5S)	E-K	60,96	1,5	41,9	73,02	7	0,60-0,70	

CC

Collapsible cores

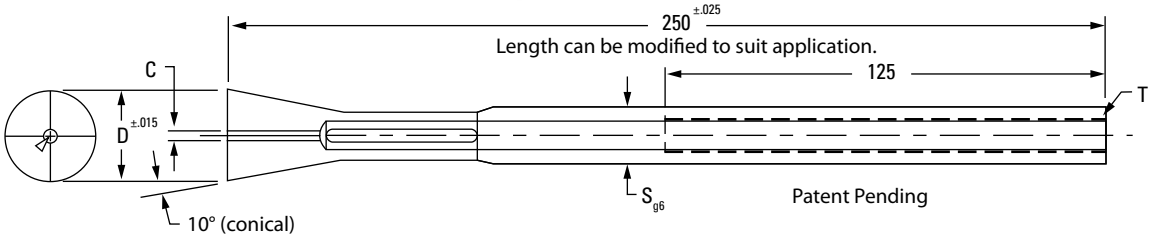


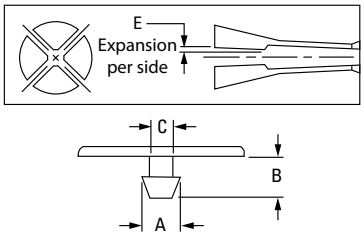

Max.Ø107.31
Min.Ø85.09
Max.Ø96.52
Min.Ø73.41
Max.Ø89.78
Min.Ø66.29
Max.Ø71.12
Min.Ø52.32
Max.Ø55.42
Min.Ø40.46
Max.Ø44.19
Min.Ø32.25
Max.Ø35.3
Min.Ø25.65
Max.Ø32.25
Min.Ø23.11
Max.Ø24.64
Min.Ø19.3
Max.Ø21.59
Min.Ø17.78
Max.Ø18.29
Min.Ø15.75


Max. molded length
incl. mold shut-off
21,59 mm 21.59 mm 25.4 mm
Max.Ø20.45
Max.Ø24.51
Min.Ø14.22
Min.Ø18.03
Max.Ø16.38
Min.Ø10.8
1.5
1.45
1.32
CCM 0003
CCM 0002
CCM 0001

EXCAV

Ex-Cav™ System



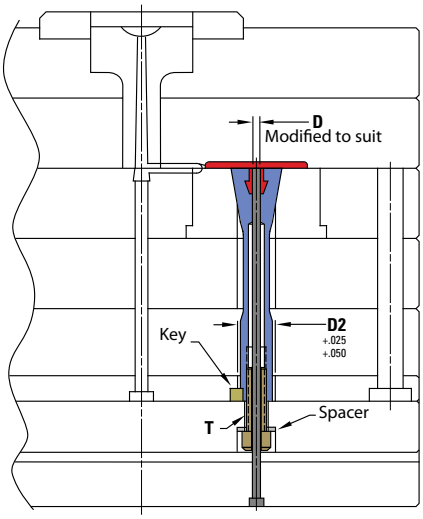


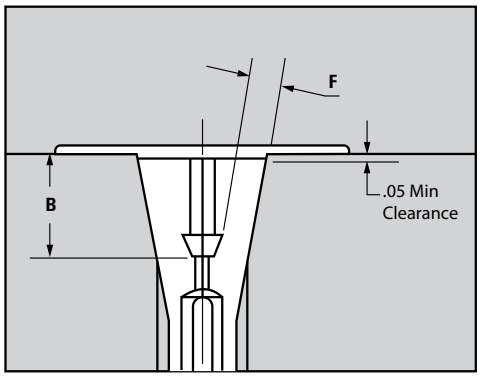
REF	D Ex-Cav diameter	A Max. Part Diameter -10°/side	B Max. molding length	C Min. part inner diameter	E Expansion per side	F Min. Wall Thickness	S Body diameter	T Thread	X Min. ejection stroke (Next page)
EXCAV20	20	14	13	2,5	1,6	3	14	M8	15
EXCAV26	26	18	20	3,5	2,5	4	16	M10	15
EXCAV38	38	30	27	4,0	3,0	4	27	M18	20
EXCAV50	50	40	39	5,5	3,5	5	34	M24	20

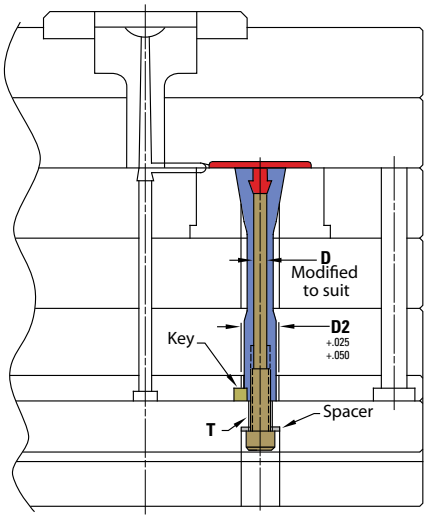
All dimensions and tolerances in millimeters. Mounting kits sold separately (see below). Expandable Cavity sizes not shown on this table are available by special order.

EXC ... BH/BP

Mounting Kits







Hollow Bolt Mounting Kit Includes:

- Key (7 Thk. × 8 × 40)
- Hollow Bolt
- Standard DIN H-13(~1.2344) Ejector Pin (400mm long)
- Spacer

Pin Bolt Mounting Kit Includes:

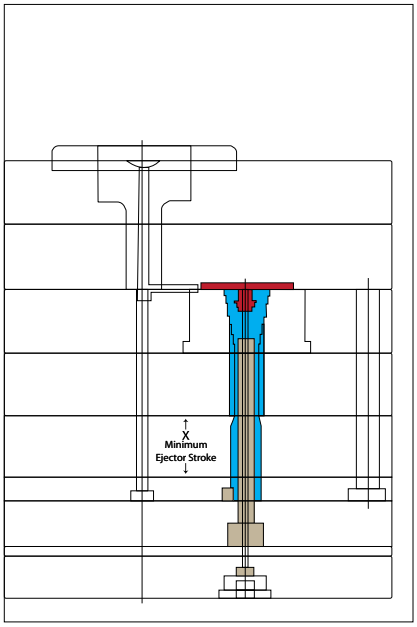
- Key (7 Thk. × 8 × 40)
- Threaded Bolt/Pin (H-13 (~1.2344), 40-44 HRC, 280mm long)
- Spacer

REF	D Nominal Pin Diameter	T Bolt size	S Spacer Size (ID × OD × Thk)	D2	Hollow Bolt Kit Number
EXCAV20	3,5	M8-1,25 × 40	8 × 22 × 4	14	**EXC20BH**
EXCAV26	4,0	M10-1,5 × 40	10 × 23 × 4	16	**EXC26BH**
EXCAV38	10,0	M18-2,5 × 50	19 × 33 × 6	27	**EXC38BH**
EXCAV50	14,0	M24-3 × 55	25 × 42 × 6	34	**EXC50BH**

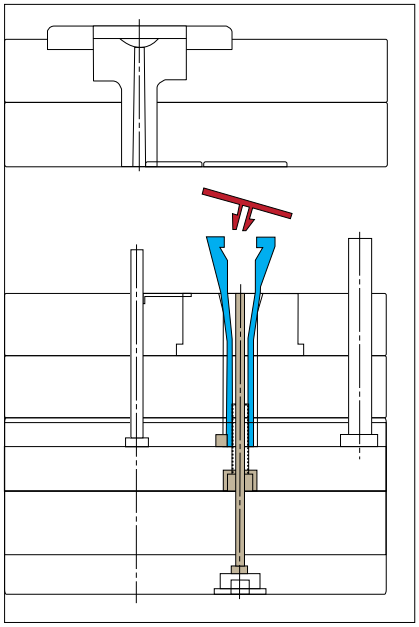
REF	D Nominal Pin Diameter	T Bolt size	S Spacer Size (ID × OD × Thk)	D2	Hollow Bolt Kit Number
EXCAV20	6,0	M8-1,25	8 × 22 × 4	14	**EXC20BP**
EXCAV26	7,7	M10-1,5	10 × 23 × 4	16	**EXC26BP**
EXCAV38	14,5	M18-2,5	19 × 33 × 6	27	**EXC38BP**
EXCAV50	19,8	M24-3	25 × 42 × 6	34	**EXC50BP**

Info

Expandable Cavities simplify tooling design to effectively mold undercuts such as threads, dimples, and protrusions on parts such as snap O-ring caps, plumbing supplies, industrial flanges and valves, electrical fixtures, and much more.
The patented Expandable Cavity design eliminates the engineering, maintenance, and machining required for slide action mechanisms which results in smaller molds or higher mold cavitation.

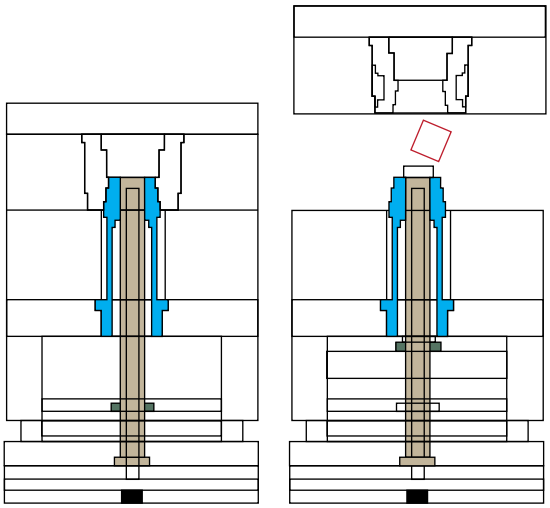


Mold Closed



Mold Open

Technical Information:
Available in four standard sizes to satisfy a wide range of applications.
The Expandable Cavity expands along a conical shape; 10° per side.
Manufactured from A-2 (~1.2363) tool steel (54-57 HRC) for repeatable expansion. For optimal performance, the Expandable Cavity should ride against a hardened insert.
Expandable Cavities are capable of operating without lubrication. However, treating the Expandable Cavity with an additional coating for wear reduction or corrosion resistance is beneficial.
Expandable Cavities can be ordered with molding detail for a 'mold ready' component.



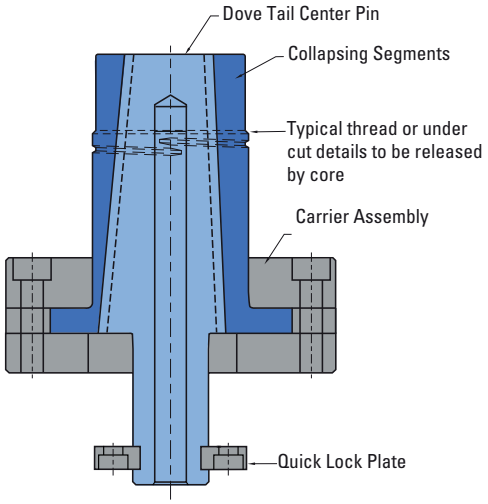
Cost savings that maximize value:
Simplified mold design
Eliminates traditional slides; allows molding of details once considered "un-moldable"
Uses existing ejector system for actuation; either mold open or ejection stages the Expandable Cavity forward to release the molded undercut
Reduces maintenance costs
Maximizes cavities per mold
Compact; often enabling more cavities in the mold and/or the use of a smaller mold base
Improved mold balance and flexibility in design
Easily accommodates family molds
Reduces cycle time from staging plates forward during mold open
Can be ordered with the required molding detail, eliminating the risk of machining errors or scrapping the unit, saving time and money
Detail is machined in a one-piece unit eliminating the risk of error or mismatch that can occur with mating slides
Manufactured with certified alloy steel (A-2) (~1.2363) and proprietary processing techniques to ensure long life and dependable performance

Frequently Asked Questions

Q. What are the material types from which an Expandable Cavity can be made, and how much hardness and wear resistance is expected?
A. A-2 (~1.2363) tool steel is the default material. It has a hardness of 54-57 HRC. Wear resistance is very good.
Q. Are surface treatments recommended?
A. It depends on the application. The DME engineering staff will review potential options, if needed.
Q. Are there any temperature limitations?
A. Maximum temperature is 260°C.
Q. What is the expected life cycle of an Expandable Cavity and what maintenance is required?
A. Customers have run millions of cycles. The biggest factor for performance is not the flexing aspect or fatigue as much as cleanliness of the tool over the life of the mold.

DOVE TAIL CORE ADVANTAGES

- Positive mechanically actuated Collapsible Core
- Collapse amount: 5% to 7% per side
- Eliminates costly Rack and Gear Systems
- Enables faster mold cycle times
- Patented Quick Lock helps cut service time
- Built-in center cooling channel
- Standard and custom sizes available

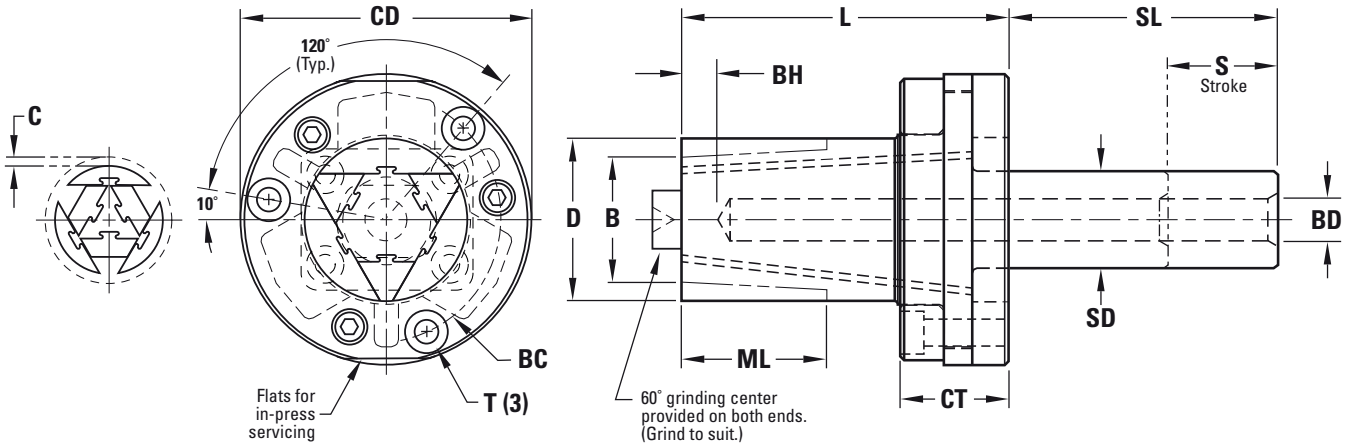


Simplified Mold Design Maximizes Cost Savings

The Collapsible Core DT Series provides a more compact and simplified solution to molding challenging internal undercut features such as o-ring grooves, slots and snap-fit designs. Available in four standard sizes and in customized sizes, the DT Collapsible Core Series eliminates the need for unscrewing mechanisms.

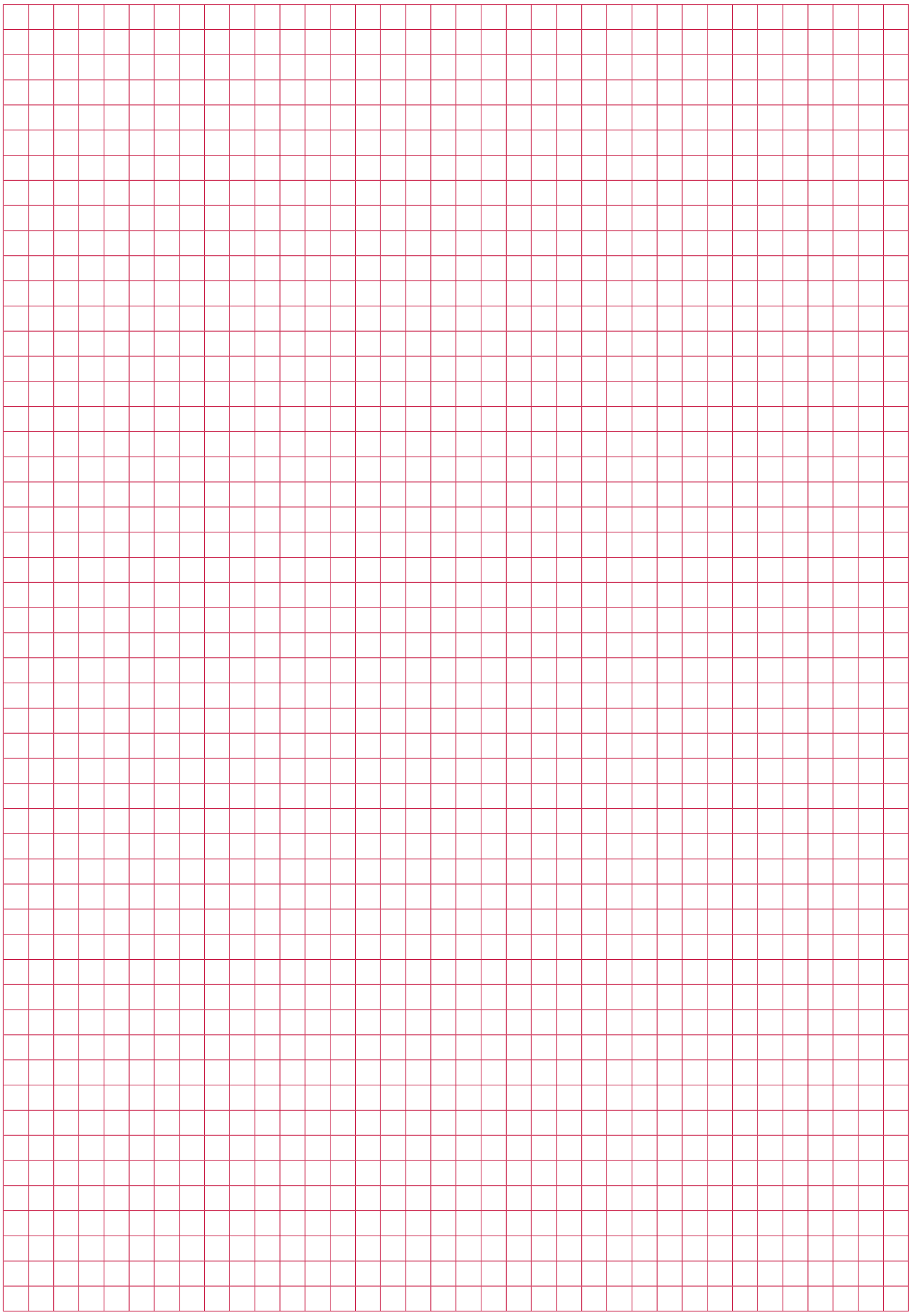
Dove Tail Collapsible Cores Enable Application Design Flexibility

- All standard DT Series Collapsible Cores offer 360 degree molding of threads or other undercut features
- Molded parts are not required to be closed at one end; they may be partially or completely open
- DME offers customized DT Cores with pre-machined part detail
- A variety of coatings and treatments are available
- For an engineering review, email your part drawing or application to dmeeu_specialprojects@milacron.com



All dimensions and tolerances are in milimeters.

REF	D Maximum Outer Diameter	B Minimum Inner Diameter +3°/Side	ML Maximum Molding Length	C Maximum Collapse	CD Carrier Diameter	CT Carrier Assembly Thickness ± 0,05	L Core Length +0,1 -0,0	SL Shaft Length	SD Shaft Diameter +0,00 -0,02	BD Cooling Hole Diameter	BH Distance to Cooling Hole	BC Mounting Screw Bolt Circle	T Mounting Screws	S Maximum Collapse Stroke
DT18	21	17	22	1,1	53	21	60	60	16	6	6	40	M5 x 25	34
DT28	33	25	28	1,6	60	22	67	60	20	8	8	47	M5 x 25	38
DT38	42	33	43	2,1	76	28	85	60	25	10	10	60	M6 x 35	54
DT48	54	42	50	2,4	98	37	104	70	30	12	12	78	M8 x 40	62



Info EXP

Expandable Cores

Broad Range of Benefits
Simple Design
The revolutionary design and engineering of the Expandable Core saves steps and solves problems that have complicated plastics molding for years. In addition to simplifying new tooling design, it can be retrofit to existing molds.

More Reliable
Complete reliability of the Expandable Core is assured, not only by the simplicity of the design, but also by the use of superior materials and proven proprietary processing techniques. It has been field tested over several million cycles.

More Compact
Using the DME Expandable Core allows you to design more cavities in each mold.

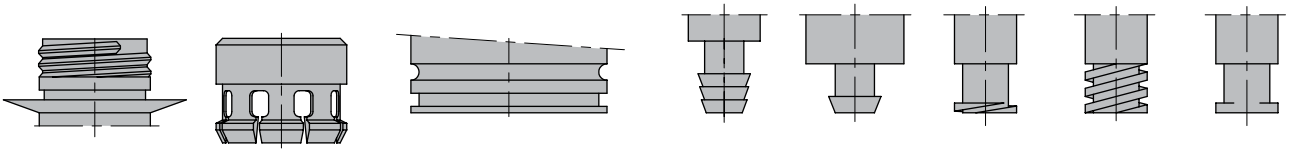
Speeds Molding Process
The Expandable Core concept completely eliminates the need for side-action mechanisms and the additional machining steps they require.

Speeds Development
The Expandable Core concept simplifies the engineering required to design and manufacture a new Core.

Lowers Development & Processing Costs
The Expandable Core saves money at every step from initial tooling to processing to maintenance. Items such as complex design details, core slides and required mechanical components.

EXP

Typical application

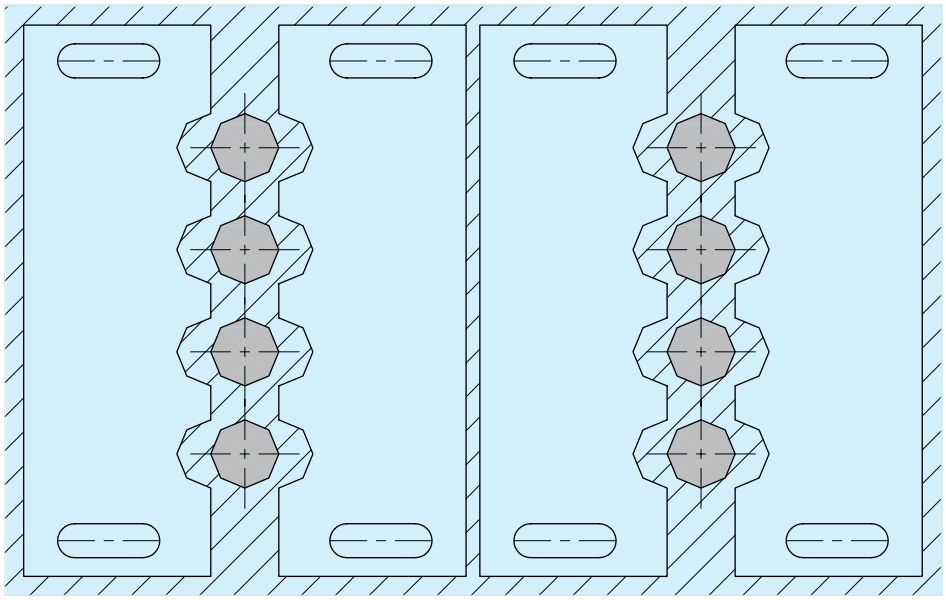


Bottle tops | Snap fit covers/lenses | O-ring grooves | Barb connections | Luer connections

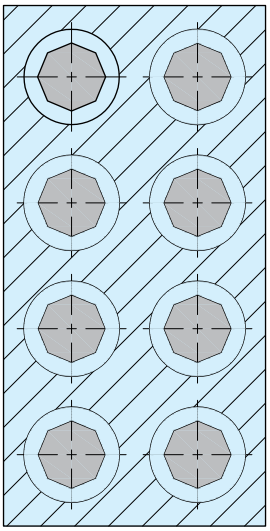
REF
EXP ****

Typical mold layouts

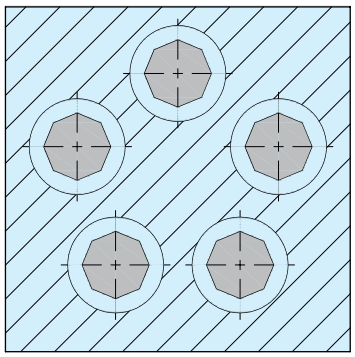
Go from this mold layout with conventional slide mold



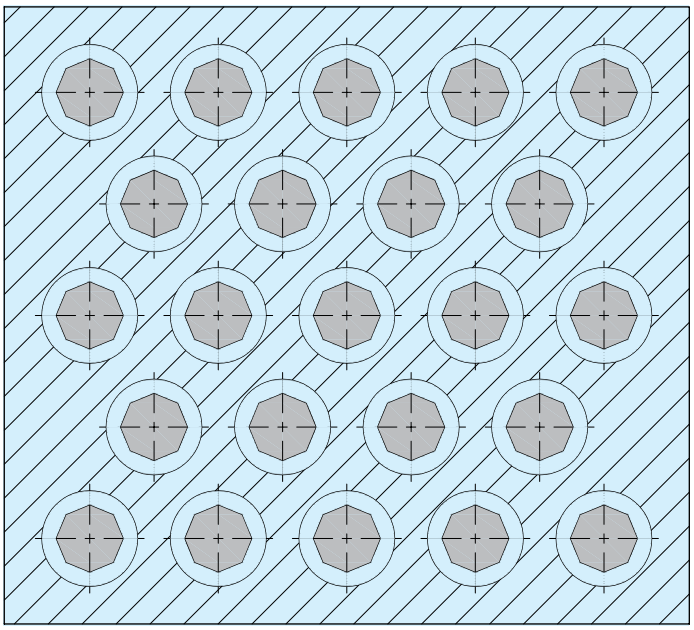
to this reduced mold size with expandable cavity



Radial mold layout with expandable cavity



Nest mold layout with expandable cavity



EXP

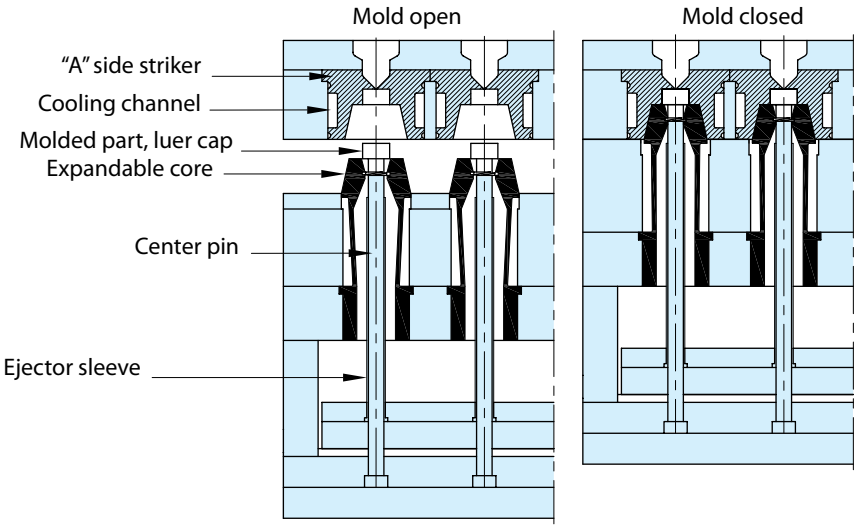
Info EXP

Expandable Core
The Expandable Core is typically made of 1.2363 tool steel, hardened to 54-58 HRC. The typical tool has 4 segments.

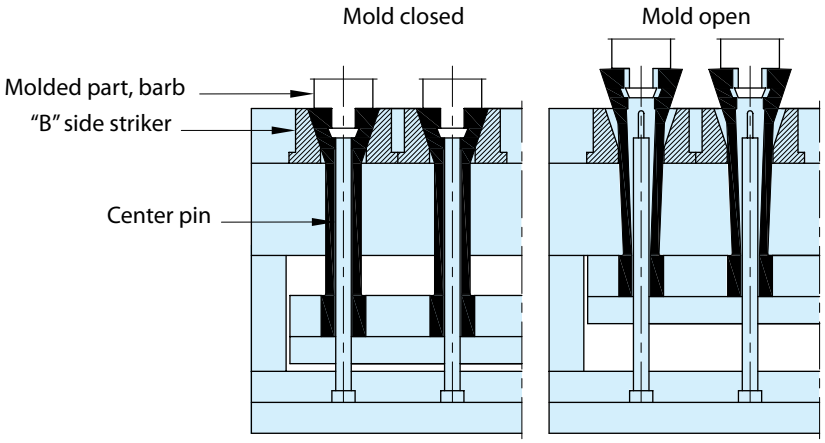
Striker Insert
The Striker Insert is made from different types of tool steel. It is hardened to 32-45 HRC scale, depending on the application. The Striker Insert has a lower hardness than the Expandable Core to ensure the eventual wear will occur on the Striker Insert. Depending on the part configuration, the Striker Insert can be used in the "A" or "B" side of the mold.(See figure 1 and 2 for details). The Striker Insert must be closely fit to the Expandable Core to ensure that in the mold closed position the segments are completely sealed against one another. The tolerance on this fit must be held to ± 0.013 mm. This will ensure flash free molding. When the mold is closed, the exterior of the Expandable Core must be supported by the Striker Insert at least 7/8 of the molded length plus the shut-off, to ensure no flash conditions. Allow for 5 mm of shut-off length below the molding length, any more is excessive.

Interchangeable Center Pin
The solid center mandrel is the most common type of center pin. It may have an inner cooling channel depending on its size. The center pin provides an internal shut-off with the Expandable Core.

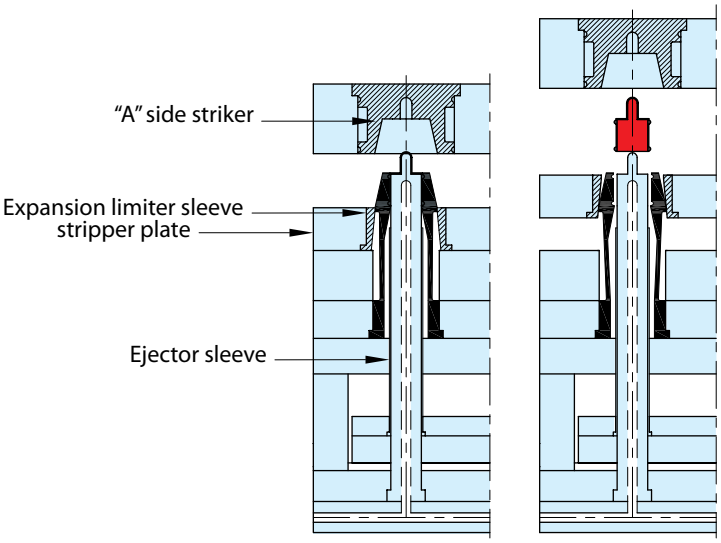
Typical application with"A" side striker insert



Typical application with "B" side striker insert



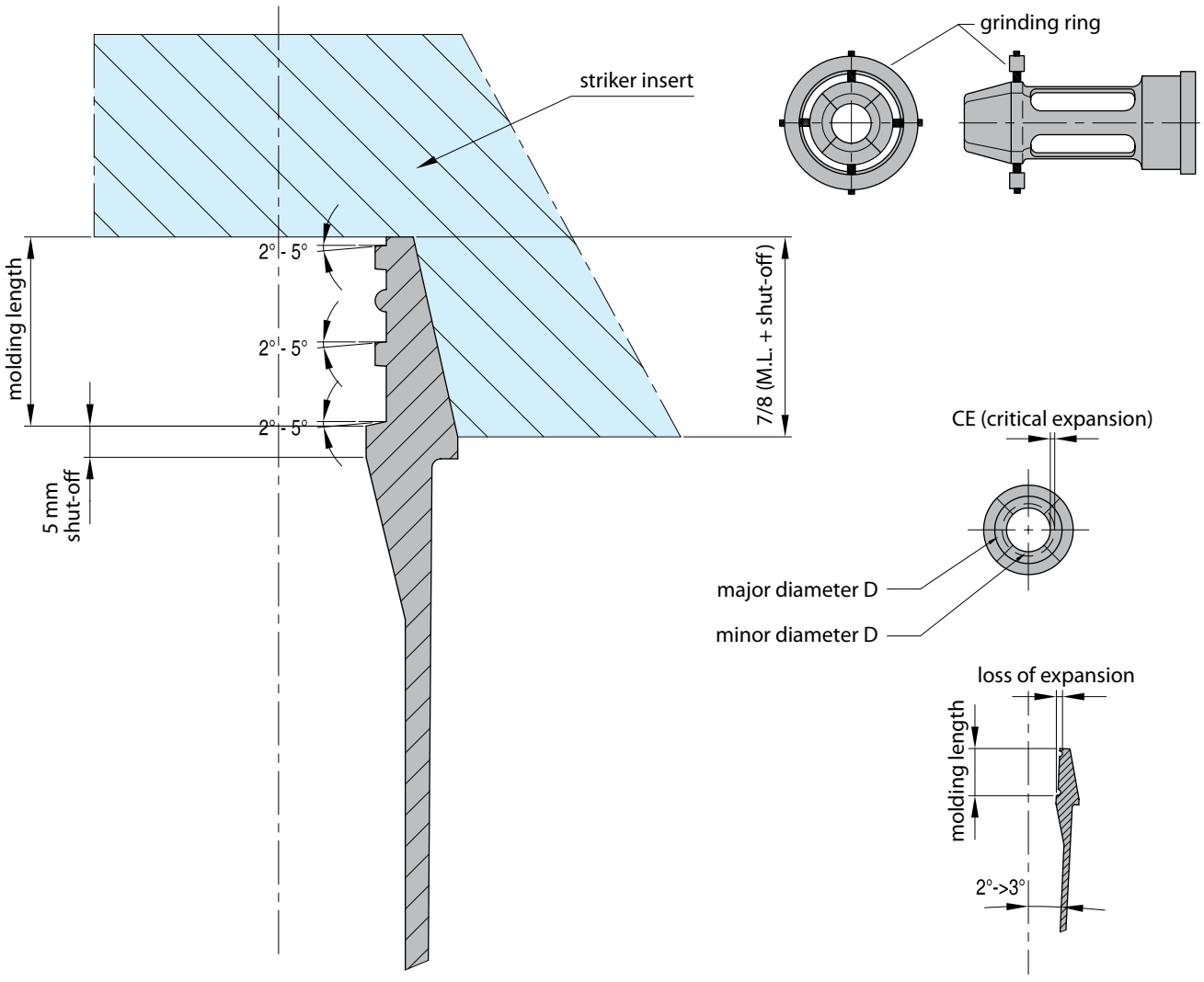
With "A" striker insert and expansion limiter sleeve



Expandable Core and Striker Insert Design

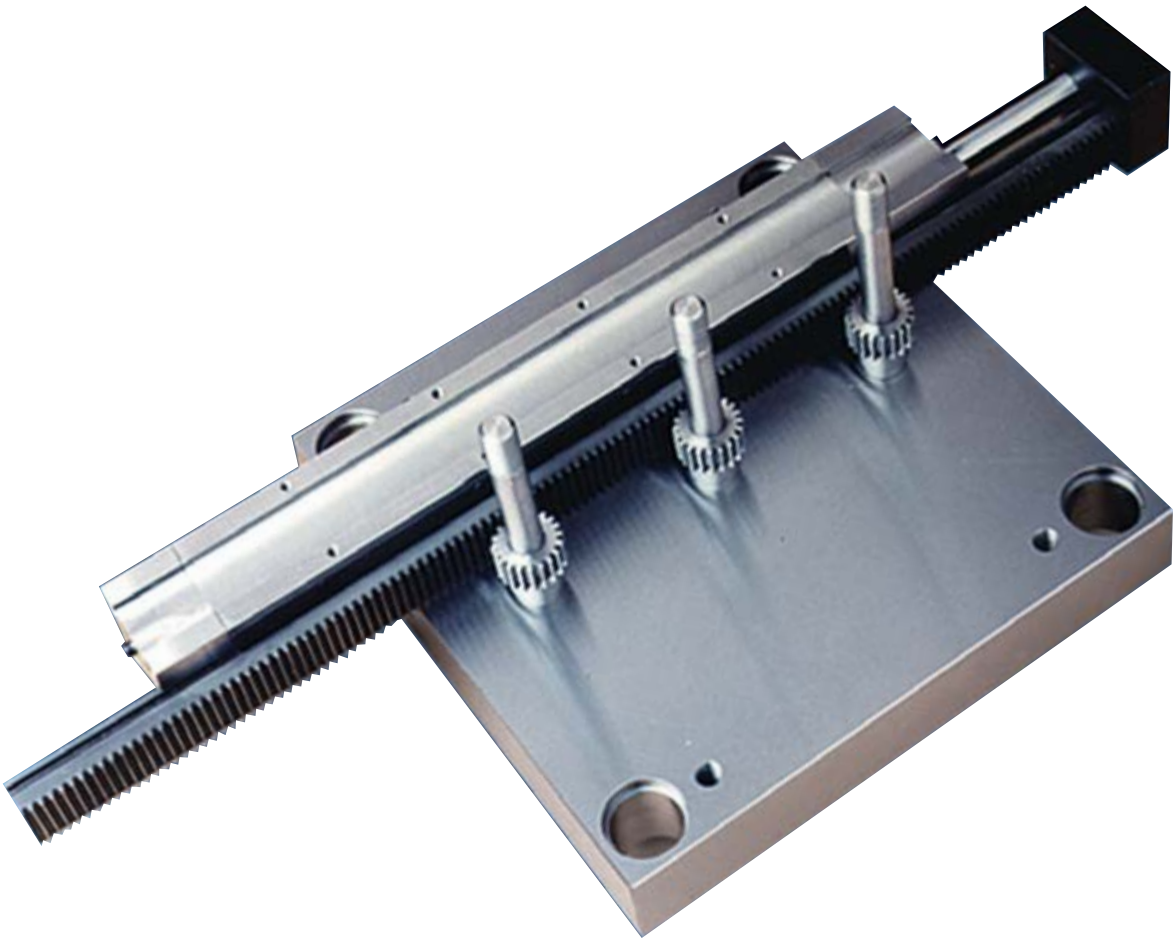
The Expandable Core can mold a full 360° around. The most common configuration is 4 segments that mold 90° apiece. The Expandable Core can also be designed as asymmetrical, such as two segments that mold 90° apiece and 3 segments that mold 60° apiece. The amount of expansion varies according to the part requirements, and clearances needed.
The critical expansion needed to release the undercut is not the radial difference between major diameter (D) and minor diameter (d).
Most Expandable Cores are usually ground or EDM'd. It is important when grinding to flood tool with suitable coolant for hardened tool steels. (Dress wheel frequently). The wheel must be of a soft grade. When grinding make sure the Expandable Core completely closed in a true circle by using the grinding ring supplied, as shown here. After all finish grinding, polishing and EDM'ing work, be sure to demagnetize the Expandable Core to prevent adhesion of any metal particles that might find their way into the Core during molding.

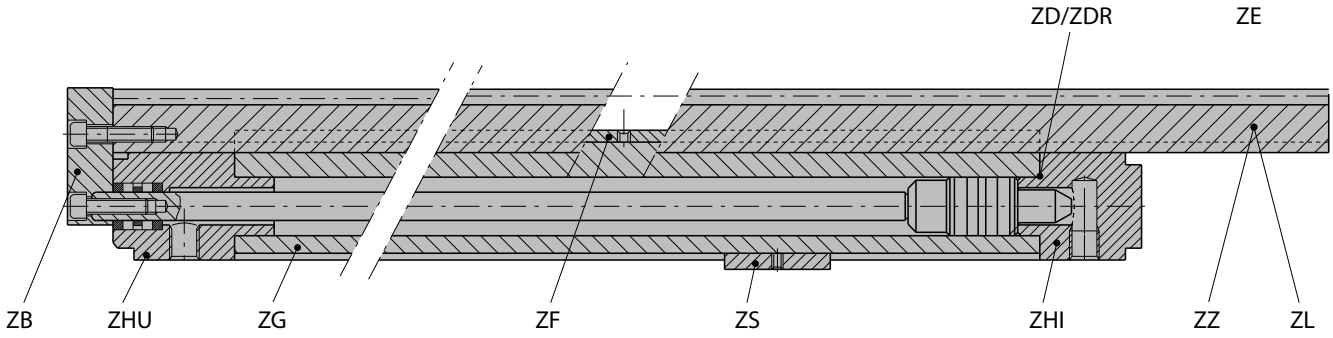
Note : **DME** does not provide the part configuration detailing or machining.



Info

Hydraulic unscrewing device



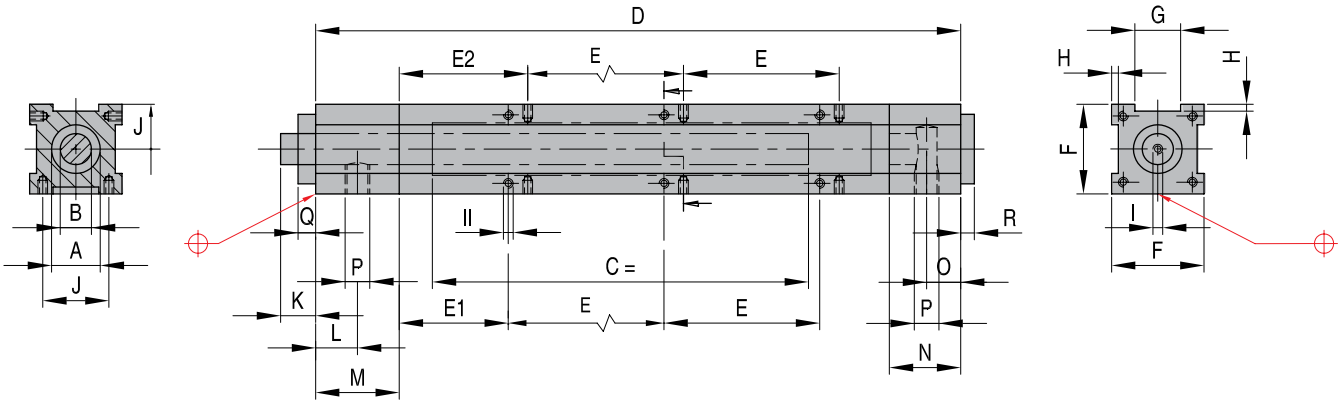


REF	Includes		
	Base construction	End caps-out	End Caps-in
ZG 25 300	ZG 25 300	ZHU 25	ZHI 25
ZG 25 400	ZG 25 400	ZHU 25	ZHI 25
ZG 25 500	ZG 25 500	ZHU 25	ZHI 25
ZG 40 300	ZG 40 300	ZHU 40	ZHI 40
ZG 40 400	ZG 40 400	ZHU 40	ZHI 40
ZG 40 500	ZG 40 500	ZHU 40	ZHI 40
ZG 63 400	ZG 63 400	ZHU 63	ZHI 63
ZG 63 500	ZG 63 500	ZHU 63	ZHI 63

Base construction

MaxT = 80°C - Max p = 150 bar

ZG

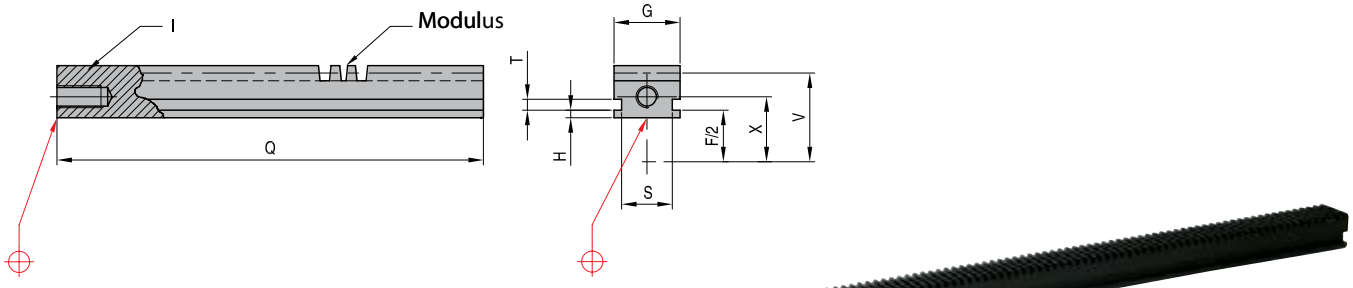


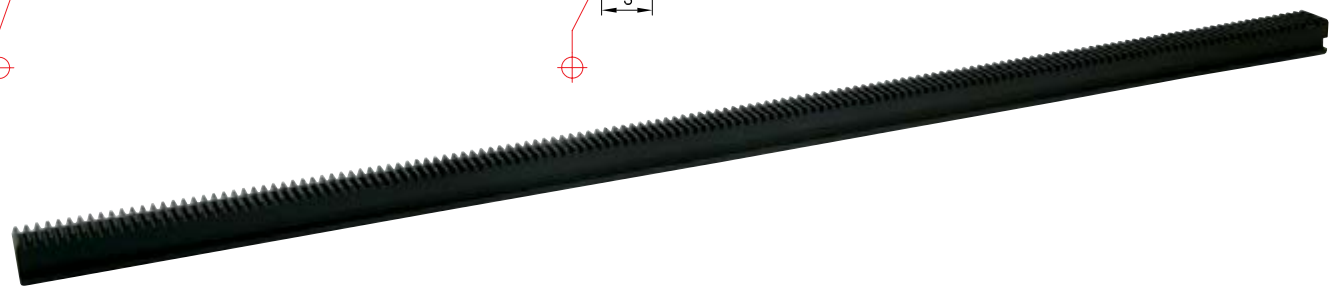
REF	A	B	C	D	E	E1	E2	F	G	H	J	K	L	M	N	O	P	Q	R	I	II
ZG 25 300	ø 25	ø 16	300	424	3x80	56	66	46	20	3,5	34	18	21,5	43	29	11	R 1/4"	9	6	M8x20	SM5x10
ZG 25 400			400	524	3x80	106	116														
ZG 25 500			500	624	5x80	76	86														
ZG 40 300	ø 40	ø 22	300	432	3x80	56	66	56	30	3,5	44	22	34	53	27	13	R 1/2"	9	8	M10x30	SM5x10
ZG 40 400			400	532	3x80	106	116														
ZG 40 500			500	632	5x80	76	86														
ZG 63 400	ø 63	ø 36	400	556	3x80	114	124	96	50	8	70	38	25	52	35	16	R 3/4"	22	12	M16x40	SM8x16
ZG 63 500			500	656	5x80	84	94														

Racks

Mat.: 1.6580 nitrided 60 HRc

ZZ

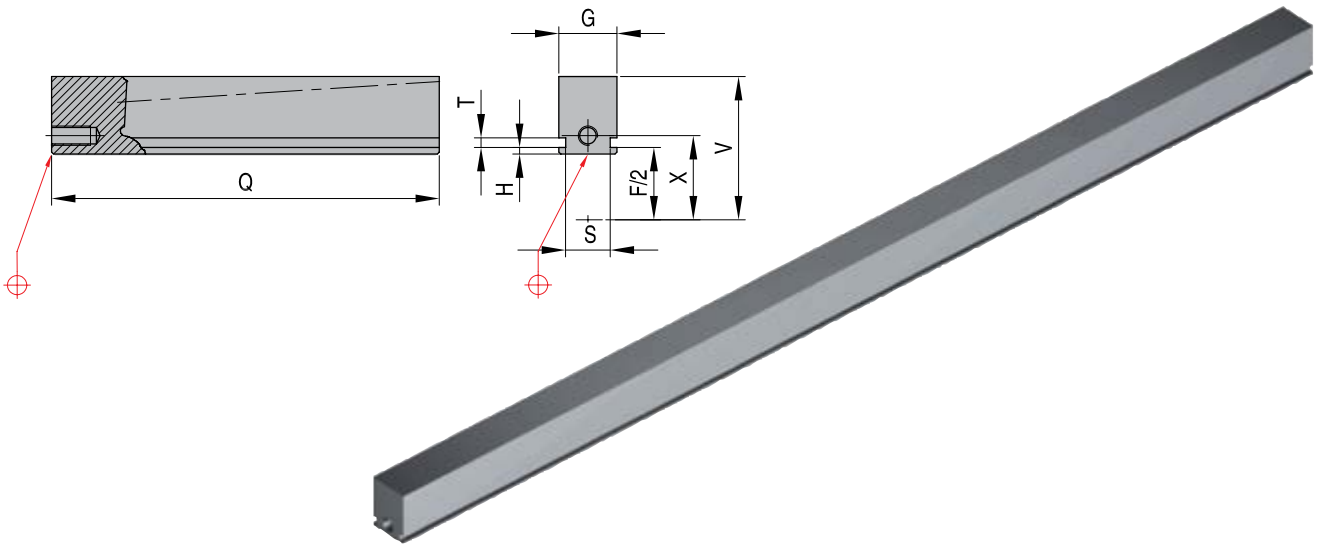




REF	A	F/2	G	H	Q	Modulus	S	T	V	X	I
ZZ 25-600/1,0	Ø 25	23	20	3,4	600	1,00	13	5	36,2	27	M8x20
ZZ 25-800/1,0	Ø 25	23	20	3,4	800	1,00	13	5	36,2	27	M8x20
ZZ 25-600/1,25	Ø 25	23	20	3,4	600	1,25	13	5	36,2	27	M8x20
ZZ 25-800/1,25	Ø 25	23	20	3,4	800	1,25	13	5	36,2	27	M8x20
ZZ 40-600/1,5	Ø 40	28	30	3,4	600	1,5	23	5	43,0	34	M10x30
ZZ 40-800/1,5	Ø 40	28	30	3,4	800	1,5	23	5	43,0	34	M10x30
ZZ 63-800/2,0	Ø 63	48	50	7,9	800	2,00	40	7	68,0	55	M12x40
ZZ 63-900/2,0	Ø 63	48	50	7,9	900	2,00	40	7	68,0	55	M12x40

ZL

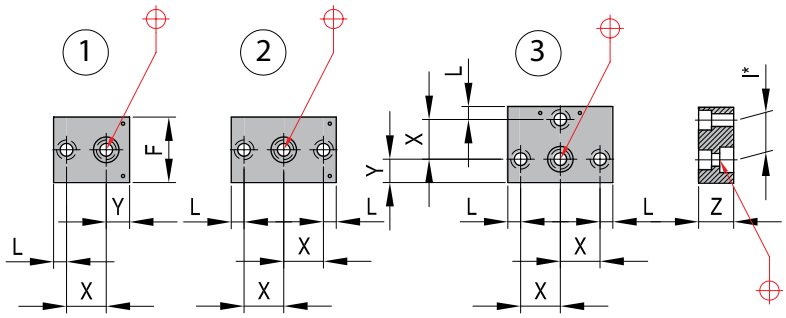
Gibs Mat.: 1.7225 ~30 HRc



REF	A	F/2	G	H	Q	S	T	V	X	I
ZL 25-800	Ø 25	23	20	3,35	800	13	5	49,5	27	M8x20
ZL 40-800	Ø 40	28	30	3,50	800	23	5	64,5	34	M10x30
ZL 63-900	Ø 63	48	50	8,00	900	40	7	100,0	55	M12x40

ZB

Flanges



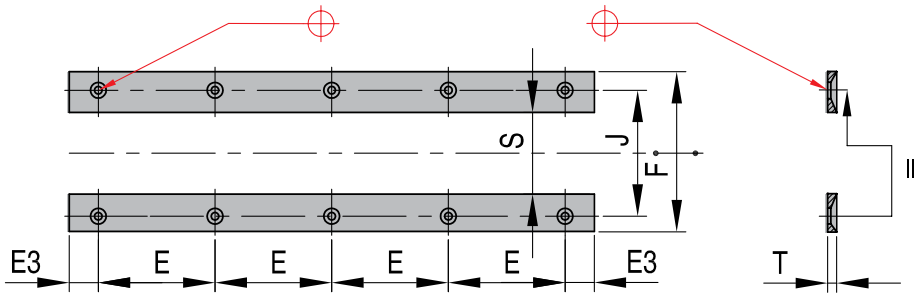
* I is the thread dimension

REF	A	X	Y	F	Z	L	I: for
ZB 25-1	Ø 25	27	12,5	46	20	10,5	2xM8x20 3xM8x20 4xM8x20
ZB 25-2							
ZB 25-3							
ZB 40-1	Ø 40	34	20,0	56	30	11,0	2xM10x30 3xM10x30 4xM10x30
ZB 40-2							
ZB 40-3							
ZB 63-1	Ø 63	55	30,0	96	40	15,0	1xM12x40+1 M16x40 2xM12x40+1 M16x40 3xM12x40+1 M16x40
ZB 63-2							
ZB 63-3							

Guideways

Order per 2 pieces

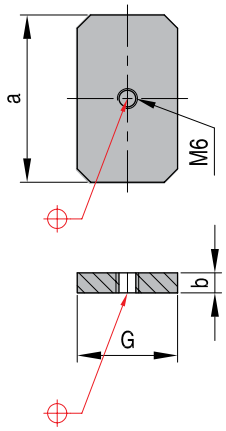
ZF



REF	A	C	E	E3	F	J	S	T	II
ZF 25-300	Ø 25	300	3x80	46	46	34	14	4	SM 5x10
ZF 25-400	Ø 25	400	3x80	96	46	34	14	4	SM 5x10
ZF 25-500	Ø 25	500	5x80	66	46	34	14	4	SM 5x10
ZF 40-300	Ø 40	300	3x80	46	56	44	24	4	SM 5x10
ZF 40-400	Ø 40	400	3x80	96	56	44	24	4	SM 5x10
ZF 40-500	Ø 40	500	5x80	66	56	44	24	4	SM 5x10
ZF 63-400	Ø 63	400	3x80	104	96	70	42	6	SM 8x16
ZF 63-500	Ø 63	500	5x80	74	96	70	42	6	SM 8x16

Locating plates

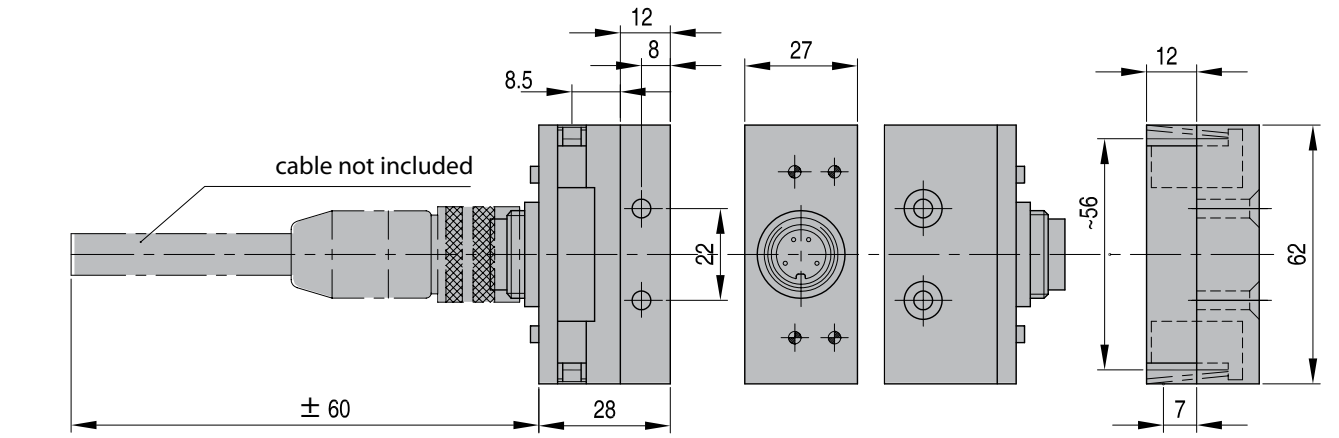
ZS



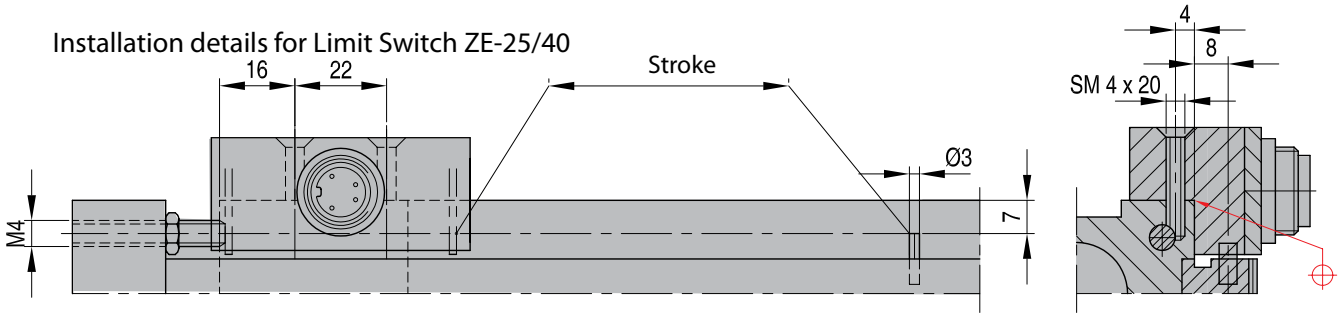
REF	A	G	a	b
ZS 25	Ø 25	20	40	6
ZS 40	Ø 40	30	50	6
ZS 63	Ø 63	50	80	15

ZE

Limit switches



Installation details for Limit Switch ZE-25/40

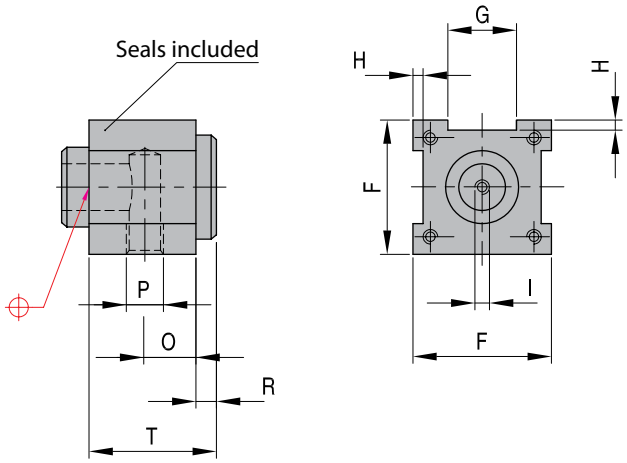


For gear information please contact ***D-M-E***

REF	Includes			
ZE 25/40	(2x) **SM4x20**	(1x) **DP3x16**	(1x) **GS4x20**	(1x) **M4 DIN 934**

ZHI

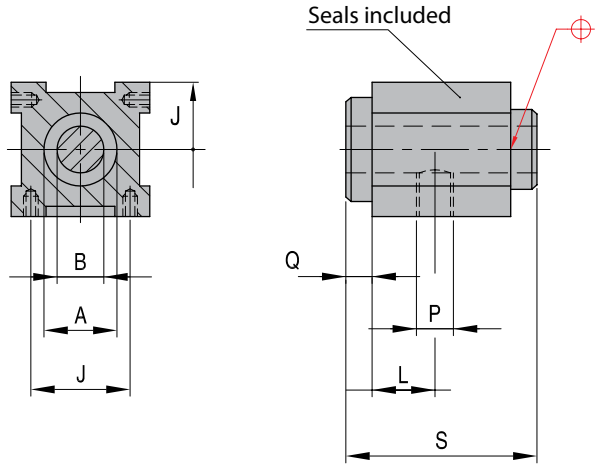
Spare part: end cap - in



REF	O	R	P	T
ZHI 25	11	6	R 1/4"	35
ZHI 40	13	8	R 1/2"	35
ZHI 63	16	12	R 3/4"	47

Spare part: end cap - out

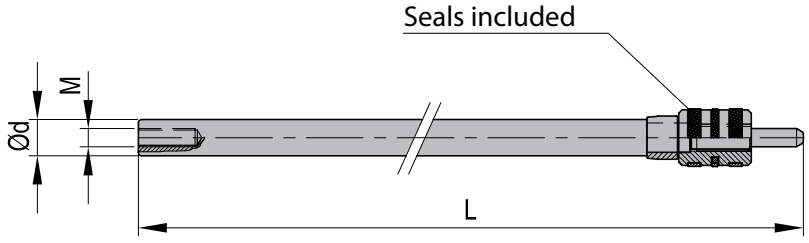
ZHU



REF	L	Q	P	S
ZHU 25	21,5	9	R 1/4"	52
ZHU 40	34	9	R 1/2"	62
ZHU 63	25	22	R 3/4"	74

Spare part: rod & pist

ZTP

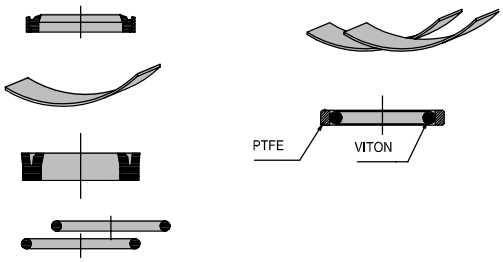


REF	Ø d	M	L
ZTP 2530 ZG 25300	16	8	426
ZTP 2540 ZG 25400	16	8	526
ZTP 2550 ZG 25500	16	8	626
ZTP 4030 ZG 40300	22	10	442
ZTP 4040 ZG 40400	22	10	542
ZTP 4050 ZG 40500	22	10	642
ZTP 6340 ZG 63400	36	16	575
ZTP 6350 ZG 63500	36	16	675

11/05/2007

ZD

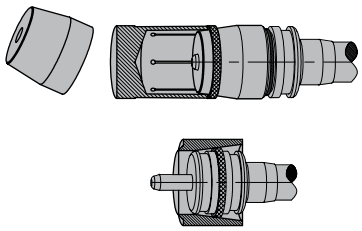
Spare part: seals (kit)



REF
ZD 25
ZD 40
ZD 63

ZDR

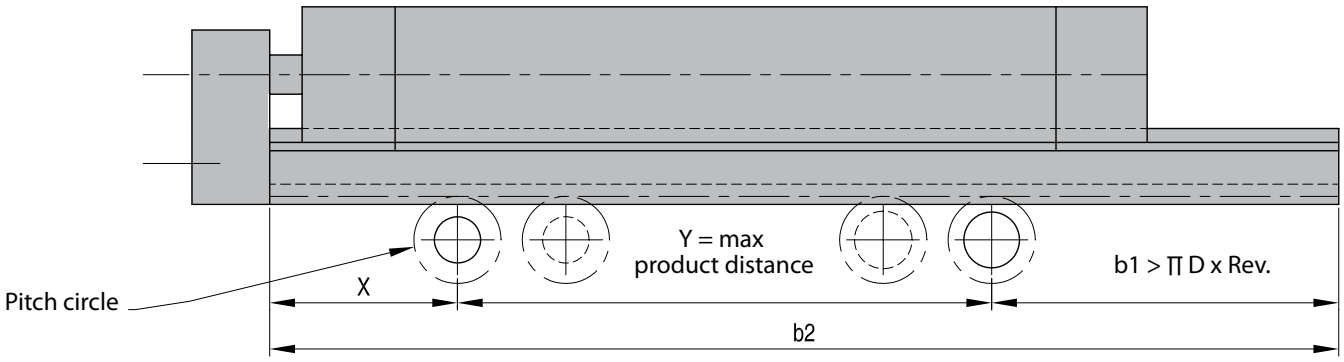
Spare part: seals (kit) + mounting tools



REF
ZDR 0025
ZDR 0040
ZDR 0063

Info

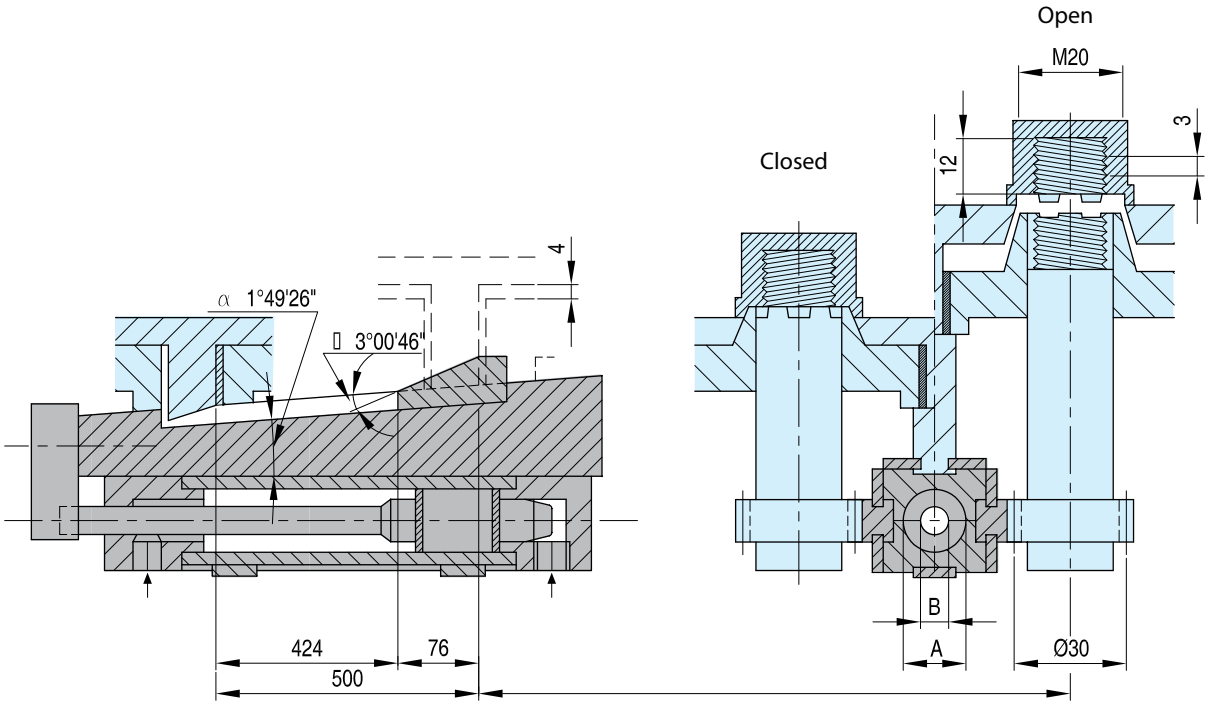
Calculation Example



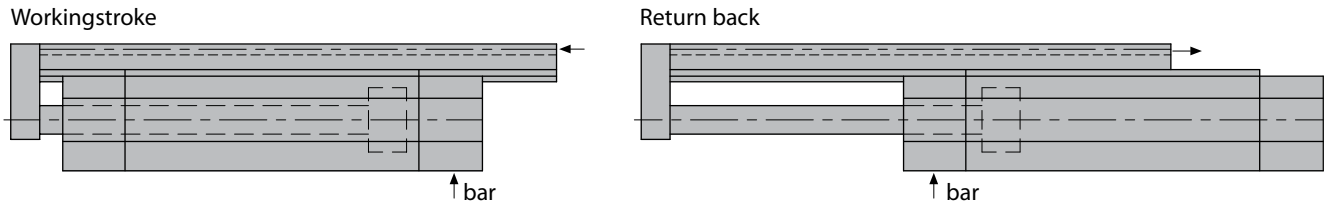
A. Stroke
a. Required revolutions (thread core) = thread height/thread lead + safety (min 0,5 t) = 12 mm/3 mm + 0,5 rev. = 4,5 rev.
b. 1. Required stroke (mm) = pitch circle x π x rev. = 30 mm x 3,14 x 4,5 rev. = 424 mm If required stroke is too long, a cog wheel transmission gear should be used 2. Length of rack b2 = X +Y + b1
c. Stripper stroke (mm) = cylinder stroke - required rack stroke = 500 mm - 424 mm = 76 mm

Calculation Example

Info

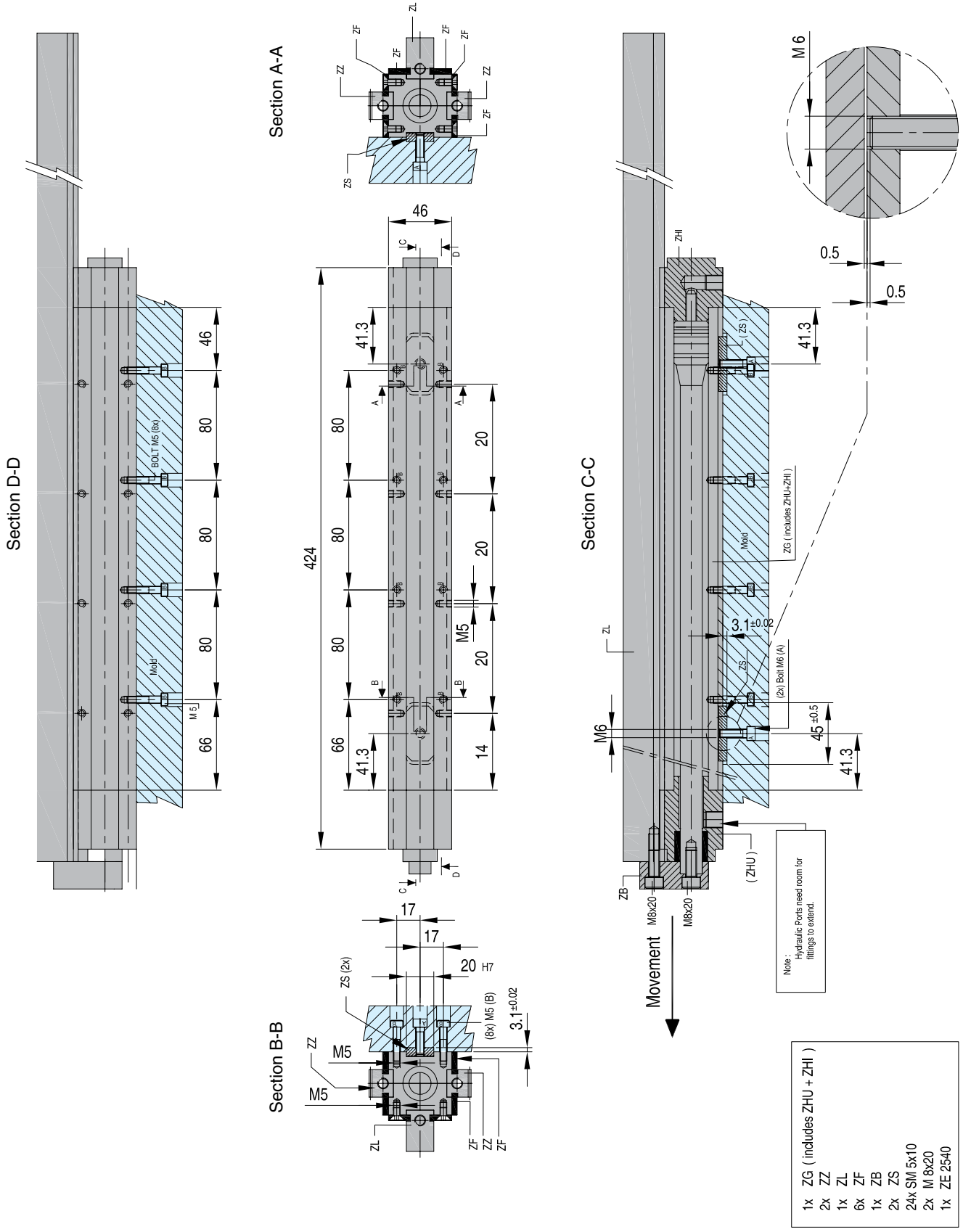


B. Control cam calculation
d. Moving cam (α) tan α = lead/dia. pitch circle x π = 3 mm/30 mm x 3,14 = 0,031847; α = 1° 49' 26"
α = 1°49'26"
e. Stripper cam (ß) tan ß = Stripper height/Stripper stroke = 4 mm/76 mm = 0,0526315; ß = 3°00'46"



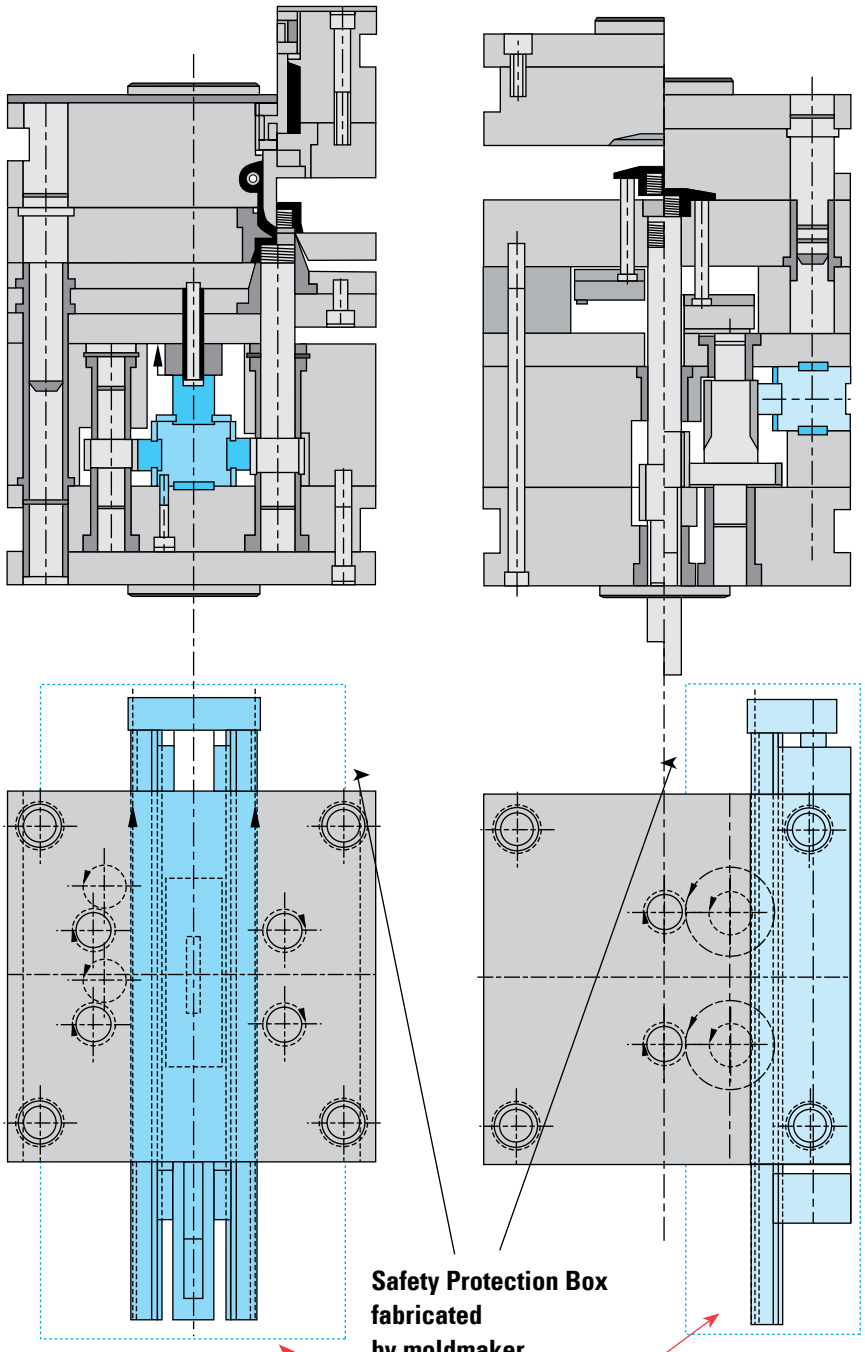
C. Unscrewing force
These figures should only be used as a guideline as many other factors will affect the calculation. (Material, variation of dimensions, material shrinkage, core surface area, temperature, lubricant, etc...)
f. Residual pressure (bar) 1/100 of max. injection pressure = 1000 bar/100 ≈ 10 bar ≈ 1 N/mm²
g. Effective core surface area (mm²) = thread dia. x π x thread height x 2* = 20 mm x 3,14 x 12 mm x 2 = 1507 mm²
* - 2 x height for developped surface (^^^^) - frontal area is neglected
h. Unscrewing torque (Nmm) = Holding pressure x surface x thread radius = 1 N/mm² x 1507 mm² x 10 mm = 15070 Nmm
i. Unscrewing force rack (kN) = unscrewing torque/radius pitch circle x number of cores = 15070 Nmm/15 mm x 4 = 4019 N = 4,02 kN
k. Hydraulic force (kN) = Unscrewing force x 1,5 = 4,02 kN x 1,5 = 6,03 kN (50 % safety, hence x 1,5)

Installation Instructions



Application A
Without guiding thread with cam

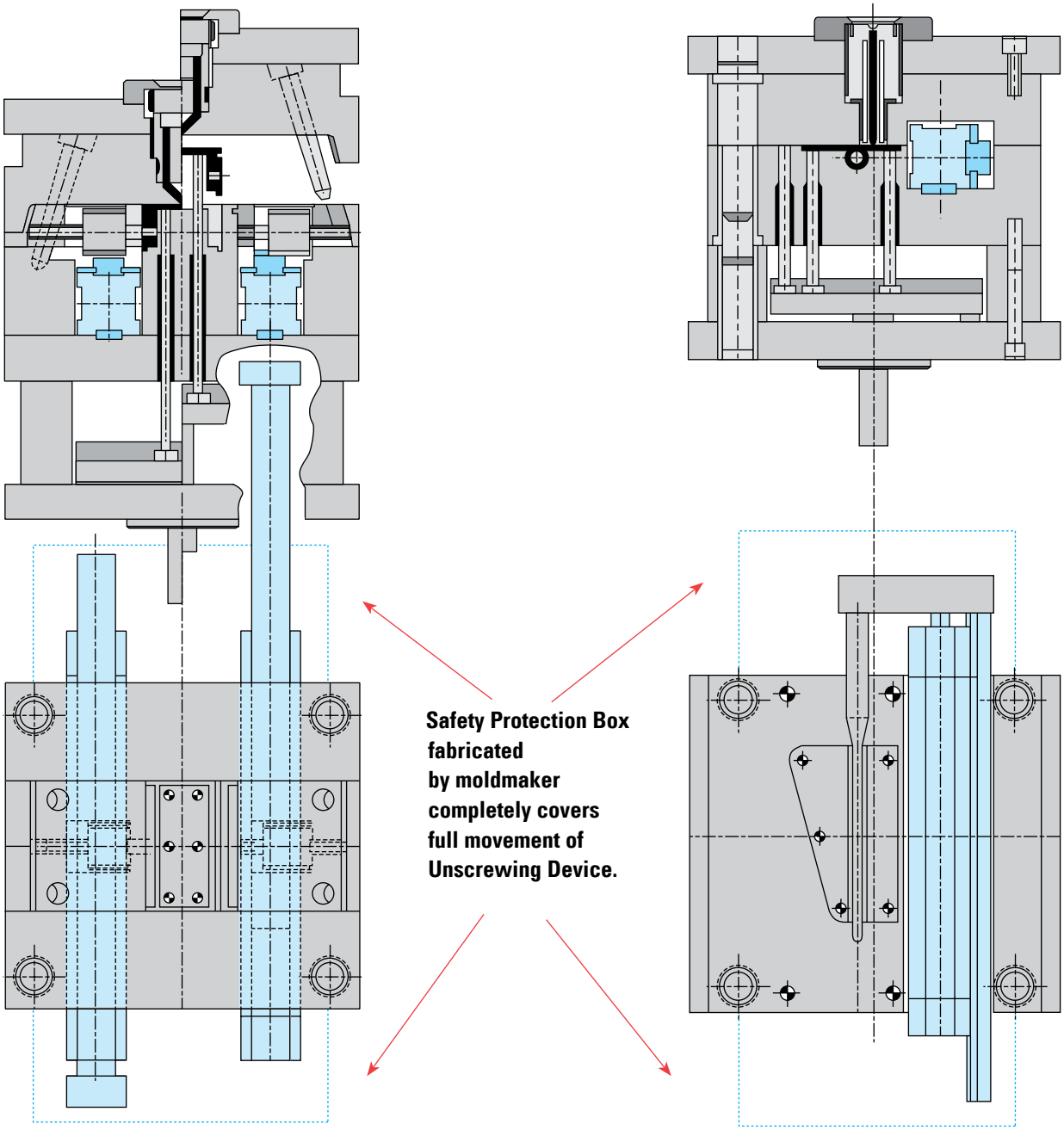
Application B
With guiding thread



Applications

Application C
With guiding thread

Application D
Long guiding cores



Safety Considerations:
Moldmaker must fabricate boxes over the rack areas which move to protect against injury to personnel. Moldmaker must also use safety interlocks to prevent movement of unscrewing device if these protection boxes are removed for any reason. Also, sheet metal should be used to cover areas where the gears are, to prevent damage from loose debris falling between the gears and racks.