

ISO 6432 MINI-CYLINDER SERIES STD

Mini-cylinders to ISO 6432 with a chamfered stainless steel barrel. The cylinder head dimensions have been reduced for some sizes so that they can be used where there are space restrictions. Can be used with different types of sensors.

Available in various versions with a wide range of accessories:

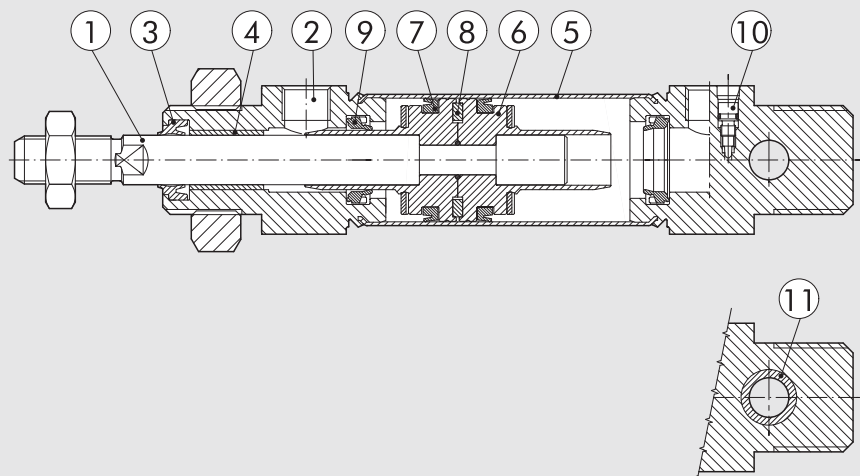
- with or without magnet
- single acting extended, retracted or through piston rod
- double acting, single or through piston rod
- with pneumatic cushioning (Ø 16-20-25)
- gaskets made of NBR, POLYURETHANE, and FKM/FPM (for high temperatures), and low-temperature gaskets
- special executions on request
- fixing accessories, guide units and mechanical rod locking



TECHNICAL DATA		Polyurethane	NBR	FKM/FPM			Low temperature
Max operating pressure	bar			10			
	MPa			1			
Temperature range	°C	-10 to +80	-10 to +80	-10 to +150 (non-magnetic cylinders)			-35 to +80
Fluid		Unlubricated air. Lubrication, if used, must be continuous					
Bores	mm	8; 10; 12; 16; 20; 25					
Design		Chamfered barrel					
Standard strokes ⁺	mm	Single-acting: for bores Ø 8 to 25 strokes from 1 to 50 Double-acting: for bores Ø 8 to 10 strokes from 1 to 100 for bores Ø 12 to 16 strokes from 1 to 200 for bores Ø 20 to 25 strokes from 1 to 500 Double-acting, cushioned: for bores Ø 16 strokes from 1 to 300 for bores Ø 20 to 25 strokes from 1 to 500					
Versions		Double-acting, Double-acting cushioned, Single-acting extended or retracted rod, Through-rod, Through-rod cushioned, Version with piston rod block, No stick-slip					
Magnet for sensors		All versions come complete with magnet. Supplied without magnet on request.					
Inrush pressure		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25
single piston rod	bar	0.8	0.8	0.8	0.6	0.6	0.6
through-rod	bar	1	1	1	0.8	0.8	0.8
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter					
Weights		See cylinder "General technical data" at the beginning of the chapter					
Notes		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air. ⁺ Maximum recommended strokes. Higher values can create operating problems					

COMPONENTS

- PISTON ROD: C45 steel or stainless steel, thick chromed
- HEAD: anodised aluminium alloy
- PISTON ROD GASKET: polyurethane, NBR or FKM/FPM
- GUIDE BUSHING: steel strip with bronze and PTFE insert
- BARREL: AISI 304 steel
- HALF-PISTON: acetal resin
- PISTON GASKET: polyurethane, NBR or FKM/FPM
- MAGNET: plasteodymium
- CUSHIONING GASKET: NBR or FKM/FPM
- NEEDLE: OT 58 with needle out movement safety system even when fully open
- BUSHING (optional): self-lubricating bronze



ISO 6432 MINI-CYLINDER SERIES TP



ACTUATORS

ISO 6432 MINI-CYLINDER SERIES TP

Minicylinders manufactured according to the ISO 6432 regulation having high resistance technopolymer heads and anodized aluminium liner. Available in various versions with a wide range of accessories:

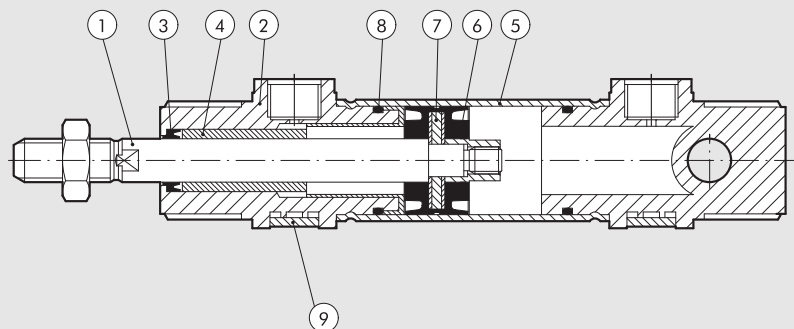
- with or without magnet
- single and double acting-single or through rod
- gaskets made of POLYURETHANE
- fixing accessories and guide units.



TECHNICAL DATA		POLYURETHANE		
Max operating pressure	bar	10		
	MPa	1		
Temperature range	°C	-10 to +60		
Fluid		Unlubricated air. Lubrication, if used, must be continuous		
Bores	mm	16; 20; 25		
Design		Aluminium liner chamfered on the heads		
Standard strokes +	mm	Ø 16: from 1 to 200		
	mm	Ø 20 to 25: from 1 to 500		
Versions		Double-acting, Double Through-rod (for both there are magnetic and non magnetic versions)		
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter		
Weights		See cylinder "General technical data" at the beginning of the chapter		
Inrush pressure		Ø 16	Ø 20	Ø 25
	single piston rod	bar	0.6	0.6
through-rod	bar	0.8	0.8	0.8
Notes		The standard version is lacking of the head nut.		
		Use of fittings with a taper thread is NOT recommended.		
		+ Maximum recommended strokes. Higher values can create operating problems		

COMPONENTS

- ① PISTON ROD: C45 steel or stainless steel, thick chromed
- ② HEADS: high resistance technopolymer
- ③ PISTON ROD GASKET: polyurethane
- ④ GUIDE OPERATOR: technopolymer
- ⑤ BARREL: drawn anodized aluminium alloy
- ⑥ PISTON GASKET: polyurethane
- ⑦ MAGNET: neodymium
- ⑧ STATIC O-RINGS: NBR
- ⑨ COVER PLATE: technopolymer



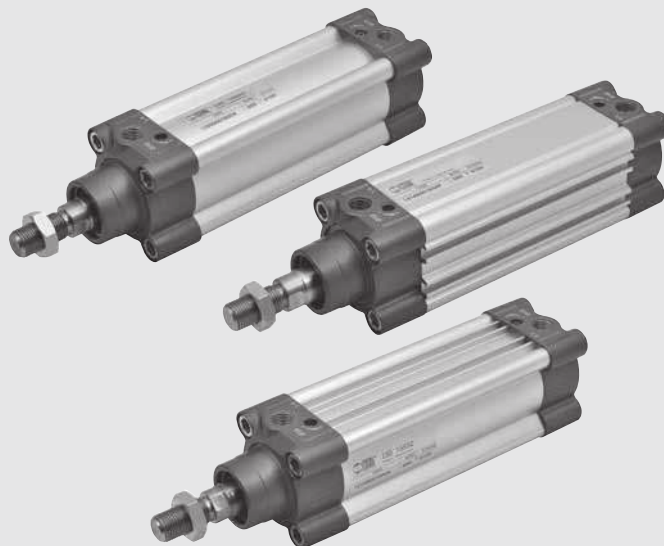
ISO 15552 CYLINDER (EX ISO 6431)

Cylinders made to ISO 15552 available in various versions and with a wide range of accessories:

- Configuration with or without magnet
- Single- or double acting – single- or through-rod
- Wide choice of NBR, POLYURETHANE and FKM/FPM gaskets (for high temperatures, for low temperature)
- Special versions on request
- Fixing accessories, guide units and mechanical piston rod lock.

They are available in three series, which differ according to the shape of the barrel and, consequently, the type of sensors and accessories that can be mounted.

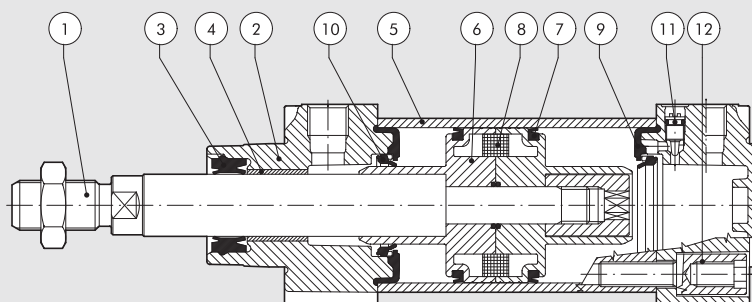
These cylinders are called series STD, type A, series 3.



TECHNICAL DATA		Polyurethane	NBR	FKM/FPM	Low Temperature
Max operating pressure	bar			10	
	MPa			1	
	psi			145	
Temperature range	°C	-10 to +80	-10 to +80	-10 to +150 (non-magnetic cyl.)	-35 to +80
Fluid		Unlubricated air. Lubrication, if used, must be continuous			
Bore	mm	32; 40; 50; 63; 80; 100; 125			
Design		Heads with Tap Tite screws			
Standard stroke †	mm	Single-acting: for bores 32 to 63 strokes from 1 to 250 Double-acting: for bores 32 to 80 strokes from 1 to 2800 for bores 100 to 125 strokes from 1 to 2600			
Versions		Double-acting cushioned, Single-acting extended or retracted rod cushioned, Through-rod cushioned, Long cushioning, High-temperature, Piston rod lock, Oil seal, Through-rod oil seal, Low friction, No stick-slip.			
Sensor magnet		All versions come complete with magnet. Supplied without magnet on request.			
Inrush pressure		Ø 32; 40: 0.4 bar Ø 50; 63 strokes < 1500 mm: 0.3 bar; strokes > 1500 mm: 0.4 bar Ø 80; 100; 125 strokes < 1500 mm: 0.2 bar; strokes > 1500 mm: 0.4 bar			
Notes		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air. † Maximum recommended strokes. Higher values can create operating problems			
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter			
Weights		See cylinder "General technical data" at the beginning of the chapter			

COMPONENTS

- ① PISTON ROD: C45 steel or stainless steel, thick chromed
- ② HEAD: die cast aluminium
- ③ PISTON ROD GASKET: polyurethane, NBR or FKM/FPM
- ④ GUIDE BUSHING: steel strip with bronze and PTFE insert
- ⑤ BARREL: drawn anodised calibrated aluminium
- ⑥ HALF-PISTON: self-lubricating technopolymer with built-in cushioning olives (aluminium with PTFE pad for diameters 80-100-125)
- ⑦ PISTON GASKET: polyurethane, NBR or FKM/FPM
- ⑧ MAGNET: plastoferrite
- ⑨ BUFFER + Static O-rings: NBR or FKM/FPM
- ⑩ CUSHIONING GASKET: polyurethane, NBR or FKM/FPM
- ⑪ CUSHIONING NEEDLE: OT 58 with needle out movement safety system even when fully open
- ⑫ SCREWS: Tap Tite for assembly



ISO 15552 CYLINDER – SERIES STD (EX ISO 6431)



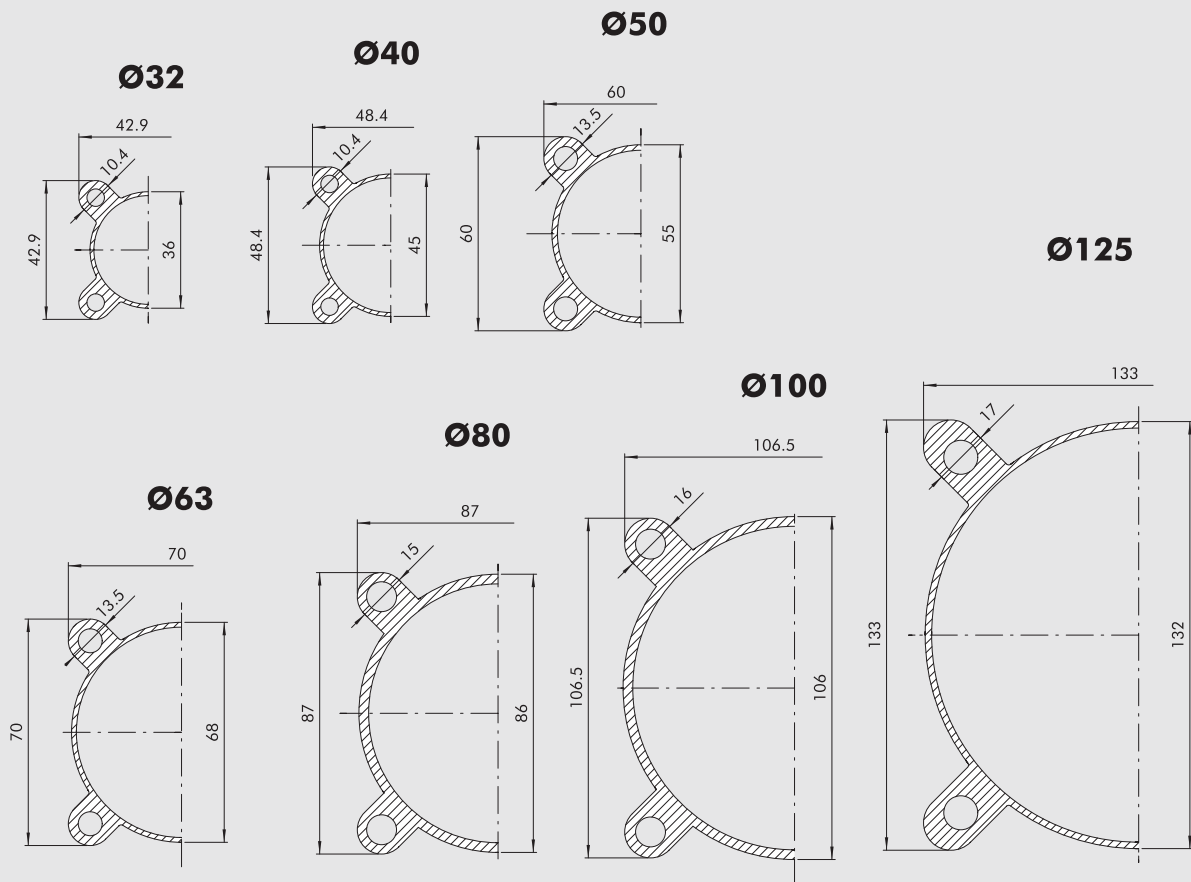
ISO 15552 cylinders, featuring a smooth barrel with no longitudinal slots. This means it is easier to clean the cylinder and there are fewer points where dirt can collect. Specific brackets are required for mounting magnetic sensors.



ACTUATORS

ISO 15552 CYLINDER – SERIES STD

BARREL CROSS SECTION



KEY TO CODES CYLINDER ISO 15552 STD

CYL	1 2 1	0	3 2	0 0 5 0	C	P	▼ E
	TYPE		BORE	STROKE	MATERIAL	GASKETS	
	120 Double-acting, cushioned, non-magnetic	0 Diameter S Non-magnetic	32 40 50	For the maximum applicable strokes, look at the technical data	A C45 chromed rod, aluminium piston rod: standard for all cylinders with ≥ 1000 mm-stroke cylinders and for cylinder with $\varnothing 80$ mm and over	N NBR gaskets P Polyurethane gaskets V FKM/FPM gaskets	E Single-acting extended rod
	121 Double-acting, cushioned	▲ G No stick-slip	63 80		C C45 chromed rod, technopolymer piston: standard for cylinders of $\varnothing 32$ to 63 mm with <1000 mm strokes	● B Low temperature	
	122 Through-rod		■ 100 ■ 125		Z Stainless steel piston rod and nut aluminium piston		
	124 Double-acting, non-cushioned				X Stainless steel piston rod and nut technopolymer piston		
	125 Opposed						
+	126 Single-acting						
	127 Tandem						
	134 Rod lock version						
*	136 Version with piston rod lock						
* ♦	137 Piston rod lock + guide unit						

- In the code of cylinder with letter in fourth position $\varnothing 100$ becomes A1; $\varnothing 125$ becomes A2
- Only available for versions with aluminium piston (A or Z)
- + Available until $\varnothing 63$ and only the versions with piston in aluminum (A or Z)
- 126... Single-acting retracted rod
- 126...E Single-acting extended rod

- ▼ Letter to be added only to the single acting extended rod version
- ▲ For speeds lower than 0.2 m/s, to prevent surging. Use no-lubricated air only
- ◆ Available up to $\varnothing 100$
- * Not available for gaskets V or B

KEY TO CODES CYLINDER ISO 15552 STD LOW-FRICTION

CYL	1 2 3	A	3 2	0 0 5 0	C	P
		TYPE	BORE	STROKE	MATERIAL	GASKETS
		A Low friction, type A	32	$\varnothing 32$ to 80	A C45 chromed rod, aluminium piston rod: standard for all cylinders with ≥ 1000 mm-stroke cylinders and for cylinder with $\varnothing 80$ mm and over	N NBR gaskets P Polyurethane gaskets V FKM/FPM gaskets
		B Low friction, type B	40	stroke 1 to 2800 mm		
		C Low friction, type C	50	$\varnothing 100$ to 125	C C45 chromed rod, technopolymer piston: standard for cylinders of $\varnothing 32$ to 63 mm with <1000 mm strokes	
		D Low friction, type D	63	stroke 1 to 2600 mm	Z Stainless steel piston rod and nut aluminium piston	
		E Low friction, type E	80		X Stainless steel piston rod and nut technopolymer piston	
		F Low friction, type F	A1 = $\varnothing 100$ A2 = $\varnothing 125$			

KEY TO CODES CYLINDER ISO 15552 STD LONG-CUSHIONING

CYL	1 3 1	A	3 2	0 0 5 0	A	P
		TYPE	BORE	STROKE	MATERIAL	GASKETS
		A 200 mm front/rear cushioning cone – 200 mm ext.	32	1 to 2600 mm	A C45 chromed rod, aluminium piston rod for all sizes	N NBR gaskets P Polyurethane gaskets
		B 150 mm front/rear cushioning cone – 150 mm ext.	40			
		C 100 mm front/rear cushioning cone – 100 mm ext.	50		Z Stainless steel piston rod and nut aluminium piston	* V FKM/FPM gaskets
		D 150 mm front/rear cushioning cone – 200 mm ext.	63			
		E 100 mm front/rear cushioning cone – 200 mm ext.				
		F 50 mm front/rear cushioning cone – 100 mm ext.				
		G 100 mm front/rear cushioning cone – 150 mm ext.				
		H 200 mm front cushioning cone – 200 mm ext.				
		I 150 mm front cushioning cone – 150 mm ext.				
		L 100 mm front cushioning cone – 100 mm ext.				
		M 150 mm front cushioning cone – 200 mm ext.				
		N 100 mm front cushioning cone – 150 mm ext.				
		O 50 mm front cushioning cone – 100 mm ext.				
		Q 200 mm rear cushioning cone – 200 mm ext.				
		R 150 mm rear cushioning cone – 150 mm ext.				
		S 100 mm rear cushioning cone – 100 mm ext.				
		T 150 mm rear cushioning cone – 200 mm ext.				
		U 100 mm rear cushioning cone – 200 mm ext.				
		V 50 mm rear cushioning cone – 100 mm ext.				

- * Version valid only for types: Q, R, S, T, U and V.

ISO 15552 LOW-FRICTION CYLINDER (EX ISO 6431) CODE 123 FOR SERIES STD CODE 129 FOR TYPE A

ACTUATORS

ISO 15552 LOW-FRICTIONS CYLINDER

The low-friction cylinder is typically used as a dandy or tensioning cylinder since it is a single-acting cylinder without a return spring. The configurations are shown below:

- 1) The best type is A as it involves less friction.
- 2) Type B should be used when the cylinder is working under normal conditions outside the pneumatic cushioning area. Cushioning is only for emergency use. It acts as a shock absorber in the case of malfunction.
- 3) Type C differs from type A due to the presence of a piston rod gasket that prevents dirt getting in when operating in dirty environments.
- 4) Type D differs from type B due to the presence of a piston rod gasket that prevents dirt getting in when operating in dirty environments.
- 5) Type E should be used when the pressurized chamber is the front one.
- 6) For type F, see point 2.

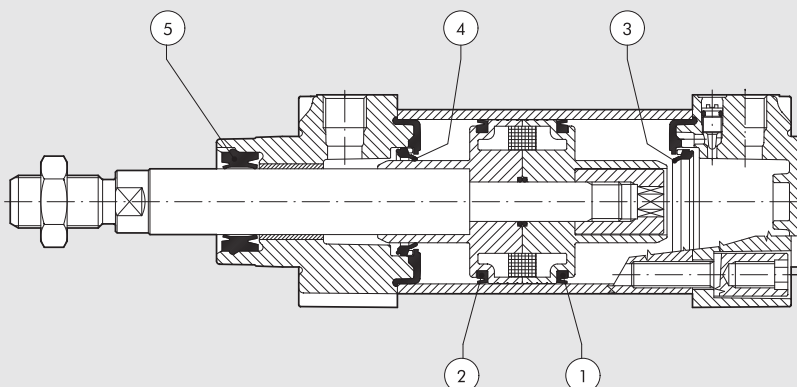


NB. THE CYLINDER IS ALWAYS SINGLE-ACTING WITHOUT A RETURN SPRING.

	TYPE	GASKETS
Rear chamber pressure	A	1
Rear chamber pressure and cushioning in case of impact	B	1+3
Rear chamber pressure and piston rod gasket	C	1+5
Rear chamber pressure, cushioning in case of impact and piston rod gasket	D	1+3+5
Front chamber pressure	E	2+5
Front chamber pressure and cushioning in case of impact	F	2+5+4

COMPONENTS

- ① Rear chamber piston gasket made of polyurethane, NBR or FKM/FPM
- ② Front chamber piston gasket made of polyurethane, NBR or FKM/FPM
- ③ Rear chamber cushioning gasket made of polyurethane, NBR or FKM/FPM
- ④ Front chamber cushioning gasket made of polyurethane, NBR or FKM/FPM
- ⑤ Piston rod gasket made of polyurethane, NBR or FKM/FPM



ISO 15552 ULTRA-LOW FRICTIONS CYLINDER (EX ISO 6431)



A typical ultra-low friction cylinder is generally used as an oscillating or tensioning cylinder. It is single acting, in the sense that compressed air is normally fed into one of the two chambers only. An external force acts on the other side. Metal Work's ultra-low friction cylinder is designed as a double-acting one, which means the compressed air can be fed into the rear or either the front chamber. They are built to comply with ISO 15552 and are available with or without a magnet. Supplied with a series 3 barrel.

A through-rod version is not available.

These cylinders are always non-cushioned.

The gaskets are made of NBR.

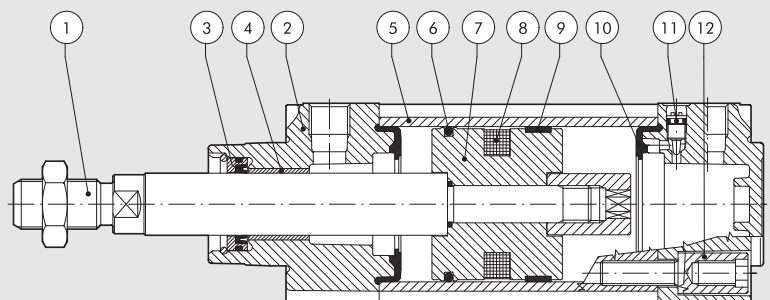
A full range of accessories is available.



TECHNICAL DATA		NBR
Max operating pressure	bar	10
	MPa	1
	psi	145
Temperature range	°C	-10 to +80
	Fluid	Unlubricated air
Bore	mm	32; 40; 50; 63; 80; 100; 125
Standard stroke	mm	1 to 1200
Design		Heads with Tap Tite screws
Versions		Double-acting magnetic, Double-acting non-magnetic (always "No stick-slip" cylinder)
Sensor magnet		All the versions with or without magnet
Inrush pressure	bar	∅ 32 = 0.08
		∅ 40 = 0.06
		∅ 50 = 0.05
		∅ 63 = 0.04
		∅ 80 = 0.03
		∅ 100 = 0.03
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter
		See cylinder "General technical data" at the beginning of the chapter
Weights		
Notes		There may be leakage between the two chambers in the presence of low pressures (up to 1 bar)

COMPONENTS

- ① PISTON ROD: C45 steel or stainless steel, thick chromed
- ② HEAD: die cast aluminium
- ③ PISTON ROD GASKET: NBR
- ④ GUIDE BUSHING: steel strip with bronze insert
- ⑤ BARREL: drawn anodised calibrated aluminium
- ⑥ PISTON GASKET: NBR
- ⑦ HALF-PISTON: aluminium alloy
- ⑧ MAGNET: plastoferrite
- ⑨ GUIDE RING: special technopolymer
- ⑩ BUFFER + Static O-rings: NBR
- ⑪ CUSHIONING NEEDLE: OT 58 with needle out movement safety system even when fully open
- ⑫ SCREWS: Tap Tite for assembly



ISO 15552 CYLINDER WITH "COMBI" PISTON ROD GASKET (EX ISO 6431)



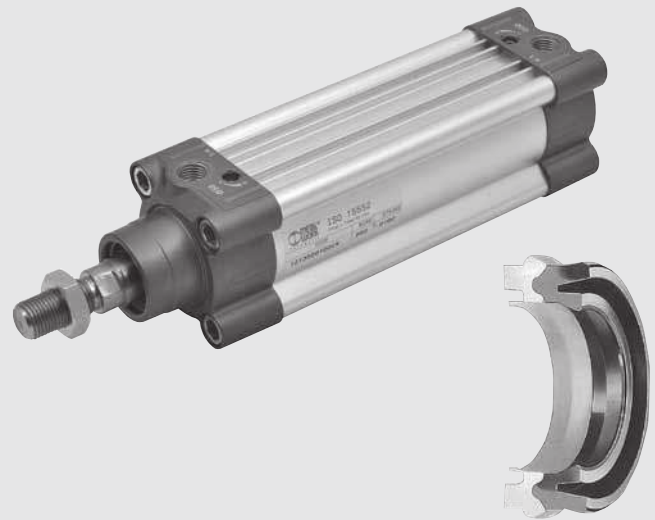
In some applications the piston rod is exposed to pollutants and dirt, which tend to adhere to the surface.

Ordinary gaskets are made of relatively soft elastomers as their main job is to provide a pneumatic seal. In critical applications they are unable to scrape dirt off the surface of the piston rod.

COMBI piston rod gaskets are designed to solve these problems.

They are made up of two separate parts:

- a **sealing element**, inside the cylinder, made of a special NBR elastomer with a Shore A hardness of 80 to provide a pneumatic seal.
- a **scraper ring**, outside the cylinder, made of highly wear-resistant plastic.



FEATURES AND ADVANTAGES

COMBI gaskets have three functions - sealing, scraping and securing. The outer projection of the scraper ring secures the cylinder head in its seat, so steel retaining rings are not required. This eliminates the risk of corrosion due to the presence of metal.

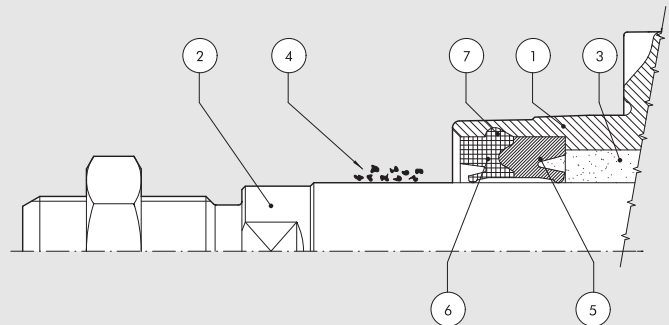
Friction is reduced. The materials used in the scraper ring and sealing element make the gasket extremely long lasting.

Cylinders with COMBI gaskets can be used with unlubricated dry air. The cylinder head seat is the same as for other Metal Work cylinder gaskets, so the cylinder head is standard.

OPERATING PRINCIPLE

The gasket is housed in the cylinder head ①. Inside the cylinder there is compressed air ③. Dirt ④ deposits on the piston rod ②.

The sealing element ⑤ provides the pneumatic seal. The scraper ring ⑥ cleans the piston rod. The projection ⑦ on the scraper ring secures the gasket in the cylinder head seat.



TECHNICAL DATA

Bores: 32; 40; 50; 63; 80; 100; 125.

The same as for ISO 15552 cylinders with NBR gaskets.

Maximum recommended speed: 1 m/s.

KEY TO CODES

The codes for ISO 15552 cylinders apply, the last letter C identifying the type of gasket.

"Long cushioning" version not provided.

Example:

1210320100CC: ISO 15552 cylinder, dual-acting, cushioned, magnetic, diameter 32, stroke 100 mm, piston rod made of C45 chrome, COMBI piston rod gasket, other gaskets NBR.

ISO 15552 TWO-FLAT CYLINDER (EX ISO 6431)



This version of cylinder is used to keep the parts fixed to the piston rod at an angle and to apply torques within the specified limits. The piston rod of the Two-Flat has two opposing longitudinal surfaces; it is made of stainless steel. The front cylinder head includes a sintered bronze bush that matches the profile of the piston rod and prevents it from rotating on its own axis. A special polyurethane gasket ensures pneumatic seal and prevents the accumulation of dirt. This technical solution is more reliable and gives a better pneumatic seal than with square or hexagonal piston rods. Supplied in series STD, with a smooth barrel, and type A or series 3, with a barrel with slots for retractable sensors. They are available in several versions and with a wide range of accessories:

- with or without magnet
- double acting, single piston rod
- double acting, through rod; one piston rod is Two-Flat, the other cylindrical
- fixing accessories.



TECHNICAL DATA		POLYURETHANE			
Max operating pressure	bar	10			
	MPa	1			
	psi	145			
Temperature range	°C	-10 to +80			
Fluid		Unlubricated air. Lubrication, if used, must be continuous			
Bore	mm	32; 40; 50; 63			
Design		Heads with Tap Tite screws			
Maximun stroke	mm	Ø 32 = 300	Ø 40 = 400	Ø 50 = 500	Ø 63 = 500
Versions		Double-acting cushioned, Through-rod cushioned, No stick-slip			
Sensor magnet		All versions come complete with magnet. Supplied without magnet on request			
Inrush pressure	bar	Ø 32 = 0.4	Ø 40 = 0.4	Ø 50 = 0.3	Ø 63 = 0.3
Max torque on piston rod	Nm	Ø 32 = 0.2	Ø 40 = 0.4	Ø 50 = 1	Ø 63 = 1
Maximum rotation on the rod	degrees	Ø 32 = 1° 30'	Ø 40 = 1° 30'	Ø 50 = 1°	Ø 63 = 1°
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter			
Weights		See cylinder "General technical data" at the beginning of the chapter			
Notes		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air			

KEY TO CODES FOR ISO 15552 TWO-FLAT STD CYLINDERS

CYL	1 2 1 TYPE	0	3 2 BORE	0 0 5 0 STROKE	F MATERIAL	P GASKETS
120	Double-acting, cushioned, non-magnetic	0 Diameter S Non-magnetic ▲ G No stick-slip	32 40 50 63	+ Ø 32 stroke 1 to 300 mm + Ø 40 stroke 1 to 400 mm + Ø 50 to 63 stroke 1 to 500 mm	F "Two-Flat" piston rod AISI 303 stainless steel nut	P Polyurethane gaskets
121	Double-acting, cushioned					
122	Through-rod					

+ Maximum recommended strokes. Higher values can create operating problems
 ▲ For speeds lower than 0.2 m/s, to prevent surging. Use no-lubricated air only

KEY TO CODES FOR ISO 15552 TWO-FLAT TYPE A CYLINDERS

CYL	1 2 1 TYPE	A	3 2 BORE	0 0 5 0 STROKE	F MATERIAL	P GASKETS
121	Double-acting, cushioned	A Standard ▲ B No stick-slip C Non-magnetic	32 40 50 63	+ Ø 32 stroke 1 to 300 mm + Ø 40 stroke 1 to 400 mm + Ø 50 to 63 stroke 1 to 500 mm	F "Two-Flat" piston rod AISI 303 stainless steel nut	P Polyurethane gaskets
122	Through-rod					

+ Maximum recommended strokes. Higher values can create operating problems
 ▲ For speeds lower than 0.2 m/s, to prevent surging. Use no-lubricated air only

ISO 15552 CYLINDER – SERIES HCR (High Corrosion Resistance)



In some applications, the cylinders are exposed to aggressive environments (e.g. the dairy, fruit & vegetable and food industry) or to substances and washings with aggressive detergents (e.g. caustic soda, hydrochloric acid and lactic acid).

Under these conditions, the HCR series cylinders ensure better corrosion resistance.

Cylinders made to ISO 15552, designed and built with materials and/or surface treatments that are highly resistant to corrosion.

They come in various versions and with a specific range of accessories:

- with or without magnet
- with single or through piston rod

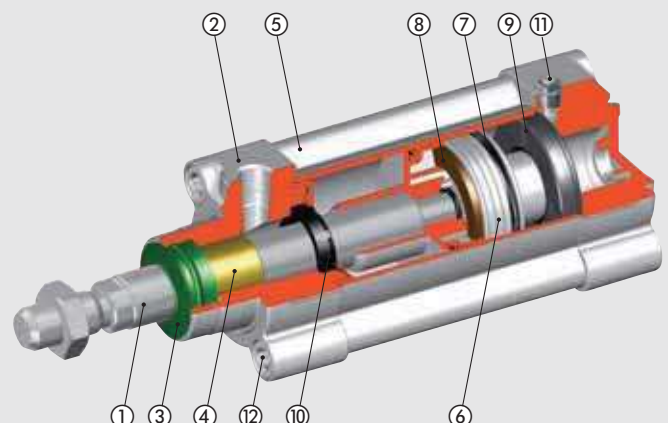
Also available with liner in the STD series or series 3.



TECHNICAL DATA		
Max operating pressure	bar	10
	MPa	1
	psi	145
Temperature range	°C	-10 to +60
	Resistance in corrosive environments at 20°C	Basic solution (5% sodium hydroxide - pH max 12) Acid solution (5% hydrochloric acid - pH min. 2.5) Salt mist testing to DIN 50021-SS, 500 hours
Fluid		Unlubricated air. Lubrication, if used, must be continuous
Bores	mm	32; 40; 50; 63; 80; 100; 125
Standard strokes	mm	For bores 32 to 80 strokes from 1 to 2800 for bores 100 to 125 strokes from 1 to 2600
Versions		Double-acting, Double-acting cushioned, Through-rod cushioned (magnetic and non-magnetic versions are available for each type)
Gaskets		Piston rod gaskets made of polyurethane, other gaskets in NBR
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter
Weights		See cylinder "General technical data" at the beginning of the chapter

COMPONENTS

- ① PISTON ROD: AISI 316, thickness-chromed
- ② HEAD: anodized pressure die-cast aluminium, epoxy-vinyl ester and epoxy-resin powder coating
- ③ PISTON ROD GASKET: special polyurethane
- ④ GUIDE BUSHING: steel strip with bronze and PTFE insert
- ⑤ BARREL: drawn anodised calibrated aluminium
- ⑥ SEMI-PISTON: made of self-lubricating technopolymer with built-in cushioning olives (aluminium with technopolymer pad for Ø 80, 10 and 125)
- ⑦ PISTON GASKET: NBR
- ⑧ MAGNET: plastoferrite
- ⑨ BUFFER + Static O-rings: NBR
- ⑩ CUSHIONING GASKET: NBR
- ⑪ NEEDLE: AISI 316
- ⑫ SCREWS: AISI 316



TWIN-ROD CYLINDER SERIES TWNC



ACTUATORS

TWIN-ROD CYLINDER – SERIES TWNC

Anti-rotation cylinders with axial dimensions to ISO 15552.

Serie STD barrel.

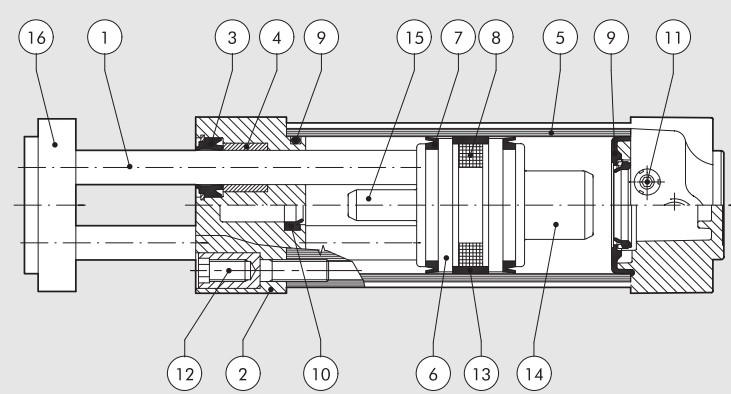
- standard configuration with magnet
- double-acting – passing twinner rods and single passing rod
- polyurethane gasket



TECHNICAL DATA		
Max operating pressure	bar	10
	MPa	1
	psi	145
Temperature range	°C	-10 to +80
Fluid		Filtered, unlubricated air. Lubrication, if used, must be continuous
Bores	mm	32; 40; 50; 63; 80; 100
Strokes +	mm	from 25 to 500
Design		Extruded profile
Esecution		Magnetic standard cushioned
Forces generated at 6 bar thrust/retraction	N	Ø 32: 434/350
		Ø 40: 678/597
		Ø 50: 1060/940
		Ø 63: 1683/1471
		Ø 80: 2714/2295
	Ø 100: 4241/3812	
Weight		See cylinder "General technical data" at the beginning of the chapter
Notes		+ Maximum recommended strokes. Higher values can create operating problems

COMPONENTS

- PISTON ROD: thick chromed steel
- HEAD: aluminium alloy
- PISTON ROD GASKET: polyurethane
- GUIDE BUSHING: sintered bronze
- BARREL: drawn anodised aluminium alloy
- PISTON: aluminium alloy
- PISTON GASKET: polyurethane
- MAGNET: plastoferrite
- BUFFER+STATIC O-rings: NBR
- CUSHIONING GASKET: front NBR, rear polyurethane
- NEEDLE: OT 58 brass
- SCREWS: Tap Tite for fixing and assembly
- GUIDE RING: special technopolymer
- REAR CUSHIONING CONE: OT58 brass
- FRONT CUSHIONING CONE: aluminium
- FLANGE: zinc-plated steel



KEY TO CODES FOR ROUND BARREL

CYL	W 1 2 1 TYPE	1 6 0 DIAMETER-EXECUTION	0 0 5 0 STROKE	0 2 0 0 EXECUTION
	W120 Double-acting, cushioned, non magnetic	160 160	+ 0025 to 2800 mm	Specify H1 value ONLY for version with intermediate hinge
	W121 Double-acting, cushioned,	200 200		
	W122 Double-acting, cushioned, through-rod	XA3 160 stainless steel piston rod		
	W123 Double-acting, cushioned, through-rod, non magnetic	XA4 200 stainless steel piston rod		
	W124 Double-acting, non-cushioned	VA3 160 FKM/FPM gasket, stainless steel piston rod		
		VA4 200 FKM/FPM gasket, stainless steel piston rod		
		KA3 160 FKM/FPM gasket, C45 piston rod		
		KA4 200 FKM/FPM gasket, C45 piston rod		
		AA3 160 + intermediate hinge		
		AA4 200 + intermediate hinge		
		● GA3 160 No stick-slip		
		● GA4 200 No stick-slip		

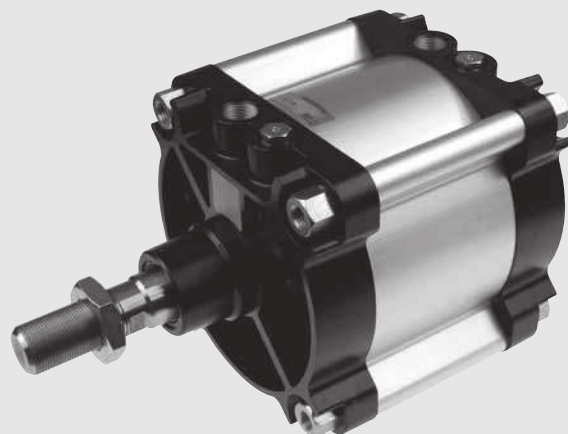
- + Maximum recommended strokes. Higher values can create operating problems
- For speeds lower than 0.2 m/s, to prevent surging. Use no-lubricated air only

VERSION WITH SHAPED BARREL

An alternative to the round barrel version is a version with a shaped barrel.

The technical data, components and dimensions are the same as for the round barrel version.

Note: Type with intermediate hinge not available.



KEY TO CODES FOR SHAPED BARREL

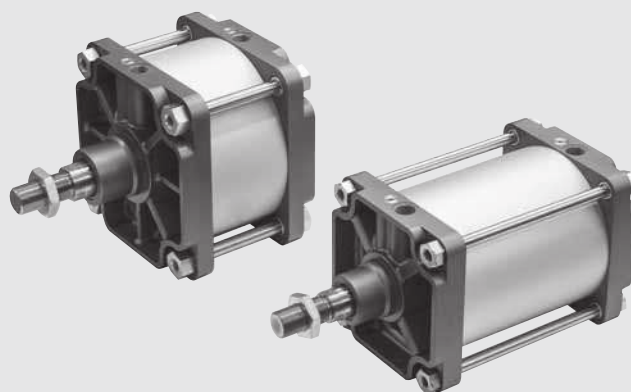
CYL	1 2 1 TYPE	1 6 0 DIAMETER-EXECUTION	0 0 5 0 STROKE	A MATERIAL	N GASKETS
	120 Double-acting, cushioned, non-magnetic	160 160	+ 0025 to 2800 mm	A C45 chromed, piston rod Z Stainless steel chromed, piston rod	N NBR gaskets V FKM/FPM gaskets
	121 Double-acting, cushioned,	200 200			
	122 Double-acting, cushioned, through-rod	SA3 160 non magnetic			
	124 Double-acting, non-cushioned	SA4 200 non magnetic			
		● GA3 160 No stick-slip			
		● GA4 200 No stick-slip			

- + Maximum recommended strokes. Higher values can create operating problems
- For speeds lower than 0.2 m/s, to prevent surging. Use no-lubricated air only

ISO 15552 CYLINDER Ø 250-320

Cylinders made to ISO 15552 available in various versions and with a wide range of accessories:

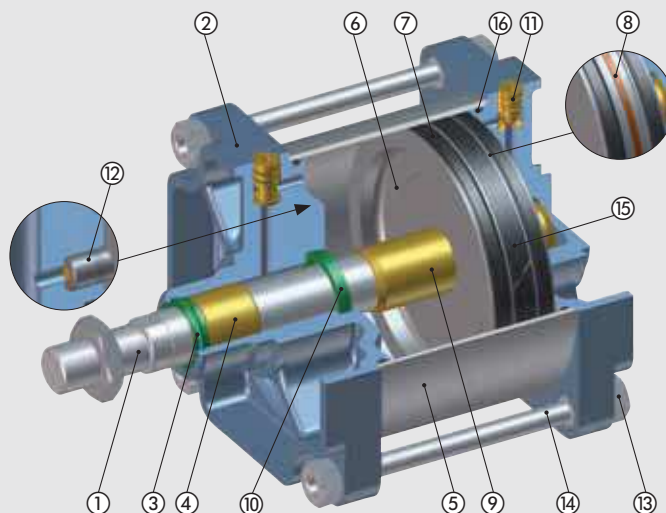
- double-acting – single- or through-rod
- with or without cushioning
- configuration with or without magnet
- with NBR gaskets, and polyurethane gasket for the piston rod only
- with FKM/FPM gaskets (high temperature versions)
- available with mounted intermediate hinge
- special configurations on request



TECHNICAL DATA		NBR	FKM/FPM
Max operating pressure	bar	10	
	MPa	1	
	psi	145	
Temperature range	°C	-10 to +80	-10 to +150
Fluid		Unlubricated air. Lubrication, if used, must be continuous	
Bores	mm	250 and 320	
Design		Round barrel with tie rods	
Standard strokes	mm	from 1 to 2000	
Versions		Double-acting, Cushioned or non-cushioned, Single piston rod or cushioned through piston rod, High-temperature, No stick-slip	
Magnet for sensors		Versions with or without magnet	
Inrush pressure		Ø 250: 0.2 bar / Ø 320: 0.15 bar	
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter	
Weights		See cylinder "General technical data" at the beginning of the chapter	
Notes		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air	

COMPONENTS

- PISTON ROD: High thickness C45 chrome steel or stainless steel (AISI 304)
- HEAD: fused aluminum painted
- PISTON ROD GASKET: polyurethane or FKM/FPM
- GUIDE BUSHING: sintered bronze
- BARREL: anodised aluminium
- PISTON: aluminium
- PISTON GASKET: NBR or FKM/FPM
- MAGNET: plastoferrite
- CUSHIONING CAP: aluminium
- CUSHIONING GASKET: NBR or FKM/FPM
- CUSHIONING NEEDLE: OT 58
- ONE-WAY VALVE for Ø 320 only: to speed up restart from end of stroke, bypassing the cushioning gasket
- SCREWS: galvanised steel
- TIE RODS: C45 steel, chromed
- GUIDE BELT: PTFE
- STATIC O-RINGS: NBR or FKM/FPM



ISO 21287 CYLINDER SERIES LINER



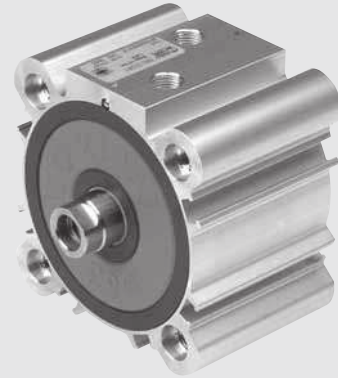
Compact cylinder to ISO 21287, LINER series, available in different versions to meet all possible requirements:

- With or without magnet
- Double acting, single or through piston rod
- Double acting, perforated through piston rod
- Single acting, extended, retracted or through piston rod
- Single acting, perforated through rod
- Double acting anti-rotating version and double acting through piston rod
- Polyurethane or FKM/FPM gaskets (for high temperatures) also available
- Dimensions and centre distances to ISO 21287.

The heads have been eliminated for ease of installation, improved sturdiness and precision. The metal lining is designed to withstand heavy-duty work, tensile stress and impact. Technopolymer parts can withstand dynamic and pneumatic thrust. The lining virtually acts as a "bearing" to which most of user accessories are attached.

The wide range of anchors provide numerous fixing points.

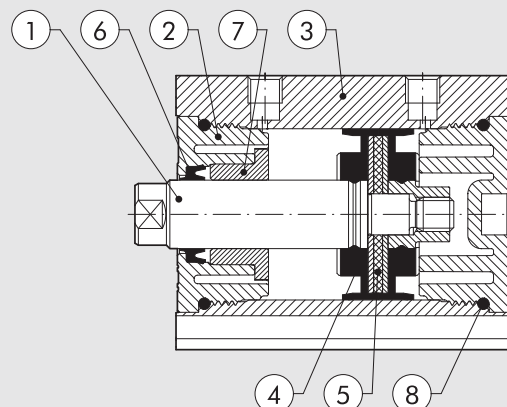
Retractable magnetic limit switches can be mounted to identify the position in the cylinder grooves.



TECHNICAL DATA		POLYURETHANE				FKM/FPM			
Max operating pressure	bar	10							
	MPa	1							
	psi	145							
Temperature range	°C	-10 to +60 (Ø 20 to 63)				-10 to +150 (non-magnetic cylinders)			
		-10 to +80 (Ø 80 to 100)							
Fluid		Unlubricated air. Lubrication, if used, must be continuous							
Bores	mm	20; 25; 32; 40; 50; 63; 80; 100 with ISO 21287 fixing centre distances							
Design		With profile							
Versions		Double-acting, Double-acting through-rod, Single-acting extended or retracted rod, Single-acting through-rod, Double-acting through-rod perforated, Double-acting non-rotating, Double-acting through-rod non-rotating, No stick-slip							
		All versions are available with male or female piston rod.							
Magnet for sensors		All versions come complete with magnet. Supplied without magnet on request.							
Inrush pressure		Ø 20	Ø 25	Ø 32	Ø 40	Ø 50	Ø 63	Ø 80	Ø 100
	for single piston rod	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.4
for through-rod	bar	0.8	0.8	0.6	0.4	0.4	0.4	0.4	0.4
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter							
Weights		See cylinder "General technical data" at the beginning of the chapter							
Notes		For correct operation, it is advisable to use 50 µm filtered air							
		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air							

COMPONENTS Ø 20-25

- ① PISTON ROD: stainless steel, thick chromed
- ② END CAP: high-performance technopolymer
- ③ BARREL: drawn anodised and calibrated aluminium alloy
- ④ PISTON GASKET: polyurethane or FKM/FPM (for high temperature)
- ⑤ MAGNET: plastoneodimio
- ⑥ PISTON ROD GASKET: polyurethane or FKM/FPM (for high temperature)
- ⑦ GUIDE BUSHING: sintered bronze
- ⑧ STATIC O-RINGS: NBR or FKM/FPM (for high temperature)



COMPACT CYLINDER SERIES CMPC



Compact cylinder series CMPC available in numerous versions to meet a full range of requirements:

- With or without magnet
- Single-acting extended rod, retracted or through-rod
- Dual-acting non-rotating and dual-acting through-rod versions
- Tandem with two, three or four stages
- Multi-position with two and three stages
- Fixing centre distances to ISO 15552 from \varnothing 32 to \varnothing 100 and from \varnothing 20 to \varnothing 100 complying with French standard NFE 49-004-1 and 2 (UNITOP). \varnothing 12 and \varnothing 16 have centre distances compatible with trade cylinders.

The special profile and outer heads locked onto the barrel by screws ensure optimal guiding of the cylinder and multiple fixing options with a wide range of mountings. To determine the position in the relevant cylinder slots, it is possible to mount retracting magnetic limit switches.

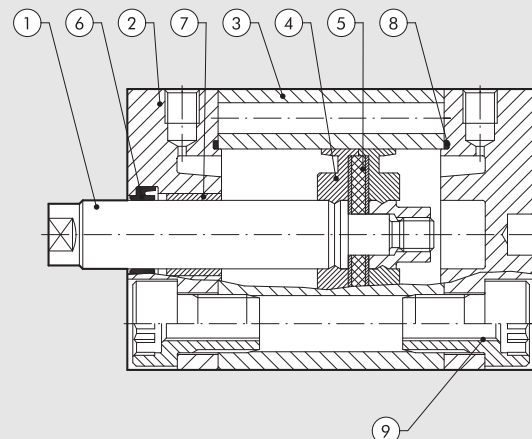
Available also in a version having FKM/FPM gaskets (for high temperature) from \varnothing 20 to \varnothing 100.



TECHNICAL DATA		POLYURETHANE					FKM/FPM				
Max operating pressure	bar						10				
	MPa						1				
	psi						145				
Temperature range	°C	-10 to +80					-10 to +150 (non-magnetic cylinders)				
Fluid		Unlubricated air. Lubrication, if used, must be continuous									
Bores	mm	\varnothing 12; 16; interchangeable with similar products									
	mm	\varnothing 32; 40; 50; 63; 80; 100 with ISO 15552 fixing centre distances									
	mm	\varnothing 20; 25; 32; 40; 50; 63; 80; 100 with NFE 49-004-1 and 2 fixing centre distances									
Design		With profile, heads with screws									
Versions		Double-acting, Single-acting extended or retracted rod, Through-rod, Through-rod perforated, Single-acting through-rod, Through-rod non-rotating, No stick-slip									
Magnet for sensors		All versions come complete with magnet. Supplied without magnet on request									
Inrush pressure	bar	\varnothing 12	\varnothing 16	\varnothing 20	\varnothing 25	\varnothing 32	\varnothing 40	\varnothing 50	\varnothing 63	\varnothing 80	\varnothing 100
		single piston rod	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.4
through-rod	bar	1	0.8	0.8	0.8	0.6	0.4	0.4	0.4	0.4	0.4
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter									
Weights		See cylinder "General technical data" at the beginning of the chapter									
Notes		For correct operation, it is advisable to use 50 μ m filtered air									
		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air									

COMPONENTS \varnothing 12 to 25

- ① PISTON ROD: stainless steel, thick chromed
- ② HEAD: extruded anodised aluminium alloy
- ③ BARREL: drawn anodised and calibrated aluminium alloy
- ④ PISTON GASKET: polyurethane or FKM/FPM
- ⑤ MAGNET: neodymium-plastic
- ⑥ PISTON ROD GASKET: polyurethane or FKM/FPM
- ⑦ GUIDE BUSHING: steel strip with bronze and PTFE insert
- ⑧ STATIC O-RINGS: NBR or FKM/FPM
- ⑨ SECURING SCREWS: zinc-plated steel



COMPACT CYLINDER SERIES CMPC TWO-FLAT



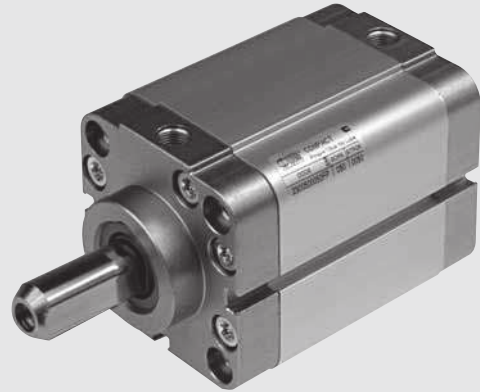
This version is used to keep at an angle the objects fixed onto the piston rod and to apply torques within the specified limits.

The piston rod in Two-Flat cylinders has two opposing longitudinal surfaces and is made entirely of stainless steel. The front head of the cylinder includes a sintered bronze bush that engages the piston rod and prevents it from rotating. A special polyurethane gasket guarantees air-tightness and dirt removal. This technical solution is more airtight and reliable than square or hexagonal piston rods.

These compact cylinders come in the following versions:

- with or without a magnet
- dual-acting, single piston rod
- dual-acting, through piston rod – one piston rod is Two-Flat, and the other is cylindrical
- fixing centre distances compatible with, ISO 15552 (former ISO 6431), or with French standard NFE 49-004-1 and 2 (UNITOP).

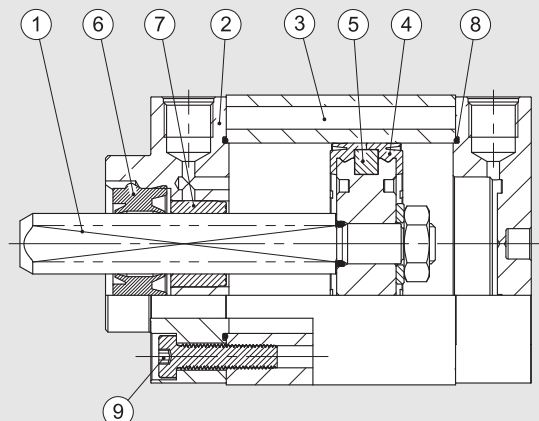
The special profile and the fact that the external heads are screwed onto the liner give an excellent guide. Numerous fixing options are available thanks to wide range of anchor points. Retractable magnetic limit switches can be mounted in slots in the cylinder to measure the position.



TECHNICAL DATA		POLYURETHANE
Max operating pressure	bar	10
	MPa	1
	psi	145
Temperature range	°C	-10 to +80
	Fluid	Unlubricated air. Lubrication, if used, must be continuous
Bores	mm	32; 40; 50; 63; 80 with ISO 15552 fixing centre distances
	mm	32; 40; 50; 63; 80 with NFE 49-004-1 and 2 fixing centre distances
Design		With profile, heads with screws
Maximum strokes †	mm	Ø 32-40 = 300; Ø 50-63 = 400; Ø 80 = 500
Versions		Double-acting, Double-acting Through-rod
Magnet for sensors		All versions come complete with magnet. Supplied without magnet on request
Inrush pressure	bar	Ø 32 = 0.8; from Ø 40 to 80 = 0.6
Max torque on piston rod	Nm	Ø 32 and 40 = 0.2; Ø 50 and 63 = 0.4; Ø 80 = 1
Maximum rotation on the rod	degrees	Ø 32 and 40 = 1° 30'; Ø 50 and 63 = 1° 30'; Ø 80 = 1°
Weights		See cylinder "General technical data" at the beginning of the chapter
Notes		† Maximum recommended strokes. Higher values can create operating problems
		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air

COMPONENTS Ø 12 to 25

- ① PISTON ROD: stainless steel, Two-Flat
- ② HEAD: extruded anodised aluminium alloy
- ③ BARREL: drawn anodised and calibrated aluminium alloy
- ④ PISTON GASKET: polyurethane
- ⑤ MAGNET: Ø 32 neodymium - Ø 40 to 100 plastroferrite
- ⑥ PISTON ROD GASKET TWO-FLAT: polyurethane
- ⑦ GUIDE BUSHING: steel strip with bronze
- ⑧ STATIC O-rings: NBR
- ⑨ SECURING SCREWS: zinc-plated steel

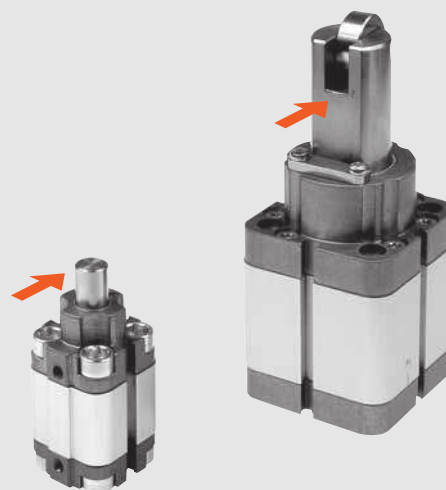



COMPACT STOPPER CYLINDER

Compact stopper cylinders designed for stopping moving parts or chucks.

- With or without magnet execution
- Single-acting, oversize extended piston rod
- Can be also used as double-acting whith spring return
- Fixing centre distances to ISO 15552 for $\varnothing 32$, $\varnothing 50$, $\varnothing 80$ and French standard NFE 49-004-1 and 2 (UNITOP).

In the relevant cylinder slots, it is possible to mount retracting magnetic sensor.

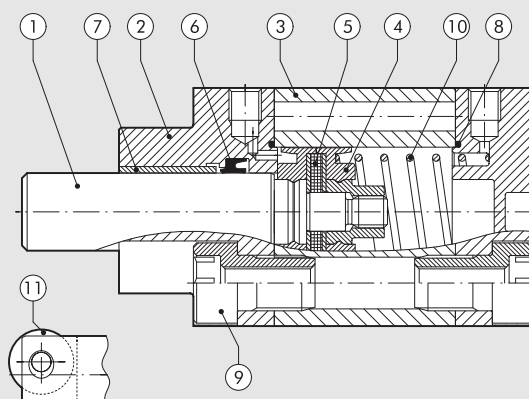


 Chuck impact direction

TECHNICAL DATA	
Max operating pressure	bar 10 MPa 1 psi 145
Temperature range	$^{\circ}\text{C}$ -10 to +80
Fluid	Unlubricated air. Lubrication, if used, must be continuous
Stroke bore	mm $\varnothing 20 \times 15$; $\varnothing 32 \times 20$; $\varnothing 50 \times 30$; $\varnothing 80 \times 30$; $\varnothing 80 \times 40$ a with NFE 49-004-1 and 2 fixing centre distances (UNITOP) mm $\varnothing 32 \times 20$; $\varnothing 50 \times 30$; $\varnothing 80 \times 30$; $\varnothing 80 \times 40$ with ISO 15552 fixing centre distances
Design	With profile, heads with screws
Versions	Single-acting extended rod, Can be also used as double-acting whith spring return
Magnet for sensors	All versions come complete with magnet. Supplied without magnet on request
Inrush pressure	bar $\varnothing 20$: 1.2; $\varnothing 32$ -50: 1; $\varnothing 80$: 0.5
Weights	See cylinder "General technical data" at the beginning of the chapter
Notes	For correct operation, it is advisable to use 50 μm filtered air

COMPONENTS $\varnothing 20$

- ① PISTON ROD: Stainless steel, thick chromed
- ② HEAD: extruded anodised aluminium alloy
- ③ BARREL: drawn anodised and calibrated aluminium alloy
- ④ PISTON GASKET: polyurethane
- ⑤ MAGNET: neodymium-plastic
- ⑥ PISTON ROD GASKET: polyurethane
- ⑦ GUIDE BUSHING: steel strip with bronze and PTFE insert
- ⑧ STATIC O-RINGS: NBR
- ⑨ SECURING SCREWS: zinc-plated steel
- ⑩ RETURN SPRING: spring stainless steel
- ⑪ WHEEL: zinc-plated steel



ROUND CYLINDER SERIES RNDC

Clean profile cylinders available in different versions:

- configuration with or without magnet
- single- and double-acting - single or through-rod
- pneumatic cushioning on request
- range of gaskets available in NBR, POLYURETHANE and FKM/FPM (for high temperatures)



TECHNICAL DATA		POLYURETHANE	NBR	FKM/FPM	LOW TEMPERATURE
Max operating pressure	bar	10	10	10	10
	MPa	1	1	1	1
	psi	145	145	145	145
Temperature range	°C	-10 to +80	-10 to +80	-10 to +150 (non-magnetic cylinders)	-35 to +80
Fluid		Unlubricated air. Lubrication, if used, must be continuous			
Bores	mm	32; 40; 50			
Design		Screwed heads			
Versions		Double-acting, Double-acting through-rod, Double-acting cushioned, Double-acting through-rod cushioned, Single-acting, Single-acting through-rod, No stick-slip			
Magnet for sensors		All versions come complete with magnet. Supplied without magnet on request			
Standard strokes †	mm	Single-acting:	for bores Ø 32 to 50 strokes from 1 to 250		
		Double-acting:	for bores Ø 32 to 50 strokes from 1 to 500		
		† Maximum recommended strokes. Higher values can create operating problems			
Inrush pressure	bar	Ø 32 and 40: 0.4 - Ø 50: 0.3			
Forces generated at 6 bar thrust/retraction		See cylinder "General technical data" at the beginning of the chapter			
Weights		See cylinder "General technical data" at the beginning of the chapter			
Notes		For speeds lower than 0.2 m/s to prevent surging, use the version No stick-slip and non-lubricated air			

COMPONENTS

- ① PISTON ROD: C45 steel or stainless steel, thick chromed
- ② PISTON ROD GASKET: polyurethane, NBR or FKM/FPM
- ③ GUIDE BUSHING: steel strip with bronze and PTFE insert
- ④ BARREL: drawn anodised aluminium alloy
- ⑤ HALF-PISTON: self-lubricating technopolymer with integrated cushioning olives
- ⑥ MAGNET: plastroferrite
- ⑦ PISTON GASKET: polyurethane, NBR or FKM/FPM
- ⑧ HEAD: anodised aluminium alloy
- ⑨ HEAD: anodised aluminium alloy

