



# CEFIL'AIR®

## Inflatable Seals

Meeting Your Critical Sealing  
Requirements.

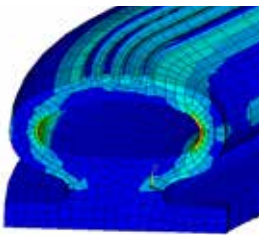
## INTRODUCTION

When faced with the problem of sealing between parts, which move in relation to one another and are capable of being connected and disconnected at will, the easiest, safest and most effective technique to use is pneumatic seals.

CEFIL'AIR® seals, which are expanded and retracted by a pneumatic process, have been designed to meet multiple applications. CEFIL'AIR® inflatable seals bring wider possibilities of use as a result of its patented design employing modern techniques and the most advanced elastomers.

These seals can satisfy the highest demands of temperatures from -60 °C to +220 °C, as well as higher temperatures during short periods. They can also withstand pressures from dynamic vacuum ( $1,33 \cdot 10^{-6}$  Bar) to several dozen Bars ( $10^2$  Bar and more). CEFIL'AIR® inflatable seals can be used in all sectors of industry including advanced techniques and scientific research.

With know-how and expertise in the field of pneumatic seals, Technetics Group develops and markets CEFIL'AIR® products for diverse customer applications. Thanks to engineering studies, calculations and FEA, particularly within maestral® laboratory, Technetics Group is able to meet the challenges of today and tomorrow, including economic challenges with reactivity, anticipation and competitiveness, as well as challenges concerning safety and security to ultimately meet customer needs.



## BIO-GUARDIAN® SEALS

Essential to the medical, pharmaceutical and food industries, the BIO-GUARDIAN® sealing solution prevents bacterial and microbial growth on equipment and materials. The BIO-GUARDIAN® solution can be used in CEFIL'AIR® inflatable seals to meet the needs of demanding hygienic applications.

As with the majority of elastomers produced by Technetics Group, BIO-GUARDIAN® seals can have an additional surface treatment to improve friction properties and gas impermeability. Laboratory results show that BIO-GUARDIAN® solutions treated with CEFIL'GLIS™ N°1 are certified FDA & USP Pharma Class VI and can be recommended for use in critical installations where the growth of microorganisms should be avoided.

## APPLICATIONS

CEFIL'AIR® inflatable seals are fitted in the following cases where sealing, handling, or locking is required:

- movable cofferdam bulkheads
- storage containers
- transport containers
- leaktight panels (naval, aerospace industry)
- nuclear vessels (equipment or personnel chambers)
- isothermal chambers
- clean rooms
- sliding or quick-locking doors (autoclaves, sterilisers)
- centrifugal filters (access doors and drainage hoppers)
- aircraft access doors
- cockpit canopies
- portholes
- cofferdams
- pneumatic conveyors (bagging hoppers, valve gates)
- phonic isolation



### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com  
technetics.com

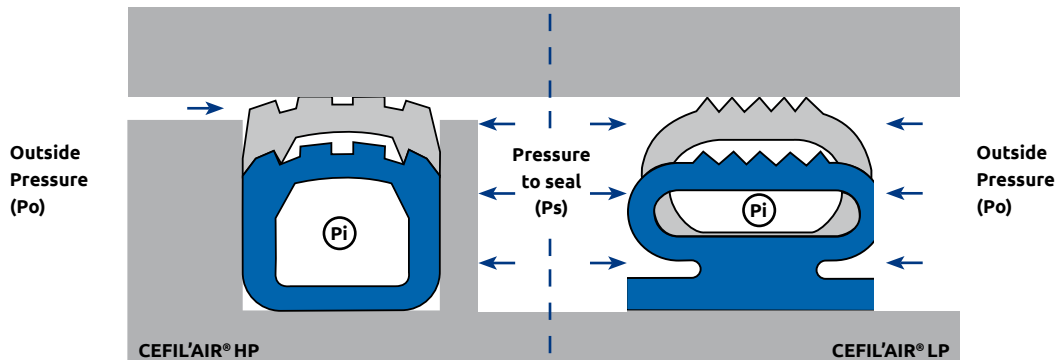
**Technetics**  
GROUP

EnPro Industries companies

## OPERATION

CEFIL'AIR® seals have no textile reinforcement or expansion system. Their expansion, like their retraction, is obtained through the combined effects of the walls of the seal forming elastic arms. The seals, which are produced from elastomers with a high modulus of elasticity and considerable elongation and fitted in grooves, are restricted to low work rates. As a result, they are protected against risks of bursting, so it is necessary to observe the fitting dimensions (table, pages 4-5).

Comment: CEFIL'AIR® HP inflatable seals must be captive in slots or grooves closed on all four faces in accordance with the specified dimensions. **You are strongly recommended not to pressurise or use the seals when one of the faces of the groove is open.** On the other hand, CEFIL'AIR® LP seals can be secured by their base and work freely. However, the maximum pressure cannot be applied until their contact face (toothed side) is against the item to be sealed.



When free, CEFIL'AIR® seals must not be inflated above  $\geq 0,8$  to  $1,5$  bar (according to the type of the profile). When fitted in a groove, they are perfectly leaktight for an inflation pressure of  $1,25$  to  $1,45$  times the pressure to seal ( $P_s$ ). The maximum inflation pressure ( $P_i$ ) which the seals can withstand depends on the clearance ( $J$ ) between the supporting frame and the moving panel (see profiles on pages 4-5). The inflation pressure ( $P_i$ ) can be higher if clearance is reduced. CEFIL'AIR® seals are designed to provide tightness on pressurised equipment. This creates a lateral force on the seal, which tends to force it either towards the outside (equipment under pressure) or towards the inside of the equipment (equipment under vacuum).

### a) Equipment under vacuum ( $P_0 - P_s > 0$ )

The condition of the surfaces in contact, as well as the completion of the assembly operation, make it possible for CEFIL'AIR® seals to withstand a vacuum of  $10^{-3}$  Torr (dynamic vacuum).

### b) Equipment under pressure ( $P_0 - P_s < 0$ )

With an internal pressure created by gas or a controlled atmosphere, the strength is directly linked to the clearances, deformation of the contact faces and the pressurisation of the seal. In these applications, it is always necessary to reduce dimension ( $J$ ) to a minimum, restricting the surface to which the pressure of the enclosure ( $P_s$ ) will be applied, in order to reduce the radial component or, depending on the arrangement, the axial component, as far as possible as this tends to force the seal outwards. Generally, the ratio  $P_s - P_0 / P_i$  is of  $0,7$  to  $0,2$  but with the limits laid down in the table concerning profiles (pages 4-5).

## MANUFACTURE

CEFIL'AIR® inflatable seals are made by joining together extruded or moulded sections. This connection is made in our workshops, which ensures perfect continuity while at the same time reducing any stresses in the joint to a minimum.

This method provides substantial flexibility with regard to the geometry of the sections. There are two types of standard profiles and a series of special profiles that are used in numerous applications, i.e. **sealing, locking or gripping during automatic handling have been created.**

**For specific uses which need reinforced manufacturing (textiles, high performance aramid fibers) or expanded profiles, see pages 12 and 13 and please contact our technical department.**

### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com

technetics.com

**Technetics**  
GROUP

EnPro Industries companies

## TYPES OF ELASTOMERS

CEFIL'AIR® inflatable seals are produced with elastomers with high mechanical properties. Silicone, SBR and EPDM are the most commonly used. Although these are high performance materials, they are not suitable for all applications, and consequently, other elastomers should be used.

Elastomers	Ref.	Δ Sh A	Temp. range °C	Properties
SBR Styrene Butadiene Rubber	1 A 60	60	-20 +100	Good resistance to: - water - demineralised water - air - diluted acids and bases - ketones Abrasion-resistant
CR* Chloroprene	4 B61K	60	-20 +110	Same as SBR, with better resistance to: - ultraviolet rays - ozone Low resistance to grease
IIR* Butyl	5 B 60	65	-20 +120	Good resistance to: - diluted acids and bases - ketones - very low permeability
EPDM* Ethylene Propylene	6 B 65	65	-30 +150	Good resistance to: - water - steam - atmospheric conditions Low resistance to hydrocarbon
VMQ Silicone BIO-GUARDIAN®	C 65 M	60	-60 +220	Good resistance to: - dry and humid heat - steam P ≤ 6 bars - cold - very low oil resistance - does not age
FVMQ* Fluorosilicone	CF 65 M	60	-50 +200	Same as Silicone, with better resistance to: - aromatic hydrocarbons - chlorinated solvents
NBR* Nitrile Rubber	3 B	70	-30 +110	Good resistance to: - oils - greases - fuels - some solvents
HNBR* Hydrogenated Nitrile Rubber	3 H	70	-40 +160	Same as NBR, with better resistance to: - ozone - high temperatures
FKM* (VITON®) Fluorocarbon Rubber	3 E 65	65	-20 +180	Good resistance to: - chlorinated solvents - aromatics - strong acids and bases

\*Profiles not kept in stock, produced on special request. (Please contact our technical department).

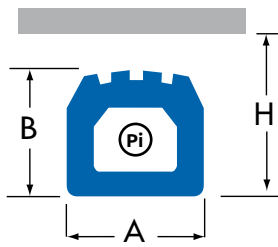
**Note :** This information represents broad outlines for use. For specific applications, please contact our technical department.

# STANDARD HP PROFILES

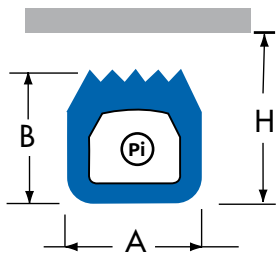
## PRODUCTION

(1) Tolerances ISO 3302-1 category 2.

Grooved profile



Corrugated profile

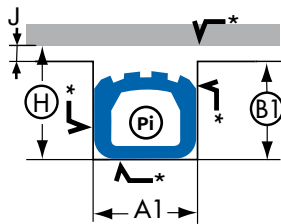


PROFILES			HOUSINGS				
Ref. Nr. silicone	Ref. Nr. SBR	A x B (1)	+ 0,5 + 0 A1*	+ 0,5 + 0 B1	+ 1 + 0 H	J max*	Pi max
339	10035	16 x 12	16	13	15	3	4
347	10036	16 x 18	16	19	21	3	4
356	10041	22 x 19	22	20	22	3	6
443	10039	26 x 19	26	20	23	4	6
405	10042	27 x 21	27	22	25	4	6
627	10175	35 x 26	35	27,5	32,5	6	8
369	10217	35 x 32	35	33,5	43,5	11	8

415	10102	6,5 x 5	6,5	5,5	6	1,5	1
512	---	14 x 10	14	11	13	3	4
639	---	16 x 14	16	15	17	3	5
603	10177	20 x 20	20	21	23,5	3,5	6
514	10351	21 x 24	21	25	28	4	7
529	---	54 x 40	54	42	50	9	10

\* The housing width and expansion of the seal should be checked in accordance with the requirements on page 7.

## ASSEMBLY

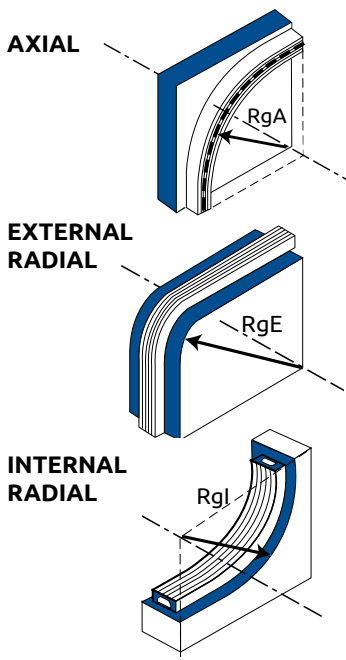


In the retracted position, the seal is contracted and protected in its groove ( $B1 > B$ ).

The clearance (J) can be reduced to zero when the two parts are in contact, without their movements being hindered by the seal ( $B1 = H$ ).

\*  $\sqrt{Ra}$  3,2 to 6,3, standard N8 (see page 9).

## CURVE RADII (between 2 straight lengths).



PROFILES STANDARDS HP					
Ref. Nr. silicone	Ref. Nr. SBR	A x B	RgA* min	RgE* min	Rgl* min
339	10035	16 x 12	38	40	52
347	10036	16 x 18	48	50	78
356	10041	22 x 19	61	50	69
443	10039	26 x 19	73	60	79
405	10042	27 x 21	83,5	70	111
627	10175	35 x 26	87,5	70	106
369	10217	35 x 32	87,5	80	122
415	10102	6,5 x 5	18	20	25
512	---	14 x 10	32	30	42
639	---	16 x 14	48	40	64
603	10177	20 x 20	60	50	70
514	10331	21 x 24	60,5	50	74
529	---	54 x 40	147	150	190

\* For profiles other than in silicone, increase the above values RgA/RgE/Rgl by a minimum of 20%.

In order to obtain the full expansion and retraction of the seal, as well as guarantee its maximum efficiency, the minimum curve radii in the corners must be in accordance with the opposite table. The sketches define the reference line of the radius at the bottom of the groove according to the position of the curve in relation to the direction of the expansion.

**Please consult our technical department for small sized circular seals.**

## TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com

technetics.com

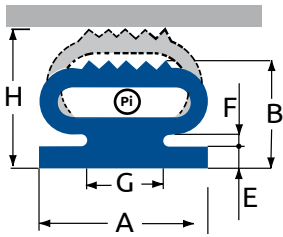
**Technetics**  
GROUP

EnPro Industries companies

# STANDARD LP PROFILES

## PRODUCTION

(1) Tolerances ISO 3302-1 category 2.



Ref. Nr. silicone	Ref. Nr. SBR	A x B (1)		Housings		Dimensions					
				A1 +2 +0	B1 +2 -2	H1	H	E	F	G	Pi max
921	10152	30	20	30	22	30	25	4	4	12	3
704	10118	40	27	40	29	40	35	5	5	15	3
736	10211	60	35	60	38	60	50	6	6	25	3
828	10126	90	55	90	60	90	75	8*	8	30	3
---	10094	130	70	130	80	130	100	15	10	40	3
---	10170	150	80	150	90	140	110	16,5	12	50	3

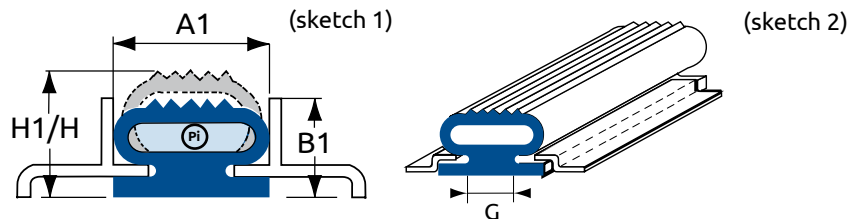
- Other forms of seals can be produced (see page 13).
- The dimensions of the dies available may be supplied on request.

\* Profile 10126E = 10 mm.

## ASSEMBLY

This profile can be used with a groove (sketch 1) or without a groove (sketch 2). Dimension (B) corresponds to the seal in the idle position. When it is subjected to a pressure of 1,5 bar (seal in free position), (H1) (maximum height) is obtained. Dimension (H) is a normal working value, intermediate values can be also used between (B) and (H). The foot must be secured on each side when the seal is subjected to an external pressure acting on its side. Specifically, in the axial position, standard LP CEFIL'AIR® seals must be maintained in the radii by quadrants.

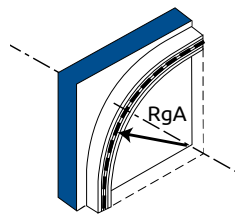
### Fixing Examples :



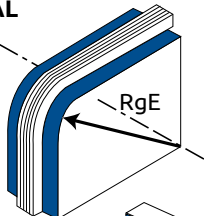
Note : Other fixing systems can be considered, they are left up to the user's initiative and are to be supplied by him.

### CURVE RADII (between 2 straight lengths).

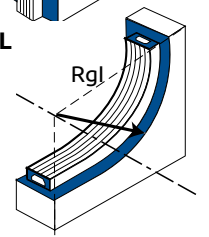
#### AXIAL



#### EXTERNAL RADIAL



#### INTERNAL RADIAL



STANDARD LP PROFILES						
Ref. Nr. silicone	Ref. Nr. SBR	A x B		RgA* min	RgE* min	RgI* min
921	10152	30	20	90	60	100
704	10118	40	27	160	90	117
736	10211	60	35	230	100	165
828	10126	90	55	320	300	405
---	10094	130	70	740	460	650
---	10170	150	80	1000	560	700

\* For profiles other than silicone, increase the above values RgA/RgE/RgI by a minimum of 20%.

In order to obtain the full expansion and retraction of the seal, as well as guarantee its maximum efficiency, the minimum curve radii in the corners must be in accordance with the opposite table, which defines the value of the radius at the bottom of the groove according to the position of the curve in relation to the direction of the expansion.

**Please consult our technical department for small sized circular seals.**

## TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913  
42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com  
technetics.com

**Technetics**  
GROUP

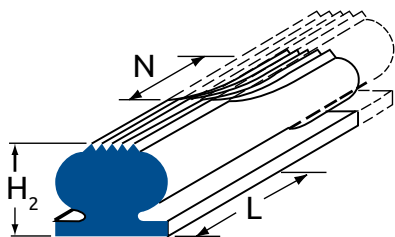
EnPro Industries companies

## END PLUGS

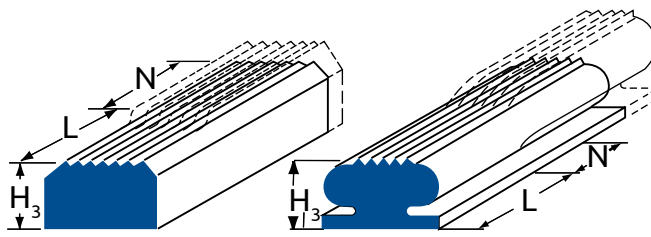
Linear seals may be manufactured with "solid" end plugs. In this case, the plugged areas are neutralised, as neither expansion nor contraction can occur.

Two constructions are possible: either by plugging the expanded seal or by plugging the retracted seal. When using either solution, it is necessary to provide flanges or end plates to hold the seal in order to prevent tearing caused by seal expansion (see flanges or retaining plates below).

### Type with expanded end



### Type with retracted end



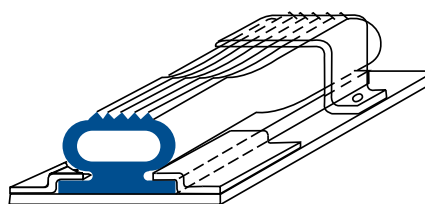
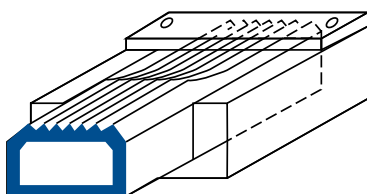
PROFILES STANDARDS HP						
Ref. Nr. silicone	Ref. Nr. SBR	A x B	H <sub>2</sub>	H <sub>3</sub>	L	N
339	10035	16 x 12	15	13	16	5
347	10036	16 x 18	21,5	19,5	16	5
356	10041	22 x 19	22,5	20,5	22	6
443	10039	26 x 19	23,5	20,5	26	7
405	10042	27 x 21	26	23	27	7
627	10175	35 x 26	34	29	35	9
369	10217	35 x 32	45	35	35	9
415	10102	6,5 x 5	6,5	5,5	6,5	2
512	---	14 x 10	13	11	14	5
639	---	16 x 14	17,5	15,5	16	4
603	10177	20 x 20	24	21,5	20	5
514	10331	21 x 24	29	26	21	6
529	---	54 x 40	48	42	54	14

PROFILES STANDARDS BP						
Ref. Nr. silicone	Ref. Nr. SBR	A x B	H <sub>2</sub>	H <sub>3</sub>	L	N
921	10152	30 x 20	25	22	20	15
704	10118	40 x 27	35	29	25	20
736	10211	60 x 35	50	38	40	30
828	10126	90 x 55	75	60	60	45
---	10094	130 x 70	100	80	80	65
---	10170	150 x 80	110	90	100	80

**Note :** The dimension N represents the intermediate part between the active seal and the end plug which cannot come into contact with the face to be sealed. The efficiency of the seal is only obtained beyond L + N.

**These parts must not be outside of the support face seals under any circumstances.**

### Flange or retaining plate



#### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com  
technetics.com

**Technetics**  
GROUP

EnPro Industries companies

## END PLUGS

For specific applications requiring expansion nearly all along the seal, EXPANDABLE end plugs are available upon request.

### Examples :

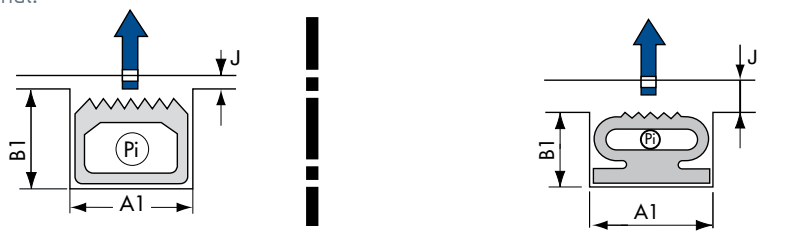


PLEASE CONSULT OUR TECHNICAL DEPARTMENT

## DEFINITION OF SEAL ACCORDING TO DIRECTION

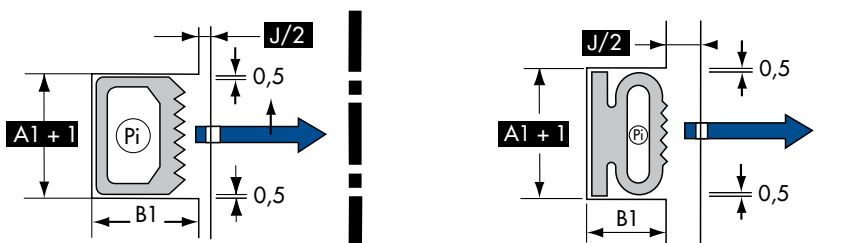
### AXIAL EXPANSION (LAYOUT I)

The working pressure  $P_i$  is normal.



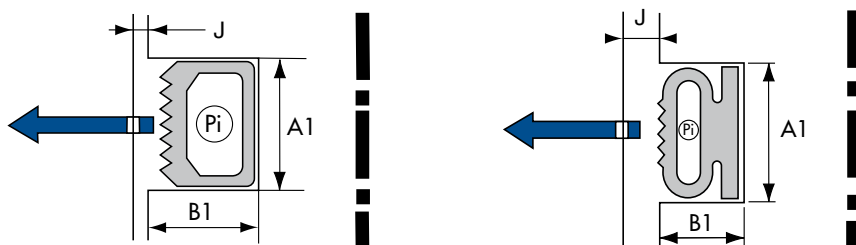
### INTERNAL RADIAL EXPANSION (LAYOUT II)

The working pressure  $P_i$  is 20 to 30% greater than the normal pressure.



### EXTERNAL RADIAL EXPANSION (LAYOUT III)

The working pressure  $P_i$  is normal or 15 to 25% higher.



The circular layouts I, II and III are also applicable for formed seals if the radius  $R_{gA}$ ,  $R_{gE}$  and  $R_{gI}$  are followed (see pages 4 & 5).

#### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com

technetics.com

**Technetics**  
GROUP

EnPro Industries companies

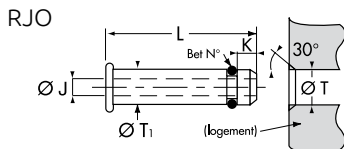
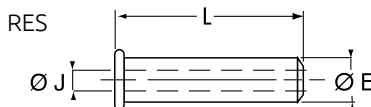
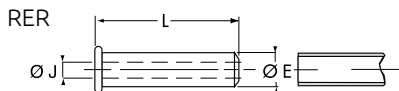
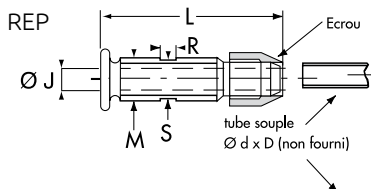
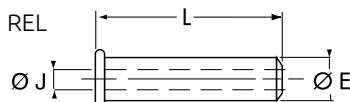
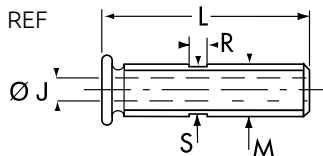
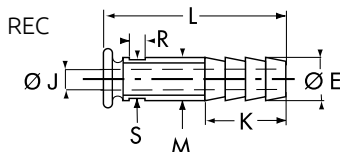


# FITTINGS AND VALVES

Our standard fittings and valves are manufactured in brass.

We also produce fittings in any other material, such as bronze, stainless steel and elastomers.

## STANDARD FITTINGS



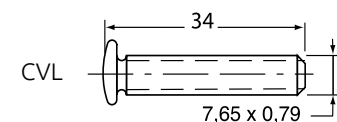
Notes:

- during the assembly of RJO fitting, it is important to secure the O-ring (chamfers 30°, smooth edges, etc.).

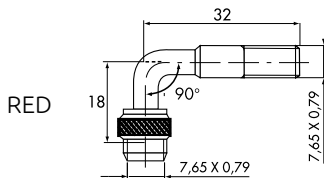
- RES fitting is only available in rubber.

Ø E		4		6		8		10		12	
M		M6		M8		M10		M12		M14	
Ø J		1,5		3		5		6		6	
K		12		16		16		20		20	
L		30/35 40/50		30/35/40 50/50		40/45/50 60/70/80		40/50/60 70/80/90		50/60/70 80/90/100	
S x R		5x6		6x6		8x8		10x8		11x8	
M	M4	M6	7,65x0,79	M8	1/8 G	M10	1/8 NPT	M12	1/4 G	M14	M16
Ø J	1,2	3	3	3	5	5	5	6	6	6	8
L	15/20/25 30/35/40	15/20/25 30/35/40	20/25/30 35/40/50	15/20/25 30/35/40	20/25/30 35/40/50	20/25/30 35/40/50	20/25/30 35/40/50	20/25/30 35/40/50	20/25/30 35/40/50	30/35/40 45/50/60	40/45/50 60/70/80
S x R	3x4	5x6	6x6	6x8	8x8	8x8	8x8	10x8	10x8	11x8	13x10
Ø E	4	6		8		10		12		14	16
Ø J	1,5	3,4		3,4		5		6,8		6,8	8,5
L	15/20/25 30/40	15/20/25 30/35/40 50		20/25/30 35/40/50		25/30/35 40/45/50 60		30/35/40 45/50/60 70		35/40/45 50/60/70 80	45/50/60 70/80/90
M						M10		M12		M14	
Ø J						3		5		7	
dxD						4x6		6x8		8x10	
L						50/60/70		50/60/70 80		60/70/80 90	
SxR						8x8		10x8		12x8	
Ø E	4	6		8		10		12		14	
Ø J	1	3		5		7		9		11	
d x 0	2x4	4x6		6x9		8x10		9x12		11x14	
L	25	35		50		60		75		85	
Ø E		6	7	8							
Ø J		3	3	3							
L		minimum lengths of 200 mm (by multiple of 100 mm)									
Ø T <sub>1</sub>	4	6		8		10		12		14	
Ø T	4H8	6H8		8H8		10H8		12H8		14H8	
Ø J	1	1,5		2		4		5		6,8	
BET N°	11018	15001		15004		15006		15007		15008	
K	2	2		4		5		5		6	
L	15/20/25 30/40	15/20/25/30 35/40/50		15/20/25/30 35/40/50		20/25/30/5 40/45/50/60		25/30/35/40 45/50/60/70		35/40/45/50 60/70/80	

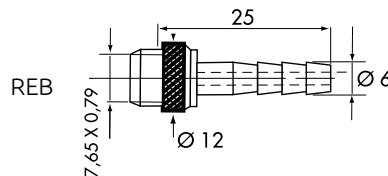
## STANDARD VALVES



with non return valve



with non return valve



without non return valve

RED elbow fittings and REB fittings can only be fitted on CVL valves and on REF valves 7,65x0,79.

## SPECIAL FITTINGS

We offer a wide range of solutions. Please contact our Technical Department for more information.

### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com

technetics.com

**Technetics**  
GROUP

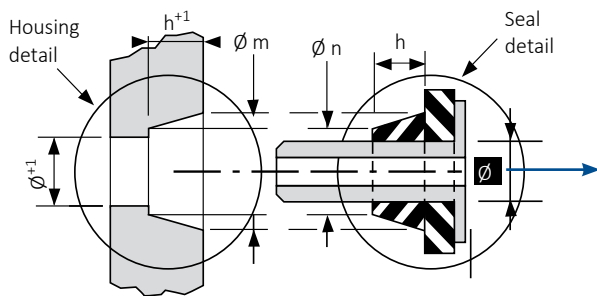
EnPro Industries companies

## POSITION OF FITTINGS AND VALVES

CEFIL'AIR® inflatable seals conception requires that connections be located at the bottom of the grooves or at the end of the seals (straight length). When seals have curves radii it is preferable to avoid connections located in the curved area. If the equipment around the seal for assembly or other reasons requires a lateral supply, it is possible to use elbow fittings or special constructions (please consult our technical department).

## OVERMOULDED CONES

### OVERMOULDED CONES (standard sizes)



For a maximum binding (metal/rubber), the fitting valves are equipped with a overmoulded rubber cone in accordance to their diameters (see table below).

Ø	4	4	6	8	10	12	14	16	18
m	6	8	12	14	21	24	26	28	30
n	5	6	10	12	14	16	18	20	22
h	3	4	6	6	10	10	12	12	12

**Note :** For REC, REF, REP fittings, and CVL valves, please consider the size of the thread part (M) as the connection diameter (see sketches on page 7). In case of intermediate value (dimensions in inches), take the next larger cone. (For other sizes, please contact our technical department).

## ASSEMBLY CONDITIONS

### SURFACE FINISH

The mean roughness obtained by machining (lathe, mill, etc.) must not be less than the value of 0,8 to 1,6 microns Ra (L.C.A. Rugotest, standard N6 - N7).

Applications where high performances are not required, 3,2 microns Ra are permissible (standard N8, L.C.A. Rugotest). Transverse scratches and local damage to the bearing surfaces to be sealed are prohibited.

### PREPARATION OF GROOVES AND CONTACT FACE

Before installation, it must be verified that the groove taking the seal is free from roughness (grit or weld spatter, flash or projections sharp edges). If roughness occurs, this must be taken off before the installation, followed by degreasing with a suitable solvent.

### INSTALLATION

1/ - The seal must be absolutely free from internal pressure at the time of fitting. If the valve is equipped with its mechanism, this must be removed during installation.

2/ - The installation of the seal in the groove must start, by positioning the pressure connexion (fittings or valves) in the (in) housings, then, the mechanical fixing is operated. It is important to make sure that splice vulcanisation is located far from the curve area.

3/ In order to fit the seal correctly, it is necessary to pressurise it immediately after positioning it in the glued groove, while observing the operation recommendations, i.e. perfectly captive on its four faces.

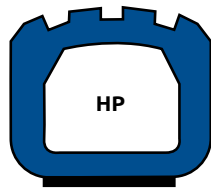
4/ It is possible to leave the CEFIL'AIR® seal pressurised throughout the time necessary for drying or vulcanizing the adhesives ; it is also possible, after a short drying time, to retract it in order to complete the setting operation. However, it must only be moved after the bond is completely fixed.

## ASSEMBLY CONDITIONS

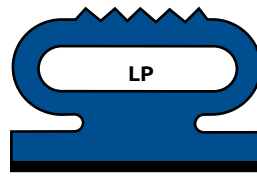
### FIXING THE SEALS

Although CEFIL'AIR® inflatable HP seals can be fitted in grooves without any form of retention, it is preferable to glue them to the bottom of the grooves. For this operation, it is recommended to use our general-purpose adhesive CEFIL'GRIP®, which can be applied directly to the metal when it has been thoroughly degreased and is free from rust or scale. For intensive utilizations of CEFIL'AIR® inflatable seals, we advise to prepare the support by a sanding process and to use the sticking primary (i.e. PM 820) and the silicone (RTV). If a different product than the one recommended is used, please check the instructions manual.

HP seals must be secured by the part opposite that of the seal (bottom of groove only), avoiding the use of adhesives on the lateral parts.



— Gluing area

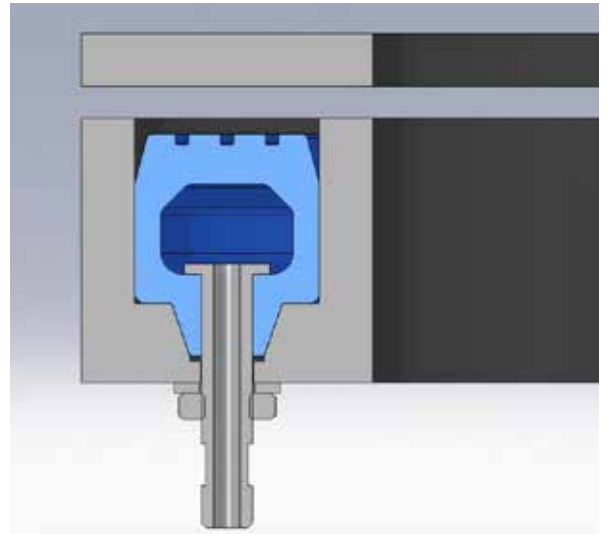


— Gluing area

LP seals will preferably be fixed mechanically, but, if an adhesive is necessary, the gluing must be limited to the foot of the profile.

### FIXING THE PRESSURE CONNECTION

The housing hole needs to have a conical part according to indications on page 9, to receive the overmoulded rubber cone of the seal. In the case of threaded connections (REC, REF, REP, CVL) tightening must be moderate and during this operation it is absolutely necessary to maintain the connection in order to avoid damaging the link between metal and rubber. It is important not to apply any torque to the fitting.



#### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com  
technetics.com

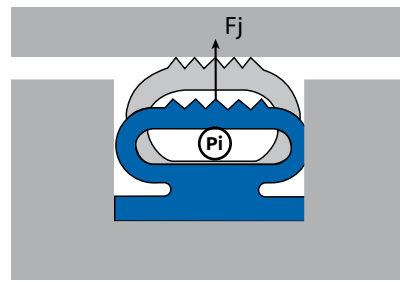
**Technetics**  
GROUP

EnPro Industries companies

## CALCULATIONS AND SUPPLY

### APPLICATION FORCE (CALCULATIONS)

CEFIL'AIR® seals are retracted even with a residual internal pressure. Their expansion occurs above the latter and brings the contact and sealing face against for the moving part. The pressure necessary for expansion varies a little over a whole range of arrangements and depending on the profiles used. In the majority of cases, the minimum operating pressure is 1,5 bar. The inflation of the CEFIL'AIR® seal provides an application force proportional to a unit contact surface. The total applied load (Fj) for the seal on the moving panel will be determined by:



$$F_j = (P_i \times K_j) \times LD$$

Pi = Internal pressure of the seal in bar  
LD = Expanded length of the seal in cm  
Kj = Coefficient of unit contact surface

Ø	512	339	347	356	443	405	627	369	415	639	603	514	616	921	704	736	828	10094	10170
Kj	1,0	1,2	1,2	2,0	2,2	2,3	3,0	3,0	0,7	1,2	1,6	1,6	5,0	0,8	1,5	2,5	3,0	4,2	5,0
Pi	4	4	4	6	6	6	8	8	1	5	6	7	10	3	3	3	3	3	3

### EXAMPLE OF CALCULATION

For a CEFIL'AIR® seal with profile N° 347, with a diameter of 1500 mm and used at an internal pressure Pi of 2 bars

$$F_j = (P_i \times K_j) \times \mu \times \varnothing^{(1)}$$

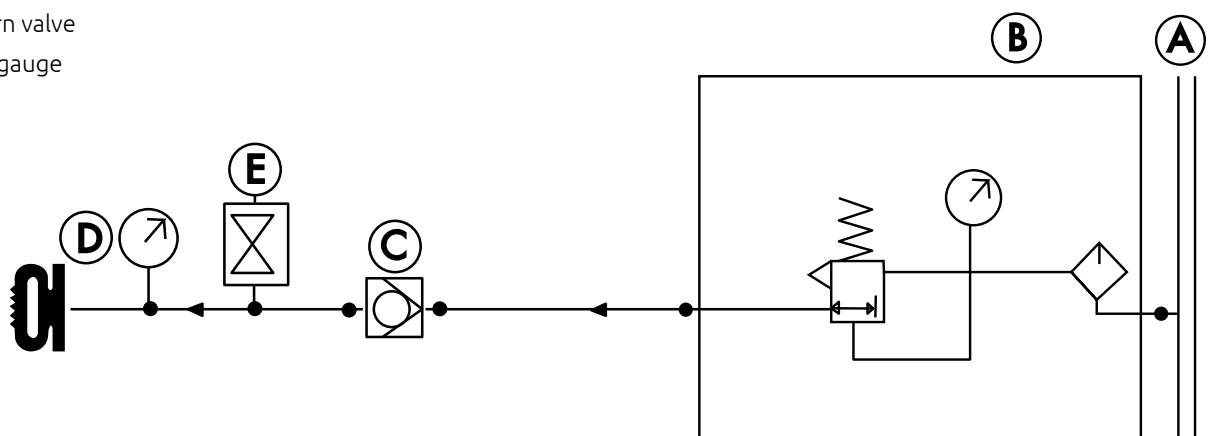
$$= (2 \times 1,2) \times (3,14 \times 150 \text{ cm}) = 1.130 \text{ da.N}$$

(1) mean diameter

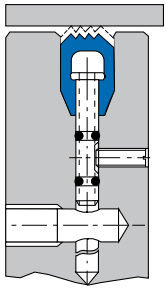
### PRESSURE SUPPLY

CEFIL'AIR® inflatable seals can be supplied either with gas or fluids. However, it is necessary to provide a constant supply, which must be guaranteed by a pressure regulator to avoid overpressure. Due to the relative permeability of elastomers (when inflated with air or gas) notably for silicone, it is necessary to provide pressure regulation for this type of inflation. It is also possible to use fluids (water, oil, etc.) to prevent elastomer gas permeability. (Please contact our technical department).

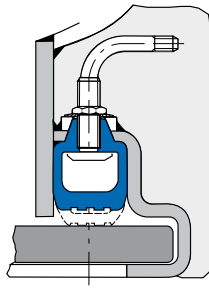
- (A) Air collector
- (B) Pressure relief valve filter
- (C) Non return valve
- (D) Pressure gauge
- (E) Valve



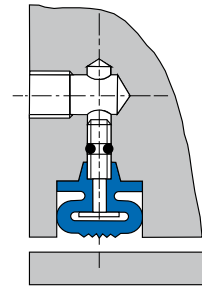
## EXAMPLES OF APPLICATION : "Sealing"



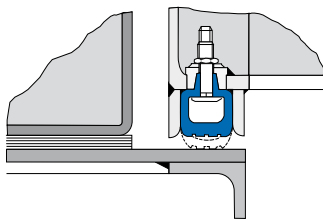
**MOBILE BULKHEAD SEALING**  
WITH PROFILE REF. 514



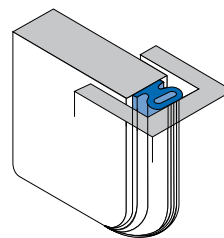
**STERILISER DOOR SEALING**  
WITH PROFILE REF. 369



**NUCLEAR POWER STATION SEALING DOOR**  
WITH PROFILE REF. 10093



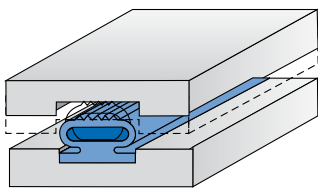
**SEAL ON ISOTHERMAL BULKHEAD SEALING**  
WITH PROFILE REF. 369



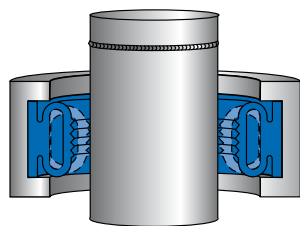
**COFFERDAM SEALING**  
WITH PROFILE REF. 10094

## EXAMPLES OF APPLICATIONS : "Handling"

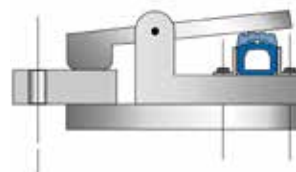
CEFIL'AIR® inflatable seals can also be used for the moving, handling, holding or clamping, particularly for fragile or complex geometry objects. (see following sketch).



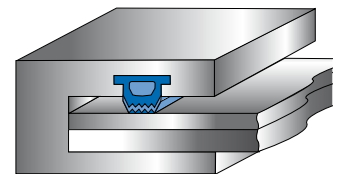
**TO LIFT**



**TO HOLD**



**TO CLAMP**



**TO PRESS**

### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai  
CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

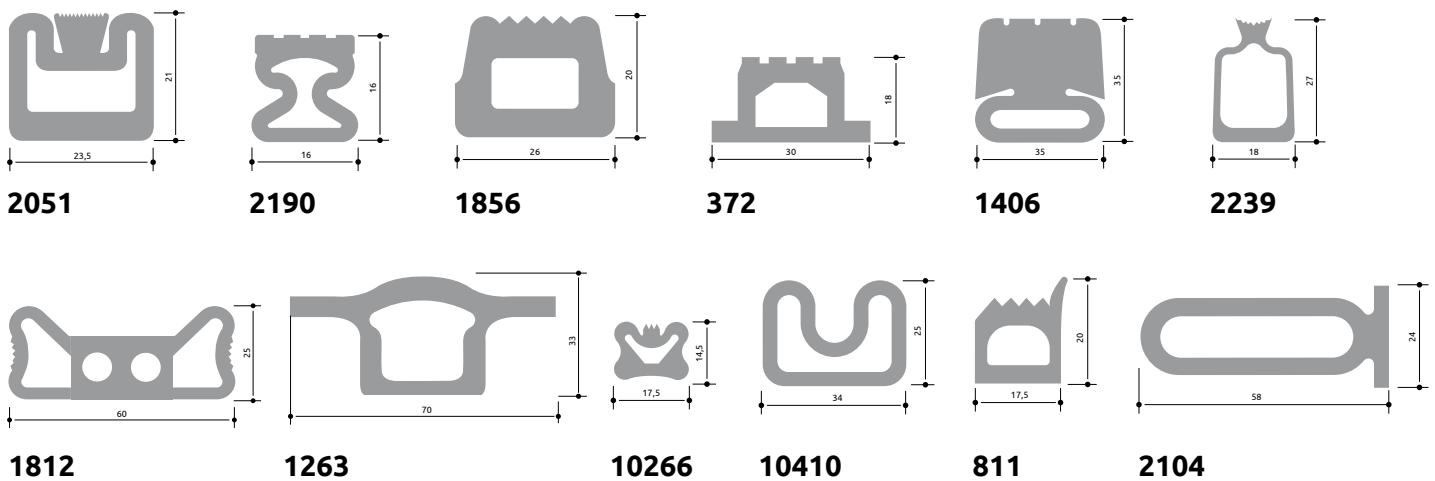
Fax: +33 (0) 4 77 43 51 51

france@technetics.com  
technetics.com

**Technetics**  
GROUP

EnPro Industries companies

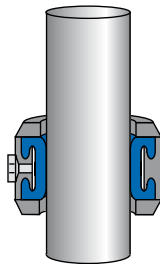
## OTHER EXAMPLES OF PROFILES



## OTHER EXAMPLES OF APPLICATIONS

### SMALL DIAMETER

#### Principle

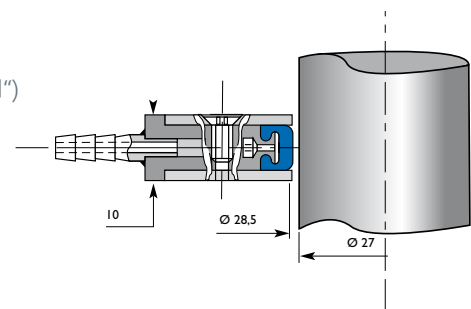


#### Locking on shaft

Application : Handling of cylindrical pieces

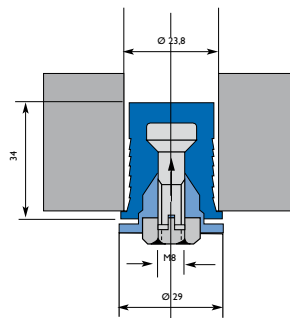
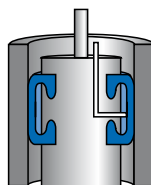
#### Examples :

Locking on shaft  
(cartridge mounting  
"minimum height occupied")



#### Hole tightening

Application :  
Handling hollow pieces  
(tube, bottle, etc.)



#### END PLUGS FOR TUBE

Example : "Mechanical expansion"

THE TECHNICAL DATA CONTAINED HEREIN IS BY WAY OF EXAMPLE AND SHOULD NOT BE RELIED ON FOR ANY SPECIFIC APPLICATION. TECHNICS GROUP WILL BE PLEASED TO PROVIDE SPECIFIC TECHNICAL DATA OR SPECIFICATIONS WITH RESPECT TO ANY CUSTOMER'S PARTICULAR APPLICATIONS. USE OF THE TECHNICAL DATA OR SPECIFICATIONS CONTAINED HEREIN WITHOUT THE EXPRESS WRITTEN APPROVAL OF TECHNICS GROUP IS AT USER'S RISK AND TECHNICS GROUP EXPRESSLY DISCLAIMS RESPONSIBILITY FOR SUCH USE AND THE SITUATIONS WHICH MAY RESULT THEREFROM.

TECHNETICS GROUP MAKES NO WARRANTY, EXPRESS OR IMPLIED, THAT UTILIZATION OF THE TECHNOLOGY OR PRODUCTS DISCLOSED HEREIN WILL NOT INFRINGE ANY INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES.

TECHNETICS GROUP IS CONSTANTLY INVOLVED IN ENGINEERING AND DEVELOPMENT. ACCORDINGLY, TECHNICS GROUP RESERVES THE RIGHT TO MODIFY, AT ANY TIME, THE TECHNOLOGY AND PRODUCT SPECIFICATIONS CONTAINED HEREIN.

ALL TECHNICAL DATA, SPECIFICATIONS AND OTHER INFORMATION CONTAINED HEREIN IS DEEMED TO BE THE PROPRIETARY INTELLECTUAL PROPERTY OF TECHNICS GROUP. NO REPRODUCTION, COPY OR USE THEREOF MAY BE MADE WITHOUT THE EXPRESS WRITTEN CONSENT OF TECHNICS GROUP.

Revised January 2016 - This document replaces any previous versions

#### TECHNETICS GROUP

EnPro Industries companies

90, rue de la Roche du Geai

CS 52913

42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00

Fax: +33 (0) 4 77 43 51 51

france@technetics.com

technetics.com

**Technetics**  
GROUP

EnPro Industries companies

COMPANY:	TEL:
CONTACT:	EMAIL:
ADDRESS:	DATE:
END USER:	INSTALLATION LOCATION:
REF:	ACTIVITIES FIELD:
N° CLIENT:	

**WORKING CONDITIONS** (Information requested for any enquiry)

New assembly or modifiable conception  or Existing not be change\*

Assembly position  Horizontal  Under cover  Vertical  Slanting

Function Needed  Sealing or  Handling

Pressure to seal\* \_\_\_\_\_ Bars or \_\_\_\_\_ daN  
 Vacuum  Atmosphere

Working temperature\* \_\_\_\_\_ (°C)

Media\* \_\_\_\_\_  
 Gas  Liquid  Vacuum

Working cycles nbr \_\_\_\_\_  
 per Hr. or  per Days or  per Months

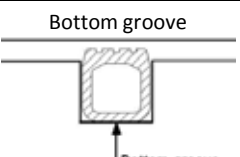
Inflating duration \_\_\_\_\_  
 Sec. or  Min. or  Hours or  Days or  Weeks or  Months or  Year

Deflating duration \_\_\_\_\_  
 Sec. or  Min. or  Hours or  Days or  Weeks or  Months or  Year

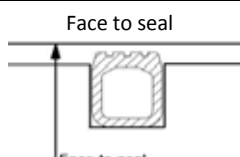
**CONFIGURATION** (Information requested for any enquiry) - dimensions in millimeter. Please provide drawing

Bottom groove cotation (Ag, ...g, ...)



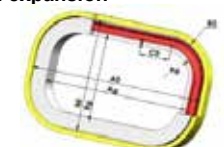

Face to seal cotation (A0, ...0, ...)



Bottom groove



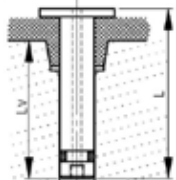
Face to seal

<b>Round corner configuration Axial expansion</b>	Mean length A0 Mean width B0 Mean Radius R0 Valve position C0 Clearance J	
<b>Round corner configuration Internal radial expansion</b>	Length A0 / Ag Width B0 / Bg Radius R0 / Rg Valve position C0 Clearance J	
<b>Round corner configuration External radial expansion</b>	Length A0 / Ag Width B0 / Bg Radius R0 / Rg Valve position C0 Clearance J	
<b>Straight length</b>	Length A0 Valve position C0 Clearance J <input type="checkbox"/> Retracted end plug <input type="checkbox"/> Expandable end plugs <input type="checkbox"/> Expanded end plugs	

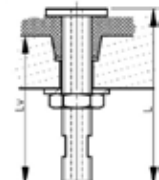
**Valve** (Information requested for any enquiry)

Material:  Stainless Steel  Brass  Rubber (RES only)  Other: \_\_\_\_\_

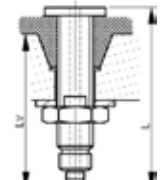
Type: \_\_\_\_\_ Size: \_\_\_\_\_ Diameter: \_\_\_\_\_ Length L: \_\_\_\_\_ Lc (RER): \_\_\_\_\_



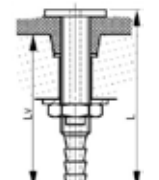
RJO



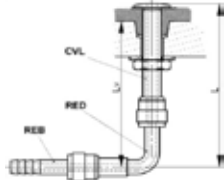
REF



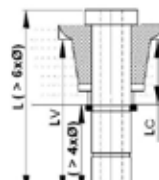
REP



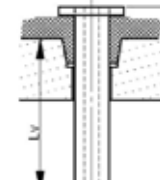
REC




CVL



CVL+RED+REB



RER



RES

CVL+REB  CVL+RED

**ADDITIONAL DETAILS**

Quantities: \_\_\_\_\_

Spot Order: \_\_\_\_\_

Yearly Order: \_\_\_\_\_

For more information on how  
Technetics Group affects your critical  
markets, visit [technetics.com](http://technetics.com).

#### ASIA

Blk 203, #05-52  
Woodlands Avenue 9  
Woodlands Spectrum 2,  
738956 Singapore

Phone: +65 6759 2335  
Fax: +65 6759 7319

#### FRANCE

90, rue de la Roche du Geai  
CS 52913  
42029 Saint Etienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00  
Fax: +33 (0) 4 77 43 51 51

49 Avenue Charles de Gaulle  
Z.I. Survaure  
42607 Montbrison cedex FRANCE

Phone: +33 (0) 4 77 96 79 80

#### GERMANY

Falkenweg 1  
41468 Neuss  
Germany

Phone: 0800-627-0151

#### UK

Acan Way, Coventry Road  
Narborough, Leicester LE19 2FT UK

Phone: +44 (0) 1162 727411  
Fax: +44 (0) 1162 727412

#### USA

2791 The Boulevard  
Columbia, SC 29209 USA

Phone: +1-803-783-1880  
Fax: +1-803-783-4279

305 Fentress Boulevard  
Daytona Beach, FL 32114 USA

Phone: +1-386-253-0628  
Fax: +1-386-257-0122

1700 E. International Speedway Blvd  
DeLand, FL 32724 USA

Phone: +1-386-736-7373  
Fax: +1-386-738-4533

1600 Industry Road  
Hatfield, PA 19440 USA

Phone: +1-800-618-4701  
Fax: +1-215-855-3570

10633 W Little York, Bldg 3, Suite 300  
Houston, TX 77041 USA

Phone: +1-713-983-4201  
Fax: +1-713-466-3721

990 Richard Avenue, Suite 117  
Santa Clara, CA 95050 USA

Phone: +1-669-242-8804  
Fax: +1-669-242-8492

#### TECHNETICS GROUP

EnPro Industries companies

[sales@technetics.com](mailto:sales@technetics.com)  
[technetics.com](http://technetics.com)



EnPro Industries companies