



Inflatable Seals Catalogue

Edition 2 2018



V·I·K·I·N·G
EXTRUSIONS LTD



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Introduction

Seals

Viking inflator seals are the ideal solution for difficult sealing situations. When parts move in relation to one another and are connected and disconnected at will the most effective technique is to use inflator seals. They provide effective solutions for:

- ☐ Large doors where machining the sealing surfaces to accommodate a conventional seal is impractical
- ☐ Processing equipment where rapid sealing and unsealing is required.
- ☐ Horizontal and vertical sliding doors

Inflator seals are inflated with air (or another fluid) using a pressure regulated supply system. When pressure is applied the seal inflates to conform to uneven surfaces and provides a reliable barrier from moisture, dust and other contaminants.

Inflator seals can operate in temperatures from -60C to +200C and even higher temperatures for shorter periods of time. Expansion capabilities (the ability to close a gap) vary by profile. However, the larger the expansion gap the larger

Using a wealth of knowledge and experience manufacturing inflator seals, Viking Extrusions

provides bespoke solutions for diverse customer requirements across a range of industries including power generation, medical and marine applications.

Clamps

Inflatable clamps apply a controlled pressure uniformly across their length to hold objects in place throughout cutting and machining operations, or hold pieces in place during bonding. These applications can include stopping items as they pass along a conveyor line and bonding air frame components.

Actuators

Inflatable actuators may be combined with traditional seals or clamps. For example, an inflatable actuator may push a seal made of a harder material to seal against a rotating piece of equipment. Similarly to inflator seals, an inflatable actuator will allow for variation in a sealing gap. This is particularly relevant for large sealing equipment

Seal Configurations

Inflatable seals can be manufactured in almost any shape or size. They can be supplied in continuous loops and expand radially inwards and outwards as well as axially. Inflator seals can be made into axial expanding rectangles, "U" shapes or other similar shapes using pre-moulded corners.

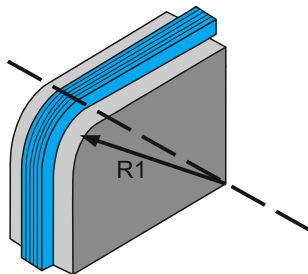
Straight length inflator seals can also be manufactured by sealing the ends of a length of extrusion.

Often inflator profiles will fit to the corners of a given application without requiring moulded corners. However, in the case of tight corners these will be required.

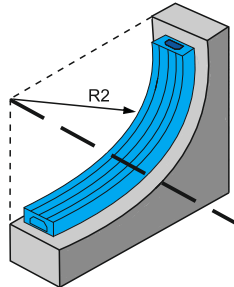
The diagrams below illustrate different common seal configurations.

The tables below show the minimum bend radii for radial inwards, outwards and axial expansion.

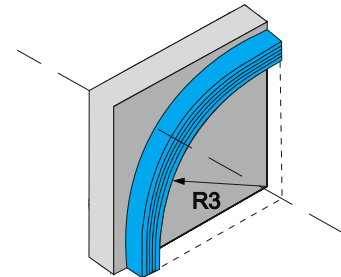
Radial Outward



Radial Inward



Axial



Minimum Radius in Direction of Expansion			
Inflator Ref No	External	Internal	Axial
368	130	500	450
1091	130	230	210
1092	150	420	335
1342	210	195	250
1565	40	140	140
1602	40	140	120
1742	205	185	420
2139			
2251	35	120	90
2264	90	150	440
2296	145	190	400
2357	125	240	450
2427	40	90	70
2668	200	20	N/A

Minimum Radius in Direction of Expansion			
Inflator Ref No	External	Internal	Axial
2774	80	180	150
2924			
2969			
3015			
3069	150	220	255
3074	N/A	150	N/A
3091	100	180	130
3104	160	130	300
3158	75	135	200
3192	60	110	150
3886			
3991			
4008			
4145	250	350	500

Figures are for guideline purposes only



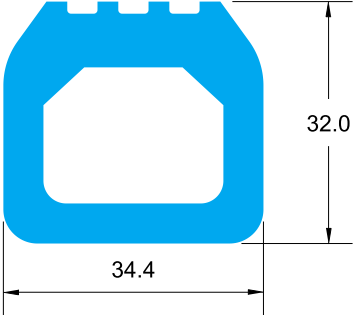
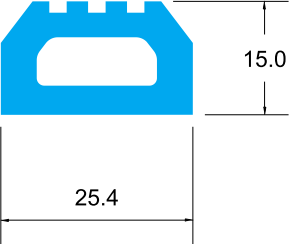
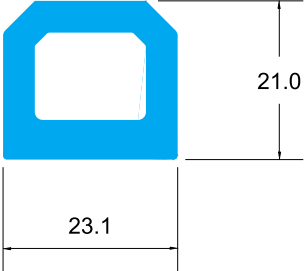
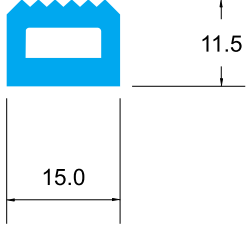
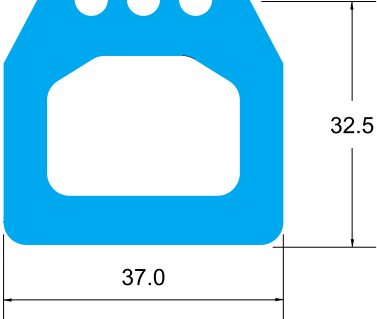
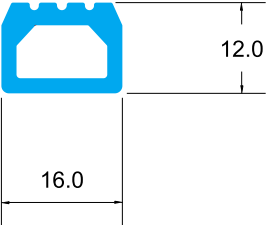
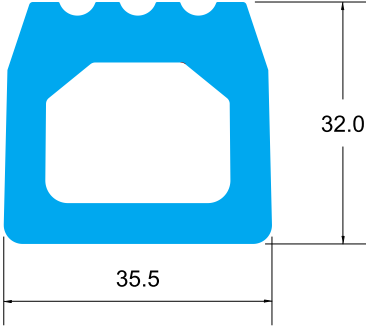
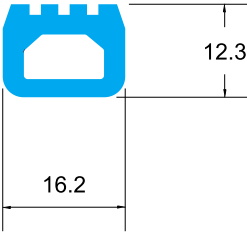
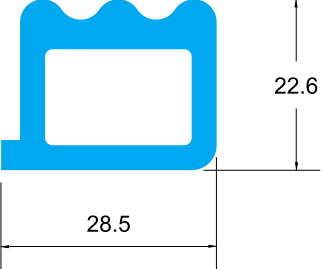
Minimum Radius in Direction of Expansion			
Inflator Ref No	External	Internal	Axial
4245			
4272	40	100	80
4418	275	280	485
4565			
4654			
4725	70	150	160
4732			
4739	80	150	130
4822			
4893			
5101			
5233			
5296			
5407			

Minimum Radius in Direction of Expansion			
Inflator Ref No	External	Internal	Axial
5485	245	275	N/A
5592			
5917	220	425	390
5954			
5974			
6044	160	280	250
6154	150	180	465
6158			
6226			

Figures are for guideline purposes only

Castellated Profiles

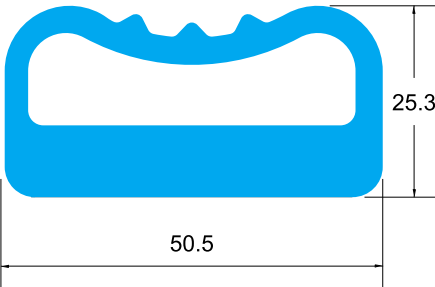
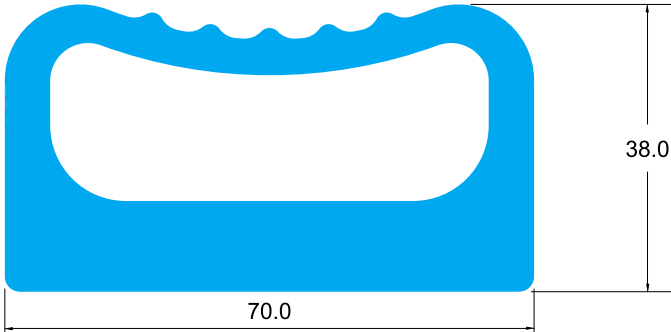
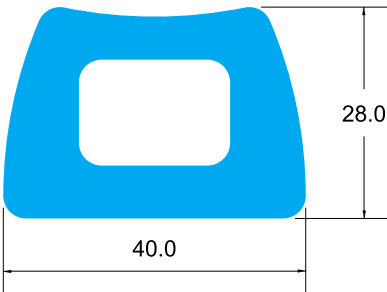
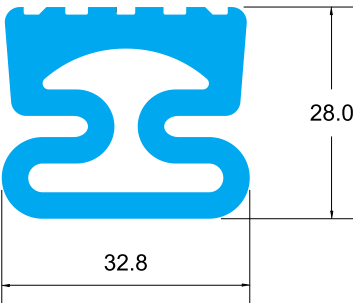
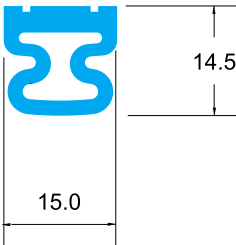
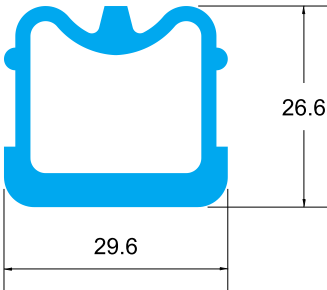
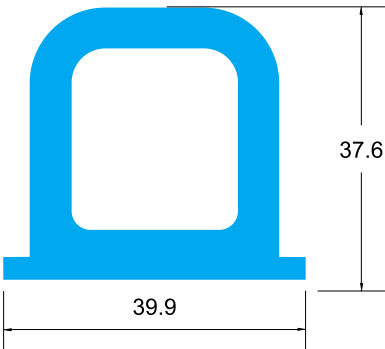
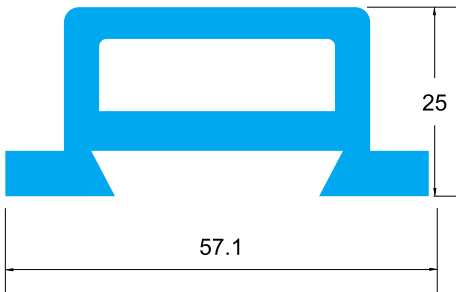
These profiles are designed for heavy duty applications and can seal against high differential pressures. They are commonly used in radial, axial and straight configurations. The sealing gap for this type of seal must be relatively small.

0368 	1565 	3192 
3886 	4145 	4539 
5101 	5233 	5917 

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
0368	VINF60	34.4	32	38	20	35	30	No
1565	VINF60	25.4	15	19	10	20	15	No
3192	VINF60	23.1	21	25	13	20	15	No
3886	VINF60	15	11.5	13.5	10	20	15	No
4145	VINF60	37	32.5	37	20	35	30	No
4539	VINF60	16	12	14	10	18	15	No
5101	VINF60	35.5	32.0	36.5	20	35	30	No
5233	VINF60	16.2	12.3	14	10	20	15	No
5917	VINF60	28.5	22.6	25.5	8	12	10	No

Unique Profiles

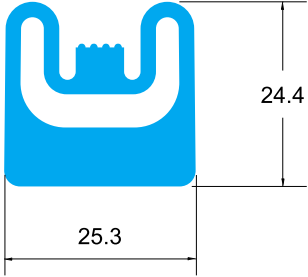
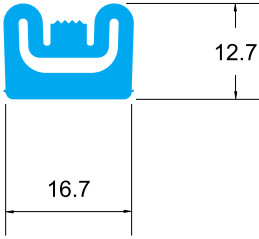
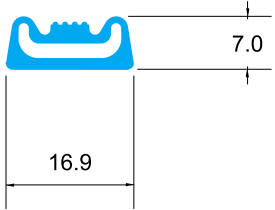
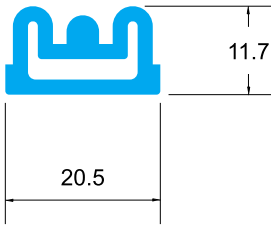
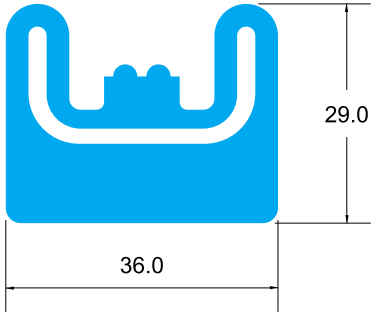
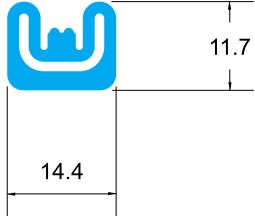
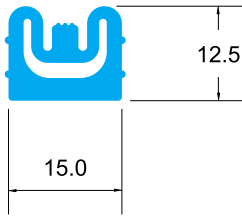
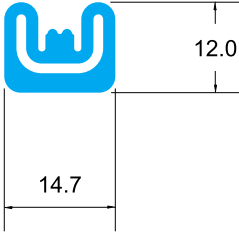
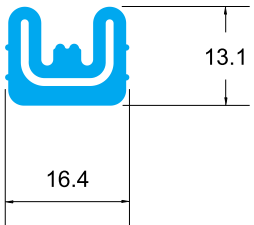
Viking Extrusions can manufacture unique inflatable seal profile so suit the customer's application. Below are examples of custom profiles that have been made previously. Please note the manufacture of a new profile will incur tooling charges.

<div>2357</div> 	<div>2668</div> 	
<div>3104</div> 	<div>6044</div> 	<div>4654</div> 
<div>5954</div> 	<div>2139</div> 	<div>1742</div> 

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
2357	VINF60	50.5	25.3	41	8	13	10	No
2668	VINF60	70	38	50	20	30	25	No
3104	VINF60	40	28	34	20	35	25	No
6044	VINF60	32.8	28	37	8	15	10	No
4654	VINF60	15	14.5	17	10	20	15	No
5954	VINF60	29.6	26.6	34	4	8	5	No
2139	VINF60	39.9	37.6	40	20	40	30	No
1742	VINF60	57.1	25	33	10	20	15	No

Frog Leg Profiles

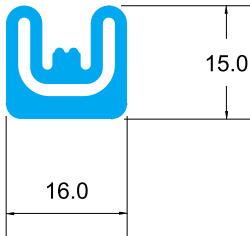
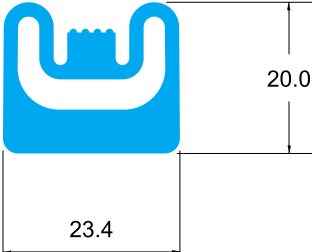
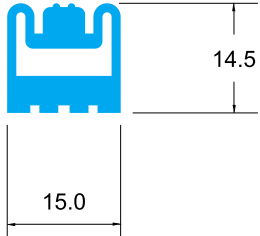
These profiles are designed for to fit into a square channel. Their “frog leg” design allows them to expand and cover a large distance relative to their size. These profiles best suit expansion axially and radially outward.

1342	1602	2251
		
2246	2296	2427
		
2774	3158	4245
		

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
1342	VINF60	25.3	24.4	37	15	25	20	No
1602	VINF60	16.6	12.7	24	10	20	15	No
2251	VINF60	16.5	7	11	8	16	12	No
2264	VINF60	20	12	18	10	20	15	No
2296	VINF60	36	29	53	10	18	15	Yes
2427	VINF60	13.7	11.2	19.5	10	18	15	Yes
2774	VINF60	15	12.5	19	10	20	15	No
3158	VINF60	14	11.5	20.5	10	18	15	Yes
4245	VINF60	16.4	13.1	21	10	20	15	No

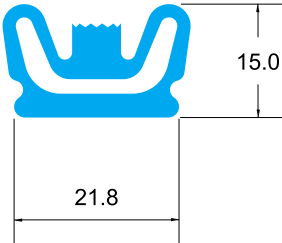
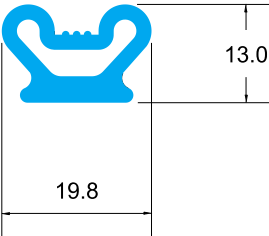
Frog Leg Profiles

These profiles are designed for to fit into a square channel. Their “frog leg” design allows them to expand and cover a large distance relative to their size. These profiles best suit expansion axially and radially outward.

4272	4725	4732
		

Footed Snap Profiles

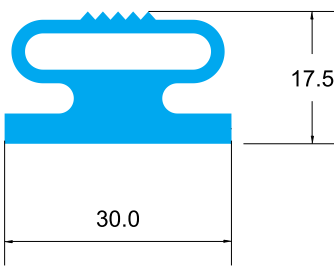
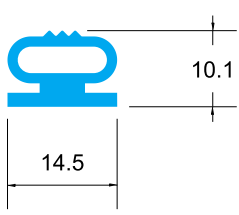
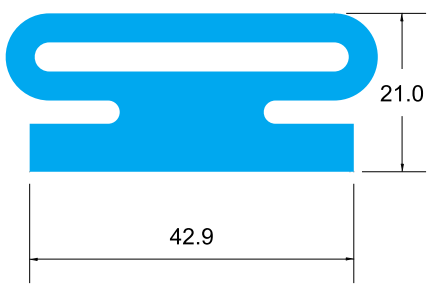
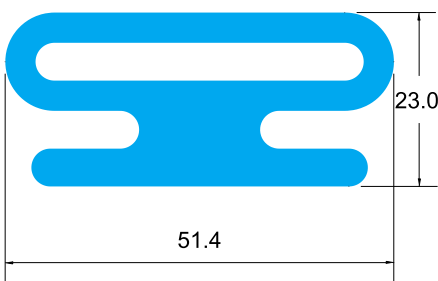
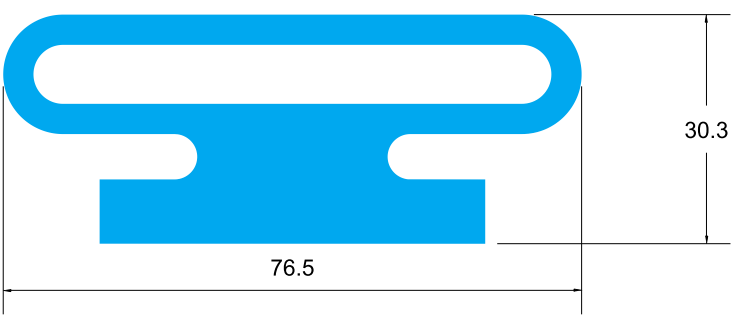
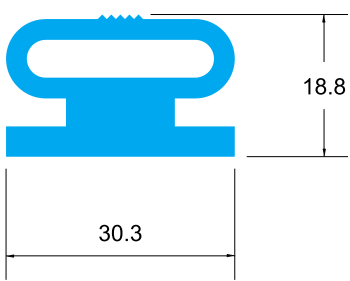
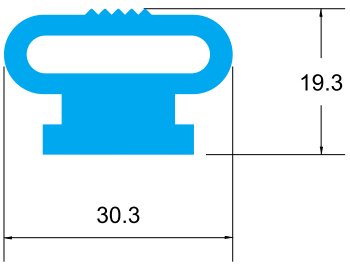
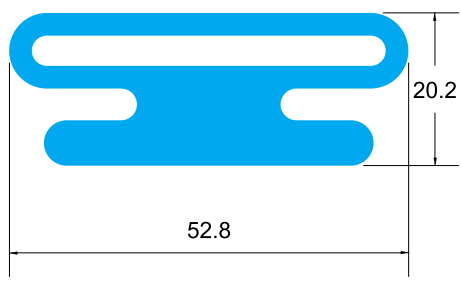
Similar to frog leg profiles, these profile provide large expansion relative to their size. The dovetail shape of their base allows them to be “snap fitted” into a mechanical retainer.

1091	5974
	

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
4272	VINF60	16	15	26	8	15	10	Yes
4725	VINF60	23.4	20	35	18	25	20	No
4732	VINF60	15	14.5	20	8	15	10	No
1091	VINF60	21.8	15	30	15	25	20	No
5974	VINF60	19.8	13	17	8	14	10	Yes

Stem/ Foot Location Profiles

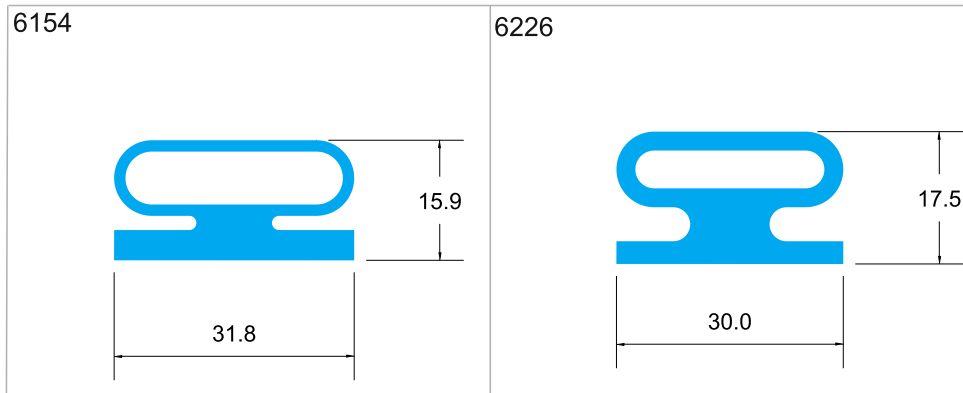
These profiles are used for a wide range of applications as they are easily fitted into a variety of mechanical retainers. When inflated these seals are fully rounded, giving them a large expansion range. They are suitable for use in radial, axial or straight applications.

1092 	2969 	3069 
4418 	4565 	
4739 	4822 	5485 

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
1092	VINF60	30	17.5	29.5	10	20	15	No
2969	VINF60	14.5	10.1	15	8	15	10	No
3069	VINF60	42.9	21	49	15	25	20	No
4418	VINF60	51.4	23	42	15	25	20	No
4565	VINF60	76.5	30.3	63	8	15	10	No
4739	VINF60	30.3	18.8	28	8	15	10	No
4822	VINF60	30.3	19.3	27	8	15	10	No
5485	VINF60	52.8	20.2	42	20	30	25	No

Stem/Foot Location Profiles

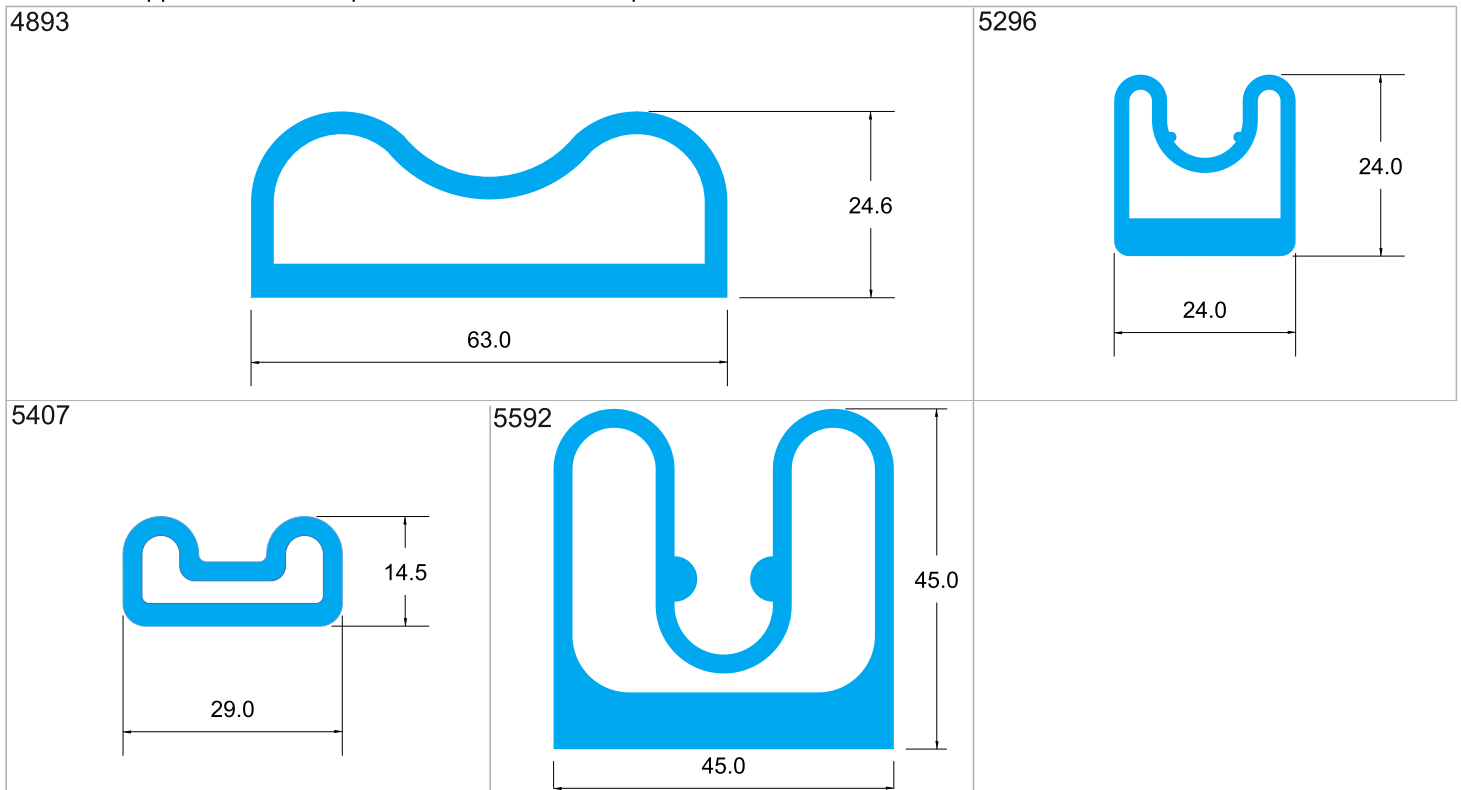
These profiles are used for a wide range of applications as they are easily fitted into a variety of mechanical retainers. When inflated these seals are fully rounded, giving them a large expansion range. They are suitable for use in radial, axial or straight applications.



Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
6154	VINF60	31.8	15.9	26	5	12	8	No
6226	VINF60	30	17.5	29	8	15	10	No

Channel-Fit Profiles

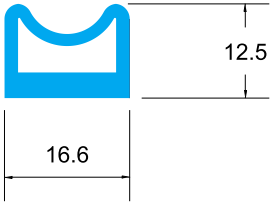
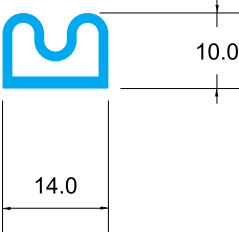
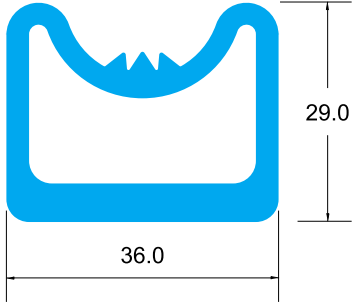
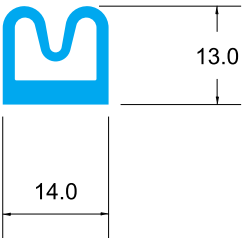
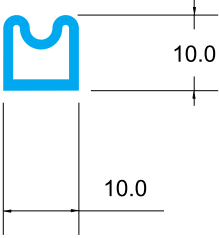
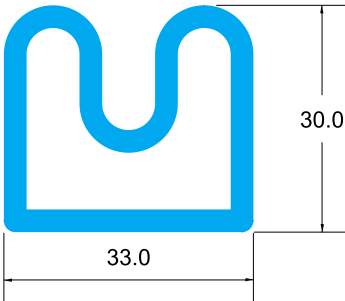
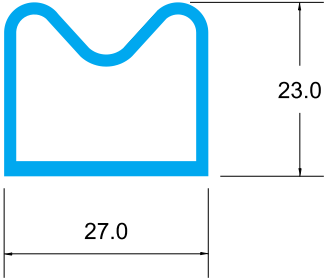
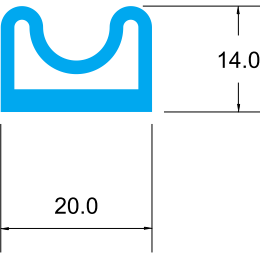
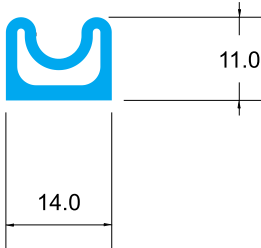
These profiles are similar to frog leg profiles. Their design allows them to expand over a large distance relative to their width and they can be easily retained in a square channel. These profiles are most suited for applications that require outward and axial expansion.



Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
4893	VINF60	63	24.6	34	5	10	5	No
5296	VINF60	24	24	34	8	15	12	No
5407	VINF60	29	14.5	21	8	15	10	No
5592	VINF60	45	45	70	6	10	8	No

Channel-Fit Profiles

These profiles are similar to frog leg profiles. Their design allows them to expand over a large distance relative to their width and they can be easily retained in a square channel. These profiles are most suited for applications that require outward and axial expansion.

2924 	3015 	3074 
3091 	3991 	4008 
4681 	4805 	4812 

Inflator Ref	Material	Width (mm)	Height (mm)	Inflated Height (mm)	Min Pressure (PSI)	Max Pressure (PSI)	Recommended Pressure (PSI)	Moulded corners
2924	VINF60	16.5	12.5	18.5	10	20	15	No
3015	VINF60	14	10	14.5	10	20	15	No
3074	VINF60	36	29	52	15	25	20	No
3091	VINF60	14	13	23	10	25	20	Yes
3991	VINF60	10	10	13	5	10	8	No
4008	VINF60	33	30	42	15	25	20	No
4681	VINF60	27	23	30	5	15	8	No
4805	VINF60	20	14	19	5	10	5	No
4812	VINF60	14	11	17	10	18	15	No

Inflator Seal Applications

Marine



Inflatable seals provide watertight solutions for sliding window and door applications.

Inflatable seals are often used for transom and salon doors on yachts and can be provided in continuous loops. With the use of moulded corners inflatable seals can also be made into frames and U shapes to suit individual applications.

Frog leg and channel fit profiles are commonly used in these situations as they can be fitted into machined grooves with no overhang to provide more aesthetic solution. Other marine applications include: portholes, cofferdam bulkheads, cargo hatches and seals that allow for the maintenance of propeller shafts.

Powder and Solids Handling



Inflatable seals are used in food processing and pharmaceutical industries where the transfer and storage of dry powders requires an airtight seal.

Examples of these applications include: inflatable seals for butterfly valves, slide gate inflatable seals, bulk bag filler seals, drum filling inflatable seals, hopper seals and seals for viscous pumping equipment.

Foot/Stem location profiles and channel fit profiles are often used in these scenarios, as they can connect and disconnect quickly.

Our FDA approved silicone that is free from TSE/BSE bi-products is perfectly suited to these environments.

Energy Generation



In the energy generation industry, specifically nuclear power, Viking inflatable seals manufactured to meet the tight tolerances and stringent quality control required.

Within nuclear power plants foot/stem location inflator seals are used to effectively seal pool gates.

Inflatable seals are also used to seal airlocks, access doors, equipment hatches.

During shutdown and maintenance periods inflatable seals are used as nozzle dams to block coolant flow from reactor to steam generator.

Inflator Seal Applications

Airtight Doors



When an airtight seal is required on a door inflatable seals can be used to ensure a positive seal. The seals expand towards the sealing face and account for any tolerance variation in the door's manufacture.

Using an inflatable seal not only allows for a positive seal but also allows for frequent access as they are quickly inflated/deflated. Footed Snap profiles and Stem/Foot location profiles make for a good solution in these kind of applications, as they can be mechanically retained

These seals are often used in nuclear power and chemical processing plants as well as labs and research facilities.

Transportation, Aerospace & Defense



Inflatable seals are used for a diverse range of bespoke and technical applications within these markets.

Inflatable bladders are used to provide uniform pressure when bonding airframe components. Inflatable seals are also used for sealing wind tunnels when testing aircraft components.

On railroad passenger cars, inflatable seals are used to allow for rapid boarding and discharge of passengers through larger doors as well as providing an airtight seal which reduces noise and drafts.

Inflatable seals can be used to provide watertight seals on the cab doors and tail gates of military and other vehicles.

Life Sciences



The specialist material used in our inflatable seals is FDA and USP Class Vi certified making it perfectly capable of meeting the requirements of medical and life science applications.

The heat and water resistant properties of silicone make an effective sealing solution for autoclaves and other sterilising applications.

Inflatable seals can also be used to seal glove boxes in aseptic manufacturing environments, as well as actuators to position equipment trays during processing.

Silicone Properties

Chemical Name	Silicone
ASTM Designation (ASTM D14/18)	VMQ
Tensile Strength (psi)	>1200
Hardness (Durometer Shore A)	60
Tear resistance	F
Abrasion Resistance	P
Compression Set	VG
Resilience Cold	E
Resilience Hot	E
Radiation Resistance	G
Impermeability to gases	F
Acid Resistance	
Mild Dilute	E
Strong Concentrate	F
Solvent Resistance	
Aplihatic Hydrocarbons	P
Aromatic Hydrocarbons	P
Oxygenated (Keytones, etc)	P
Resistance To:	
Swelling in lubricating oil	P
Oil and Gasoline	F
Animal Oils	G
Water Absorption	E
Oxidation	E
Ozone	E
Sunlight Aging	E
Heat Aging	O
Low Temperature	O
Flame	F
Vegetable Oils	P
Chlorinated Hydrocarbons	P to F

P=poor, F=fair, G=good, V=very good,
 E=exceptional

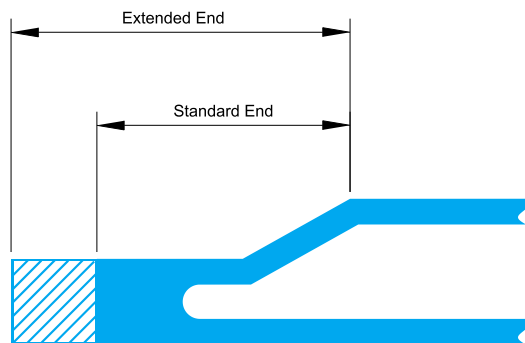
VINF60

A custom compound specifically designed for use in the manufacture of inflatable seals. Features include high tear strength characteristics. Supplied in colour; cobalt blue only. FDA approved to 21 CFR 177.2600. This material complies with European Union directive EC193/2004. We certify that this material is free from TSE/BSE bi-products.

Shore Hardness	60° +/- 5°
Elongation at break	450%
Tensile strength	10 MPA
Tear strength	25 Kn/M
Specific Gravity	1.16
Temperature Range	-70°C to + 200°C
Compression set	35%

Straight Length Inflators

Inflator seals can also be supplied in straight lengths. This type of design requires solid, non-expanding zones on each end of the seal. This is followed by a transition area where the seal expansion increases until it reaches its full height.



Air connectors may be attached through the base or end of the seal. If pressure plates are used to secure the seal in place, then extended non-expanding zones will be required.



Moulded Corners

The size of a radius that an inflatable seal can be bent around is dependent on the shape of its specific profile. For axially expanding inflatable seals moulded corners may be used to enable the seal to conform to tight radii or 90° bends. The table below contains existing moulded corners that can be added to inflatable seals.

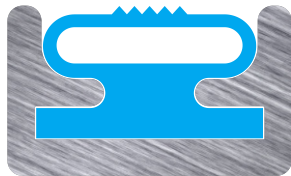
Moulded corners for new and existing profiles can be manufactured to customers' requirements but tooling charges will be incurred.

Inflator Ref	Corner Mould Specifications (mm)		
	Inner Radius	Outer Radius	Outside Dimensions
2296	30	66	75/75
2427	15	29.5	39/39
3091	2	16	30/30
3158	15	29.5	39/39
3158	24	38.5	48.3/48.5
4272	1.5	17..5	41/41
5974	5.2	25	69/69



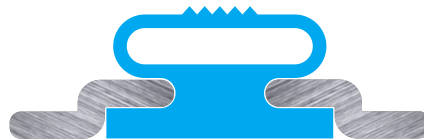
Mechanical Retainers

Retainers for Stem/ Foot Location Profiles



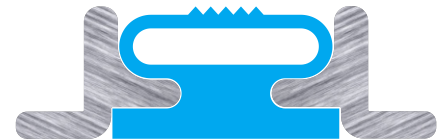
Slide-in

An extruded aluminium retainer profile which the inflatable seal is fed into from one end.



Z-Clip

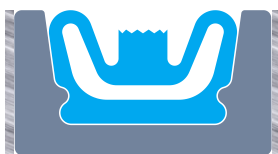
Clips which are screwed down at set intervals. The inflatable seal is then fitted between the clips.



Split-Channel

A two piece extruded aluminium retainer. Generally one side is secured in place and the other is removable to aid seal fitting

Retainers for Snap Fit Profiles



Rubber Snap-in

A high shore hardness rubber profile is extruded which fits into a channel and holds the inflatable seal in place.



Snap-in

An extruded aluminium profile which the inflatable seal is push-fitted into.

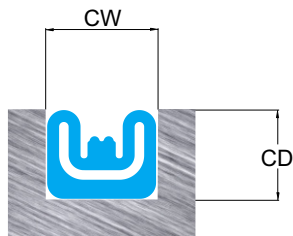


Machined Groove

A machined groove which the inflator seal is push fitted into.

Mechanical Retainers

Machined grooves are commonly used to secure seals in radial in/out and axial configurations.



CW = channel width (width of profile plus its tolerance)

CD = channel depth (height of profile plus its tolerance)

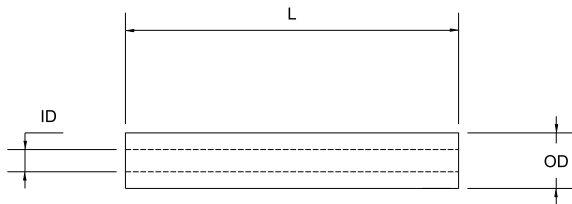
Recommended Retainer Grooves for Castellated, Frog Leg and Channel Fit Profiles

Inflator Seal Ref	CW (mm)	CD (mm)
Castellated Profiles		
0368	36.4	34
1565	27.4	16.3
3192	24.7	22.6
3886	16.3	12.8
4145	39	34.5
4539	17.3	13.3
5101	37.5	34
5233	17.8	13.6
5917	30.5	24.2
Frog leg Profiles		
1342	26.9	25.7
1602	18.2	14
2251	18.1	8
2264	21.6	13.3
2296	38	31
2427	15	12.5
2774	16.3	13.8
3158	15.3	12.8
4245	18	14.4
4272	17.3	16.3
4725	25	21.6
4732	16.3	15.8
Channel Fit Profiles		
2924	17.8	13.8
3015	15.3	11
3074	38	31
3091	15.3	14.3
3991	11	11
4008	35	32
4681	29	24.6
4805	21.6	15.3
4812	15.3	12.3
4893	65.5	26.2
5296	25.6	25.6
5407	31	15.8
5592	47.5	47.5

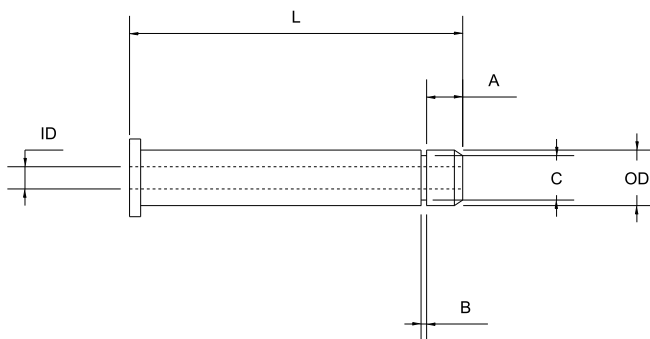
Air Connectors

For seals joined into rings the air connector is most commonly joined to the base of the seal. For some castellated, channel fit and foot/stem location inflators air connectors may be placed in a side wall. However, this may have an adverse effect on the inflatable seal's durability and life span. For straight length inflator seals, air connectors may be placed in one or both ends.

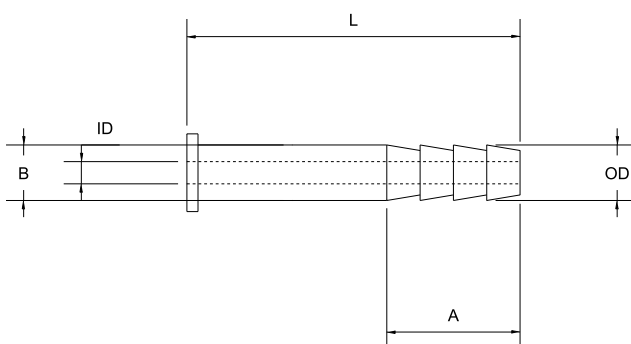
Bespoke inflation stems may also be manufactured to customer specifications however extra charges may apply.



Hose (silicone)				
Ref:	Material	ID	OD	L
ACA1	VGP60	5	8	400
ACA2	VGP60	3	6	400
ACA3	VGP60	4	6	400
ACA4	VGP60	3.5	6.5	400
ACA5	VGP60	6	14	400

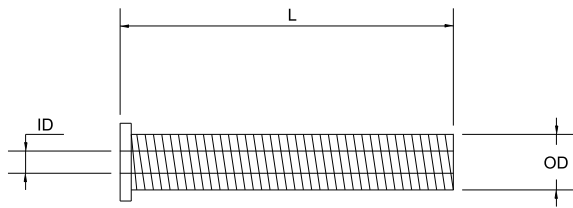


Push-Fit Valve (stainless steel)						
Ref:	ID	OD	L	A	B	C
ACB1	4	8	18.8	2	2	5.6
ACB2	2.5	6	26.8	5.6	1.8	5.6
ACB3	2.3	7	34.6	7.5	2	5
ACB4	4	11.9	34.5	6	3.2	8
ACB5	4	8	67.7	10.3	1.5	7.7
ACB6	4.2	8	69.7	5.5	1	7.8
ACB7	4.2	8	202	5	1.5	7.8

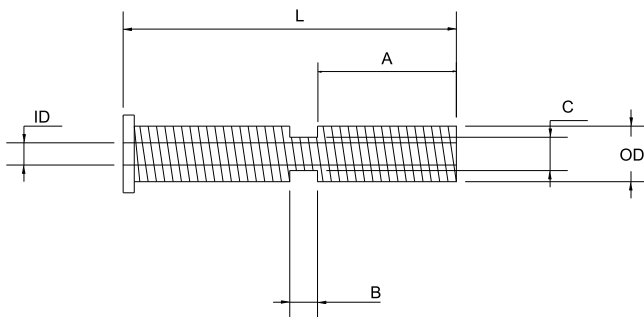


Hose Barb Valve (stainless steel)					
Ref:	ID	OD	L	A	B
ACC1	3	6.6	38.7	15	7.6
ACC2	3	6.6	46.4	12	8
ACC3	3.2	6.3	73	15	7.9
ACC4	3	6.6	38.2	14.5	7.8
ACC5	1.5	4	14.7	7.8	4

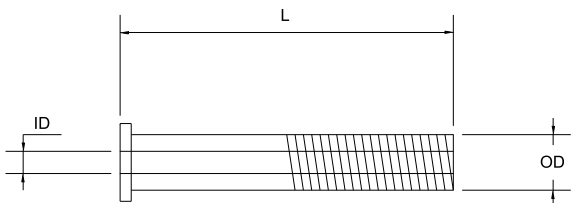
Air Connectors



Threaded Valve (stainless steel)			
Ref:	ID	OD	L
ACD1	5	9.7	94.3
ACD2	2	6	30
ACD3	5	9.9	67
ACD4	4	7.8	22.2
ACD5	4.3	7.9	26.5
ACD6	2.9	5.9	40
ACD7	5	9.5	52



Threaded Valve with Wrench Flat (stainless steel)						
Ref:	ID	OD	L	A	B	C
ACE1	5.3	10	50.5	7.2	7.9	7.4
ACE2	4.1	9.6	35.8	15.5	4.4	7



Part Threaded Valve (stainless steel)				
Ref:	ID	OD	L	A
ACF1	4	8	86	34
ACF2	4	8	200	39
ACF3	4	8	200	54



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