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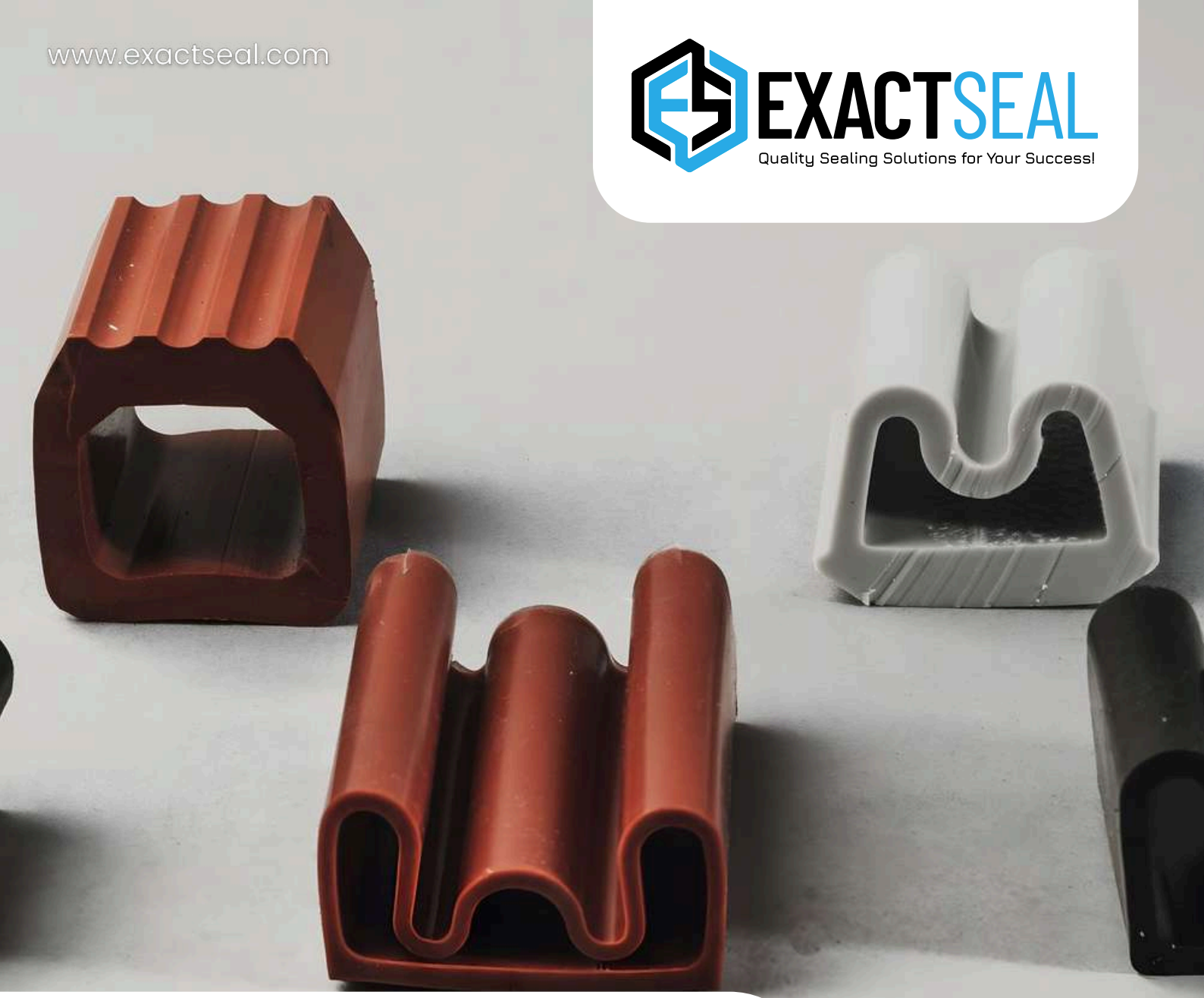
Quality Sealing Solutions for Your Success!



CATALOG

Inflatable Seals

Fabric Reinforced Inflatable Seals
Non-Fabric Reinforced Inflatable Seals

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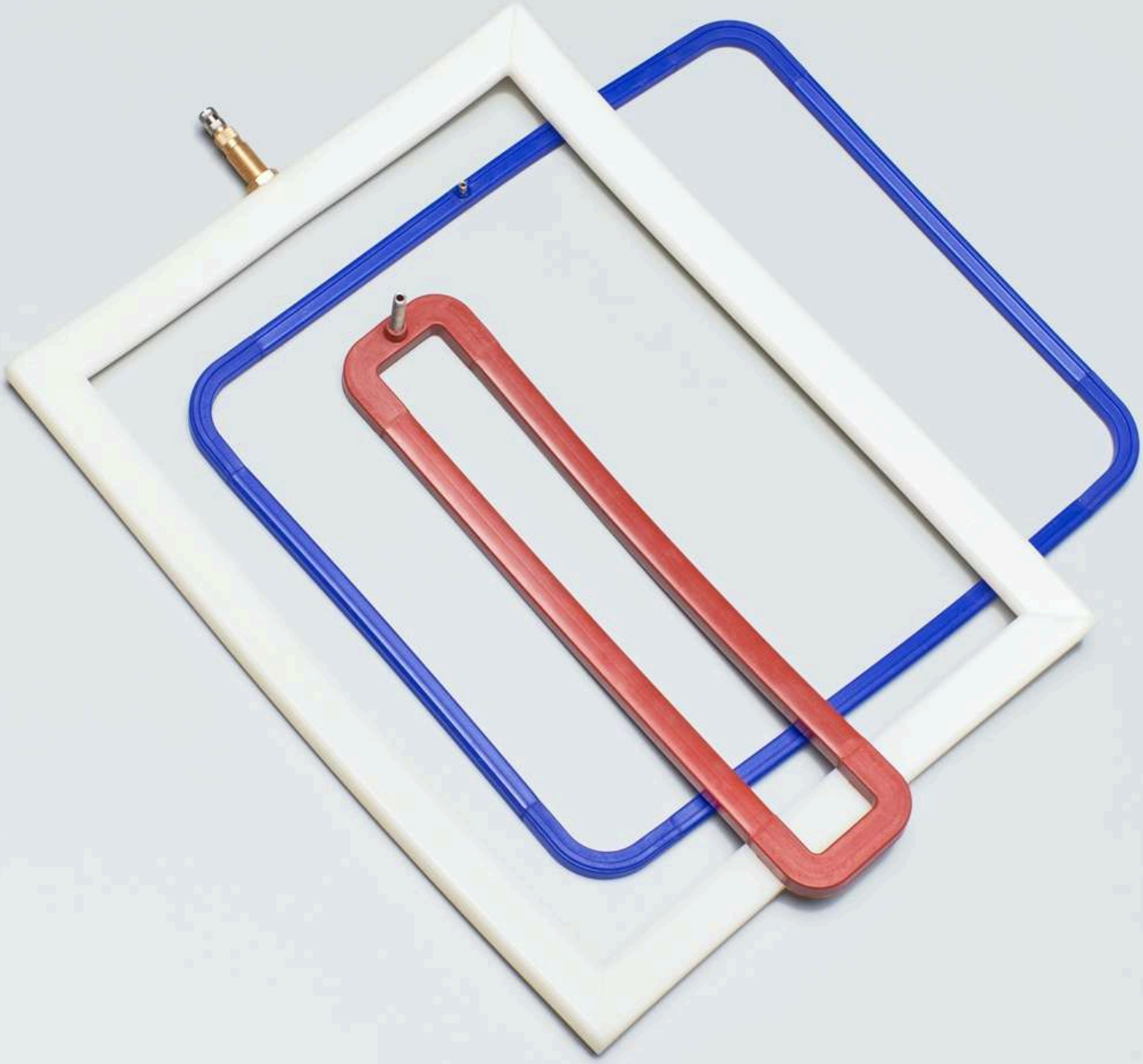

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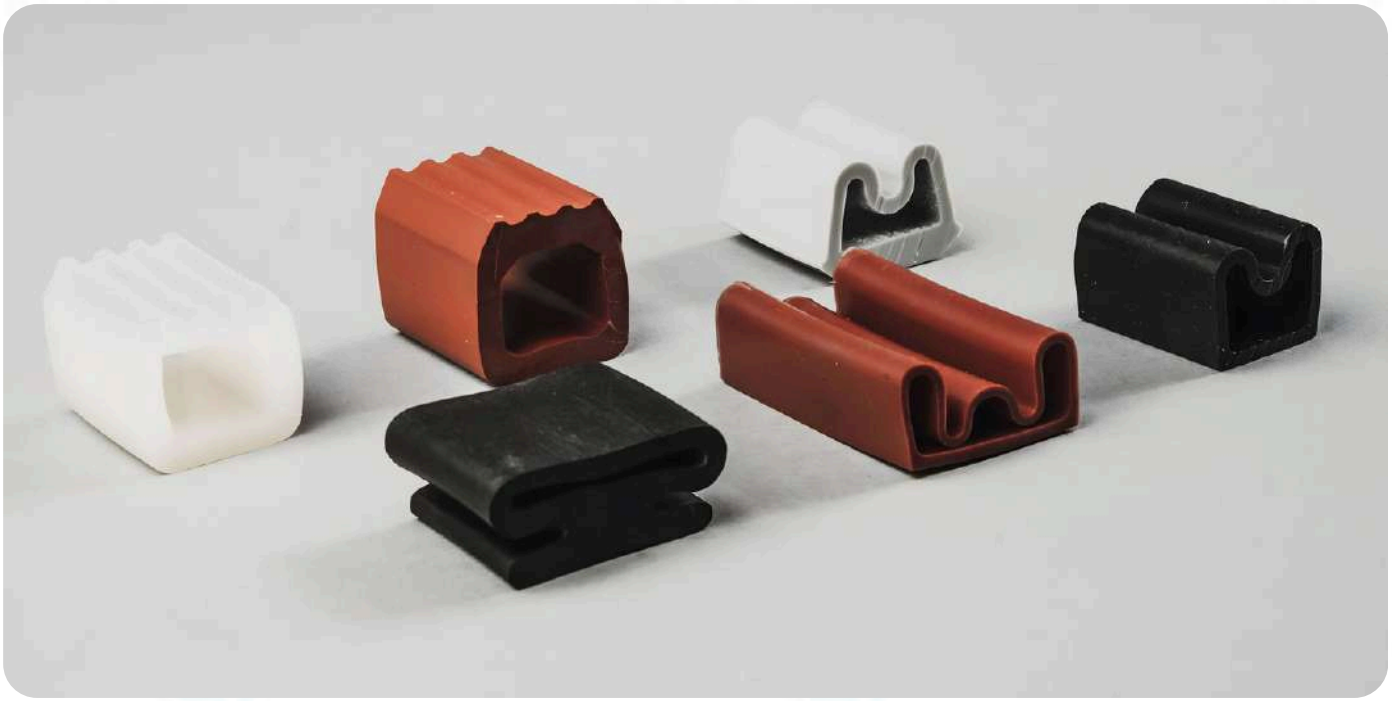
INTRODUCTION



WHAT ARE INFLATABLE SEALS?

Inflatable seals are rubber seals that expand (instead of compressing) to provide contamination-proof sealing across various applications. Unlike standard elastomeric seals, inflatable seals perform efficiently on irregular or misaligned surfaces, improving their sealing integrity. They are engineered to inflate, creating a secure barrier between the mounting and striking surfaces. These seals are easier to use since they require less force while ensuring complete sealing. This makes them an ideal solution for your specialized sealing needs.

WHY USE EXACTSEAL'S INFLATABLE SEALS?

With over 30 years of experience, Exactseal has perfected the craft of engineering bespoke inflatable seals that meet and exceed customer specifications. Our state-of-the-art in-house tool room ensures that we maintain an extensive stock of standard cross sections, ready to fulfill urgent orders. Exactseal's dedicated design team excels in custom engineering, offering innovative solutions for clamp fabrication, a wide array of air connectors, and tailored material recommendations to enhance seal performance. Moreover, we specialize in manufacturing fabric-reinforced, fully molded inflatable seals capable of withstanding extreme temperatures and pressures. Choosing Exactseal means benefiting from unmatched expertise, rapid turnaround times, and seals that are engineered for optimal performance and durability in the most challenging environments.

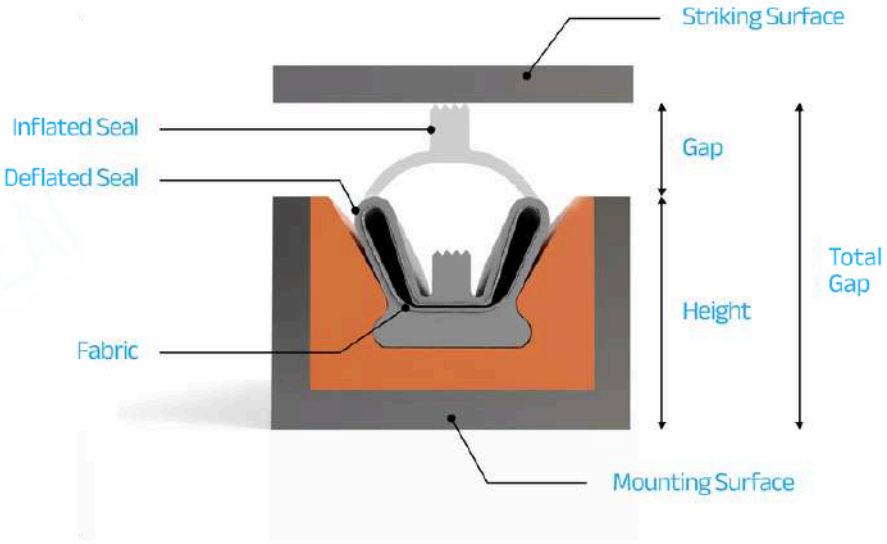
ADVANTAGES

Inflatable seals provide numerous advantages over traditional seals:

- Seal uneven surfaces
- Seals gaps with wide tolerances
- Overcome issues arising from compression set
- Effective in Pressurized environments
- Better operational seal life
- Ideal for critical applications

TECHNICAL DETAILS

Parts of the Inflatable Seal



Seal inflation gap

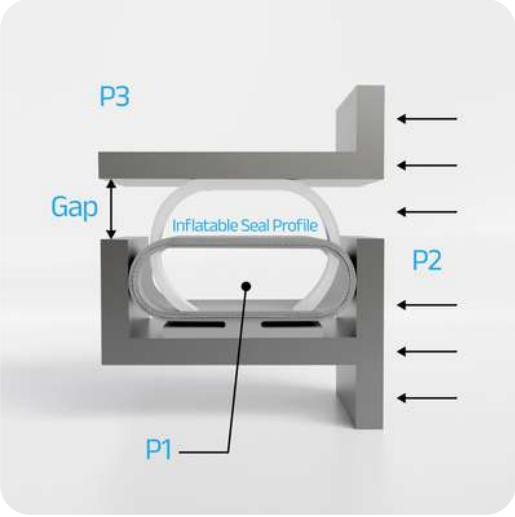
To ensure optimal performance, the inflation gap for inflatable seals should be minimized. For most inflatable seals, an ideal inflation gap falls between 4-5 mm, depending on the seal profile. Gaps that are too small can create installation challenges due to groove and seal tolerances affecting the fitment. Conversely, excessively large gaps can lead to increased wear and tear on the seal material, significantly reducing the seal's lifespan over time. By maintaining an optimal inflation gap, you can achieve a balance that maximizes both the ease of installation and the durability of the seal.

Media

Seal material is chosen based on the specific media in which the seal will operate. For a comprehensive guide on material selection, refer to the table on page 28, which details the available materials and their properties. This resource ensures that you can select the most suitable material for your application, considering factors such as chemical compatibility, temperature resistance, and mechanical strength. By choosing the right material, you enhance the seal's performance and longevity in its operating environment.

Optimal Inflation Pressure

For most non-reinforced inflatable seals, the optimum inflation pressure is up to 2 bar (28 PSI). Fabric-reinforced inflatable seals, however, can withstand pressures up to 12 bar (170 PSI). In special conditions, higher inflation pressures might be necessary, but this can negatively impact the seal's operational life, leading to increased replacement and downtime costs. Fortunately, more than 90 percent of inflatable seal applications can effectively function with pressures up to 2 bar, ensuring both efficiency and longevity in typical use scenarios.



The illustration shown here demonstrates a typical sealing application. Information required in order to determine the optimum seal pressure, and hence making the right profile choice.

Here,
Gap = Clearance between deflated and sealing surface
P1 = Inflation pressure
P2 = Pressure inside equipment
P3 = Outside (atmosphere)
Differential Pressure = P2-P3

As a general rule, inflation pressure i.e. P1 should be 0.1-0.13 MPa (1-1.37 bar) higher than the differential pressure. Let's take a look at the following examples to better understand this.

Example 1: If P2 = atmosphere (1 bar) and P3 = atmosphere (1 bar), then the pressure differential across the seal = 0 MPa (0 bar). In this case, it is recommended that the seal be inflated at 1 bar i.e. P1 should be 1 bar.

Example 2: If P2 = 0.15 MPa (1.5 bar) and P3 = atmosphere, then the pressure differential across the seal = 0.17 MPa (1.5 bar). It is recommended that the seal be inflated at pressures between 2.5 to 3 bar i.e. P1 should be 2.5 to 3 bar.

Temperature

Temperature ranges for inflatable seals are contingent upon the specific seal material employed, typically spanning from approximately -60°C to +300°C (-76°F to +482°F).

CLASSIFICATION OF INFLATABLE SEALS

1. BY MANUFACTURING / CONSTRUCTION

1.1 Non-Fabric Reinforced Construction

Exactseal's non-reinforced inflatable seals are crafted exclusively from elastomers. Typically, these seals are produced through extrusion, but they can also be molded to precise dimensions when required. Unlike fabric-reinforced inflatable seals, non-reinforced versions are not designed to endure extremely high internal pressures. However, they offer an excellent balance of quality and performance at a more affordable price, making them the preferred choice worldwide for standard sealing applications.

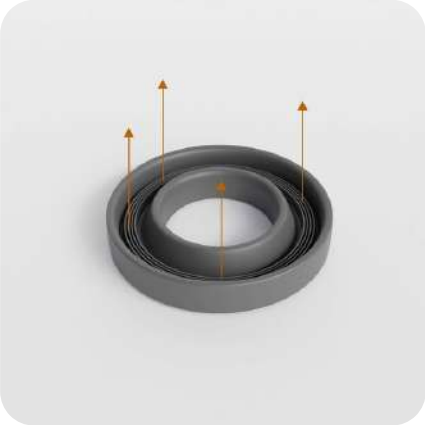
1.2 Fabric Reinforced Construction

For applications involving extreme pressure and temperatures or rugged environments like ocean beds, high-temperature furnaces, and nuclear plants, we recommend our molded, fabric-reinforced inflatable seals. The molding process ensures a seamless construction, while the fabric reinforcement significantly enhances the seal's strength and durability, resulting in an extended lifespan. These fabric-reinforced inflatable seals are manufactured through intricate processes that necessitate specialized tooling.

With decades of industrial experience, Exactseal has honed the tools and expertise needed to produce both standard and custom-engineered profiles. We meticulously mold fabrics within the seals with high precision, selecting the appropriate fabric based on the specific application requirements. Refer Page 34 for Fabric Comparison Chart

2. BY EXPANSION TYPE & DIRECTION

Exactseal's inflatable seals are designed to inflate and deflate in three fundamental directions of operation. Each of these directions has specific performance parameters, such as the height of inflation and the bend radius. These parameters ensure that the seals function optimally and can be tailored to meet various application needs.



2.1 Axial Inflatable Seals

Axial inflatable seals expand outward from a fixed centerline, creating a reliable face seal perpendicular to the centerline. They offer controlled expansion, adaptability to surfaces, and unwavering strength. These qualities make them ideal for applications requiring consistent sealing without sacrificing size or precision.

2.2 Radially Inward Inflatable Seals

Radially inward inflatable seals expand inward to create a tight seal against a surface, making them ideal for applications with limited space or curved surfaces. They offer precise sealing solutions without sacrificing space or maneuverability, commonly used in vacuum chambers, robotic arms, and holding devices.

2.3 Radially Outward Inflatable Seals

Radially outward inflatable seals use air pressure to create a tight, tailorable seal that fills gaps and conforms to uneven surfaces. They inflate from a central channel, adjusting the sealing force and adapting different gap sizes. These seals are versatile and commonly used in applications where flexibility and adaptability are essential.

3. BY GEOMETRY

Exactseal's inflatable seals can be tailored to nearly any shape or size to suit diverse application needs. Our advanced molding capabilities enable us to produce seals in a wide range of sizes and designs to meet specific client specifications. We produce custom inflatable rubber seal in various shapes and sizes. Broadly, we categorize them as circular, rectangle/square, straight, and U-shaped, depending on their use in final applications.

3.1 Circular Inflatable Seals are indispensable for sealing applications such as manhole covers, hopper seals, and industrial equipment like fluidized bed dryers and autoclaves, where circular dimensions are prevalent. We design these seals to provide a reliable and secure seal. They ensure containment and protection in environments where circular sealing solutions are essential.

3.2 Rectangular Inflatable Seals are widely utilized in sealing applications requiring precision and reliability, such as doors for clean rooms, nuclear facilities, and satellite testing facilities. Their rectangular structure offers optimal sealing performance, ensuring a tight and non-leaking seal in critical environments. Rectangular seals offer an effective solution for diverse sealing needs.

3.3 Inflatable Seals With Straight configurations are commonly employed in clamps and actuators, where precise sealing and consistent performance are paramount. Unlike other configurations, straight seals feature vulcanized ends that do not expand, ensuring a secure and stable seal. These come along with retention mechanisms, providing customers with complete sealing solutions tailored to their specific requirements.

3.4 U-shaped Inflatable Seals are favored for applications such as inflatable gate seals, where reliable sealing is essential for controlling fluid flow and preventing leaks. Featuring vulcanized ends, U-shaped seals offer improved stability and durability, ensuring long-lasting performance in demanding environments. Exactseal provides specialized retention mechanisms designed to complement U-shaped seals.

APPLICATIONS OF INFLATABLE SEALS

PHARMACEUTICAL

The pharmaceutical industry frequently uses inflatable seals because of their contamination-free sealing capabilities.

Inflatable Seals for Fluidized Bed Dryers

Fluidized Bed Dryers play a crucial role in ensuring the even drying of granules and powders intended for tablet production. Exactseal's inflatable seals are specifically designed to seal the chambers of FBD, preventing any contaminants from entering the system or any Active Pharmaceutical Ingredient (API) from leaking out. This is essential to avoid potential health risks for end consumers and machine operators.

The latest inflatable seal designs are capable of withstanding both positive and negative differential pressure. In fact, Exactseal has gone a step further by creating explosion-proof inflatable seals suitable for 12 bar Fluidized Bed Dryers.

Inflatable seals for Air Tight Doors

Cleanrooms are designed to regulate the level of airborne particles and reduce the risk of contaminants entering. Exactseal produces specialized inflatable seals that provide a completely airtight seal for cleanroom doors, also referred to as Air Tight Doors.

MEGA FACTORIES

In today's era of continuous automation, the demand for efficient and precise machinery is crucial. Robotic equipment can be specifically designed to surpass human capabilities, excelling in tasks such as lifting heavy loads, transporting bulky items, quick processing, ensuring complete accuracy, and operating non-stop.

Inflatable Robotic Clamps

Exactseal possesses the necessary knowledge and skills to create personalized inflatable seals that are specifically engineered for installation on robotic arms.

These seals are designed to accommodate clamps that are integrated within them. When lifting an object, the seal inflates, enabling the clamping of the item securely. Once a strong grip is established, the object can then be safely transported to its intended destination.

AEROSPACE

Rubber parts are commonly employed in the aerospace field because of their sealing properties and ability to endure high temperatures, rendering them the top choice for aerospace and aviation sectors.

Inflatable Seal for Satellite Transportation Systems (STS)

Exactseal provides its specially designed inflatable seals for installation within the suspension cradle of the Satellite Transportation Systems. These systems play a crucial role in safeguarding the satellite from various environmental hazards that may arise during transportation. The primary function of the inflatable seal is to minimize the impact of shocks, vibrations, and handling loads, all while ensuring a contamination-free environment.

Inflatable Seal for Vibration Testing Room

Exactseal produces meticulously engineered inflatable seals that have a crucial function in ensuring airtightness in the vibration testing facility for satellites. This is of utmost significance as the testing process involves the generation of high-frequency sound waves, which, if leaked, could potentially pose severe health risks to both humans and the surrounding ecosystem.

Inflatable Seal for Aircraft Hangars

Aircraft hangars must possess substantial size and utmost security to safeguard the planes against adverse weather conditions and potential harm from various external factors such as dust, debris, rodents, birds, and more. Exactseal's tailor-made inflatable seals, designed with precision, provide impeccable dust-proof sealing on every side of the hangar door, effectively addressing these concerns.

Inflatable Seal for Aircraft Canopies

Airplanes maintain cabin pressure by utilizing cooled and filtered air from the engines to match the altitude of the flight, ensuring unobstructed breathing for all passengers. The aircraft doors are securely sealed with Exactseal's inflatable seals, which expand outward around the door's perimeter.

TRANSPORTATION

Transportation plays a significant role in our everyday lives, encompassing various modes such as automobiles, water vessels, railways, and planes. Within the transportation sector, rubber seals find wide-ranging applications.

Inflatable Seals for Railway Doors

Exactseal's inflatable seals are utilized for sealing sliding doors in passenger railcars to prevent the entry of undesired elements, all the while improving passenger comfort and safety. In addition to providing a barrier against moisture, these inflatable seals aid in dampening vibrations and enhancing sound absorption, all while adhering to regulations and standards for flame, smoke, and toxicity. Furthermore, we have formulated compounds that meet EN45545R22/23 HL3 standards.

BULK MATERIAL HANDLING

Bulk materials may exist in various forms such as powdery, granular, lumpy, abrasive, or viscous, making their handling intricate. This complexity is further heightened in industrial settings where any leakage of such materials is unacceptable. Therefore, there is a crucial requirement for efficient sealing in bulk material handling processes.

Inflatable Seals for Butterfly Valves

Exactseal's inflatable seals are well-suited for butterfly valves. Butterfly valves are commonly employed in fluid handling systems that handle highly abrasive materials, slurries, and more, in order to control or halt the flow of materials, typically for maintenance or safety reasons.

OVENS & FURNACES

Industrial ovens and furnaces are highly sought after for heat processing functions in various industries. The effectiveness of these ovens greatly relies on the design and efficiency of their sealing.

Inflatable Seals for Oven/Furnace Doors

Exactseal's inflatable seals are essential for optimizing furnace efficiency by reducing heat and emissions. Given the extreme temperatures at which furnaces operate, any heat loss translates to energy loss, resulting in increased costs and potential health and environmental risks.

PAPER INDUSTRY

The daily lives of individuals have been enriched by the pulp and paper industry. As the demand for environmentally friendly paper and production methods continues to grow, there is an increasing requirement for advanced equipment technology.

Inflatable Seals for Doctor Blades

During the milling process, doctor blades have various functions, including removing water, eliminating contaminants from the roll, and inking the sheet. Exactseal's inflatable seals ensure consistent contact pressure along the entire length of the doctor blade, even in cases where the length can reach up to 50 feet.

NUCLEAR

The utilization of elastomers in the nuclear power sector is extensive, particularly in sealing applications like airtight doors, covers, liners, and vibration dampeners. It is imperative to acknowledge that this industry is accompanied by various environmental and health risks, which can be effectively managed by adhering to the prescribed regulations and guidelines.

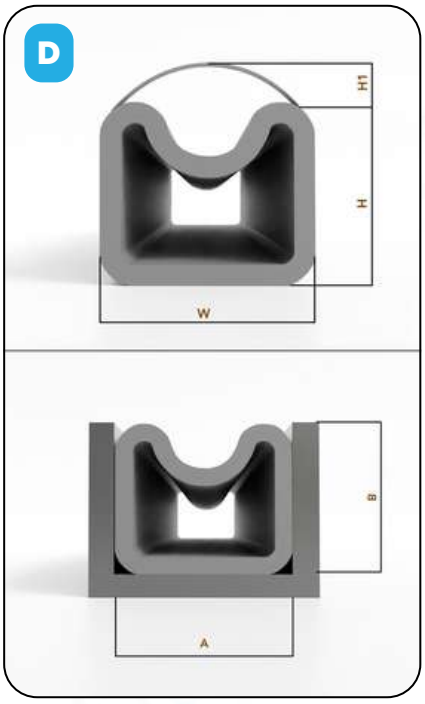
Inflatable Seals for Nuclear Containment Facility

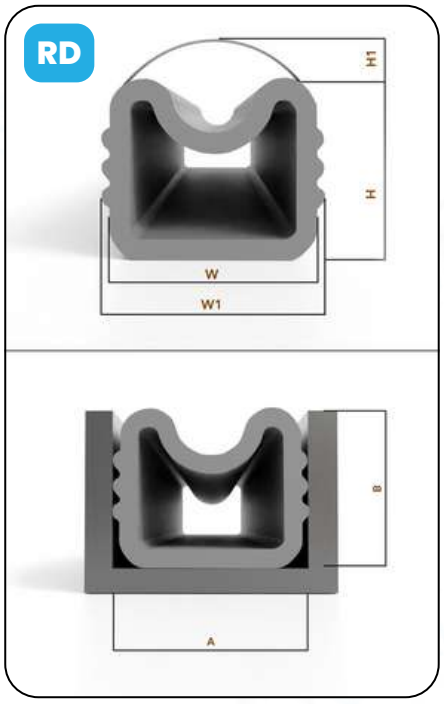
Exactseal's inflatable seals provide a completely leak-proof seal for doors within nuclear containment facilities. Once the door is closed, these seals inflate to effectively seal the space between the door and its frame, ensuring that no contaminants can enter the room and no hazardous particles can escape.

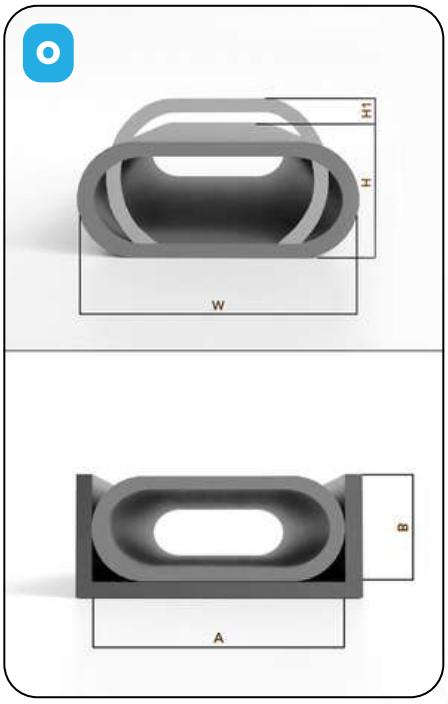
TYPE 1: FOOTLESS SEALS

The Footless Seal represents one of the simplest configurations available. Unlike other designs, it lacks foot-like structures for clamping and retention purposes. Its straightforward design and easy installation make it a popular choice, accounting for approximately 60-70% of inflatable seal fabrications. While capable of withstanding moderate pressures, for applications requiring higher inflation pressures, Type B Footless Seals, which are reinforced with fabric, are utilized for added durability and resilience.

TYPE 1A: NON-FABRIC REINFORCED CONSTRUCTION

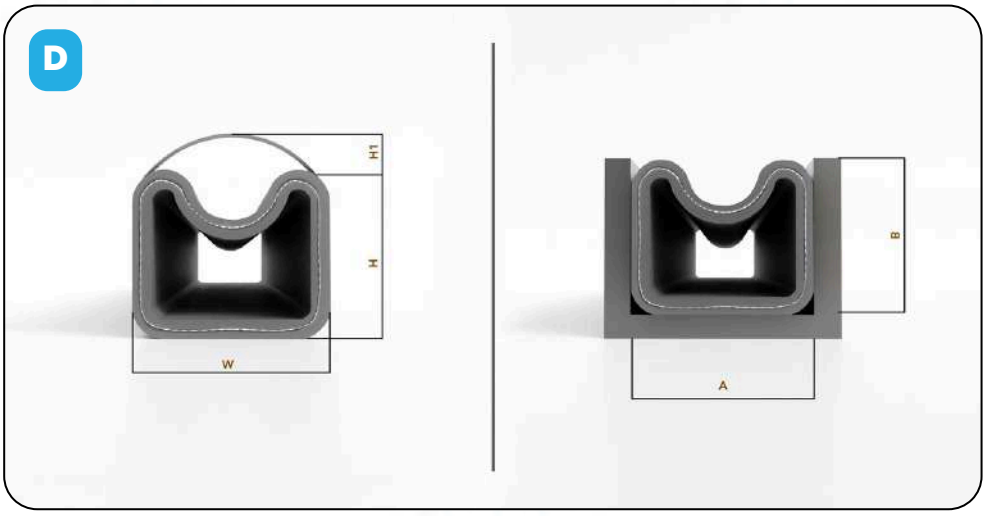


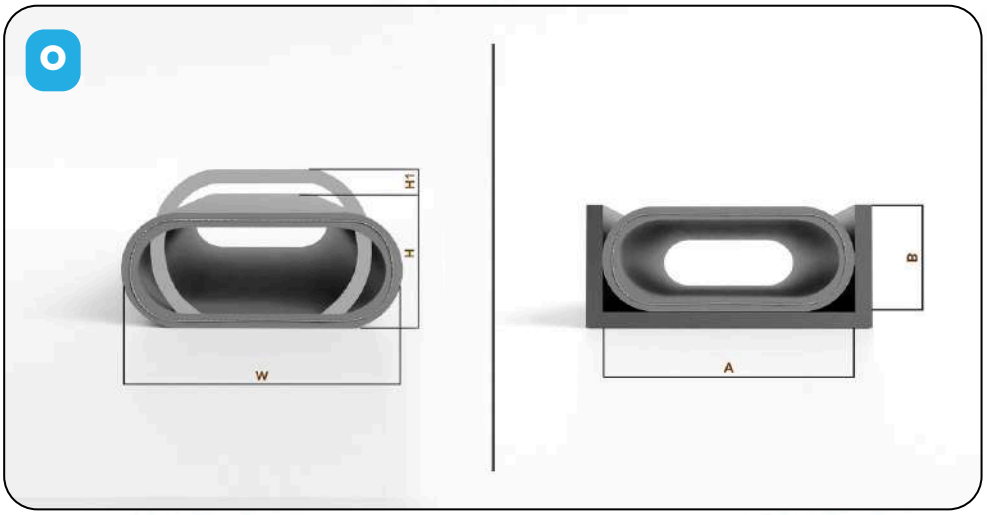




PROFILE CODE	TYPE	W (mm)	H (mm)	W1 (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
							A	B
EXS-INF-1A25	D	12.7	12.7	-	6.35	29	13.7	13.5
EXS-INF-1A06	D	15	15	-	7.5	29	16	15.8
EXS-INF-1A26	D	23.6	19	-	9.5	43.51	24.8	20
EXS-INF-1A16	D	35	32	-	16	43.51	36.5	33.3
EXS-INF-1A27	D	63.5	50	-	25.4	43.5	65.7	51.6
EXS-INF-1A28	RD	17	16	20	8	29	18.2	16.8
EXS-INF-1A29	RD	25.4	19	27.4	9.5	43.51	26.6	20
EXS-INF-1A18	O	19.1	6.4	-	4.8	14.5	20.3	7.1
EXS-INF-1A19	O	31.8	9.6	-	9.6	29	33.3	10.3
EXS-INF-1A20	O	38.1	12.7	-	11.2	29	39.6	13.5
EXS-INF-1A21	O	50.8	12.7	-	19.1	29	52.6	13.5
EXS-INF-1A30	O	76.2	19	-	25.4	43.51	78.4	20

TYPE 1B: FABRIC-REINFORCED CONSTRUCTION





PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-1B16	D	63.5	50	25.4	145.04	65.7	51.6
EXS-INF-1B01	O	19.6	9.6	3.2	87.02	20.8	10.3
EXS-INF-1B04	O	38.1	12.7	12.7	87.02	39.6	13.5
EXS-INF-1B14	O	76.2	19	31.8	145.04	78.4	20
EXS-INF-1B07	O	101.6	25.4	44.5	145.04	103.8	26.7

RETENTION SYSTEMS

Adhesive/Tape

To ensure seals expanding axially or radially inward remain securely in place within the groove channel, they can be bonded to the channel's bottom using adhesives, glue, or double-sided tape.

Tight Fit

Exactseal engineers expertly secure outward-expanding seals by under sizing them, leveraging rubber's elasticity for a snug fit. Our precise approach ensures reliable performance across various applications, reflecting our commitment to quality engineering. This strategy underscores our dedication to ensuring optimal functionality and durability.

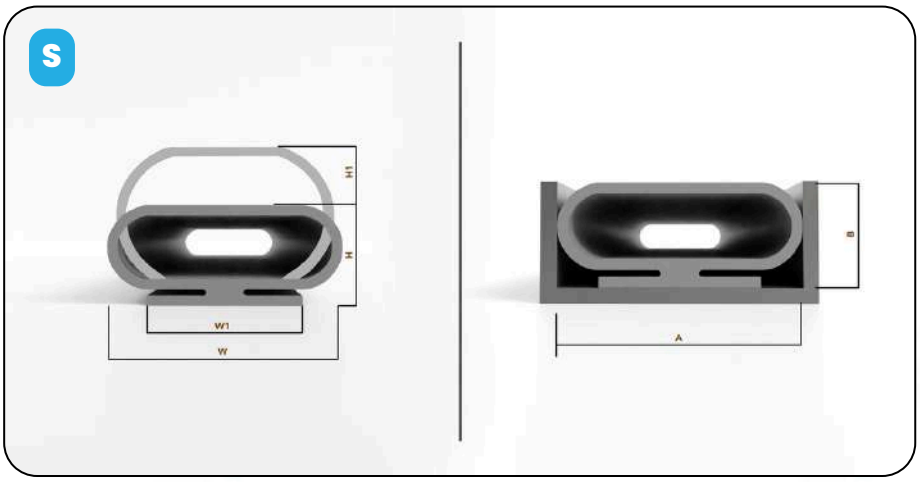
Ribs

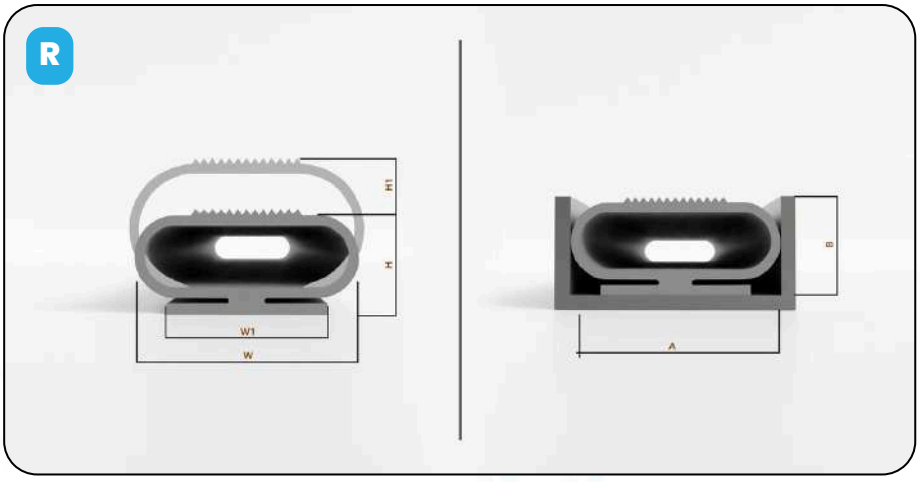
In specific scenarios, seals are crafted with ridges along the outer side of the side walls. These ridges provide enhanced friction, effectively gripping the seal tightly within the groove channel.

TYPE 2: FASTEN-IN SEALS

Fasten-In Seals feature foot-like structures designed to clamp the seal securely in slots or grooves below. These footed seal profiles are popular for their ease of retention and their capability to fully expand and round out when inflated.

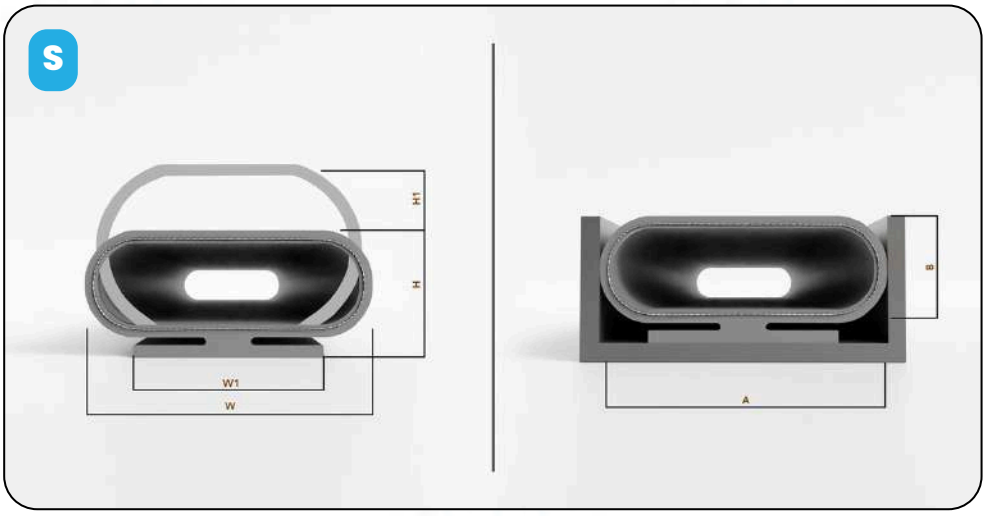
TYPE 2A: NON-REINFORCED CONSTRUCTION





PROFILE CODE	TYPE	W (mm)	H (mm)	W1 (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
							A	B
EXS-INF-2A01	S	17.5	11.1	14	3.2	21.76	18.7	11.9
EXS-INF-2A02	S	25.4	12.7	19.1	6.5	29	26.9	13.5
EXS-INF-2A03	S	31.8	16	25.4	9.6	43.51	33.3	16.8
EXS-INF-2A04	S	50.8	22.3	44.5	19.1	43.51	52.6	23.3
EXS-INF-2A05	S	76.2	31.8	50.8	25.4	43.51	78.4	33.1
EXS-INF-2A10	S	101.6	41.4	82.5	44.4	43.51	103.8	43
EXS-INF-2A06	R	30	20	24	8	43.51	31.5	21
EXS-INF-2A07	R	39.7	25.4	33.1	11.2	43.51	41.2	26.7
EXS-INF-2A08	R	60.4	35	45.3	20.7	43.51	62.2	36.3

TYPE 2B: FABRIC-REINFORCED CONSTRUCTION

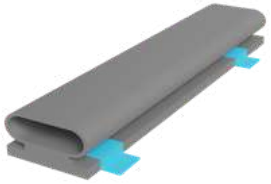


PROFILE CODE	TYPE	W (mm)	H (mm)	W1 (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
							A	B
EXS-INF-2B10	S	25.4	12.7	19.1	8	87.02	26.9	13.5
EXS-INF-2B11	S	31.8	16	25.4	9.6	145.03	33.3	16.8
EXS-INF-2B12	S	50.8	22.3	44.5	19.1	145.03	52.6	23.3
EXS-INF-2B13	S	76.2	31.8	50.8	31.8	145.03	78.4	33.1

RETENTION SYSTEMS

U-Channel with Side Pins

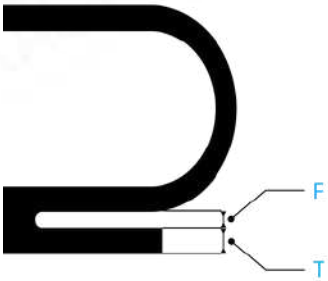
The seal is mounted in an extruded channel, with footed seals being held in place by pins inserted through the channel into the seal flanges, offering extra stability and ensuring a secure fit.



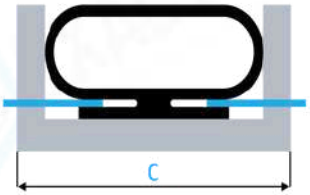
Z-Clamps

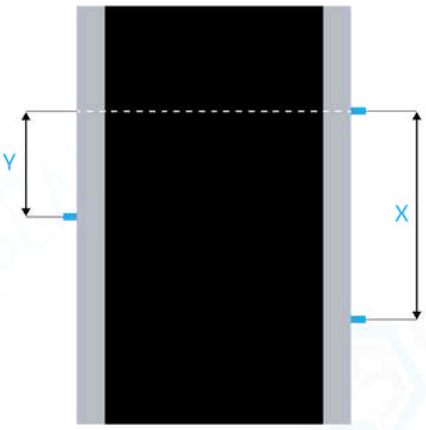
Stainless steel Z Clamps are affixed along the seal at regular intervals, securely fastening the seal in place through this mechanism.

RETENTION SYSTEM MEASUREMENTS

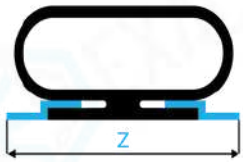


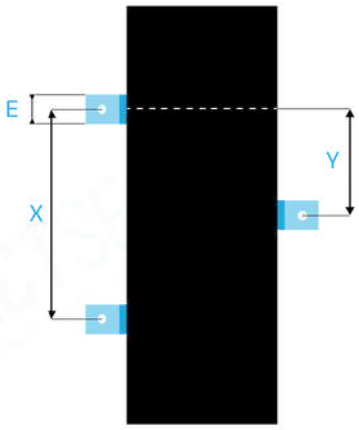
Foot Thickness & Gap





U-Channel with side pins





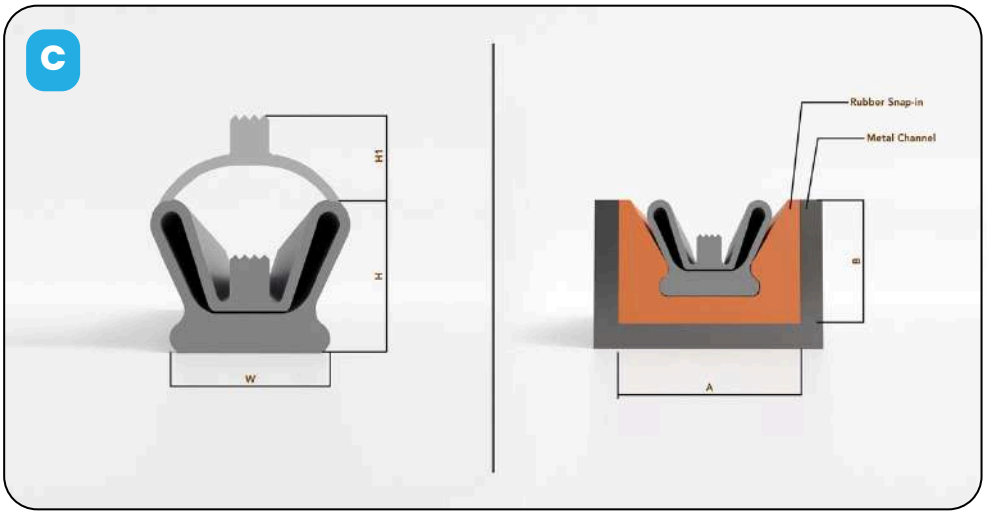
Z-Clamp Retention

PROFILE CODE	FOOT THICKNESS (T) (mm)	GAP ABOVE FOOT (F) (mm)	X (mm)	Y (mm)	U-CHANNEL WIDTH (C) (mm)	OPEN INSTALLATION Z-CLAMP (mm)	
						Z-CLAMP WIDTH (Z)	Z-CLAMP WIDTH (E)
EXS-INF-2A01	3	3	101.6	50.8	25.4	40	9.5
EXS-INF-2A02	3	2	127	63.5	38.1	44.4	9.5
EXS-INF-2A03	3.5	2.5	152.4	76.2	38.1	54	9.5
EXS-INF-2A04	6.35	5.35	254	127	76.2	76.2	12.7
EXS-INF-2A05	7.5	6.5	381	190.5	101.6	85.7	12.7
EXS-INF-2A10	8	7	508	254	127	124	15.88
EXS-INF-2A06	3.5	2.5	152.4	76.2	38.1	54	9.5
EXS-INF-2A07	4.8	3.8	254	127	76.2	76.2	12.7
EXS-INF-2A08	6.5	5.5	381	190.5	101.6	85.7	12.7
EXS-INF-2B10	3	2	127	63.5	38.1	44.4	9.5
EXS-INF-2B11	3.5	2.5	152.4	76.2	38.1	54	9.5
EXS-INF-2B12	6.35	5.35	254	127	76.2	76.2	12.7
EXS-INF-2B13	7.5	6.5	381	190.5	101.6	85.7	12.7

TYPE 3: SNAP-IN SEALS

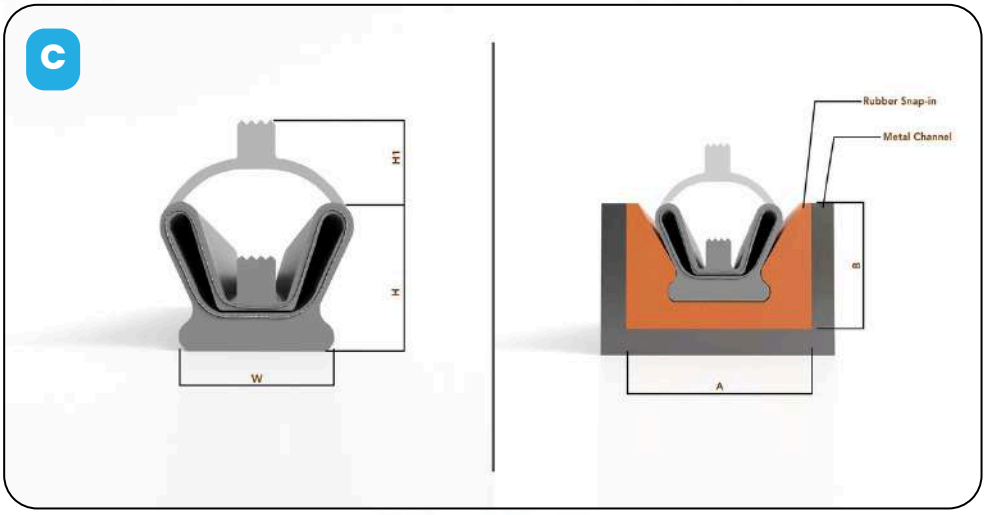
Snap-In Seals are ideal for applications requiring sealing of large inflation gaps, particularly with crown-type configurations. These profiles are designed for axial or radial outward expansion but are not recommended for inward expansion. They are the preferred choice for straight seals.

TYPE 3A: NON-REINFORCED CONSTRUCTION



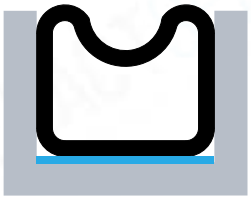
PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-3A01	C	15.9	12.7	9.53	21.76	23.9	18.7
EXS-INF-3A08	C	17.5	12.7	9.53	29.01	25.5	18.7
EXS-INF-3A02	C	25.4	16	12.7	29.01	33.4	22
EXS-INF-3A09	C	38.1	18.2	15	43.51	46.1	24.2
EXS-INF-3A03	C	50.8	31	28	43.51	58.8	37

TYPE 3B: FABRIC-REINFORCED CONSTRUCTION



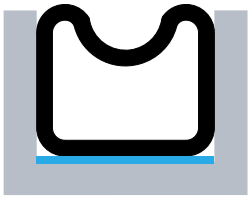
PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-3B05	C	17.6	12.7	11.1	87.02	25.6	18.7
EXS-INF-3B18	C	25.4	16	14.8	87.02	33.4	22
EXS-INF-3B09	C	44.5	30.5	29	145.04	52.5	36.5

RETENTION SYSTEM



Plastic/Metal Retainer

Type 3 seals are designed to snap into plastic or metallic retainers. Plastic retainers are extruded as a single unit, whereas metal retainers are produced in three separate pieces and assembled with bolting pins. The seal is then securely snapped into these retainers.



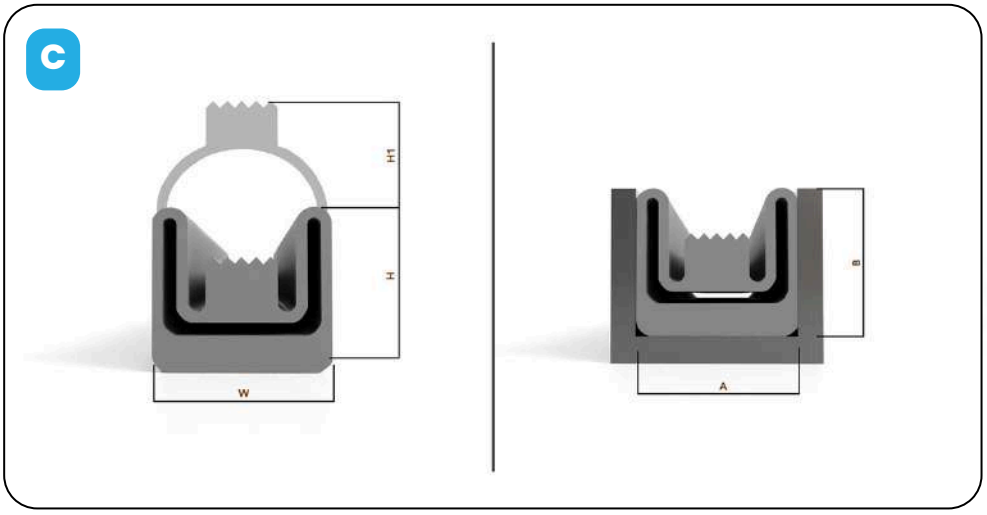
Snap-In (Rubber Retainer)

The seal is snapped into an extruded rubber retainer, which is firmly held within a channel or supported on its sides.

TYPE 4: BONDED BOTTOM SEALS

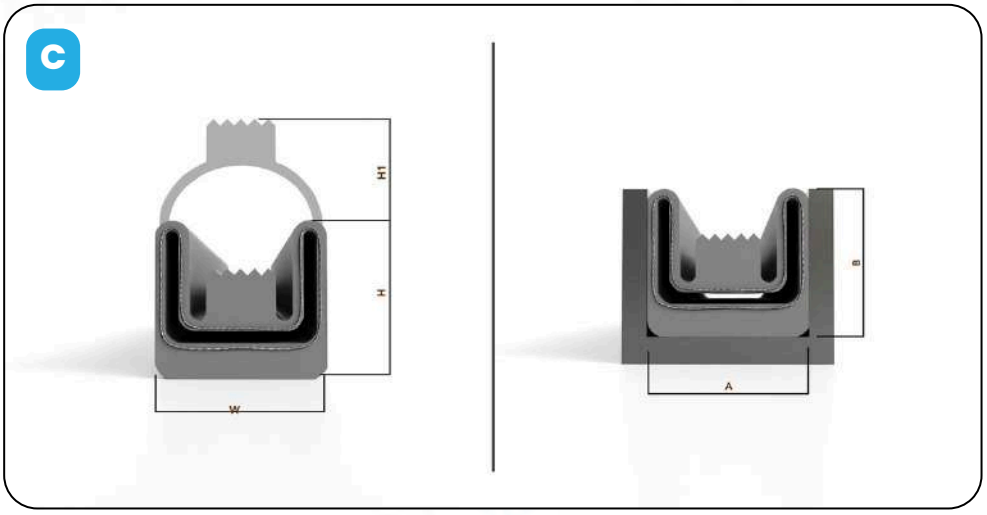
These seals lack a base structure for retention and are instead bonded at the bottom within a square channel. They can cover larger seal gaps compared to other profiles and can inflate up to 90-100% of their original height.

TYPE 4A: NON-REINFORCED CONSTRUCTION



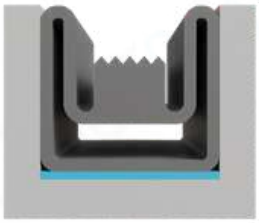
PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-4A01	C	13.72	11.17	9.53	21.76	14.72	11.97
EXS-INF-4A02	C	16.66	11.1	11.13	21.76	17.86	11.9
EXS-INF-4A03	C	25	25	23.8	43.51	26.2	26
EXS-INF-4A04	C	35	32	30	43.51	36.5	33.3
EXS-INF-4A05	C	50.8	38.1	35	43.51	52.6	39.4

TYPE 4B: FABRIC-REINFORCED CONSTRUCTION



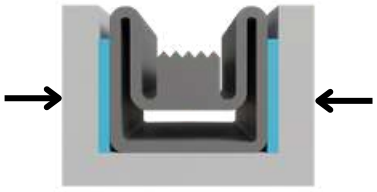
PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-4B13	C	16.66	11.1	11.13	87.02	17.86	11.9
EXS-INF-4B14	C	25	25	23.8	87.02	26.2	26
EXS-INF-4B15	C	50.86	38.1	35	145.04	52.5	39.4

RETENTION SYSTEM



Adhesive/Tape

Axially and Radially inward expanding seals can be retained within the groove channel by having their bottoms bonded with adhesive, glue, or double-sided tape.

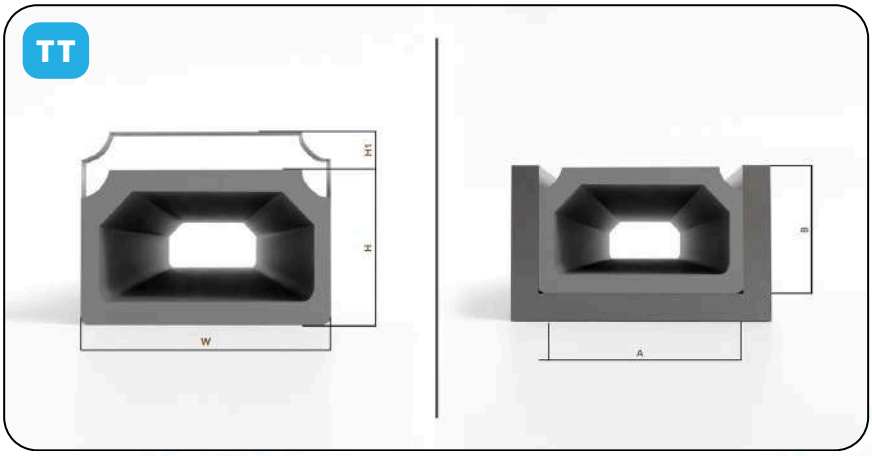


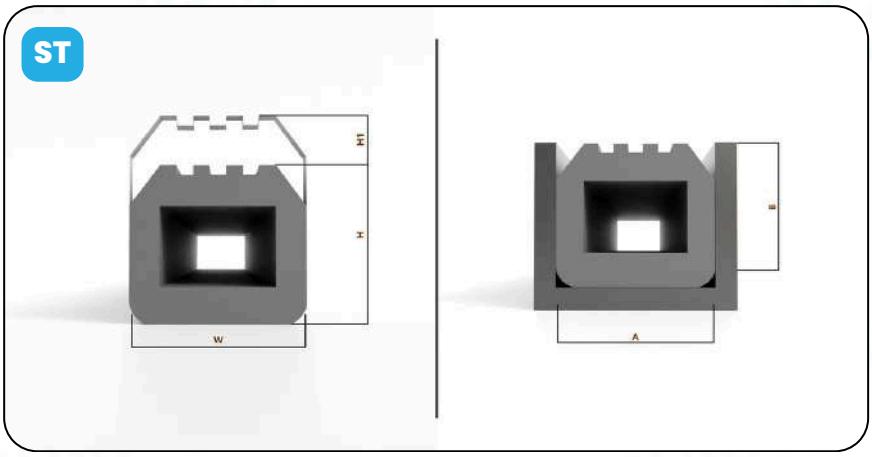
Tight Fit

Radially outwards expanding seals can be retained within groove by being made slightly shorter than the required length, effectively undersizing the seal. Due to the elastomeric properties of rubber, the undersized seal will stretch to fit tightly inside the groove channel. At Exactseal, engineers possess the expertise to determine the precise proportion for undersizing the seal.

TYPE 5: SLOT-FIT SQUARE SEALS

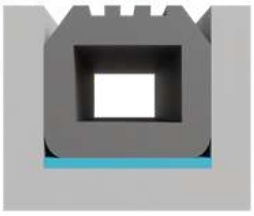
Slot Fit Square Seals are ideal for heavy-duty lifting or gripping applications. Their design offers increased seal life, making them suitable for uses with frequent inflation and deflation cycles. Thanks to their rigid walls, these seals can withstand higher pressures than other non-reinforced seals.





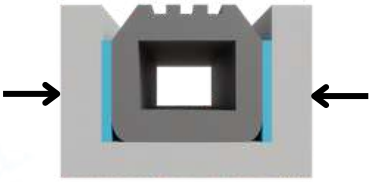
PROFILE CODE	TYPE	W (mm)	H (mm)	H1 (mm)	MAX. INTERVAL PRESSURE (psi)	U CHANNEL (mm)	
						A	B
EXS-INF-501	TT	7	5	1.25	14.50	7.9	5.35
EXS-INF-502	TT	14.5	11	2.75	21.76	15.5	11.5
EXS-INF-527	TT	35	32	10	87.02	36.5	32.8
EXS-INF-528	ST	14	10	2.5	29.01	15	10.4
EXS-INF-504	ST	16	12	3	29.01	17	12.5
EXS-INF-505	ST	18	17	4.25	43.51	19.2	17.7
EXS-INF-529	ST	23	20	5	43.51	24.2	20.7
EXS-INF-522	ST	25	12	3	43.51	26.2	12.5
EXS-INF-526	ST	26	22	6.5	87.02	27	23
EXS-INF-510	ST	30	30	7.5	87.02	31.5	30.8
EXS-INF-511	ST	35	32	8	87.02	36.5	32.8
EXS-INF-521	ST	40	22	5.5	87.02	41.5	22.7
EXS-INF-523	ST	50	20	5	87.02	51.8	20.7

RETENTION SYSTEMS



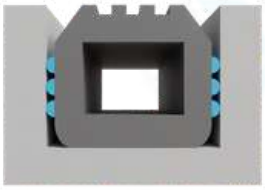
Adhesive/Tape

To ensure seals expanding axially or radially inward remain securely in place within the groove channel, they can be bonded to the channel's bottom using adhesives, glue, or double-sided tape.



Tight Fit

Exactseal engineers expertly secure outward-expanding seals by under sizing them, leveraging rubber's elasticity for a snug fit. Our precise approach ensures reliable performance across various applications, reflecting our commitment to quality engineering. This strategy underscores our dedication to ensuring optimal functionality and durability.



Ribs

In specific scenarios, seals are crafted with ridges along the outer side of the side walls. These ridges provide enhanced friction, effectively gripping the seal tightly within the groove channel.

NOTES

Recommended Inflation Gap

Inflation gap recommendations are based on optimal sealing conditions. For effective sealing, the gap should be adjusted according to the specific application and environment. For more details, contact us at info@exactseal.com

Max. Internal Pressure

Seals must be pressurized only in closed (supported) conditions. Lower sealing pressure extends the operational life of the seal.

Materials

Our all standard profile are available in EPDM and Silicone. We also manufacture our inflatable Seals in other materials* like, Nitrile (Buna N), FKM (Viton), Neoprene, Natural Rubber, etc.
*Additional tooling and design charges will be applicable for the same.

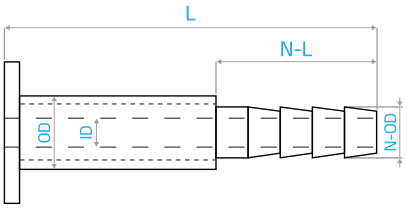
Need more Technical Info?

For more details of profile, visit www.exactseal.com/portfolio/inflatable-rubber-seals/ or simply reach out to us by mailing us at info@exactseal.com or calling us at +1 (317) 559-2220.

AIR CONNECTORS

AC 1

Threaded
With Nipple

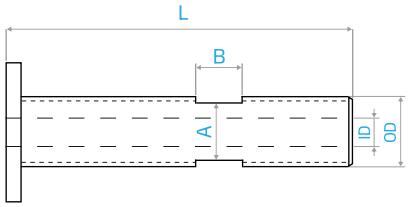


All Dimensions in mm

AC CODE	OUTER DIAMETER (OD)	INNER DIAMETER (ID)	NIPPLE LENGTH	NIPPLE OD	LENGTH
EXS-AC1F	M4	1.5	8	2.7	20
EXS-AC1A	M6	2.0	12	4	30
EXS-AC1B	M8	3.4	16	6	40
EXS-AC1D	M12	5.2	20	10	50

AC 2

Simple
Threaded
With Slot

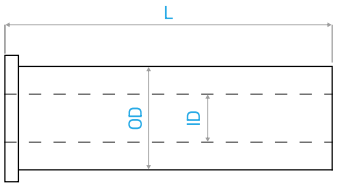


All Dimensions in mm

AC CODE	OUTER DIAMETER (OD)	INNER DIAMETER (ID)	SLOT WRENCH (AXB)	LENGTH
EXS-AC2A	M4	1.5	3 x 4	20
EXS-AC2B	M6	3.4	5 x 6	30
EXS-AC2C	M8	3.4	6 x 8	40
EXS-AC2E	M12	5.2	10 x 12	50

AC 4

Threaded
With Nipple

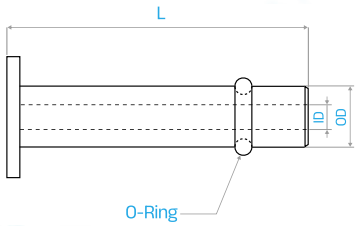


All Dimensions in mm

AC CODE	OUTER DIAMETER (OD)	INNER DIAMETER (ID)	LENGTH
EXS-AC4A	8	3	Minimum Length: 200mm (In multiple of 100)
EXS-AC4B	12	6	
EXS-AC4C	16	9	

AC 5

O-Ring
Nozzle



All Dimensions in mm

AC CODE	OUTER DIAMETER (OD)	INNER DIAMETER (ID)	Z	METRIC O-RING	LENGTH
EXS-AC5G	3.8	1.5	2	0.8 x 2.7	20
EXS-AC5H	5.8	2.5	3	1.27 x 3.91	30
EXS-AC5I	7.8	3.4	4	1.5 x 5.5	40
EXS-AC5J	11.8	5.2	6	1.9 x 8.7	50

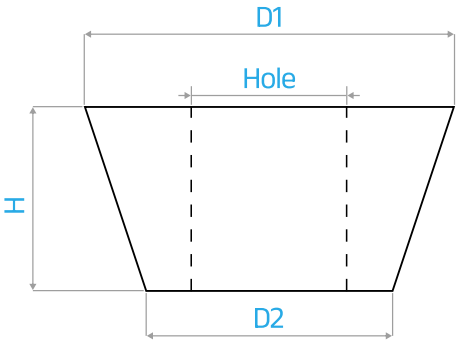
END CONNECTORS

Male-Fit Connectors

Female-Fir Connectors

THREAD TYPE	
METRIC	BSPP
SIZES	
M6	1/8"
M8	1/4"

CONE DIMENSIONS



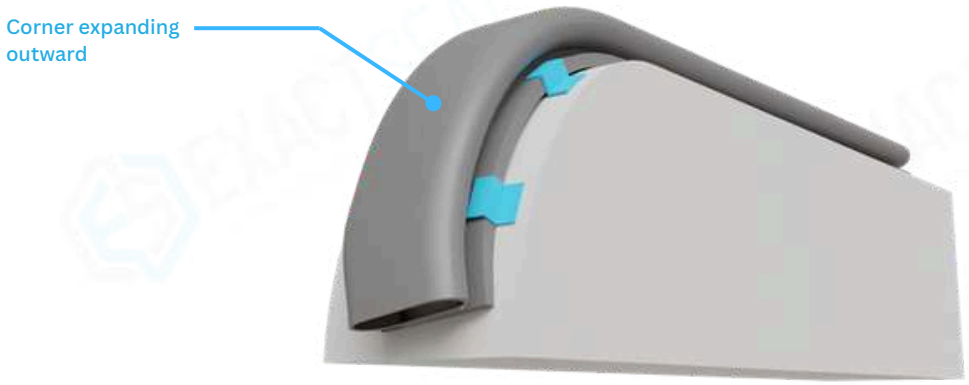
All Dimensions in mm

HOLE	D1	D2	H
4	6	5	3
6	12	10	6
8	14	12	6
12	24	16	10

TECHNICAL DATA ON CORNER RADIUS

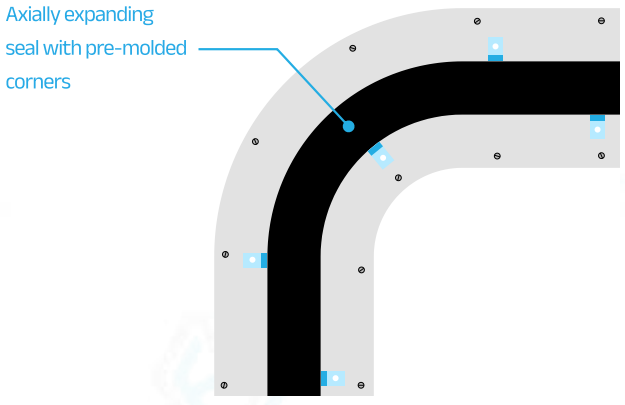
CORNER RADIUS FOR RADIAL EXPANSION

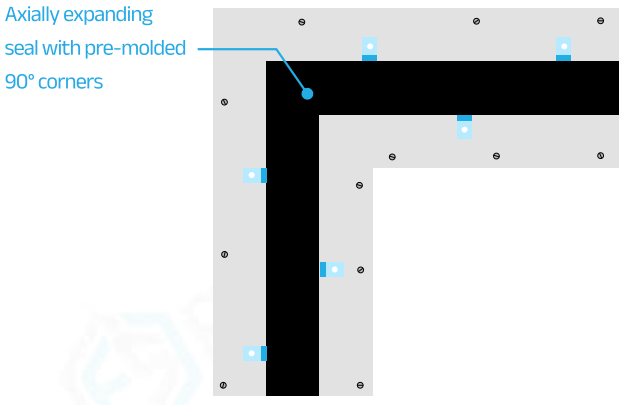
Depending on the cross section of the seal profile, Exactseal's non-reinforced or fabric-reinforced inflatable seals designed for radially outward expansion can typically operate with a minimum corner radius of four to eight times their relaxed height. However, expansion at the corners will be somewhat restricted unless the corner radius is made more generous. Expansion is further restricted when the seal is designed for radially inward expansion. If possible, seals should be designed for radially outward expansion. Right-angled corners are not available for radially expanding seals.



CORNER RADIUS FOR AXIAL EXPANSIONS

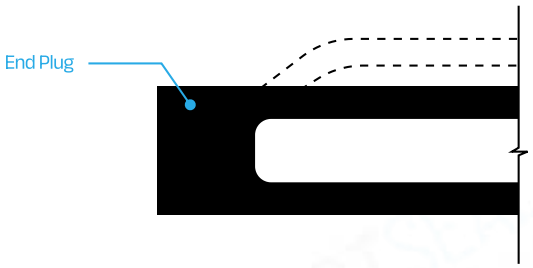
It is possible to form or pre-mold inflatable seal corners that have a radius of approximately twice the cross section width for seals that expand axially. With larger corner radii, circular seals with a single join can be comfortably installed in seal grooves. Corner radiuses of 90° are required only for certain profiles. It is not recommended by Exactseal because the seal's weakest part is subjected to increased strain. However, a seal with 90° corner radii can be custom manufactured if necessary.





END PLUGS AND CLAMPING

Inflatable seals manufactured in a linear fashion must be sealed at the ends if they are not produced in a closed geometric shape. These seals come with vulcanized blocks or 'End Plugs' on both ends, which are not inflatable. Typically, the end plugs are included in the deflated state of the profile. If you need the end plugs to be provided in the inflated state of the seal, please get in touch with one of our sales engineers. Please note that there will be additional tooling and fabrication charges for this customization.



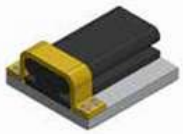
Side Section View

3D View

The end clamping mechanism is utilized for straight seals, with pressure plates being bolted to alleviate stress on the seal ends.

Single Screw Pressure Plate

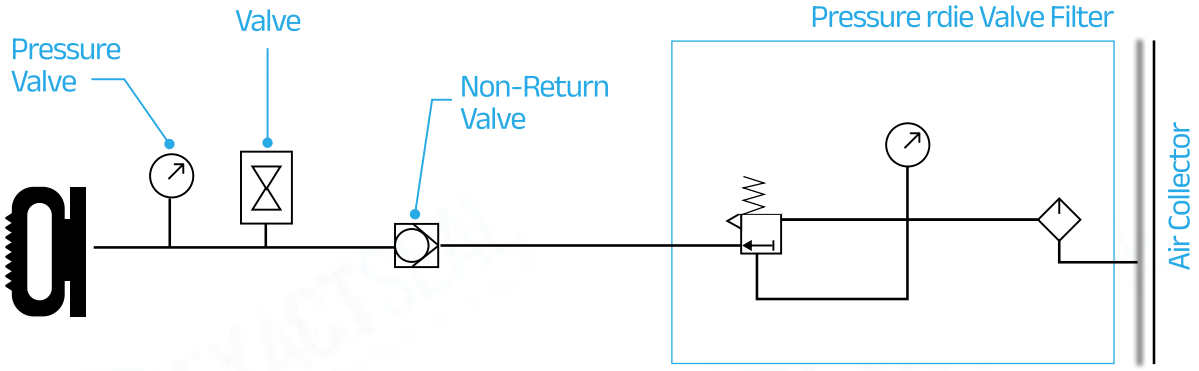
Double Screw Pressure Plate



Fixed Pressure Plate

PRESSURE SUPPLY

Exactseal offers Inflatable Seals that can be easily inflated using air, gas, or fluids. However, it is crucial to ensure a constant supply of inflation, which can be achieved by utilizing a pressure regulator to prevent over-pressure. In the case of elastomers, particularly silicone, which have a relative permeability when inflated with air or gas, it becomes essential to regulate the pressure for this type of inflation. Alternatively, fluids such as water or oil can be employed to prevent gas permeability in elastomers.



FABRIC COMPARISION

Fabric reinforced seals are employed in applications with extreme pressure and temperature conditions. The inclusion of fabric reinforcement significantly enhances the overall strength of the seal. Skilled labor meticulously molds the fabrics into the inflatable seal using specialized processes.

Each fabric possesses unique properties, necessitating a thorough analysis by our production engineers to determine the most suitable fabric for optimal seal performance. Certain fabrics may have limitations concerning the thickness that can be utilized within the seal, the temperature it can endure during operation, and other factors. Exactseal manufactures Fabric Reinforced seals with following fabrics.

NYLON

Nylon, a widely utilized fabric in our inflatable seals, is renowned for its durability and resistance to abrasion. Its strength and flexibility contribute to the seals' exceptional dynamic characteristics. Moreover, nylon exhibits remarkable heat resistance, withstanding temperatures of up to 250 °F.

DACRON®

Dacron demonstrates excellent tensile characteristics, making it the top choice for situations that demand high flexibility. Due to its chemical inertness, it provides strong protection against deterioration caused by chemical bleaches and abrasion. Dacron proves to be particularly efficient in scenarios with temperatures exceeding 250°F (120°C).

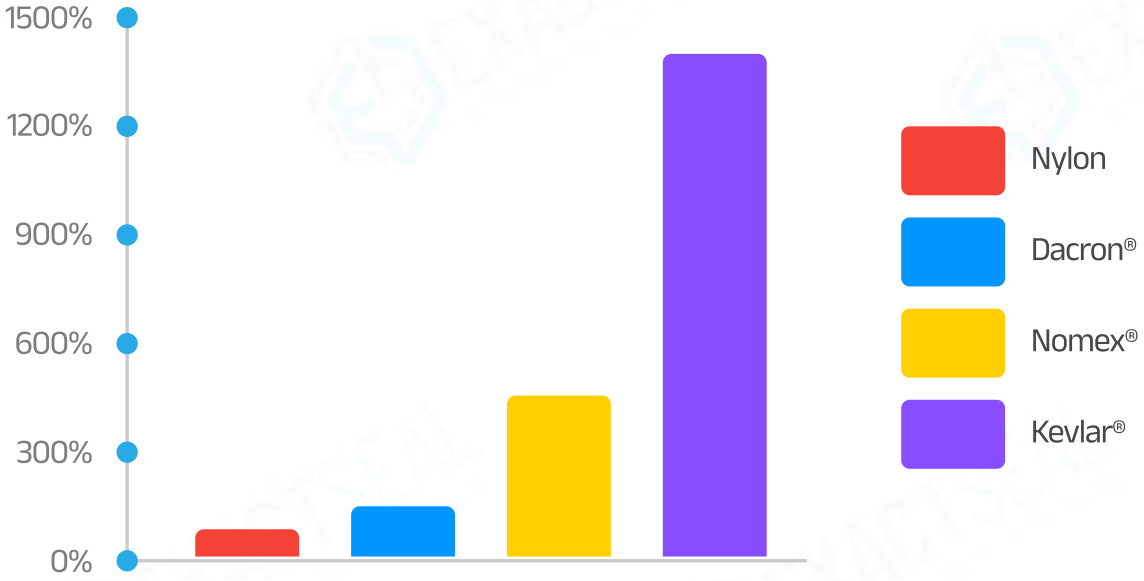
NOMEX®

Nomex surpasses Dacron in terms of its temperature and chemical resistant characteristics. Nomex items are durable, tough, and (in thinner variations) pliable, exhibiting excellent resistance to tearing and abrasion. It is available in fiber and sheet formats, commonly utilized as a textile in applications necessitating protection from heat and flames. Nomex can withstand temperatures of up to 450°F.

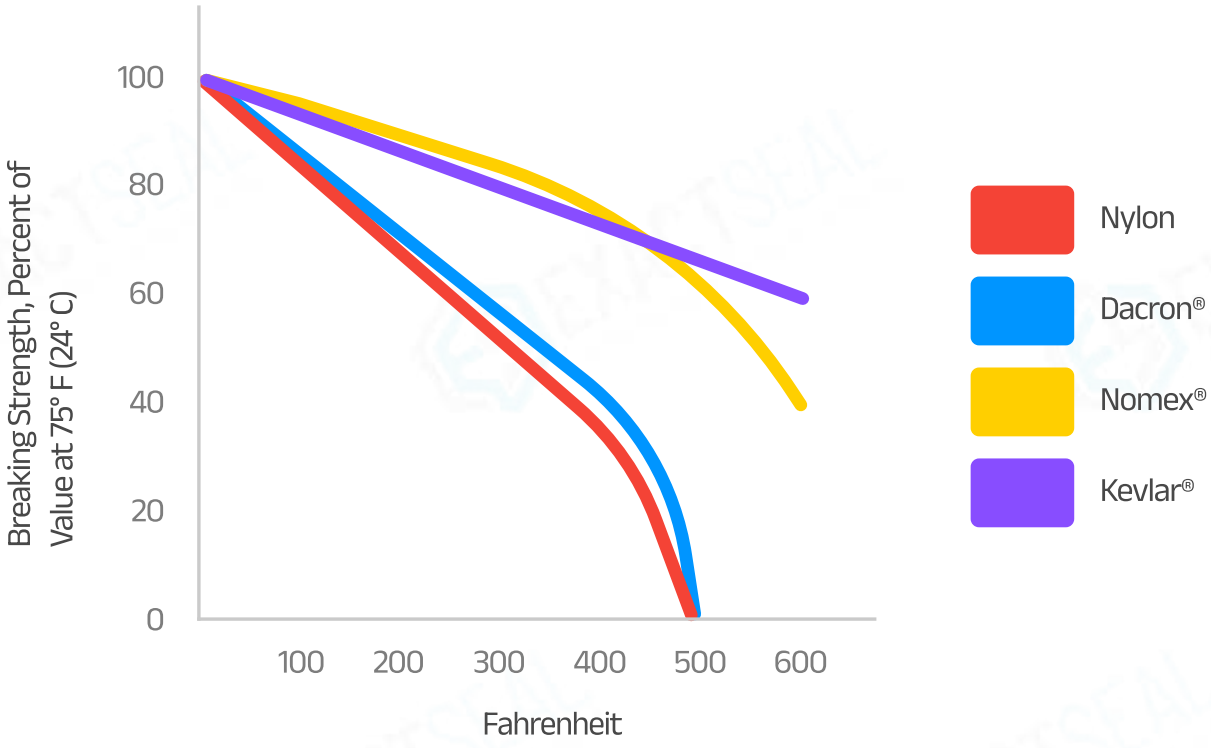
KEVLAR®

Kevlar stands out as a heat-resistant and robust synthetic fiber that is both lightweight and long-lasting. It is the most powerful fabric utilized by Exactseal, albeit pricier than other fibers. Nevertheless, its application is limited to larger cross sections due to its thickness. Kevlar showcases exceptional heat resistance and breaks down above 400°F without melting, boasting similar high temperature resilience as Nomex but with roughly three times the strength.

FABRIC STRENGTH AS COMPARED TO NYLON



STRENGTHS OF TYPICAL INDUSTRIAL YARNS AT ELEVATED TEMPERATURES



*Dacron®, Nomex®, and Kevlar® are registered trademarks of E. I. du Pont de Nemours and Company or its affiliates. Typical Industrial Yarn Strength chart is also courtesy of E. I. du Pont de Nemours and Company or its affiliates.

MATERIAL COMPARISON CHART

Excellent
Very Good
Good
Fair
Poor

COMMON NAME	EPDM OR EP RUBBER	NEOPRENE	NBR OR BUNA-N	SILICONE
CHEMICAL NAME	Ethylene Propylene	Chloroprene	AcrylonitrileButadiene	Silicone
ASTM DESIGNATION(D1418)	EP	CR	NBR	VMQ
Tensile Strength (MPa)	15.2	14	13	10
Elongation	450%	400%	350%	580%
Hardness Range (Sh A)	50-80	50-80	50-80	30-80
Low Temperature (°C)	-50	-25	-50	-50
High Temperature (°C)	150	110	120	230
Density (g/cm3)	1.2	1.3	1.3	1.2
Compression Set (ASTM D 395 2B)	50% (22h @ 125°C)	35% (24h @ 100°C)	36% (24h @ 100°C)	39% (22h @ 175 C)
Tear Resistance	◆	◆	▲	▲
Abrasion Resistance	◆	●	◆	■
Resilience (Cold)	◆	◆	◆	●
Heat Resistance	●	●	◆	●
Radiation Resistance	●	◆	■	◆
Impermiability to gases	◆	◆	◆	▲
ACID RESISTANCE				
Mild Dilute	●	●	■	●
Strong Concentrate	◆	◆	■	▲
SOLVENT RESISTANCE				
Aliphatic Hydrocarbons	■	▲	●	■
Aromatic Hydrocarbons	■	■	■	■
Oxygenated (Ketones, etc)	◆	■	■	■
RESISTANCE TO				
Swelling in Lubricating Oil	■	◆	●	■
Oil and Gasoline	■	◆	●	▲
Animal Oils	▲	▲	●	◆
Water Absorption	●	◆	●	●
Oxidation	●	●	◆	●
Ozone	●	●	▲	●
Sunlight Aging	●	●	■	●
Heat Aging	●	◆	◆	●
Flame	■	◆	■	▲
Vegetable Oils		◆	◆	■
Chlorinated Hydrocarbons	■	■	▲	■

MATERIAL COMPARISON CHART

Excellent | Very Good | Good | Fair | Poor

COMMON NAME	NATURAL RUBBER	HBNR	FLOUROSILICONE	FKM (VITON)
CHEMICAL NAME	Natural Isoprene	Hydrogenated Nitrile Rubber	Flourosilicone	Flouroelastomer
ASTM DESIGNATION (D1418)	NR	HNBR	FVMQ	FKM
PHYSICAL PROPERTIES				
Tensile Strength (MPa)	22	22	5	10
Elongation	750%	300%	225%	300%
Hardness Range (Sh A)	40-80	50-90	40-80	70-85
Low Temperature (°C)	-55	-30	-63	-15
High Temperature (°C)	90	150	175	230
Density (g/cm3)	1.1	1.4	1.5	1.8
Compression Set (ASTM D 395 2B)	20% (24h @ 70 C)	20% (24h @ 100°C)	22% (22h @ 177 C)	15% (70h @ 200 C)
Tear Resistance	Good	Excellent	Poor	Fair
Abrasion Resistance	Excellent	Good	Fair	Good
Resilience (Cold)	Good	Good	Good	Fair
Heat Resistance	Fair	Good	Excellent	Excellent
Radiation Resistance	Fair	Poor	Excellent	Excellent
Impermiability to gases	Fair	Good	Excellent	Poor
ACID RESISTANCE				
Mild Dilute	Poor	Fair	Excellent	Excellent
Strong Concentrate	Poor	Fair	Good	Excellent
SOLVENT RESISTANCE				
Aliphatic Hydrocarbons	Poor	Excellent	Very Good	Excellent
Aromatic Hydrocarbons	Poor	Good	Excellent	Excellent
Oxygenated (Ketones, etc)	Poor	Good	Fair	Fair
RESISTANCE TO				
Swelling in Lubricating Oil	Poor	Excellent	Excellent	Excellent
Oil and Gasoline	Poor	Excellent	Good	Excellent
Animal Oils	Poor	Excellent	Excellent	Excellent
Water Absorption	Very Good	Very Good	Excellent	Excellent
Oxidation	Poor	Excellent	Excellent	Good
Ozone	Poor	Very Good	Excellent	Excellent
Sunlight Aging	Poor	Good	Excellent	Good
Heat Aging	Fair	Good	Excellent	Excellent
Flame	Poor	Fair	Excellent	Excellent
Vegetable Oils	Poor	Good	Excellent	Excellent
Chlorinated Hydrocarbons	Poor	Good	Fair	Good

THANK YOU

Please feel free to contact us using the details provided below. We look forward to assisting you further.

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