DURLON®
SEALING SOLUTIONS

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SEALING SOLUTIONS FOR

Chemical Processing

Our Vision

Evolution isn't a choice in today's business landscape, it's the only way to succeed.

Progress relies on everything moving forward; from people to machinery to production. Everything must flow.

As we engineer our way to a better world, we are breaking down barriers, making sure each process is in place, always reflecting and improving. We are experts at delivering the best sealing solutions to help our customers unlock their highest potential.

Our global community of industry leading specialists drive our innovative production and materials to consistently raise the bar.

Whether through the stress of everyday use, or specialized applications and high-temperature environments, liquid or gas, our products deliver sustainable integrity.

At Durlon, we succeed when you succeed.

DURLON®
SEALING SOLUTIONS

Sealing Solutions for **Chemical Processing**

The chemical industry is one of the most important economic sectors, and in general, can be divided into the following areas:

- Basic chemicals
- Fine chemicals
- Specialty chemicals
- Inorganic chemicals: Acids, Alkalis, Salt
- Organic chemicals: Pharmaceutical, Biochemical, Bioengineering

Each of these areas have different requirements, therefore, specially developed sealing solutions are required. The seals are essential for reliability, as they ensure hazardous, aggressive and corrosive media is controlled securely, regardless of the process or operating conditions.

The basic chemicals segment produces both inorganic and organic chemicals. Organic chemicals are used in the production of other chemicals, such as dyes, plastics, and petrochemical products. Inorganic chemicals usually are used to make solid and liquid chemicals, and industrial gases; sodium, sulfuric acid, and chlorine are some of the most common.

Products in the fine chemical industry are manufactured in discontinuous processes. Successive production steps, such as mixing, reacting and separating are typical here. The batches are often relatively small and the processes are demanding. Flexible, multi-purpose systems, usually equipped with agitators, reactors, filters, dryers and other special equipment, are predominantly applied. These different manufacturing processes often results in crystallizing, paste-like, highly viscous or highly corrosive media under changing pressure and temperature conditions.

Specialty chemicals include individual molecules or mixtures of molecules (i.e., formulations) that are manufactured on the basis of a unique performance or function. Many other sectors rely on specialty chemicals for their products, including automotive, aerospace, agriculture, and cosmetics and food, among others.

In manufacturing and processing, particularly extreme parameters will occur during the handling of inorganic basic chemicals. In addition to aggressive, sometimes toxic media, high pressures prevail. Furthermore, the seals used here must have a wide temperature range. Accordingly, high-quality, robust and chemically resistant materials are in demand. In order to meet the high standards of the statutory emission values in processes, the seal must make a decisive contribution.

Whether you are dealing with agrochemicals, basic chemicals, specialty chemicals, consumer products, or pharmaceuticals, Durlon® has the products, materials, and expertise you need in your industrial applications. When dealing with fine and specialty chemicals, gaskets that can withstand high temperature and chemical resistance are required. In addition to the use of aggressive and sometimes toxic media, temperatures from +300°C down to a cryogenic range are not uncommon. The material of the finished seal must be able to stand up to these varied conditions.

By combining innovative products with unparalleled service, Durlon® recognizes the potential hazards and critical need for personal safety in chemical processing industries, while also considering the importance of regulatory compliance, reduced downtime, ease of maintenance, integrity, and emission reduction. We invest a great deal in research and development to consistently improve the performance of our sealing products. In addition to outstanding chemical resistance to various aggressive media, our gasket materials must resist high and low-temperature extremes and possess robust mechanical strength.

Innovative products
Unparalleled service

Durlon® Metallic & Semi-Metallic Gasketing

Durlon® metallic gaskets are manufactured from a combination of metals and designed to withstand extreme temperatures, pressures and chemical exposure. Available in standard and custom configurations, these rugged metal gaskets are made of a wide range of materials to accommodate all types of process applications.

These gaskets are designed to work by ”initial line contact” or a wedging action between the flange and the gasket.

Durlon® semi-metallic gaskets include both metallic and non-metallic components, either containing a metal core with sealing materials on both flat surfaces, or a pliable core encased in a thin metallic casing. These configurations are most popular, and available in a wide variety of styles and sizes. They can typically be fabricated of any metal which is available in thin strip or sheet, and that can be welded. Therefore, they can be used against virtually any corrosive medium dependent upon the choice of the metal and filler or facing material.

Our computer-aided manufacturing process uses rigorous quality control programs to ensure premium quality product performance. The metallic component gives the gasket superior structural integrity, while the non-metallic element ensures superior sealing. To be able to achieve an effective seal, proper gasket selection must occur with metallic gaskets. The following elements must be considered when determining the correct gasket for the application.

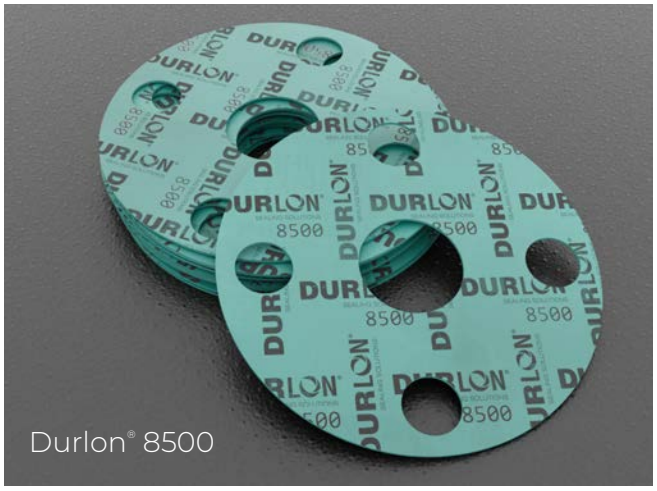
Temperature
Most gaskets consist of two or more components or ingredients. The overall temperature resistance of a gasket is determined through analysis of the upper and lower limits for each component. There are two parts that need to be considered and verified when selecting the correct gasket material. The first part is to verify the metal component used to ensure the maximum temperature for the material is not exceeded. Secondly, the maximum temperature rating for the filler or facing material must be verified to ensure it is not exceeded. In most cases the filler or facing material will be the sacrificial element and will be the governing factor when selecting a semi-metallic gasket.

Chemical Compatibility
The gasket must be resistant to chemical corrosion or chemical attack. The rate of corrosion is dependent on the time, temperature, and concentration of the media and must be considered when selecting both the gasket metallurgy and filler or facing material.

Flange Compatibility
The flange itself must be designed so that it can apply a sufficient amount of clamping force to ensure the flange serrations are biting into, or seating the gasket. Flange materials also need to be verified against the specified metallurgy in semi-metallic gaskets. If left unverified, it is possible for galvanic type corrosion to occur due to dissimilar metals.

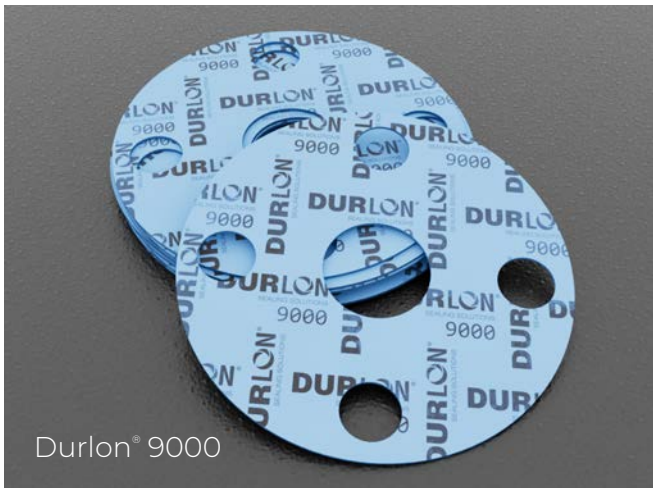
Gasket Seating Stress
The gasket seating stress is the minimum force required to compress the gasket so that it forms an effective seal while resisting the blowout or internal pressure of the system. Seating stress must also be taken into consideration with both the gasket type and flange surface finish. The minimum and maximum seating stresses are product specific and recommended by the manufacturer, the table below shows the recommended minimum and maximum stresses for Durlon® metallic gasketing products.

Durlon® Product Recommendations

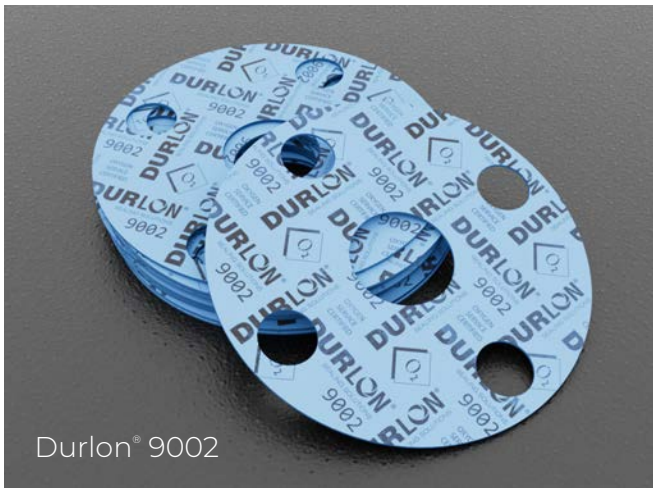


Durlon® 8500

Durlon® 8900



Durlon® 9000



Durlon® 9002

Durlon® SWG DRI


Durlon® Durtec®

Physical Properties & Certifications

Physical Properties	8500	8900	9000	9002	SWG	Durtec®
Composition	Aramid -Inorganic NBR	Aramid -Inorganic NBR	Inorganic Filler / Pure PTFE Resins	Inorganic Filler / Pure PTFE Resins	Spiral Wound Gasket	Specially Engineered Metal Core Technology
Color	Green	Black	Blue	Blue	Style: DRI	-
Temperature: Min Max Continuous, Max	 -73°C (-100°F) 371°C (700°F) 287°C (548°F)	 -73°C (-100°F) 496°C (925°F) 400°C (752°F)	 -212°C (-350°F) 271°C (520°F) 260°C (500°F)	 -212°C (-350°F) 271°C (520°F) 260°C (500°F)	-	 -200°C (-328°F) 1,000°C (1,832°F) 650°C (1,200°F)
Pressure, max, bar (psi)	103 (1,500)	138 (2,000)	103 (1,500)	103 (1,500)	-	430.9 (6,250)
Density, g/cc (lbs/ft^3)	1.7 (106)	1.6 (100)	2.2 (138)	2.2 (138)	-	-
Compressibility, %	8-16	7-17	8-16	8-16	-	-
Recovery, %	50	50	40	40	-	-
Creep Relaxation, %	20	15	30	30	-	-
Tensile Strength, MPa (psi)	13.8 (2,000)	13.8 (2,000)	13.8 (2,000)	13.8 (2,000)	-	-
Sealability ASTM 2378 (Nitrogen)	0.03 cc/min	0.2 cc/min	0.01 cc/min	0.01 cc/min	-	-

Durlon® SWG - All Durlon® SWG's are manufactured according to ASME B16.20 standards. Quality Assurance complies with API Specifications Q1 and ISO 9001 standards. Super Inhibited Graphite meets the requirements of Shell Specification MESC SPE 85/203 and meets PVRC SCR Flexible Graphite Spec for FG 600 material.
Durlon® Durtec® - Physical Properties: dependent on facing material and metallurgy of core, data shown above is for Inconel® 625 core and HT1000® covering layers.

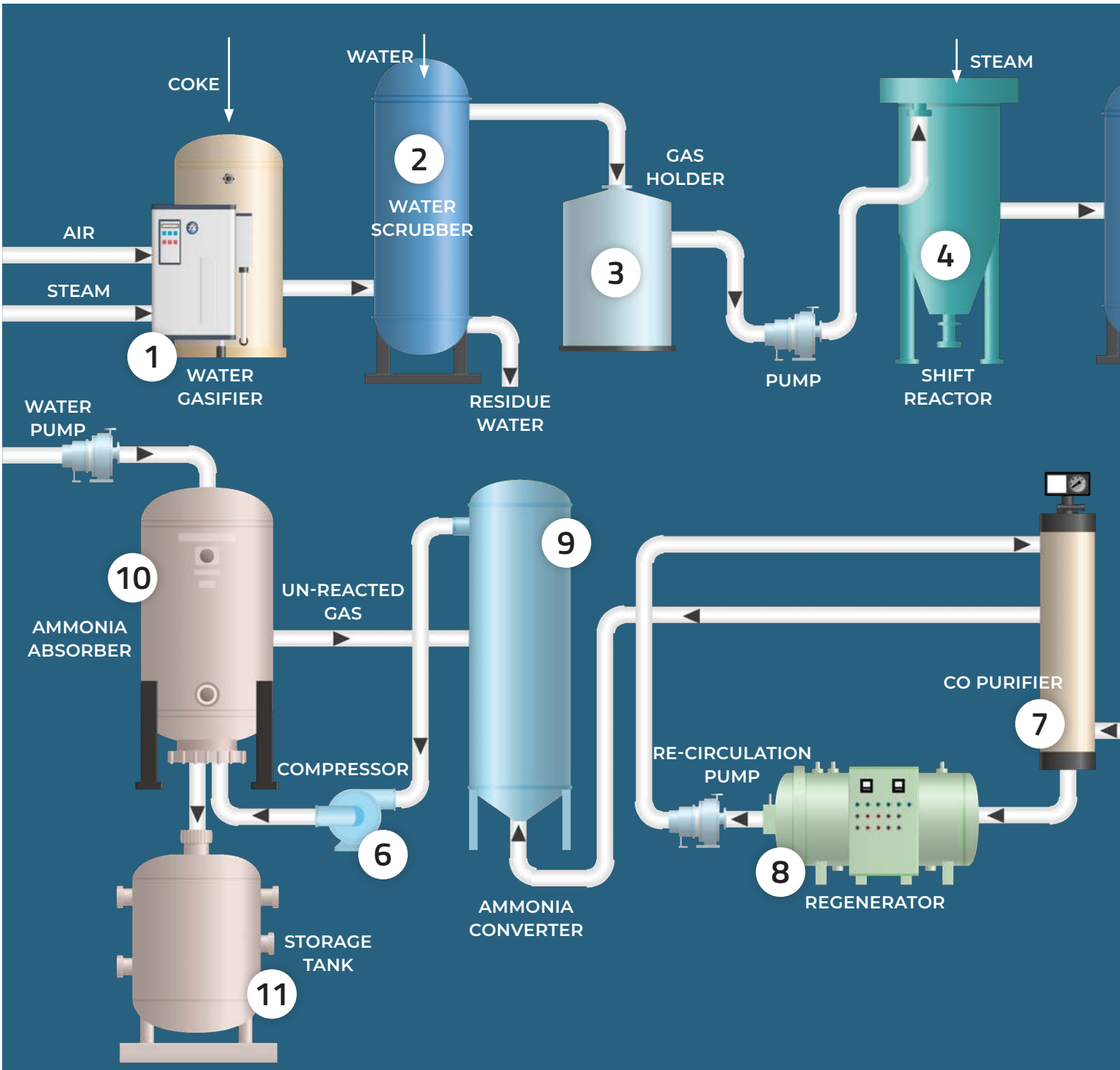
Style	Certifications
8500	California Proposition 65, RoHS Reach Declaration, API 6FB Fire Test with avg. temperature >650°C, 30 minutes, 40 bar, 1 ml (inch/min.) max allowable leakage, Conforms to the FDA requirements of 21 CFR 177.2600.
8900	ANSI/API 607 Fire Test with 6th Ed., Zero leakage, RoHS Reach Declaration.
9000	RoHS Reach Declaration, ANSI/API 607 Fire Test 6th edition, Zero leakage (The test fixture was subjected to an external flame of 875°C (1607°F) average for 30 minutes. The measured leakage was 1.8 ml/min, where the max allowable limit is 1200ml/sec.), Approved material for WRAS (Water Regulations Advisory Scheme), USP Class VI 121°C (250°F) for 30 min., TA-luft (VDI Guideline 2440), ABS-PDA & Pamphlet 95, the chlorine institute, DNV-GL, (EC) 1935/2004 & EU (10/2011), and conforms to FDA requirements of 21 CFR 177.1550 for food and drug contact.
9002	BAM oxygen service: gaseous & liquid up to 260°C (500°F) at 52 bar (754 psi), and conforms to FDA requirements of 21 CFR 177.1550 for food and drug contact. Lox Mechanical Impact (ASTM G86 & ISO 21010) with zero reactions out of 20 at a test reaction frequency of 0%. RoHS Reach Declaration.
SWG	TA-luft (VDI Guideline 2440), API Standard 6FB Fire Test- 6 inch Class 300 SWG FG
Durtec®	Passed modified API 607 fire test and meets the requirements of Shell Specification MESC SPE 85/203 & PVRC SCR Flexible Graphite Specification for FG 600 material, RoHS Reach Declaration.

Durlon® 9000 is made with Teflon™ fluoropolymer. Teflon™ is a trademark of The Chemours Company FC, LLC used under license by Triangle Fluid Controls Ltd.

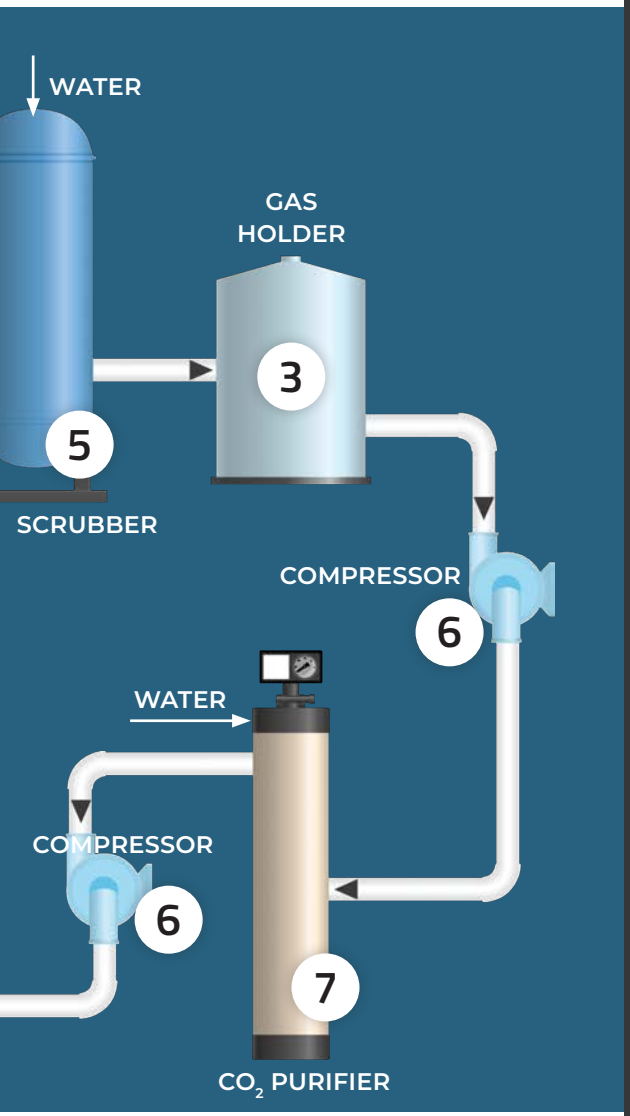
Note: ASTM properties are based on 1/16" sheet thickness, except ASTM F38 which is based on 1/32" sheet thickness. This is a general guide only and should not be the sole means of accepting or rejecting this material. The data listed here falls within the normal range of product properties, but should not be used to establish specifications limits nor used alone as the basis of design. For applications above Class 300, contact our technical department.

Warning: Durlon® gasket materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications stated are typical. No applications should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious injury. Data reported is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained within are subject to change without notice. This edition cancels and obsoletes all previous editions.

Ammonia Production Process Flow Diagram



NOTE: This is a graphical representation of an ammonia production process, showing the primary process flow path. It does not show the minor details of the process, rather it focuses on the equipment used, and other instruments that are present. It helps to illustrate how the major components of this type of process plant interacts with each other to bring about the desired effect.



Durlon® Product List

1. 8300, 8900, SWG
2. 79XX, 8500
3. 8300, 8500
4. 9000. SWG
5. SWG
6. 9000, SWG
7. SWG
8. SWG, Durtec®, HT1000®
9. SWG
10. 9000, SWG
11. 9000

Ammonia Production Flow Process:

1. WATER GASIFIER: a furnace in which a mixture of steam and coal is heated at high temperatures to produce a gas mixture of Co and H2.

2. WATER SCRUBBER: filled with water through which the gas mixture is bubbled to remove impurities. The water absorbs the impurities, leaving a clean gas mixture of CO and H2.

3. GAS HOLDER: The clean gas mixture of CO and H2 is stored in a gas holder, which is a large tank that can withstand high pressures.

4. REACTOR: The clean gas mixture of CO and H2 is then fed into a reactor where it is reacted with nitrogen gas (N2) to produce ammonia (NH3). This reaction is carried out at high pressures and temperatures to increase the yield of ammonia.

5. SCRUBBER: The gas mixture leaving the reactor contains ammonia, un-reacted gases, and impurities such as water vapor and carbon dioxide. The gas mixture is passed through a scrubber, filled with water or an acid solution to remove the impurities and produce a clean gas mixture of ammonia and hydrogen.

6. COMPRESSOR: The gas mixture of ammonia and hydrogen is compressed to higher pressures to increase the yield of ammonia.

7. PURIFIER: The compressed gas mixture of ammonia and hydrogen is then purified to remove any impurities such as water vapor and carbon dioxide.

8. REGENERATOR: The solid material used in the purifier becomes saturated with impurities over time and needs to be regenerated. The regenerator is a furnace in which the solid material is heated to high temperatures to remove the impurities and regenerate the material for reuse in the purifier.

9. AMMONIA CONVERTER: The ammonia converter is a reactor vessel in which the purified gas mixture of ammonia and hydrogen is reacted at high temperatures and pressures to produce pure ammonia gas. The gas mixture is fed into the converter and passed over a catalyst bed made up of iron catalysts. The catalyst bed promotes the reaction between the ammonia and hydrogen gases, which results in the production of pure ammonia gas.

10. AMMONIA ABSORBER: The pure ammonia gas is then absorbed in water or acid solution to produce liquid ammonia.

11. STORAGE TANK: The liquid ammonia is then stored in a tank for later use or distribution.

The core of the Durlon® brand is to provide fluid sealing solutions that make sense, both financially and strategically. We accomplish this through process-oriented design, sector-specific knowledge, and extensive testing. Our goal is to ensure performance and safety while adhering to the quality management system registered to ISO 9001:2015.

At Durlon, we offer specially developed sealing solutions tailored directly to your specific needs.

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