GORE® Sealant Technologies for Chlor-Alkali Applications

Rick Freer / Marcos Gomes November 13, 2014



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- Introduction to W. L. Gore & Associates
- What is PTFE & ePTFE?
- GORE[®] Sealant Technologies
- Case Histories
- Value in Chlor-Alkali Applications





W. L. Gore & Associates

- Founded in 1958
- Privately held
- \$3 billion in sales
- 10,000+ associates
- Recognized as a "Best Company to Work For"





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An Enterprise Organized Around Four Divisions







W. L. Gore & Associates — Worldwide Locations



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Polymerization of Tetrafluoroethylene

- PTFE is produced by polymerization of a C₂F₄ (tetrafluoroethylene) monomer to produce a very long chain macro molecule.
- The Carbon-Fluorine chemical bond is the strongest known producing superior protection against chemical attack.







Properties of PTFE

Advantages

- Chemically inert to almost all media (pH 0-14)
- Wide range of thermal resistance
- Non-aging, weather and UV resistant
- Low coefficient of friction
- Physiologically harmless
- Wide application versatility

Disadvantage

• Mechanically weak





3 Generations of PTFE



Gasket Performance Benefits of ePTFE

• Superior Reliability of GORE[®] Gaskets:







Standardize Across Flanges

		Cl ₂	NaOH	H₂SO₄	BRINE	
		Chlorine Path	Caustic Soda (Evaporation)	SAC (Cl2 Drying)	Cell Room, Bath, Electrolizers	Brine
Flange material		Titanium Stainles Steel FRP Carbon Steel (Dry CI2)	Carbon Steel Stainless Steel Metal Alloys Nickel	FRP PTFE-Lined Steel GLS	Titanium FRP	FRP Carbon Steel
Common Gaskets	Metal Reinforced	Х				Х
	Filled PTFE	Х	Х	Х		Х
	Metal		Х			
	EPDM			Х	Х	Х
	Envelopes			Х		
Problems with Common Gaskets	High Corrosion	Х	Х	Х		
	Corrosion that leads to potential downtime	Х		Х	Х	Х
	Danger of Emissions	Х			Х	
	Seal may not be able to reliably meet Continuous Production Demands	Х			Х	Х
	Creep due to Thermal Cycles & High Temperatures		Х	Х		
	Rubber Compression Set & Degradation			Х	Х	Х
Applications for GORE® Gasketing	Piping	GORE® Universal Pipe Gasket (Style 800)				
	Large Diameter Applications	GORE® Series 500 Gasket Tape				





Tight-Sealing







Legend: ARLA, 3.2mm (1/8") sheet thickness Initial Gasket Stress: 43.5 MPa (5000 psi) Initial Pressure: 55 bar (800 psi) Aging Conditions: 96 hours at 315°C (600°F)

Note: Third party testing validates approximately 100,000 times less emission for GORE® UPG sheet gasketing.



Outstanding Creep Resistance

- Difference amongst leading PTFE options revealed by simple test
 - 34.5MPa (5000 psi), 230°C (446°F), 15 minutes







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GORE[®] Universal Pipe Gasket (Style 800)

• Standardize across process piping









GORE[®] Series 500 Gasket Tape

Saves You Time, Money and Trouble
Fits any shape instantly & reliably









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Case Study 1 FRP Process Piping

Plant	Chlor-alkali manufacturer
Flanges	FRP Standard ANSI pipe sizes
Pressure:	10 bar (150 PSI) Maximum
Temperature:	49°C (120°F) Maximum
Previous Gasket	EPDM, EPDM w/ PTFE envelope, Viton
Application	Process Piping
Media	Chlorine, Caustic Soda

Solution:

GORE[®] Universal Pipe Gasket (Style 800) provide chemical compatibility of 100% PTFE with low stress to seal characteristics. Ultimately, the goal is to standardize on gasket reducing the need for multiple gaskets in these applications. Customer has specified GORE[®] Universal Pipe Gasket (Style 800) successfully for over 4 years.





Case Study 2 Heat Exchanger-Wet Chlorine



Diameter: Pressure: Temperature:	1067 mm (42" ID) 0,7 bar (10 PSIG) 85°C (185°F)
Previous Gasket:	Filled PTFE
Problem:	Repeated Leakage

Solution: GORE[®] Series Gasket Tape, is available on a spool, the user customizes a gasket in place on the flange in minutes, with minimal manpower. The application recommendation was 6,35 mm ($\frac{1}{4}$ ") thick x 25,4 mm (1") wide with a torque of 170 Nm (125 ft-lbs). The tape form can eliminate unnecessary downtime while waiting for custom-produced gaskets done offsite. The adhesive backing holds the gasket in place securely for a quicker and safer installation.





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Value in Chlor-Alkali Applications

Maximizing Performance & Safety

- Premium Performing Products
- Training
- Application & Installation Assistance
- Established Track Record of Performance in Chlor-Alkali Applications







OBRIGADO THANK YOU



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