

Zerust® Flange Saver®

PROTECT FLANGE ASSEMBLIES WITH A CORROSION INHIBITING WRAP



Flange Corrosion

THE PROBLEM >>>

Flange, valve and welded-joint corrosion costs clients millions annually!

- Complex geometry of flanges prevents effective surface preparation and coating
- Frozen nuts and bolts
- Weakened weld joints
- Loss of containment

THE IMPACT >>>

Maintenance costs and downtime are time consuming and expensive!

- Downtime required for dismantling corroded flange assemblies for inspections, equipment removal, flange blinding, etc.
- Hot work repair of severely corroded flanges adds to downtime and costs
- Labor and equipment costs/logistics are pain points – especially for offshore facilities
- Unscheduled stoppages due to corrosion related leaks



Flange Savers in Use

THE SOLUTION IS >>>

ZERUST FLANGE SAVERS

FEATURES >>>

- Rugged, UV-resistant film cover designed for severe outdoor exposure
- Proven Zerust Vapor Corrosion Inhibitor (VCI) in film
- Installation in minutes without special equipment
- Completely removable within 1 minute.
- Provides two years of corrosion protection in outdoor and offshore environments
- Inexpensive, simple, highly effective, and versatile
- Inhibits additional corrosion even after corrosion has started
- Sized to fit standard flanges; custom sizes may be special ordered
- Quick inspection can be conducted through an optional window in the film

APPLICATIONS >>>



FPSOs



Jetties



Offshore Platforms & Rigs



Offshore Platforms & Rigs

AWARDS

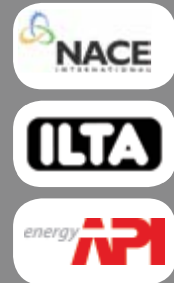


Zerust Flange Saver
2012: Winner of the MP
Readers' Choice NACE
Corrosion Innovation of the
Year award

CREDENTIALS

- 40+ years of experience in corrosion prevention
- Client support in 50+ countries
- Chair key task group at NACE International

MEMBERSHIPS



INSTALLATION EXAMPLES



Inland Terminal Oil Lines

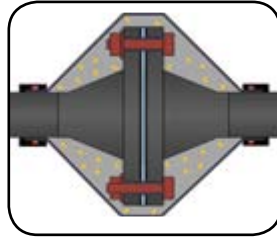
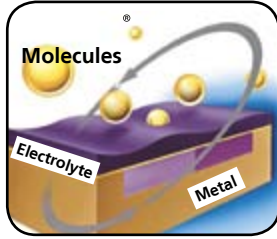


Offshore Platform Fire Water Line



Coastal Terminal Oil line with Gate Valve

HOW ZERUST® VAPOR CORROSION INHIBITORS (VCIs) WORK >>>



- VCI molecules are released from the inner film into the enclosure
- These molecules adsorb onto metal surfaces and form a protective layer
- When the film enclosure is removed, the VCIs dissipate
- The Zerust VCI is non-toxic, with no smell or taste

COST IMPACT OF FLANGE CORROSION >>>

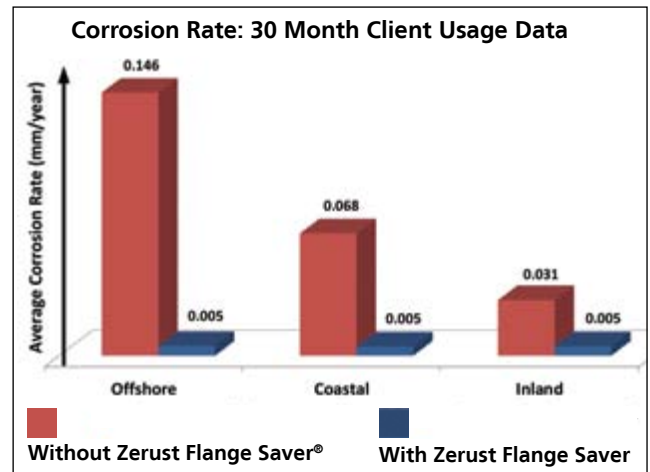
Annualized Flange Maintenance Costs		Indirect Flange Corrosion Costs	
Cost of replacement flange	\$12	<ul style="list-style-type: none"> • Labor + Time to torque open frozen nuts and bolts • Time required to secure hot work permits, purging, certification, etc. if shearing of flanges is required • Logistics of equipment required for inspection and maintenance in case of flange replacement – especially for offshore facilities! • Delays in removal/replacement, blinding, etc. of critical equipment • Opportunity costs of downtime of pipeline • Risks of flange failure, leaks, cleanups, safety, litigation, etc. 	
Cost of nuts and bolts	\$12		
Cost of paint	\$4		
Prepping/priming/painting/welding	\$5		
Scheduled flange replacement	\$20		
TOTAL	\$53	• TOTAL	\$\$\$\$!

Assumptions:

- ~10 years to flange failure due to crevice corrosion
- Average 6" diameter pipeline and API 6A Class 150 flange pair at cost = \$120
- 8 sets of nuts and bolts for this pipe-to-pipe flange @ \$3 per set, 50% replaced during the life of the flange
- Hourly low skill labor rate = \$20/hour and high skill labor rate = \$50/hour

SOLUTION EFFECTIVENESS >>>

- Proven results with 4+ years of client use on offshore and coastal facilities
- Offshore clients have experienced 75%+ reduction in cost of corrosion repair and coating maintenance.
- Downtime due to flange corrosion is significantly reduced.
- Long term laboratory and field trial results are positive, client validated and available upon request



MATERIAL PERFORMANCE >>>

Developed for Tough Field Conditions	
UV-Resistance	2 years of exposure
Tensile Strength	21+ Mpa
Elongation	800%
Operating Temperature	-20°C to 80°C
Melting Point	105°C
Service Life	2 years
Shelf Life	5 years

PARS SANAT KEYMAND

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