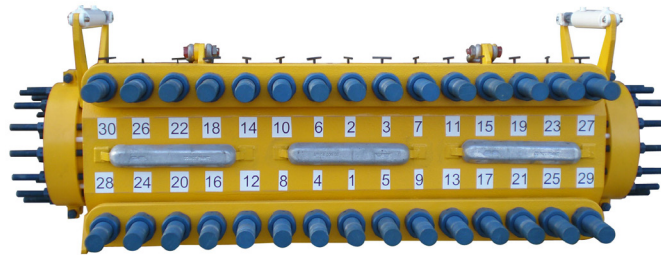


Diver Installed Smart Clamp

Permanent pipeline repair solution

The diver installed Smart Clamp is a split mechanical fitting used to repair a damaged or leaking subsea pipeline. The fitting eliminates costly pipeline shut downs and expensive hyperbaric welding associated with alternative repair methods. After installation, the Smart Clamp design provides a permanent, high-quality seal and structural reinforcement for the duration of the design life of the pipeline.



FEATURES

Available in structural and non-structural configurations

Provides pressure containment within the encapsulated area

Cost saving, effective repair method

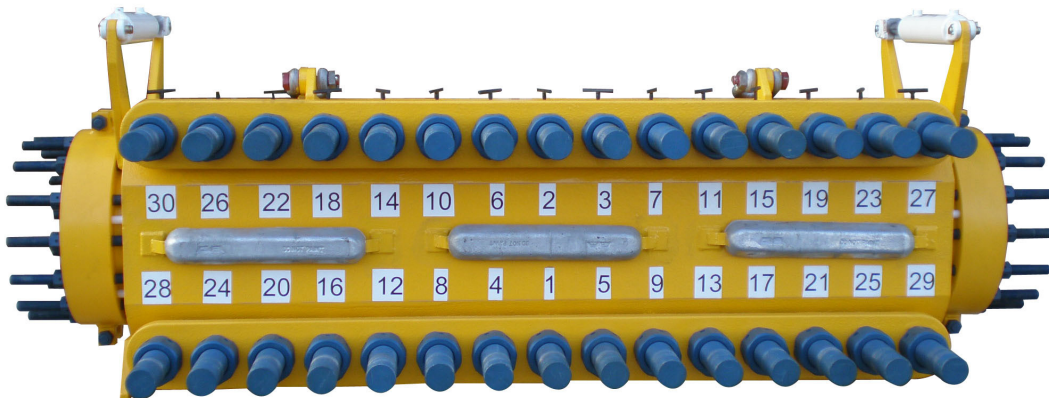
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Our structural and non-structural configurations ensure we meet diverse permanent pipeline repair requirements. Typically, the non-structural version is used to repair a pipeline that is structurally sound and has only minor damage such as pinhole leaks, local pipe wall thinning, or shallow dents. The structural clamp uses a grip and bowl mechanism to provide structural integrity to more severely damaged pipelines with defects including cracked girth welds, kinks, or punctures.

Diver Installable Smart Clamp Design Features

- » Viton® B circumferential and longitudinal seals as standard, Buna-N (Nitrile) or other elastomeric compounds can be provided for compatibility with pipeline contents and inhibitors
- » Elastomeric circumferential seals are mechanically set, permanently pressurized, and fully restrained, mitigating concerns of explosive decompression effects for gas service
- » Seal extrusion guards for 12-in Nominal Pipe Size (NPS) and larger when API 5L pipe outside diameters tolerances become significant
- » Port for annulus testing, grout injection, or filling with inhibitor between the seals and pipeline
- » Galvalum® III anodes sufficient for 25-yr design life
- » Externally coated with 3-part marine epoxy
- » Hardened steel grips and bowls (structural version) provide reinforcement to the pipeline by transferring axial loads from the pipeline into the body of the fitting, effectively replacing structural integrity and removing longitudinal stresses from the damaged pipeline section
- » Internal components are securely retained whether the fitting is open or closed, before or after installation



Technical data

Design Parameters

Nominal Pipe Size (NPS): any API Specification 5L pipe and wall thickness

Service: Standard (i.e. crude oil, natural gas, hydrocarbons, water, or chemical injection, etc.) and Sour (i.e. hydrogen sulfide, carbon dioxide, etc.)

Design Pressure Rating: up to ANSI Class 2,500

Design Temperature Range: 25°F to 250°F / -4°C to 121°C

Design Life: 25 years

Length Between Circumferential Seals (Non-Structural version): design standard is the greater of 12 in or 1-nominal pipe diameter

Length Between Tension Grips (Structural version): design standard is nominal pipe outside diameter + 1.75 in

Internal Diameter at Center of Clamp: design standard is pipe outside diameter + 1.625 in

Hydraulic Cylinder Pressure (max): 2,500 psig (172 barg)

Material Specifications

Body: ASTM A105 forging for 12 in NPS and larger; ASTM A516 Gr. 70 pressure vessel plate for 10 in NPS and smaller

Actuator Flanges: ASTM A105 forging or ASTM A516 Gr. 70 pressure vessel plate

Tension Bowl and Grips (Structural version): AISI 4140 (i.e. ASTM A-519 Gr. 4140, Heat Treated to 34-40 Rc, NQ&T)

Compression Rings and Structural Attachments: ASTM A36 or ASTM A516 Gr. 70

Seal Extrusion Guards (12 in NPS and larger): Type 316 stainless steel

Elastomeric Circumferential and Longitudinal Seals: Viton® B, 70/80 durometer

Studs and Nuts: ASTM A193 Gr. B7 and ASTM A194 Gr. 2H, respectively, all Xylan coated (i.e. PTFE, dark blue)

Anode(s): Galvalum® III

External Coating: Carboline® 890 Epoxy Paint System, safety yellow color

Applicable Design Codes, Standards, and Specifications (latest editions)

PCRS Group Smart Clamp Drawings, Bill of Materials (Controlled Copies), and Vendor Supplied Material Test Reports

OIE ISO 9001:2015 Quality Assurance - Quality Control Procedures and PCRS Operating Procedures

ASME Boiler Pressure Vessel Code, Section V Nondestructive Examination

ASME Boiler Pressure Vessel Code, Section VIII, Division 1 and 2

ASME Boiler and Pressure Vessel Code, Section IX Welding and Brazing Qualifications

ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

ASME B31.8, Gas Transmission and Distribution Systems

ASME B18.2.1, Square and Hex Bolts and Screws Inch Series

API 6H, Specification on End Closures, Connectors and Swivels

API 5L, Specification for Line Pipe

NACE MR0175, Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

DNV Recommended Practice RP B401, Cathodic Protection Design

Code of Federal Regulations, Title 49, Parts 192 and 195

Certifications

ISO 9001:2015 - World Certification Services Ltd. - Accredited by UKAS Quality Management

EN 10204 Section 3.1B (DIN 50049), Inspection Documents for the Delivery of Metallic Products



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