



Contour

Clock Spring Contour is ideal for repairs involving complicated geometry situations such as tees, flanges, & varying diameter pipe. It is an engineered, wet applied repair system featuring bi-axial or quad-axial stitched fiberglass cloth applied in a wet-lay system with two-part epoxy and a filler material. It is available in multiple kit-sizes for any diameter pipe. Engineered repairs follow ISO or ASME guidelines.

Repairs can be used as a pressure-containing repair to seal leaks or as a reinforcing repair to restore the strength of a pipe in the axial and circumferential direction. Clock Spring Contour can be installed with minimal disruption to the operation of a pipe, and normally only requires a cold work permit to complete the installation, as only hand tools are used.

Clock Spring Contour is regularly used in plants, refineries, tank farms, terminals & offshore locations around the globe. Process Plant, Refinery and Offshore Pipe Repairs: An engineered repair designed using Clock Spring Contour will help ensure your repairs are applied quickly and get you safely to the next scheduled turn-around.

Clock Spring Contour has been certified by DNV GL in accordance with the ASME PCC-2 and ISO 24817 standards.

- Available in multiple kit-sizes for any diameter pipe
- Engineered repairs are designed by our qualified engineers following ISO or ASME guidelines.
- Ideal option for repairs involving complicated geometry situations such as tees, flanges, & varying diameter pipe.
- No pipe cutting or welding is necessary, with repairs only requiring a cold-work permit.
- Engineered Repair Design Report (ISO or ASME) is available
- Installation kit included
- Cloth is stitched, not crimped, to minimize creep and both Quad or Biax architectures are available to suit the geometry of the repair

LEAK REPAIR

Clock Spring Contour can be used for leak repair, even challenging environments with complicated pipe architecture and design.

COMPLEX GEOMETRIES

Facilities often feature complicated design of pipe works with tees, flanges and valves. Clock Spring Contour is very useful for a quick, economical repair in these applications.



Clock Spring Contour ISO TS 24817 Qualification Data	For Quad Fabric	For Biax Fabric
Qualification Requirement	Result	Result
Ply or Layer Thickness	2.1mm (0.0827 inch)	2.1mm (0.0827 inch)
Tensile Modulus (Circumferential)	11.0 GPa (1.60x10 ⁶ psi)	9.1 GPa (1.32 X 10 ⁶ psi)
Tensile Modulus (Axial)	10.8 GPa (1.57 x 10 ⁶ psi)	14.4 GPa (2.09 x 10 ⁶ psi)
Tensile Strain to Failure (Circumferential)	1.8%	2.7%
Tensile Strain to Failure (Axial)	1.9%	1.8%
Tensile Strength (Circumferential)	147 MPa (21.3 ksi)	138 MPa (20.1 ksi)
Tensile Strength (Axial)	149 MPa (21.6 ksi)	153 MPa (22.3 ksi)
Thermal Expansion Coefficient (Circumferential)	15.7 x 10 ⁻⁶ C ⁻¹ (8.7 x 10 ⁻⁶ F ⁻¹)	25.6x10 ⁻⁶ C ⁻¹ (13.9 x 10 ⁻⁶ F ⁻¹)
Thermal Expansion Coefficient (Axial)	15.7x 10 ⁻⁶ C ⁻¹ (8.7x10 ⁻⁶ F ⁻¹)	20.0x10 ⁻⁶ C ⁻¹ (11.0 X 10 ⁻⁶ F ^{-10.07})
Poisson's Ratio (Circumferential)	0.29	0.07
Poisson's Ratio (Axial)	0.30	0.11
Shear Modulus (Resin)	1.1 GPa (0.159 X 10 ⁶ psi)	0.11 GPa (0.159X 10 ⁶ psi)
Barcol/Shore Hardness	(82.5 Shore D)	(82.5 Shore D)
Upper Service Temperature Limits for Non-Leaking Defects	Standard Epoxy 118 °C (280°F)	HighT Epoxy 162°C (324°F)
Service Temperature Range <small>Allowable temperatures are designed individually following ISO TS 24817/ASME PCC-2 guidance</small>	-55°C (-67°F) to 162° C (324° F)	
Lap Shear Strength to Steel	10.0 MPa (1450 psi)	10.0 MPa (1450 psi)
Aged Lap Shear Strength (1000 hours in 93°C in water)	9.3 MPa (1349 psi)	9.3 MPa (1349 psi)
Fracture Toughness, LCL	149 Jm ⁻² (0.851 in lbf/in ²)	149 Jm ⁻² (0.851 in lbf/in ²)

Clock Spring is a licensed trademark of NCF Industries, Inc.

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Find Field Reports, Testing Validations and More at www.ClockSpring.com

