



Contour

ClockSpring|NRI Contour is an engineered repair system that employs bi-axial or quad-axial stitched fiberglass cloth applied in a wet-lay system using two-part epoxy and a filler material. It is ideal for repairs involving complicated geometry, including tees, flanges, and varying diameter pipe.

Contour is used globally in plants, refineries, tank farms, terminals and on offshore assets as a pressure-containing repair to seal leaks and as a reinforcing repair to restore the strength of a pipe in the axial and circumferential directions.

This product is available in multiple kit sizes for any diameter pipe and can be installed with minimal disruption to operations. And because it is installed using only hand tools, only a cold work permit is required.

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

Applications

- Plants, refineries, tank farms, terminals and offshore assets
- Structural reinforcement on straight pipes as well as elbows, tees, and flanges
- Girth welds on vessels and pipelines
- Damage prevention to coatings from potential impact and abrasion

- Installation on top of stopgap measures (plugs, banded patches and clamps) to provide a long-lasting reliable repair
- Splash zone and fully submerged applications

Features

- Available in multiple kit sizes
- No hot work required
- Repairs conform to ISO 24817 and ASME PCC-2 guidelines
- DNV-GL certified

BENEFITS:

- Installs without disrupting operations
- Minimal creep ensures a long service life
- No heavy lifting
- No environmental hazards
- No hot work, no heat affected zones, no chance of burn through, no VOCs, no fumes



QUALIFICATION DATA

PROPERTIES	For Quad Fabric	For Biax Fabric
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 (1.32x10 ⁶ psi)
Tensile Modulus (Axial)	10.8 GPa (1.57x10 ⁶ psi)	14.4 GPa (2.09x10 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)	15.7x10 ⁻⁶ C ⁻¹ (8.7x10 ⁻⁶ F ⁻¹)	25.6x10 ⁻⁶ C ⁻¹ (13.9x10 ⁻⁶ F ⁻¹)
Thermal Expansion Coefficient (Axial)	15.7x10 ⁻⁶ C ⁻¹ (8.7x10 ⁻⁶ F ⁻¹)	20.0x10 ⁻⁶ C ⁻¹ (11.0x10 ⁻⁶ F ^{-1.07})
Poisson's Ratio (Circumferential)	0.29	0.07
Poisson's Ratio (Axial)	0.30	0.11
Shear Modulus (Resin)	1.1 GPa (0.159x10 ⁶ psi)	0.11 GPa (0.159x10 ⁶ psi)
Hardness	82.5 Shore D	82.5 Shore D
Upper Service Temperature Limits for Non-Leaking Defects	Standard Epoxy 80°C (176°F)	HighT Epoxy 142°C (288°F)
Service Temperature Range <small>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)

Warranty: ClockSpring|NRI routinely implements product improvements. Please contact your local distributor or office for the most current product specifications. ClockSpring|NRI warrants the quality of this product when used according to directions.



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