



BlackDiamond

Clock Spring BlackDiamond® is ideal for transmission pipeline integrity repairs involving field bends, deformation, metal loss, and crack-like anomalies. It is an engineered, wet applied repair system featuring proprietary carbon fiber cloth applied with a two-part epoxy and a high modulus filler material. It is available in multiple kit sizes for any diameter pipe, in any configuration. Engineered repairs follow ISO or ASME guidelines.

Repairs can be used as DOT accepted permanent repairs for integrity digs, with proven negligible creep ensuring a long service life with carbon fiber technology. BlackDiamond can be installed with minimal disruption to the operation of a pipe, without the use of hot work, heavy machinery, or shut down to operations.

As the superior alternative to welded sleeves, BlackDiamond is regularly used in regulated pipelines, transmission lines, and onshore pipelines around the globe. An engineered repair designed using BlackDiamond will help ensure your pipeline is repaired quickly and restored to maximum allowable operating pressure without shutting down.

BlackDiamond holds certifications with TUV NORD and TUV SUD.

FEATURES & BENEFITS INCLUDED:

- 50-year DOT accepted repair system for transmission pipelines.
- ASME PCC-2 and ISO 24817 compliant.
- Repair kits will restore pipelines to MAOP on up to 80 percent wall loss, mechanical damage, mill defects, and axial flaws.
- Removes need for pressure reduction or pipeline shutdown.
- Zero performance loss validation on 10 year test program.
- Excellent adhesion to virtually any substrate.
- Can be applied on field bends and girth welds.
- Used in all environments, in over 60 countries.
- Can be used in road and river crossings, and air to soil transitions.
- High Temperature and Subsea systems available.
- BlackDiamond kits are installed quickly and efficiently by certified installers.
- Remote training classes available for Operator Qualification.
- Simple marking band system makes repairs visible to in-line inspections tools.
- Robust low profile repairs with high strength and low creep.
- Easy to install and cure.

COMPLEX GEOMETRIES

BlackDiamond can be used for complex repairs, even in challenging environments with complicated pipe architecture such as large diameter flanges, tees, buckles, and mitered elbows.





ISO TS 24817 / PCC-2 QUALIFICATION DATA

QUALIFICATION REQUIREMENT	RESULT	RESULT
Ply or layer thickness	0.57 mm	0.023 inch
Tensile modulus (Hoop)	49.1 GPa	7,130 ksi
Tensile modulus (Axial)	23.8 GPa	3,460 ksi
Tensile Strength (Hoop)	576 MPa	83 ksi
Tensile Strength (Axial)	247 MPa	35 ksi
Tensile Strain to failure (Hoop)		1.27%
Tensile Strain to failure (Axial)		1.30%
Poisson's Ratio		0.196
Lap Shear Strength to Steel (Sandblasted)	17.2 MPa	2500 psi
Barcol/Shore Harness		80 (Shore D)
Thermal Expansion Coefficient (Hoop)	$2.52 \times 10^{-5}/^{\circ}\text{C}$	$1.4 \times 10^{-5}/^{\circ}\text{F}$
Thermal Expansion Coefficient (Axial)	$1.278 \times 10^{-5}/^{\circ}\text{C}$	$0.71 \times 10^{-5}/^{\circ}\text{F}$
Application Temperatures	5° C - 60° C	40° F - 140° F
Service Temperature Limits for Non-Leaking Defects	82° C	180° F
Glass Transition Temperature (T _g)	100° C	212° F
Shelf Life		2 years
Primer Color		Yellow

**PIG DETECTABLE BANDS AVAILABLE
FOR ANY DIAMETER PIPE SIZE**

**COMPRESSIVE MODULUS FILLER AVAILABLE
FOR ADEQUATE LOAD TRANSFER TO WRAP**

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

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