



Composite Solutions for Pipeline

CSNRIcomposites.com

Who We Are

CSNRI is part of ClockSpring|NRI, the high-performance critical infrastructure solutions company. We simplify asset and environmental stewardship and help drive global economies, delivering safe, sustainable solutions for the construction, maintenance, and emergency repair of critical infrastructure. Our composite construction and repair solutions have been deployed in 75 countries and include industry standard products such as Clock Spring™, Atlas™, A+ Wrap™, SynthoGlass® XT, ThermoWrap™, and DiamondWrap® composite products.

We support our products with best-in-class design, engineering, testing, and training services to ensure proper installation and optimal performance. Our industry-leading products are **easy to install, cost-effective to deploy, and durable for decades.**

Industry-Leading Solutions for Pipeline

CSNRI pipeline repair systems are the most robust and best tested in the industry. Through repeated testing and on-going innovation, the pipeline solutions portfolio can address a wide range of defects and overcome many repair challenges. Our industry-leading solutions are a safer and more sustainable alternative to other technologies and repair options. Composite repairs reduce the most hazardous variables in pipeline integrity operations – primarily welding and lifting. By reducing many of the risks associated with these and other physical hazards, composites are increasing the safety of field personnel. Composites are also more sustainable, since they remove the need to vent or purge the pipeline, which reduces GHG emissions.

Addressable Defects

- Corrosion / Erosion
- Dents / Wrinkle Bends
- Cracks or Crack-Like Features
- Seam and Girth Weld Defects
- Manufactured Defects
- Gouges / Metal Loss



Technical Support

- Deliver world class training and in-field support
- Provide responsive and on-demand service



Engineering Expertise

- Assess challenges and recommend customized solutions
- Leverage multiple technology platforms with delivery systems
- Provide in-depth documentation and third-party validation

Tested for Pipelines

- With high continuous pressure
- With high cyclic pressure lines
- With high temperatures ranges
- Above ground or buried
- Near- or Underwater lines
- Under axial or bending loads
- Located in Geohazards



Project Optimization

- Lower total project cost
- Improve contractor productivity
- Extend life cycle

Cracks



Dents



Wrinkle Bends



Geohazard



Transmission Pipeline Products



Family Brand	Product Name	Primary Use	Per Ply Thickness	Max Temperature	Fabric Description	Resin Description
Clock Spring®	Clock Spring	Metal loss and small deformations	0.075 in. (1.9 mm)	201°F (94°C)	Unidirectional (hoop) Fiberglass	Pre-cured Polyester
	Clock Spring HT			264°F (129°C)	Unidirectional (hoop) Fiberglass	High-temp pre-cured Vinyl Ester
	SnapWrap	Metal loss and small deformations with limited thickness availability	0.075 in. (1.9 mm)	201°F (94°C)	Unidirectional (hoop) Fiberglass	Pre-cured Polyester
	SnapWrap HT			264°F (129°C)	Unidirectional (hoop) Fiberglass	High-temp pre-cured Vinyl Ester
A+ Wrap™	A+ Wrap	Metal loss and small deformations including non-straight geometries	0.014 in. (0.35 mm)	194°F (90°C)	Bi-directional fiberglass	Moisture cured Polyurethane
	A+ Max			194°F (90°C)	Tri-directional fiberglass	Moisture cured Polyurethane
Atlas™	Atlas	Large deformation and crack/crack-like features	0.017 in. (0.43 mm)	180°F (82°C)	Bi-directional carbon fiber	High-strength epoxy
	Atlas HT			450°F (232°C)	Bi-directional carbon fiber	High-temp epoxy
	Atlas UA	Circumferentially oriented crack-like features and axially dominated repairs	0.016 in. (0.41 mm)	180°F (82°C)	Unidirectional (axial) carbon fiber	High-strength epoxy
	Atlas UA HT			448°F (231°C)	Unidirectional (axial) carbon fiber	High-temp epoxy
Contour Apex™	Contour Apex	Metal loss and small deformations	0.042 in. (1.07 mm)	212°F (100°C)	Multidirectional Fiberglass	High-strength epoxy

Defect Type Overview

Metal Loss:	Corrosion Internal wall loss Gouges Minor manufacturing defects Abrasion
Deformation:	Plain Dents Dents on weld Buckles Ovality concerns Wrinkle Bends (hoop)
Crack/Crack Like:	Seam-weld anomalies SCC Plain body cracks Laminations Severe manufacturing defects
Axial Dominated:	Girth weld anomalies Geohazards Bending loads Thermal cycling Wrinkle Bends (axial)

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