

COMPOSITE REINFORCED COATINGS FOR THE INDUSTRIAL WORLD

PRE-IMPREGNATED
MOISTURE CURED

HIGH TEMP. & CHEMICAL
COMPATIBILITY

SYNTHO-GLASS[®]XT

THERMO-WRAP[™]

LEAK REPAIR
SOLUTIONS



VIPER-SKIN[®]

THERMO-WRAP[™] CF

HIGH PRESSURE
SOLUTIONS



PRODUCT CATALOG

ALL REPAIRS ARE NOT CREATED EQUAL

NRI OFFERS A FULL LINE OF CUTTING EDGE COMPOSITE SOLUTIONS FOR PIPE REPAIR AND REINFORCEMENT

Failure is not an option when a pipeline needs repair. That is why, since 1982, hundreds of companies around the world have trusted NRI to solve their pipe rehabilitation needs.

Our customers – Exxon, Mobil, Chevron, Tesoro Refining, to name a few – will be the first to say NRI's quality products and industry-leading solutions have successfully completed thousands upon thousands of pipe repairs, restorations, and reinforcements worldwide.

Today, the spectrum of NRI's composite solutions and service offerings are unrivaled in this highly specialized field. Utilizing NRI's in-house quality lab ensures that our materials deliver unparalleled product performance and conform to ASME-PCC2 and ISO TS 24817 codes. Our composite solutions range from carbon fiber and fiberglass, to a variety of aramid composite reinforcing systems.

Industries Served:

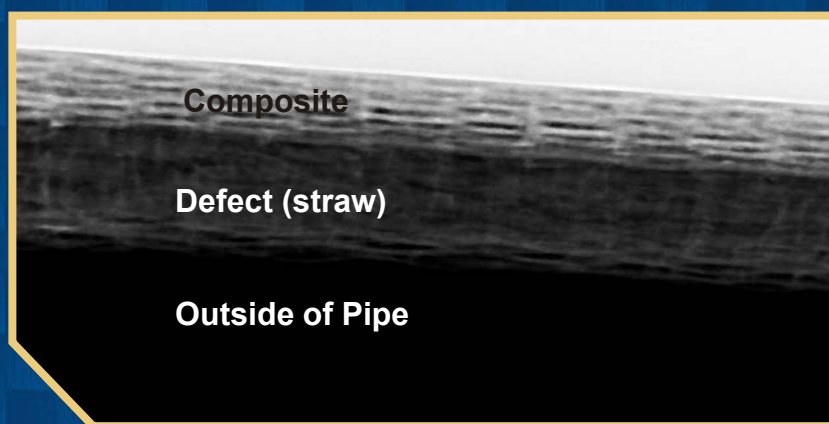
- Oil & Gas Distribution & Transmission
- Refining and Petrochem
- Industrial (Chemical, Food Processing)
- Offshore
- Marine
- Mining
- Water/Waste Water

Product Compliance:

- ASME PCC-2 article 4.1
- ISO TS 24817
- US DOT
- CSA Z662-07
- API 570
- ASME B31
- ACI 440

Technical Services:

- Provides A Full Suite Of Composite Repair Training Programs
- Site Supervision/ QC Services
- Composite Repair Conferences/ Seminars
- Customized-Design And Engineering Calculations



ASME PCC-2-2015
(Revision of ASME PCC-2-2008)





Innovative Composite Solutions

COMPOSITE REINFORCED COATINGS FOR THE INDUSTRIAL WORLD

EDUCATE

NRI-U is advancing knowledge, training, and understanding of composite repair systems



INNOVATE

R&D is patenting tomorrow's composite technology today



SUPPORT

From FREE Engineering Support, to installation oversight, we make sure jobs are done right



CONFIDENCE

Visit
neptuneresearch.com
for more information

THERMO WRAP INSPECTABLE Inspectable High Temperature Fiberglass Epoxy System

Description

- Engineered, highly conformable, bi-directional fiberglass using NRI's patented inspectable Thermo-Poxy™ epoxy
- High temperature, non-hazardous, chemically resistant system
- Easily monitored through radiographic inspection
- Engineered Composite Repair (ECR) System designed to meet or exceed ASME PCC-2, ASME B31, ISO TS24817, DOT, API, CSA Z662 standards



Installation Properties

- VOCs: None
- Pot Life: 75 Minutes @ 75°F (24°C)
- Working Time: 45 Minutes @ 75°F (24°C)
- Gel Time: Approx. 161 Minutes @ 70°F (21°C)
- Cure Time: Approx. 18 Hours @ 75°F (24°C)
- Service Temperature: < 300°F (149°C)
- Application Temperature: 50 to 280°F (5 to 138°C)
- Solids Content: 100%
- Shelf Life: 12 Months with recommended storage conditions

Typical Applications

- Flare lines, blow down lines, steam piping, cooling water lines
- Girth welds, elbows, tees
- Chemical processing lines
- Reinforced coating for elevated temperatures
- Corrosion repair
- Elevated temperature

Benefits

- Inspectable with radiography
- High temperature rating with an ambient-cured epoxy
- No heating or post-curing required
- Full factory engineering, calculations, and support
- Code compliant
- Patented polymer inspection capability
- Non-woven architecture allows for scalable increases in ply thickness

System	Thermo-Wrap Inspectable
Surface Preparation	SSPC-SP 11 (1-3 mil profile)
Filler Material	Thermo-Fill HT
Primer	Thermo-Poxy Inspectable
Fiber	Fiberglass

THERMO-WRAP™ CF

High Temperature Carbon Fiber Epoxy System

Description

- Engineered carbon fiber composite system utilizing high-strength, bi-axial hybrid carbon and glass fiber with NRI's patented Thermo-Poxy™ epoxy
- Designed to repair and restore substrates operating at elevated temperatures, while still curing at room temperature
- Engineered Composite Repair (ECR) system was designed to conform to and is recognized by ASME PCC-2, ASME B31, ISO TS24817, DOT, API, and CSA Z662 standards for nonmetallic reinforcing solutions



Installation Properties

- VOCs: None
- Pot Life: 75 Minutes @ 75°F (24°C)
- Working Time: 45 Minutes @ 75°F (24°C)
- Gel Time: Approx. 161 Minutes @ 70°F (21°C)
- Cure Time: Approx. 18 Hours @ 75°F (24°C)
- Service Temperature: < 300°F (149°C)
- Application Temperature: 50 to 280°F (5 to 138°C)
- Solids Content: 100%
- Shelf Life: 12 Months with recommended storage conditions

Typical Applications

- Flare lines
- Steam piping
- Girth welds, elbows, tees
- Chemical processing lines
- Elevated temperatures

Benefits

- High temperature rating with an ambient-cured epoxy
- No heating or post-curing required
- Full factory engineering calculations, and support
- Non-hazardous
- High flash point
- High tensile strength and stiffness

System	Thermo-Wrap CF
Surface Preparation	SSPC-SP 11 (1-3 mil profile)
Filler Material	Thermo-Fill HT
Primer	Thermo-Poxy
Fiber	Carbon fiber & fiberglass



SYNTHO-GLASS[®] XT

Extreme Strength Fiberglass Composite System

Description

- Unique, moisture-cured, bi-directional composite designed to repair and reinforce internal and external corrosion on pipes and pipelines
- Our pre-impregnated system ensures proper fiber-to-resin content ratios
- Engineered Composite Repair (ECR) system was designed to meet or exceed ASME PCC-2, ASME B31, ISO TS24817, DOT, API and CSA Z662 standards for nonmetallic reinforcing solutions
- Repair and reinforce virtually any geometry in minutes



Installation Properties

- VOC: None
- Working Time: 30 minutes 75°F (24°C)
- Set Time: 2 Hours 75°F (24°C)
- Resin Type: Moisture-cured, polyurethane
- Resin Application: Pre-impregnated
- Service Temperature: -50° to 194°F (-45° to 90°C)
- Application Temperature: 40° to 150°F (4° to 65°C)
- Shelf Life: 12 months with recommended storage conditions

Typical Applications

- Pipeline Integrity
- Transmission and distribution pipelines
- Oil and gas risers
- Girth welds on vessels and pipelines
- Straights, elbows, tees, nozzles, and flanges
- Process piping: chemicals, oil, gases, and water
- Atmospheric corrosion

Benefits

- Moisture-cured polyurethane resin reduces composite preparation time by 50%
- Installs in wet, rainy, or submerged environments ensures application in virtually any situation
- Flexibility permits application on odd geometries while eliminating diameter specific inventory
- Full factory engineering consultation and support, ensuring safe and successful repairs

System	Syntho-Glass XT
Surface Preparation	SSPC-SP 11 (1-3 mil profile)
Filler Material	Syntho-Poxy HC
Primer	Syntho SubSea LV
Fiber	Fiberglass



VIPER-SKIN®

Carbon Fiber Composite Reinforcement System

Description

- First bi-axial hybrid carbon and fiberglass polyurethane moisture-cured system, blending carbon's strength/stiffness with the ease-of-use of moisture-cured pre-impregnated, reducing installation time and cost
- Engineered Composite Repair (ECR) system designed to meet or exceed ASME PCC-2, ASME B31, ISO TS24817, DOT, API, CSA Z662 standards
- Can be applied in splash zone, sweating, or surface condensation applications
- Moisture-cure allows for subsea and wet environment applications
- Conforms to all diameters, shapes, welds, and irregular geometries



Installation Properties

- VOCs: None
- Working Time: 30 Minutes at 75°F (24°C)
- Set Time: 2 Hours at 75°F (24°C)
- Resin Type: Moisture-cured polyurethane
- Resin Application: Micro-controlled, Pre-impregnated
- Service Temperature: -50° to 194°F (-45° to 90° C)
- Application Temperature: 32° to 150°F (-0° to 65°C)
- Shelf Life: 12 Months with recommended storage conditions

Typical Applications

- Transmission and distribution pipelines
- Oil and gas risers
- Mechanical dents and defects
- Girth welds on vessels and pipelines
- Straights, elbows, tees, and flanges
- Process piping: chemicals, oil, gases, water, and steam

Benefits

- Moisture-cured polyurethane resin reduces composite preparation time by over 50%
- Installation in wet, rainy, or submerged environments ensures ease of application
- Full factory engineering consultation support, ensuring safe and successful repairs

System	Viper-Skin
Surface Preparation	SSPC-SP 11 (1-3 mil profile)
Filler Material	Syntho-Poxy HC
Primer	Syntho SubSea LV
Fiber	Carbon fiber & fiberglass



SOIL-TO-AIR & SPLASH ZONE CORROSION

Description

- The Syntho-Glass® line of products are patented and designed to repair and reinforce pipes, pipelines, and structures including timber piles, damaged by soil-to-air and/or splash zone corrosion
- Fiber-reinforced polymer (FRP) systems incorporate epoxy, polyurethane, and resins in combination with glass and carbon fiber for unparalleled strength, durability, and chemical-resistance
- Pre-impregnated composites save time and reduce costs, while ensuring proper fiber-to-resin ratio



Typical Applications

Prevent future corrosion and abrasion due to: soil-to-air corrosion, splash zone corrosion, crevice corrosion, galvanic corrosion, freeze/thaw and frost/heave cycles

- Transmission and Distribution Pipelines
- Process Piping
- Oil and Gas Risers
- Girth welds, elbows, tees, nozzles, flanges, and straights

Benefits

- Moisture-cured composite systems reduce preparation time by 50%
- Easily install in wet, rainy, or submerged environments
- Apply to virtually any shape or geometry
- Full factory engineering consultation and support

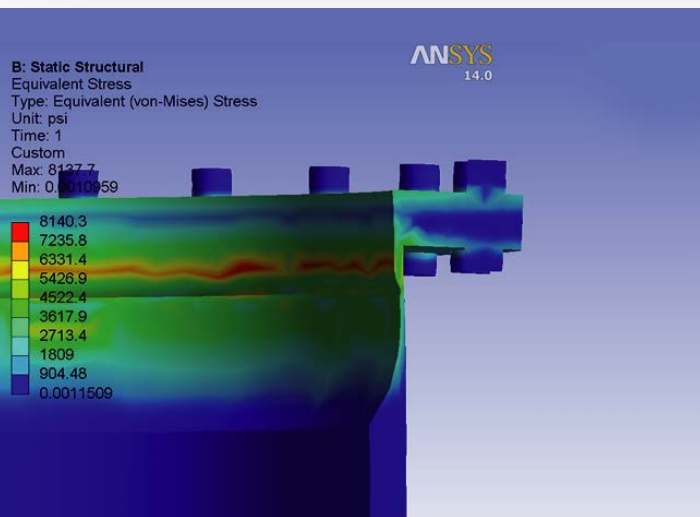
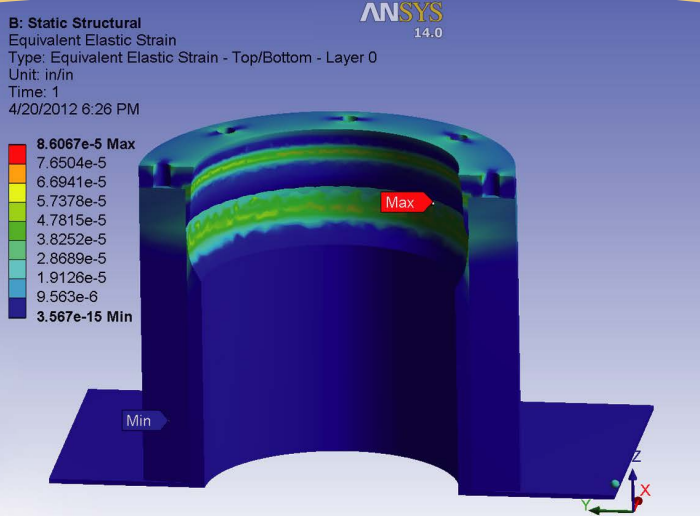
Engineering Services

- Structural analysis and design of projects
- Detailed design proposals
- Project-specific method statements and Quality Control (QC) hold points

TANK REHABILITATION

Description

- Composite repairs provide optimal solutions for the repair or retrofit of tanks and vessels
- High-strength, low-weight, conform to any shape, while maintaining structural integrity over wide range of temperatures and environments
- NRI's ISO 9001 quality manufacturing program ensures consistent material
- Trained, in-house engineering support
- On-demand Finite Element Analysis (FEA)



Typical Applications

- Full tank rehabilitation
- Structural retrofitting
- Patch repair
- Tank roof repairs
- Environmental protection

Benefits

- Quick external patch
- Long term life
- Numerous product options for diverse application scenarios
- Full factory engineering calculations, consultation, and support ensuring safe and successful repairs

Engineering Services

- Structural analysis and design
- ANSYS FEA Modeling software
- Detailed design proposals
- Project-specific method statements and Quality Control (QC) hold points



PRODUCTS



SYNTHO◇GLASS®

- Fiberglass, pre-impregnated composite, activated by salt or fresh water
- Repair/reinforce virtually any low psi pipe in minutes
- Initial setting time of 30 minutes (75°F/24°C), on copper, steel, stainless steel, PVC, fiber reinforced pipe, clay, concrete, rubber, and more



SYNTHO◇GLASS®UP/NP

- Syntho-Glass UP and NP Repair Systems were designed for leak repair applications on copper, steel, stainless steel, PVC, fiberglass-reinforced pipe, concrete, rubber, and more
- Combine Syntho-Glass & Syntho-Steel to repair joints, couplings, and leaks
- Syntho-Glass UP was designed to repair active leaks up to 60psi
- Syntho-Glass NP was designed to repair non-active leaks up to 300psi



SYNTHO◇GLASS®UV

- Aesthetically pleasing, non-yellowing composite providing UV stabilization for pipe coatings, where UV degradation is of concern
- Prevents future corrosion/abrasion due to mechanical impact, freeze/thaw and frost heave, soil-to-air/water-to-air corrosion, crevice corrosion, galvanic corrosion
- Can be used in immersion, or on below- or above-grade pipes and piles



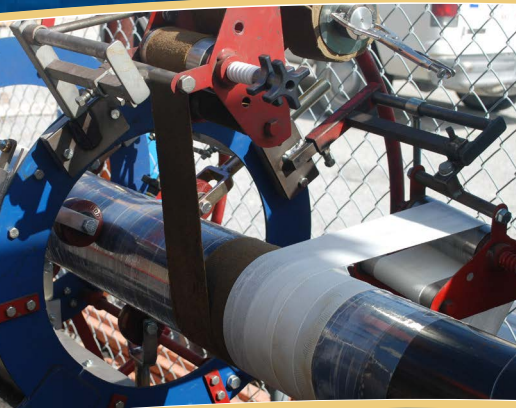
SYNTHO◇GLASS®FX

- Extremely conformable, thin, flexible, and lightweight
- Fiberglass, pre-impregnated composite, activated by salt or fresh water
- Repair/reinforce virtually any low psi pipe in minutes
- Initial setting time of only 30 minutes (75°F/24°C), on copper, steel, stainless steel, PVC glue joints, fiber reinforced pipe, clay, concrete, rubber, and more



SCAR-GUARD®

- Protects field joint coatings from abrasion, stresses, and scarring of directional drilling (HDD), and boring
- Creates abrasion-resistant, sacrificial outer laminate to protect pre-approved coatings including epoxies, shrink sleeves, and cold/hot-applied tapes
- Controlled set-times and extreme conformability provide fast installs in any environment



SYNTHO-SHIELD™

- Designed to mitigate splash zone corrosion and impact
- Two layer, two component system: petrolatum tape and Syntho-Glass
- Provides long-term mechanical and corrosion protection for pipes, flanges, valves, and related surfaces
- Pre-impregnated system designed to offer solution for corrosion, insulation, and waterproofing problems



TRIDENT-WRAP®

- Repairs non-leaking natural gas risers exhibiting wall loss up to 80% at <300psi (20.7bar)
- Eliminates atmospheric corrosion in accordance with Distribution Integrity Management Programs (DIMP)
- 8 layers allows the repair of corroded piping or risers without shut-down or replacement
- Conforms to ASME B31, DOT, API, and CSA Z662 standards for non-metallic reinforcing solutions



TRIDENT-SEAL®

- Live natural gas repair system permanently seals active leaks up to 60psi (4 bar) without interruption to service
- Third-party testing for long-term pressure retention has been conducted at 90psi (6 bar)

PRODUCTS



SYNTHO♦SUBSEAL™ LV

- Unique blend of liquid epoxy, polymer, and aliphatic polyamine curing agents that is able to displace water from wet surfaces
- Excellent adhesion, highly resistant to high pressures, temperature extremes, and chemicals and petroleum products
- Can be applied above- or below-grade
- Ships non-regulated by USDOT, IATA, IMO
- ISO 12944 High Durability Qualified



COMPOSITE♦GUARD™ FP

- System protects composites installed in areas requiring fire proofing
- Creates a low-conductivity thermal barrier between the composite repair's outer layer and an external flame
- Prevents composite from reaching maximum temperature rating and degrading or failing



SYNTHO♦SUPPORT™

- Designed to prevent corrosion or abrasion damage on pipe support areas
- Eliminates the need to paint future hard to reach areas
- Can be used in immersion and above- or below-grade
- Can be used for corrosion/abrasion prevention on steel (carbon and stainless), galvanized metal, concrete, fiberglass-reinforced pipe, iron, PVC, and wood



COMPOSITE♦CLAMP™

- Designed to seal pipeline leaks in conjunction with engineered composite systems
- Powder-coated carbon steel with an internal rubber patch
- 3.5" wide and available in lengths designed for diameters from 2" to 8"
- Clamps may be linked together to seal pipe diameters up to 24"



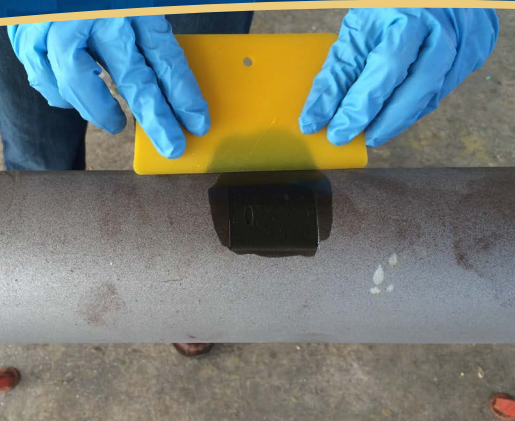
SYNTHO-POXY™ HC

- Two-part epoxy compound that cures quickly at ambient temperatures
- High compressive strength and bond make it excellent for repairing pitted metal and steel subjected to high pressure
- Resistant to many solvents, hydrocarbons, and adverse environments
- Non-hazardous and non-flammable system



SYNTHO-STEEL™

- Two-part, steel-reinforced epoxy putty
- Cures in minutes, and will not drip or sag, will set on wet surfaces
- Non-toxic: NSF 61 and BS6920 approved for use with potable water
- Can repair virtually any surface including metals, masonry, wood, ceramic, glass, and plastics
- Resistant to hydrocarbons, ketones, alcohols, esters, halocarbons, aqueous salt solutions, dilute acids and bases
- Non-hazardous and non-flammable system



THERMO-FILL™ HT

- Two-part carbon nanotube-reinforced epoxy filler
- Bonds to materials exposed to temperatures up to 300°F (149°C)
- Non-toxic, non-hazardous and non-flammable system
- When fully cured, resistant to hydrocarbons, ketones, alcohols, esters, halocarbons, aqueous salt solutions, and dilute acids and bases



THERMO-FILL™

- Two-part, titanium-reinforced epoxy putty
- Designed to bond and repair materials exposed to high temperatures
- Will not drip or sag; non-toxic, non-hazardous and non-flammable
- When fully cured, resistant to hydrocarbons, ketones, alcohols, esters, halocarbons, aqueous salt solutions, and dilute acids and bases

CIVIL PRODUCTS



TITAN® ♦ 118

- For repair of structural concrete including columns, beams, and slabs
- Uni-axial carbon fiber fabric, saturated with two-part, Titan® Saturant Epoxy
- Uni-directional fabric with primary, continuous fibers oriented in the 0° direction
- Designed for use in wide variety of environments
- High chemical resistance and high temperature ratings
- Conforms to ACI440 standards for non-metallic composite reinforcing solutions for concrete
- Titan 118 is an ICC-ES ESR-3548 listed product



TITAN® ♦ 218

- For repair of structural concrete including columns, beams, and slabs
- Unique, bi-axial carbon fiber fabric, saturated with Titan Saturant Epoxy
- Titan® 218 carbon fiber is oriented in the 0° / 90° directions with the 0° direction being the primary, continuous fibers
- Designed for use in wide variety of environments
- High chemical resistance and high temperature ratings
- Conforms to ACI440 standards for non-metallic composite reinforcing solutions for concrete



TITAN® ♦ SATURANT EPOXY

- Two-part, 100% solids epoxy designed for composite laminate repair in combination with our Titan® infrastructure repair system
- Designed to conform to ACI440 standards for nonmetallic composite reinforcing solution of concrete
- Epoxy system provides high tensile values using fiberglass or carbon fiber laminates



TITAN® ♦ TOP COAT

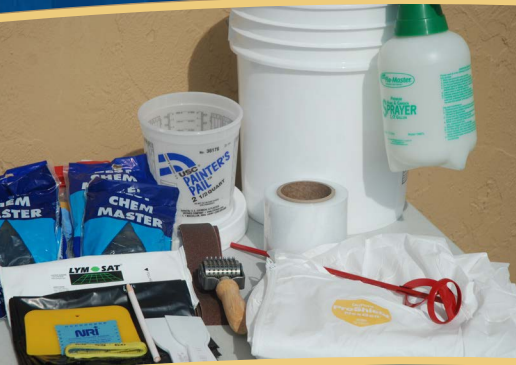
- Titan®-Top Coat is an aesthetically pleasing epoxy coating which provides a final protective layer over the Titan® structural repair system.

INSTALLATION SUPPORT



MARINE KIT

- Emergency repair kit designed to repair leaks aboard vessels, allowing the vessel to return to port
- Medium, Large and XL Damage control kits available for vessels up to 50'
- Kit includes everything necessary to install the repair



APPLICATOR TOOL KIT

- Recommended application tool kits to install Thermo-Wrap™ Inspectable and/or Syntho-Glass® XT
- Kits include everything necessary to install the specified system



SURFACE PREP

- Allmet Safety Tool: Only EX Certified Cold Work surface preparation tool of its kind that can be used in ATEX zones 1 and 2 (high flammable risk)
- Long-lasting cylindrical file works on difficult geometries including tees, elbows, and welds, cleaning steel to SSPC-SP 11, Power Tool to Bare Metal



SATURATION MACHINE

- The Resinator is a patented, epoxy field saturation machine
- Designed for use with NRI's Thermo-Wrap™ and Titan® Systems
- Saves time and money allowing faster field-saturation than traditional hand-saturation techniques
- Controls resin-to-fiber ratio for accurate saturation
- Constructed of lightweight, welded aluminum tubing, the Resinator can accommodate a variety of fabric widths up to 12"



Innovative Composite Solutions

3875 Fiscal Court, Ste #100
Riviera Beach, FL 33404
United States

Phone: 561-683-8992
Fax: 561-683-8366

Visit

neptunerresearch.com

for more information.