



An ISO 9001:2015
Certified Supplier

PRODUCT TECHNICAL DATA SHEET

Aquawrap® Bear™

Highly Conformable Bi-Axial Tubing Configuration

Aquawrap® Bear™ G-22 fabric is a highly conformable, bi-axial tubing glass fabric that is used around irregular shapes and anomalies. It comes pre-impregnated with our water-activated 22-77 resin system and is ready to apply right out of the bag. It can be used for the repair and reinforcement of existing mechanical systems, structures, and piping. The cured product is a very durable, high strength material, impervious to fuels, most chemicals and solvents. It permanently bonds to a wide variety of surfaces such as metals, composites, concrete, plastics and wood. This product ships DOT non-hazardous.

Aquawrap® is ready to apply, right out of the bag and cures by way of a chemical reaction with field-applied water. This offers considerable advantages over conventional cloth-resin systems in that there is no resin measuring, mixing, spreading, solvents, or dripping polymer mess.

PRODUCT PROPERTIES			
Working Time:	30-40 min. at 25°C (77°F)	Mix Ratio:	No mixing required
Application Temps:	4-93°C (40-200°F)	Service Temps:	-40 - 121°C (-40 - 250°F)
Cure Time (dry to touch):	30-60 minutes at 25°C (77°F)	Full Cure:	7 days at 25°C (77°F)
Usual Packaging:	Pre-Packaged Rolls	Shelf Life:	1 year
Chemical Resistance:	Acetone, mek, toluene, gasoline, ethyl alcohol and many others	Hardness:	90 Shore D - ASTM D-2240

TEST	BEAR™ FABRIC
Tensile Strength (warp direction). psi	31555
Tensile Modulus (warp direction), msi	1.98
Tensile load per ply (warp direction), pounds per inch of width	1196
Thickness , mils	38
HDT , °F (estimated)	325
CTE , in/in / °F (estimated)	8.2 e ⁻⁶
Tg °F	288
Bond strength to steel with BP-1 Adhesive , psi	1360

ATTENTION: All of the following data are based on laboratory conditions, at room temperature. Field conditions can radically change the characteristics of this product. Higher temperatures will lessen the working life of the product. Allow adequate time for application. Field testing is strongly recommended prior to application.

Design and Application Instructions

Design guidelines, application notes and wrap calculations for various applications are available from the factory.

Storage

Store at 60-90° F in a dry place. Keep from freezing. Dispose of any leftover material.

Handling

Aquawrap® is shipped in a sealed protective bag to protect it from atmospheric moisture. Because it cures with the application of water (and air humidity), care must be taken in handling the sealed bags to prevent puncturing or scuffing, which would cause the product to cure in the bag. Once the bag is opened and the Aquawrap® is exposed to the humidity in the air, it will begin to cure and will gel within about 60 minutes. Therefore, work must be well planned prior to opening the bag. Aquawrap® requires no other special handling or application procedures. This resin is slightly irritating to certain sensitive people; it will give off a small amount of carbon dioxide vapor while curing; and the cured resin is permanent and very difficult to remove, so gloves, safety glasses and other personnel protection equipment appropriate for the task must be used.

Shelf Life

12 months from date of sale, in an unopened package, stored in cool warehouse conditions.

Caution – Read MSDS prior to use. Some persons may be irritated by this product. Use caution and PPE. This product is for industrial use by professionally trained personnel only. Please read and understand all application instructions prior to using.

Warranty

The manufacturer warrants that the goods delivered hereunder shall be free from defects in material and workmanship. The WARRANTY shall extend for a period of one (1) year after date of delivery of such goods to customer. This warranty is void in the event that the protective pouch has been damaged. THE MANUFACTURER MAKES NO WARRANTY EXPRESS, IMPLIED, (INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR INTENDED PURPOSE), OR STATUTORY, OTHER THAN THE FOREGOING EXPRESS WARRANTY. Failure of customer to submit any claim hereunder within the Warranty Period after receipt of such goods shall be an admission by customer and conclusive proof that such articles are in every respect as warranted and shall release the manufacturer from any and all claims for damage or loss sustained by customer. In the event customer submits a claim for defective material within the required Warranty Period, the parties agree that customer's sole and exclusive remedy shall be the replacement of such defective goods or a refund of the price of the defective goods. To the greatest extent practical defective goods shall be returned to the manufacturer for analysis. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR SPECIAL, INDIRECT OR INCIDENTAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, LOSS OF USE OF GOODS OR ANY PART THEREOF, EVEN THOUGH THE MANUFACTURER HAS BEEN NEGLIGENT OR HAS BEEN INFORMED OF CIRCUMSTANCES WHICH MIGHT GIVE RISE TO SUCH DAMAGES.

Data and parameters listed herein and in our data sheets have been obtained by Field-Applied Composite Systems LLC using materials under carefully controlled conditions. Data of this type should not be used by engineers as design specifications, but rather as indicative of ultimate properties obtainable. Before using, user should determine the suitability of the product for its intended use. In determining whether the material is suited for a particular use, such factors as overall application configuration and design, field conditions and environmental criteria to which it will be subjected should be considered by the user.



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INSTALLATION PROCEDURE FOR PIPING

Aquawrap®

G-03 Fabric – G-05 Fabric – C-2 Carbon Fabric and Bear™ types

READ AND UNDERSTAND ALL MSDS's FOR THESE PRODUCTS PRIOR TO HANDLING OR INSTALLING THEM. CHEMICAL GLOVES AND SAFETY GLASSES ARE MANDATORY. A FACTORY AUTHORIZED TRAINING SESSION IS REQUIRED FOR INSTALLATION ON ANY CODE REGULATED PIPING SYSTEM. THE FOLLOWING INSTRUCTIONS SERVE AS AN ADDITION TO TRAINING.

1. This product is not recommended for pipes with leaks or pipes which may develop leaks.
2. Planning is an essential part of a good installation. The elements of a good plan are having a proper wrap design (Note that the calculators we have available will assist in the development of a good wrap design.). The next step is to develop a wrap plan. This should include the number of lifts required and for long wraps segmenting the wrap on the pipe. Note that the number of layers per lift should be limited to 25 for the G-03 fabric 8 for the G-05 and 5 for the C-2 fabric. It is also important to mark the areas on the pipe so that the wrap gets installed in the proper position along the length of the pipe.
3. Major surface contamination buildup should be removed prior to any high quality cleaning. This is often done with water-based pressure washer machinery and high-alkalinity detergent wash.
4. Paint may or may not need to be removed, depending on the type of repair. Generally any paint or coating must be removed. All pipeline tape wraps, bitumen coatings, insulation, etc. must be removed.
5. Abrasive blast to a near white (NACE No.2/SSPC-SP 10) level all surfaces that the composite will contact. This is adequate for most work. Installations requiring structural adhesion, or for isolated patch applications where the patch is held to the work surface by its adhesion, must be white metal blasted (NACE No.1/SSPC-SP 5). Where abrasive blasting is dangerous or impossible, surfaces that the composite will contact should be abraded (scratched up) with the equivalent of an 80-grit abrasive and the metal surfaces should be brought to the equivalent of the appropriate NACE level mentioned above. If abrasive cleaning is not allowed, chemical cleaning of the affected are must be done. In addition, a high strength, high build epoxy should be applied over the worst areas and allowed to cure before the application of the composite reinforcement. (Fig.1 and Fig. 2). For wet or submerged applications high pressure washing may be adequate.
6. For pipes with dents with gouges the gouge must be ground out to remove any residual cracks. Dye pen or mag particle inspection must be used to verify that any residual cracking has been removed. There must be at least 60% wall remaining in the gouge area. The dent should then be filled with structural filler compound per paragraph 8 below.



Fig. 1 – The sandblasting done on this line revealed more damage than was visible during the initial inspection. Proper cleaning is essential to a sound repair.

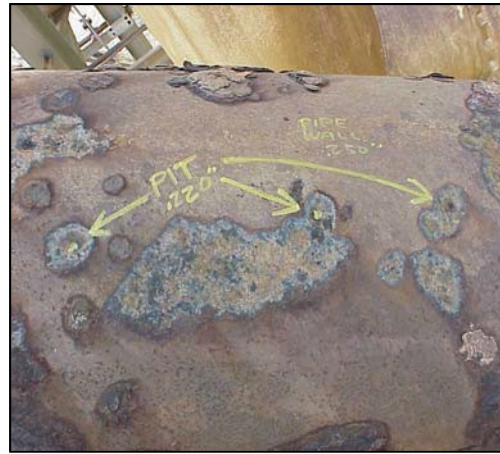


Fig. 2 – Surface preparation as shown is generally unacceptable. In cases where the pipe cannot be properly cleaned, it should be noted that the final ultimate properties of the composite layup may be compromised (such as bonding to the steel surface).

7. Excess dust and residue from the abrading should be blown or wiped away with oil-free compressed air or new, clean solvent wipes. Acetone or hexane are suggested for low temperature applications. **Cleaning preparations such as degreasing fluids which may leave a residue should not be used.** Special precautions should be observed when cleaning surfaces operating at high temperatures (above 100°F), or for applications where a low flash point solvent is inappropriate. For this type of cleaning, use of Bromothane S solvent is recommended. It is non-flammable and leaves no residue on the surface.
8. All sharp corners, corrosion pits, dents, leak repairing patches and wall/diameter offsets greater than 1/8th-inch (3mm) (1/16th-inch for fluid-tight installations) should be smoothed with a high compressive and high flexural strength filleting and filling compound. The recommended load transfer for structural applications is BIO-FIX 911 or BIO-DUR 563 (Fig. 3 and Fig. 4). For wet concrete BP-4 is recommended. Alternative load transfer materials may be used only for non-structural applications. Most circumferential piping welds and the like require no special filleting or smoothing. Check with a straight edge to confirm the surface is level.



The defect must be completely filled in and the compound must be smoothed and leveled out. Remove high spots and fill any low spots.

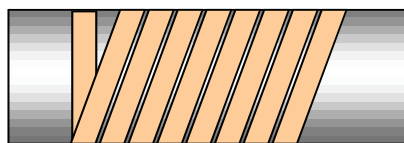


Use a straight edge to confirm evenness

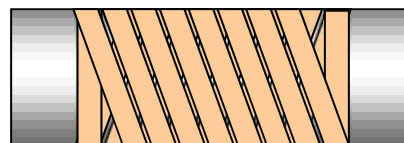
9. After filling and smoothing, wipe the surface again with a clean cloth and a solvent cleaner. Remove any dust or foreign matter from the surface of the pipe in the area of the repair.
10. Plan the wrap. Most applications are best done with spiral wrapping, but some require circumferential wrapping. The appropriate design calculator will assist in the wrap selection process. It is usually best to begin the wrap at one end of the damaged area. In the event that the damaged area is too long to complete the wrap before the resin cures the wrap must be done in sections. It is good practice to mark the areas of the pipe to be wrapped.
11. Apply primer. It is important to select the proper primer for the application you are working on. BP-1 is generally best for dry applications. For wet steel BIO-DUR 563 is recommended. For wet concrete BP-4 is recommended. The preferred method to apply BP-1 is a short nap paint roller. For underwater installations painters' mits are recommended. For most applications it is best to allow the primer to tack off for several minutes but in any case the wrap should be applied before the adhesive is fully cured. Refer to our list of primers for more information, or contact our office for a recommendation.

SPIRAL WRAP: (Note that for underwater installations spiral wrapping is preferred over circumferential wrapping as the longer pieces of fabric are easier to manage as they do not tend to float away from the column.)

- a. Open the first Aquawrap® pouch and begin the first layer of the wrap by doing one complete wrap, straight around the pipe.
- b. When the first wrap is applied, continue wrapping and start a spiral toward the far end of the area to be wrapped. The wrap should be spiraled down the pipe with no edge to edge overlap. Continue to spiral the material around the pipe without overlapping so that each wrap's bottom or beginning edge just touches top or ending of the preceding one. Continue to wrap until the roll ends or the opposite end of the area to be wrapped is reached. Proceed to pull significant tension on the roll and wrap it around the pipe until the requisite number of layers is applied, thoroughly spraying with water, **EVERY** layer, as it is being wrapped.
- c. When the roll has been completely applied, begin another roll starting the new roll's beginning end back about 6 inches onto the end of the previous roll.
- d. When the opposite end of the area to be wrapped is reached stop and thoroughly spray the wrapped area with water. At this end of the wrapping area, make one complete straight wrap around and then begin spiraling the fabric the opposite way toward the beginning of the wrapping area. As before, the pitch of the spiral should such that the edge of each layer just touches the preceding layer without overlap. Spray each subsequent layer with water.
- e. When the required number of layers has been applied secure the end. (See "SECURING THE WRAP", below.) If there is excess material on the roll which is not needed immediately for another wrap simply continue wrapping it until the roll is finished.



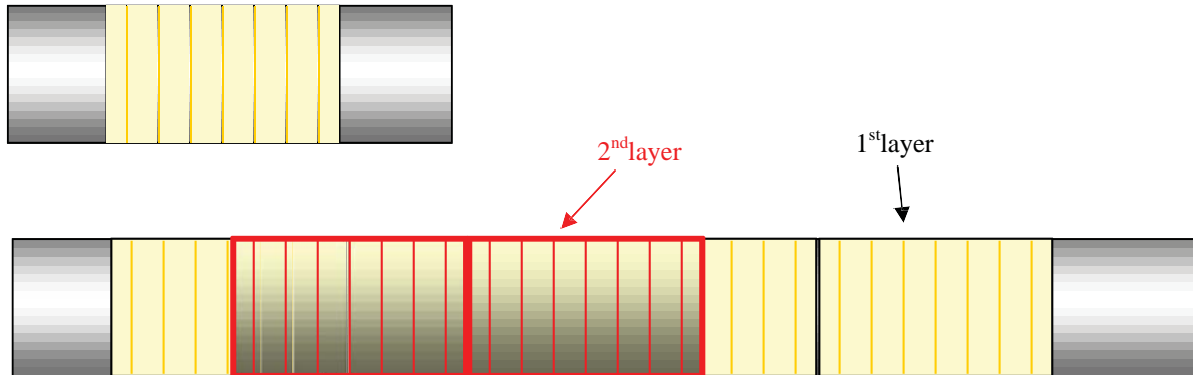
First Wrap



Second Wrap

CIRCUMFERENTIAL WRAP:

- a. Begin the first course by applying the required number of layers of fabric to one end of the area to be wrapped. Proceed to pull significant tension on the roll and wrap it around the pipe until the requisite number of layers is applied, thoroughly spraying with water, **EVERY** layer, as it is being wrapped.
- b. Lay the second course next adjacent to the first. Adjacent layers should be edge to edge.
- c. Continue wrapping until the opposite end of the pipe has been reached.



- d. If more than one roll of material is required per course, overlay the first layer or fabric with the second by about 6 inches.
- e. Secure the entire wrap.
- f. Press the end of the roll down onto the pipe surface to be wrapped. An assistant should hold this starting point in tight contact with the pipe at all times.

Exceptions:

- i) When passing around or over obstructions, relax the tension while pressing downwards into the repair surface. Continue on around and do not start pulling tension again until you are certain that you are not pulling the Aquawrap[®] off of the obstruction. Apply extra layers in these regions.
 - ii) When transitioning from a large diameter down to a smaller diameter (for example, a concentric reducer) do not pull tension in the area of the transition, or the Aquawrap[®] will slip off of the larger diameter.
12. While wrapping, tiny droplets of water should be visible squeezing through the weave of the Aquawrap[®] fabric. If at any time there is a lack of such droplets visible, more activating water should be misted over the Aquawrap[®] surfaces with any appropriate sprayer.
 13. If wrapping is interrupted, and the applied material cures to the “dry to touch” stage, BP-2 Primer should be brushed or rolled onto the dry surfaces before continuing with wrapping.
 14. Tack the termination of the final layer of the final roll to the composite structure with Stricture Banding[™] or FACS Tiger Tabs[™]. All high performance repairs should be over-wrapped with Stricture Banding[™]. Apply the first wrap of Stricture Banding[™] smoothly and with only slight tension; subsequent layers should be tightly stretched while wrapping.

Note: For areas of diameter transition (see Exceptions, above) the Stricture Banding[™] should be applied first, tightly, only to the large diameter. A very light tension must be used in the actual transition area; followed by a full tension application in the smaller diameter area. Special techniques are available to overcome this situation where warranted. Contact F.A.C.S. LLC Technical Support for details.

15. Perforate the surfaces of Stricture Banding™ using any suitable pointed object, such as the Perforator Tool, available from F.A.C.S. LLC.
16. When cured to the touch, remove all Stricture Banding™. After the installation is fully dry (about 120 minutes) thumb-nail test), tie-in to existing/adjacent coating on both sides of Aquawrap®. F.A.C.S. LLC can furnish high quality paint for this over-coating. For buried pipeline applications a 2 part epoxy coating or tape coat is sufficient. For water-submerged applications, a special primer and over-coating is required. Standard poly pipe tape may be used for applications below ground, provided there is not a significant amount of ground water.

INSTALLATION CHECKLIST INCLUDING HOLD POINTS

Aquawrap®

Instructions should be carefully read and understood prior to beginning the installation. Also read and understand the MSDS sheets for these materials prior to beginning the installation. Proper factory training is required, as the following checklist covers only the basic steps of proper installation. If you have technical questions, please call F.A.C.S. LLC Technical Support at 626-633-0294. Chemical gloves and safety glasses are mandatory, along with any other PPE specific to your application environment.

Measurements, Temperatures, and Product in line confirmed

Proper repair materials confirmed

Pipe surface preparation

Filler material applied and smoothed

Mix primer and apply

Hold – Allow primer to become tacky. This takes about ten minutes.

Wet-out fabric and install onto piping

Apply Stricture Banding™

Hold – composite should cure to “fingernail” hard before proceeding

Remove Stricture Banding™ completely

Check for voids and unacceptable imperfections

Apply PowerCoat™ Paint or other environmentally suitable coating. For under water installations either **BD** DUR 560 or BP-4 are recommended.

Aquawrap® should be allowed to completely cure (up to 7 days at 77°F) before exposure to maximum **db** condition