



Corrosion Control International

Inshore & Offshore Corrosion Protection

FAQ

Listed below are frequently asked questions and answers regarding CCI's Retrowrap products and services.

1) Please explain in detail how the gel works (chemical proposition).

The inhibited gel is used in combination with the wrap where the outer wrap panel forms a watertight environmental barrier.

During installation, the hydrophobic elements within the gel repel water creating an anaerobic state inside the wrap. The inhibitor contains a proprietary blend of O² scavengers, biocides and reactive components which pacify the iron oxide on the pipe surface exactly the way inhibitors function "inside" pipelines. However, in our case, the performance is enhanced by the induced hoop tension within the wrap and the fact that the inhibitor is held static within the gel against the pipe surface.

2) Do you have any references from independent inspection authorities, for example Lloyds or DNV?

We have a test report from ITI Laboratories commissioned by Shell, Exxon, Chevron, Amoco and Texaco to test four methods of retrofit riser protection.

3) Retrowraps can be easily removed for regular checks. What is your opinion of ways for these checks?

The simplest method to establish a test procedure is to fit a polished steel coupon of known weight under the wrap near the flange closure during installation. These can be removed at pre agreed periods during the evaluation typically one year, three year, five year and weighed. Any change represents corrosion loss per year in microns. This technique is well computed against accepted formulas. We have recently completed a very large project in Puerto Rico where our client is currently considering fitting remote corrosion rate monitoring which will avoid the requirement to remove the wrap. Due to the gel within the felt distorting the sound waves, ultrasonic testing will not provide a truly accurate picture. We could provide (2) 1.5m lengths which overlap and interlock together but this will be more expensive than a standard 3m length. However it has been requested before in Lake Maracaibo for the same reasons.

4) Do you have any other suggestions how to check the working of Retrowrap after installation instead of removing the whole wrap? How can a customer be sure that corrosion has stopped completely?

Remote monitoring or much simpler as already discussed above, I would suggest coupons inside the wrap located near the closure flanges. Please note the wrap will stay in place temporarily after the flanges have been unbolted due to the gel being in total contact with the steel.

5) What would it cost to have the anti-fouling system applied?

When specifically requested, we use a low surface energy coating produced by International Paints called Intersleek. This is applied to the wrap outer jacket immediately after manufacturing and before the wraps are gelled. The increased costs due to excessive handling, etc., is 35 to 40 percent. However, please note these systems, although very effective, are mechanically weak and subject to damage. Subsequently we are currently investigating a thermal sprayed copper nickel coating, but at this time, we have no data as to long term adhesion of the copper film to the wrap.

6) Can the wrap/bolts withstand the pressures of a 900 bar water jet?

Marine growth does not anchor itself very tightly to the wrap fabric. Therefore 900 bar water jet pressure would not be necessary to clean the wraps. If the HD fabric (6.5mm) is used, then there would be very little risk of damage to the wrap panel and closure flanges or bolting system.

7) Are there any extra handicaps installing Retrowrap around a diagonal riser/pipe?

Retrowrap can be installed on diagonal bracing or on diagonal piles as long as the closure flange is positioned along the longest side. The surplus material on the opposite side to the flange can then be cut in to suit the pipe joint contour.

8) If the risers are affected by pitting corrosion, how can we convince a customer that the gel does stop the advance pitting corrosion? Please explain how this works.

Once the corrosion pits are encapsulated within the gel, they are in an anaerobic state. However, if the pit depth is greater than 6mm, they should be filled by hand applying extra gel before installing the wrap.

9) Is there a sell by date for the wrap with and without the gel in case the wrap is not immediately installed?

Shelf life is approximately 2 to 3 years depending upon ambient temperature as long as the wraps are packaged for possible long-term storage. Under normal conditions, wraps may be stored for greater than 12 months which is typical within the offshore industry. However, I have inspected some wraps that sat in an offshore storage forgotten for over 3 years and these were found to be okay.

10) If the gel is not applied at the CCI but rather at customer's site, how is it done?

The wraps must be gelled using hot flood coating techniques. We can see no benefit to not gelling them prior to shipment or coating on site other than political e.g. to have local labor content within the finished product. We have done this in Saudi Arabia and Ireland. However, we do sell extra gel for hand application over irregular shapes.

11) What kind of nylon is used?

Nylon 6/6. (Nylon is a trademark of Dupont)

12) The margins of pipe diameters vary quite a bit due to corrosion in places. What are the margins?

We can accommodate a diametric change of 1.5cm e.g. 4.5cm on circumference. However, we can design to accommodate diametric changes as great as 6cm if we know this situation exists in advance.

13) Once the wrap is put around the pipe and held together with the long bolts, is it possible to rotate the wrap? If so, will this damage the felt and gel?

“No.” The holding power of the gel will prevent any radial movement of the wrap once in

circumferential contact with the riser. The only way the wrap can be repositioned is to open it up at least 180°. This will not damage the system, although gel will be seen to have transferred to the pile surface. This situation is normal and will not affect long-term performance.

14) In case of diagonal pipe, would you recommend to have the flange closure on top of the pipe or underneath?

On a diagonal or battered pile as stated in 9, the flange is always positioned on the longest side. The opposite side can then be cut to the contour of the interface between the vertical and angular members.

15) What are clear guidelines for when to use Retrowrap HD?

The HD was specifically designed for the offshore industry. Basically any area that is likely to receive heavy abrasion or impact will benefit from using the HD. Although this is approximately 30 percent more expensive than the standard fabric. Please remember this relates to a fraction of the installation and long-term service costs. It is perhaps worthwhile noting that for some inshore applications where piles are known to be subject to regular impact from construction or service vessels, the HD fabric has proven under these circumstances to be the only economic solution available.

16) What would be the cost for hiring a diver? Is the cost for having a diver about the same as the cost for Retrowrap?

There is no data concerning the cost of hiring a diving team. Retrowrap is expensive when compared to paint or fiberglass tape. However the quality of the final installation should be taken into consideration. Surface preparation time should be less and durability of the product of the Retrowrap should be greater than the other systems.

17) How long would it take to install the following standard wrap sizes? 6 pcs. 18" OD 8 pcs 18" OD

Installation for a Retrowrap on a riser 18" OD x 3m long should be less than 45 minutes. This assumes that two divers are in the water.

18) To what extent do the risers need to be cleaned? Would it be the same if paint had been applied? Is it okay if there are still a few places left on the riser with rust when Retrowrap is installed?

Cleaning for Retrowrap is not as extensive as required for paint. Yes it is okay if a few places are left with some rust as long as you remove the loose scale. The cleaning method of choice is hydro blasting. However, some clients use hand cleaning with scrapers and a powered wire brush. If there are any deep pockets of corrosion, they will be filled with gel from the Retrowrap when it is tensioned around the piling. If needed, extra Retrogel can be supplied.

19) What material is best for the bolts?

We supply 316L stainless steel hardware, but we can get whatever the customer requires. Not slightly better but "significantly" better at end, however, for conductor protection, the reduced thickness of the standard fabric has been found an advantage when the guide tube inside diameters to connector outside diameter's clearance is very small.

20) Is the Retrowrap Std strong enough for the North Sea or would the HD be more suitable?

Whether the customer uses standard wrap or HD, it's their choice. The standard wrap has a very high abrasion resistance which is the important factor to consider when selecting a fabric. The HD fabric has slightly better abrasion resistance. However, its tensile strength is twice that of the standard fabric. The standard fabric would have a tensile of 8927 kilograms per meter (500 lbs/in of width). If the platform is far offshore where large waves will be impacting

the structure, then the heavy duty fabric is preferred by most clients as the wave's suction force is significantly higher offshore than near shore. Because the cost difference between the two is not that great, most customers in the North Sea have selected the HD fabric. Installation costs for either system would be about the same.

21) The quoted prices include everything except for tools and divers. Is this correct?

Prices quoted are inclusive, ready to install. The diver would have to supply the necessary tools.

22) Are the tools easily available in the correct sizes?

Yes, tools are easily available in the correct sizes. We will supply wrenches that will fit the bolt heads.

23) How do you position the wrap to start installation? Are "suspender straps" always required to hold the wrap in place and are they included in the price?

The "suspender straps" are generally used on pilings greater than 24". Lifting lugs are permanently attached to the wrap's outer skin via mini pulley blocks through which lifting ropes are connected to the suspender system which has been pre attached to the pile. The installing crew then easily adjusts the vertical height by pulling the lifting ropes. The suspender strap utilizes a ratchet load binder similar to those used to secure loads on the back of trucks.

24) Is Retrowrap fireproof?

Retrowrap is not fire proof; however fire retardence can be custom blended into the base material.

25) What type of guarantee is there?

We guarantee material workmanship but this would not cover impact damage from workboats or other heavy objects that are along side a platform.

26) What are the positive and negative points of underwater paint, tape and Retrowrap?

The only positive thing about underwater paint is that it is probably considerably less expensive in the can to Retrowrap. In areas where there is no wave impact, such as above the splash zone and deep underwater, a paint system probably would survive providing there is adequate substrate preparation.

Tape systems do not have good impact resistance and were originally developed for underground pipelines and as such are not subjected to high frequency impact such as would be experienced from large waves and are subject to ingress of marine growth at the spiral joint. They are labor intensive to install correctly under water but the material cost is substantially less than Retrowrap. Retrowrap is a complete system. The design is such that it is only necessary to place the wrap around the pilings and tension the flanges together with hardware and you will obtain a high quality project with most of the workmanship being done in our factory and you don't have to rely on diver skills underwater to obtain a lasting product.

27) What is "Splash Zone" Corrosion?

Splash zone corrosion comprises of 3 zones e.g. atmospheric, splash and tidal and is by far the most aggressive and difficult location to provide a long term solution where highly oxygenated water combines with tidal rise and fall to create a constant changing wet and dry substrate on structures such as jetties and loading berths, bridge piles, berthing dolphins, etc. The interface between the pile and the deck is a high stress location and as such vulnerable to accelerated stress corrosion. The long term protection of this area through the splash zone to below LAT is our core business.

28) How do you solve "Subsea" Corrosion?

Subsea corrosion protection is achieved by three solutions:

- a. Galvanic/sacrificial anodes require no external power source where zinc and aluminum alloy anodes are attached directly to the structure. The protective current comes from the electrochemical reaction created by the connection of the anode material to the more noble or electrically positive metal of the structure. Advantages are relatively easy installation, low maintenance and less inspection. Disadvantages are limited current output, the need for electrical isolation of the structure and must be used in conjunction with a good splash zone coating system.
- b. Imprest current is provided from an external DC power source. The current is delivered to the anodes which are much lighter in weight than sacrificial anodes and are manufactured from a material which has a very low or essentially inert dissolution rate since the anode simply serves to introduce the protective current into the electrolyte (seawater). Typical anode materials are silicone iron, graphite and more recently Platonized titanium or silver lead for use in seawater. Advantages are lightweight adjustable output, large current available and can be applied to poorly coated or bare steel structures. Disadvantages should only be installed by CP qualified corrosion personnel. Requires constant external power source and requires regular maintenance and monitoring.
- c. The alternative to above is to extend the use of barrier coating systems e.g. our jackets down to below seabed elevation in some areas of the world where skills are not readily available to install the system described above. Also some end users still retain the mistaken belief that barrier coatings are the only way to provide long term protection. Today major structures are still being designed without the benefits of CP!