



CCS Wrap Systems

Single Ply

CCS is the manufacturer of anti-corrosion industrial quality Wrap Systems. The Manufacturing plant is situated in Bennington, Vermont. CCS has been approved by SHELL oil Co. as a single source supplier for marine wraps in the United States, has supplied wraps to DOW Chemicals, La Guardia airport Authority and others.

Wrap Specifications

General

This induced tension wrap system, affords both active and passive protection to sub-sea and splash zone structures. The wrap acts as a physical barrier to the corrosive environment, depriving the structure surface from coming in contact with oxygenated seawater. The active protection factor are the corrosion inhibiting agents within the wrap, which arrest and deter further corrosion to the structure.

Additional anti fowling agents can be applied to the outer surface of the wrap to eliminate barnacle growth.

Positioning the wrap on the pile is targeted at the splash- zone, exact location is determined by the customer.

To maintain its position once installed and provide a good association between the substrate and the active components of the wrap, the membrane is stretched around the pile like an elastic band, generating hoop tension.

The required hoop tension is a function of the strength of wave suction force, which the wrap has to overcome in order to maintain its position, and the hydrostatic pressure differential to prevent water ingress due to tidal fluctuations. Suction forces are primarily due to fluctuations in hydrostatic pressure resulting from natural wave motion, therefore, larger waves produce higher suction forces and the hoop tension required to overcome these forces will be higher. Likewise, high tide ranges, require higher hoop tension.



CCS has acted upon experience in the field which has successfully demonstrated, that flexibility in varying the thickness of both the outer skin and the interior matrix in conjunction with the size and number of the reinforcing filaments, according to the customers specification, will yield higher value for the customer. This resulted in the use of two dedicated fabrics, designed to function within the limits of both budgetary restraints and technical excellence.

Single Ply Wrap System

CCS single Ply Wrap is a dedicated custom designed marine fabric, structural skin in its construction, where a memory enhanced polyamide (nylon 6/6) reinforcing scrim, is sandwiched between two alternative layers of polyurethane and inline. These are in turn co-bonded to an inner penetration- resistant polyester felt, to provide a combined total thickness of 4.75 mm.

Prior to shipment, the fully assembled wrap is factory impregnated with a thixotropic hydrophobic gel, containing 10% corrosion inhibitors at the rate of 0.8 lb. /sq. ft.

The wrap is thus ready for a one piece immediate installation on location.

Special note: shot blast surface preparation, primers, fillers and tapes **are not** required for the installation of the wraps.

Jacket Length

CCS Single Ply Wrap can be supplied in any continuous lengths up to 177”.

Closure Flanges

Closure flanges are full length reinforced "geon" fiber extrusions. The flanges are drilled at 3/8” centers to accept SS 316L bolt sets.

Note: CCS flanges are not subject to cracking or creep during service life. Geon is the proprietary name of a material developed by BF Goodrich for boat bumpers.



Packaging and Storage Requirements

CCS Single Ply Wraps are transported from our site in Vermont in dedicated packing crates designed for on-site open storage.

Special crates for overseas shipping or such allowing multiple opening/ closing are available upon request.

Note: covers or inside storage facilities are not required.

Weather Limitations for Installation

CCS Single Ply Wraps can be installed in any weather, considered safe for surface/shallow depth diving operations, by the local safety officer in charge of site.

Please note, long term storage under freezing point temperature, may call for using a heat box to bring wrap gel temp. up to 10 c. prior to installation.

Pile Cleaning Requirements and Recommended Methods.

Mechanical removal of marine growth and delaminated iron oxide is necessary. Insure that the pile surface is free from sharp projections such as: Barnacle and Pedicel greater than 40 mill.

Alternative methods:

- LP water jet
- Air powered rotary brush (whirl away)
- Contra rotating hydraulic articulated ship's bottom cleaner (MC211)

Note: Hand scraping is a slower but acceptable alternative.



Advantages of Wrap Installation

CCS Single Ply Wraps are designed to reduce substrate preparation to the simplest form. This therefore, significantly reduces installation time and obviates the requirement for a “hot work” permit. As shot-blasting is not required, environment considerations are reduced to almost nil.

Installation supplies:

1. Hardware supplied with Wraps:

Sufficient 3/8” x 1/2” stainless steel 316L bolts, nuts, washers and nylon lock nuts.

2. Tools supplied with Wraps:

- Set 1/2” Acme threaded Draw Bolts
- 7/8” AF 1/2” Drive Extended Socket.
- 7/8” AF Combination Spanner
- 9/16” AF Combination Spanner
- 9/16” Extended Socket

3. Tools required from Platform Stores

- 1/2” Drive, 300 ft/lb, Variable Setting Air Driven Impact Wrench
- 1 lb. Hammer
- Hacksaw*
- Straight Edge*
- Plywood Cutting Board*
- Stanley Knife*
- Tube White Marker Paint*

*These tools are required only in cases where wraps need length adjustment.

Work Procedure:

Substrate Cleaning

Marine growth, delaminated paint and iron oxide must be removed by water jetting or other procedure adopted by the client. The pillar must be smooth without protrusions.



Note: White metal preparation is not required.

Wrap assembly:

1. Take the Acme threaded draw bolt with washer attached and using the 7/8" extended socket fitted to the impact wrench, drive the bolt through the first hole in one flange and fabric until the reduced diameter and protrudes about 2". Continue fitting the draw bolts into every other hole with an extra bolt in the last hole.
2. Mark the riser to located position of top of wrap to insure centralized or correct positioning in accordance with drawing.
3. Remove plastic protective backing. Then position wrap around riser. Using impact wrench power attached to upper most draw bolt, drive through opposing edge of fabric and flange. Continue until reduced diameter and thread appears sufficient to install 1/2" nut and washer using 7/8" spanner. After first checking the final position of the wrap on the riser, tighten flange, using 7/8" combination wrench, until wrap is self-supporting.
4. Continue driving remaining draw bolts through opposite flange and fir nuts and washers to all bolts.
5. Using impact wrench with deep well socket, commence tensioning operations. Keep the wrap flanges parallel by alternately tightening all bolts. Continue tightening until both flange faces are pulled together.
6. Fit bolts as specified, stainless steel monel**, titanium** with washers through each alternate hole between draw bolts. Fit second washer and tighten to draw flanges together,

**Monel or titanium bolts are available at additional cost.

7. Reverse impact wrench and remove draw bolts, taking care to retain nuts and washers.
8. Fit bolts into vacated draw bolt holes. Using impact wrench fitted with correct socket, tighten all bolts until flanges compress fabric into face-to-face contact throughout the flange length.

Inspection: The bolt length has been selected so that when (3) three threads are protruding for the nylon lock nut, the wrap has been correctly tensioned.

9. Inspect wrap outer surface to insure that it is free from wrinkles and to see that the gel has exuded from the circumferential extremities. Fit and tighten nylon lock nuts. Check that (3) three threads are protruding.



Site Wrap Length Adjustment

When required, CCS Single Ply Wrap can be shortened to suit site conditions, using tools listed above. .

- A. Measure out length required to within 3” of nearest bolt hole. Mark flanges with white marker paint, then slide flanges off the wrap until marked area is clear of wrap panel.
- B. Take a hacksaw and cut flanges keeping cut line as square as possible. Push flanges back into original positions.
- C. Using marker paint draw cut lines onto wrap panel.
- D. Place wrap, gelled face down, onto cutting board. Using straight edge and Stanley knife, cut fabric to required length. Avoid ragged edge knife cuts.

Note: If cut line is greater than 3” from original hole, it is acceptable to drill flanges to provide additional holes.

Suggestions:

- We suggest divers work in 3– 4 men teams where pile cleaning operations start one week before jacket installation.
- From similar projects around the world, one team with 2 divers in the water and 2 divers topside on work floats should install on pre-cleaned piles, an average of 8-10 piles per day.
- Equipment: U shaped work float, compressed air or hydraulic power pack for impact wrenches.
- Note: CCS supplied installation tools are designed to accept ½” square drive.

Crew training

CCS will provide installation instruction and training in shop at Bennington.

On site instructor available upon request.



Quality Control

All wraps supplied by the factory will be serial numbered from which full traceability for each individual wrap can be obtained.

When wrap shipments arrive on site, crates should be inspected for external damage, immediate report to CCS is mandatory in case of damage.

Upon first opening the case, wrap quantity should be inspected followed by a report to CCS in case of discrepancies.

Daily Inspection

Inspection should be carried out daily on jackets installed:

- Check flange tightness (using gauge provided).

- Vertical alignment and flange orientation if provided by the client.

- Check outer skin of jacket for damage.

- Note wrap number and enter on inspection report.

- Transfer serial number on to a built schedule.

Monitoring of Corrosion Effect:

CCS recommends that one out of ten jackets should be fitted at time of installation with three corrosion rate, Independent lab coupons, in upper, center and lower positions. Each coupon will be supplied from the manufacturer in a dedicated shipping envelope with a serial number etched on to the exterior surface. The time, date and position of installation should then be written on the shipping envelope and further entered on the inspection installation report.

CCS recommends that one year from completion of all installation, one pile where coupons are fitted, be selected at random, the jackets opened, coupons removed and returned to the coupon supplier for analysis. The suppliers report will provide corrosion rate in mills. The original will be sent directly to the client with a copy to CCS.



Warranty

CCS provides a written warranty for a period of 10 years.

PLEASE FEEL FREE TO CONTACT US WITH EVERY QUESTION OR INFORMATION REQUIRED.

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