Field Service

AMERICAN
SPIRALWELD PIPE

THE RIGHT WAY

AMERICAN
SPIRALWELD PIPE

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Note: The contents of this Field Service Guide are provided for informational purposes and convenience. It remains the responsibility of the installing contractor to comply with the requirements of the project's plans and specifications, and in the event of a conflict, the terms of the plans and specifications shall govern and control. However, to the extent any sales representative or other agent or representative of AMERICAN makes any statement that conflicts with the contents of this Field Service Guide, the contents of the Field Service Guide shall govern and control, and it shall be the responsibility of the installing contractor to comply with the terms of the Field Service Guide, subject, however, to the preceding sentence.

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Field Service
Product Introduction

❑ DELIVERY

❑ HANDLING
- Nylon straps or slings
- No chains or cables
- Padded forks and carriage on forklift

❑ STORAGE
- Stringing
- Sand bags
- Dirt berms
- End caps to remain in place until immediately before pipe is laid
- Bracing
  - Wood or steel screw jacks
- Care should be taken to protect coating while stored on site

❑ BUNKS
- Property of ASWP and may be asked to return
- Not intended for site storage of pipe

❑ TOOLS
- "Shoe horn" type device (similar to a car leaf spring)
- Sleever bar or pry bar
- Porta Power jacks
- Holiday detector
- Propane torch for shrink sleeves

❑ JOINT MATERIALS
- Shipped loose
  - Shrink sleeves
  - Repair tape and primer
  - O-ring gaskets and joint lube (gasketed joint pipe only)
  - Mastic filler

❑ JOINT ASSEMBLY
- Lap-Weld
  - ASWP's assembly recommendations attached
- O-Ring
  - ASWP's assembly recommendations attached
  - Feeler gauge, check each joint
- Methods and tips:
  - Hinge
  - Insertion blocks
  - Markings for maximum insertion (welded pipe)
  - Markings for minimum insertion (o-ring pipe)

❑ JOINT COATING - Field applied exterior and interior
- Shrink sleeve
  - CANUSA recommendations attached
  - Covalence recommendations attached
- Joint tape (if shrink sleeves are not used)
- Joint interior grout
  - Per project specifications
  - ASWP's recommendations attached

❑ TAPE REPAIR
- Preparation
- Various types of damage
- Holiday detection
- Polyken YGIII recommendations attached
  - Must comply with project specifications

❑ CEMENT MORTAR LINING REPAIR
- ASWP's recommendations attached

❑ PIPE MARKINGS
- Unique project identifiers (customer name, project number, mill sequence number, etc.)
- Sequenced mark numbers
- Field top identification

❑ BRACING
- How to remove
- How to replace
- How to adjust

❑ DAMAGED PIPE
- When to call - If in question call
- Who to call
  - ASWP Project Specialists - 866-442-2797
- Information to provide
  - MK #
  - Sequence #
  - Station
  - Full description of problem
  - Pictures

❑ ATTACHED LIST OF ATTENDEES

❑ COPY WITH ATTACHMENTS PROVIDED TO INSTALLING CONTRACTOR

The above topics are being covered as a service to the installing contractor and are intended to address the fundamentals required to familiarize a crew with steel pipe. It remains the responsibility of the installing contractor to comply with all requirements of the project's plans and specifications. A more comprehensive volume of installation guidelines are available in the American Water Works Association (AWWA) Standard, C604 Installation of Buried Steel Water Pipe – 4 inch (100mm) and Larger.

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Welded Lap Joint Assembly Recommendations

Inside Weld Only, Post Backfill

This information pertains to the field assembly of welded lap joints when the welding is to be performed on the inside of the pipe, after the exterior joint has been prepared and trench backfill has been placed to a minimum of 12" over the top of the pipe, and prior to inside joint coating application. This method is commonly referred to as "Weld After Backfill."

I. Joint Assembly

1. Lower pipe into position, always using care to prevent damage to the coating. Handling methods must be followed in accordance with ANSI/AWWA standards and AWWA M11 to prevent coating damage. Should damage occur, it must be immediately repaired in accordance with ANSI/AWWA standards and the enclosed repair procedures.
2. Approach spigot end of previously installed pipe by lowering bell of next pipe at slight angle.
3. Allow the bell to overlap the spigot of the pipe section previously laid. This overlap distance shall be the joint lap indicated on the ASWP joint detail sheet. It is always good practice to mark the appropriate overlap distance on the spigot with an approved paint stick prior to laying the next pipe section.
4. A tack weld (optional) 2" to 4" in length can be field applied where the bell overlaps the spigot. Application of this tack weld will help create a hinge point that will aid in the assembly of the joint, and prevent the pipe from slipping off the spigot during assembly and backfilling operations.
5. Allow the pipe section to lower into final position. On occasion the bell may need some intervention by the pipe laying crew for proper assembly. Always make sure that the pipe is properly braced and, as a result, the pipe ends are substantially round. When necessary, a wedge shaped device, such as a tapered car leaf spring ("shoe horn"), may be used to help guide the bell over the spigot. Deflected pipe may require removal of tack weld to facilitate alignment. Reapplying a tack weld may help prevent the pipe from disengaging during backfilling operations.
6. Alignment should be verified and adjusted as required.

II. Application of Heat-Shrinkable Sleeve

Application of heat-shrinkable sleeves shall be performed in accordance with ANSI/AWWA C216 and the sleeve manufacturer's recommendations.

III. Backfilling

Specified backfill material shall be placed in the trench and compacted in accordance with contract specifications. Backfill must extend a minimum of 12" over the top of the pipe prior to application of the inside weld.

IV. Joint Weld

1. Welding can be performed at any time after the backfill has been placed to a minimum of 12" over the top of the pipe.
2. Prior to welding, the joint gap should be equalized as required by placing wedges at appropriate locations. The joint can then be tack welded at four or more equally spaced locations around the circumference of the pipe to maintain the gap. By not taking measures to maintain an equalized gap, the gap may accumulate excessively at one or more locations.
3. Weld shall be applied in accordance with the contract documents.

V. Interior Joint Finish - Grouting

A cement grout shall be applied in accordance with ANSI/AWWA C205 and American's Interior Joint Grouting Recommendations.

Note: These recommendations are for informational purposes only. American SpiralWeld Pipe Company, LLC (ASWP) assumes and accepts no responsibility for proper assembly, installation, or quality of workmanship performed by the installing contractor.

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O-Ring Joint Assembly Recommendations

Proper assembly of an o-ring joint is critical to the successful operation of the pipeline. The following step-by-step guidelines should be observed during the installation of all o-ring joints.

I. Joint Assembly

1. The bedding should be placed to the required thickness in such a manner that the pipe is evenly supported throughout its entire length. A bell hole should be placed at every bell end to facilitate assembly of the joint, verification of gasket containment, and application of joint coating.

2. As a standard, o-ring pipe should not be laid in a downhill direction on a slope greater than 10% without consideration being given to properly anchoring the pipe.

3. Prior to engagement of the joint, the inside of the bell must be cleaned of foreign matter, as required, and coated with water soluble American Pipe Lube. Once the pipe is in position to be engaged, the spigot must be cleaned of foreign matter, as required, and coated with pipe lube. Once coated, care must be taken to keep the bell and spigot ends free of dirt. The pipe ends should be substantially round during assembly of the joint.

4. Prior to placement on the spigot, pre-stress the o-ring gasket by folding it in half and stretching it as much as possible by hand. Once pre-stressed, place the o-ring gasket into the spigot groove. To equalize the gasket tension, insert a rounded instrument, such as a dowel, rounded end screwdriver, or hammer handle, between the gasket and the groove. Move the instrument around the full circumference twice and then withdraw the instrument.

5. To help verify equal insertion of the spigot during assembly, mark the outside of the pipe at four locations (top, bottom, and both spring lines) at a distance of the nominal engagement + 1" from the spigot end.

6. Insert the spigot end about 1" into the bell and verify that the end is centered within the bell and that the pipe being engaged is collinear with the previous pipe prior to engaging the full distance. During the initial insertion, care must be taken to assure proper alignment of the two ends (ends must be square to one another) and containment of the gasket in the spigot groove.

7. Without using excessive force, insert the spigot end as far as it will go into the bell, but not less than the distance noted on the joint detail drawing.

8. Once the spigot is completely inserted, the appropriate joint deflection, or pull, can be accomplished by disengaging one side as noted on the laying drawings. This deflection should never be more than that noted on the joint detail drawing.

9. Do not proceed with further installation until first verifying that the joint was correctly assembled and that the gasket is fully contained within the groove and did not roll out of the joint during assembly. Use of a feeler gauge to verify that the gasket is not displaced at any point around the circumference of the joint is critical. If a gasket has been rolled, disassemble the joint, remove and discard the rolled gasket, place a new gasket on the spigot, and reassemble the joint. Destroy the removed gasket so that it cannot be used on future joints.

10. When handling or installing pipe, occasionally a bell, spigot, or the assembled joint may unknowingly be bumped, resulting in a slight flattening of that area. The damage may be so slight that it is not readily visible, but becomes apparent, even in a properly assembled joint,

when inspecting with the feeler gauge. If damage of this nature occurs, disassemble the joint and repair the flat spot(s) on the bell/spigot. It is best, when possible, to rotate the pipe being inserted such that the two initially affected areas will not be in contact after the joint is reassembled. Reassemble the joint and proceed from step 8 above.

11. Once successful assembly of the joint is complete, sufficient backfill should be placed to prevent movement of the pipe due to successive installation.

II. Application of Heat-Shrinkable Sleeve

Application of heat-shrinkable sleeves should be made in accordance with ANSI/AWWA C216 and the sleeve manufacturer's recommendations.

III. Backfilling

Specified backfill material should be placed in the trench and compacted in accordance with contract specifications.

IV. Interior Joint Finish - Grouting

A cement grout should be applied in accordance with ANSI/AWWA C205 and American's Interior Joint Grouting Recommendations.

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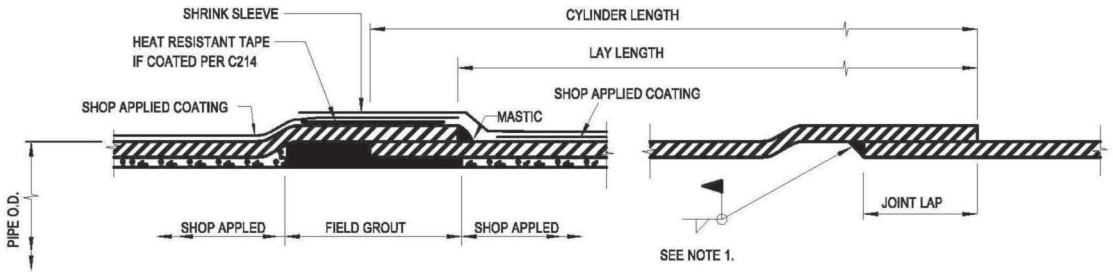
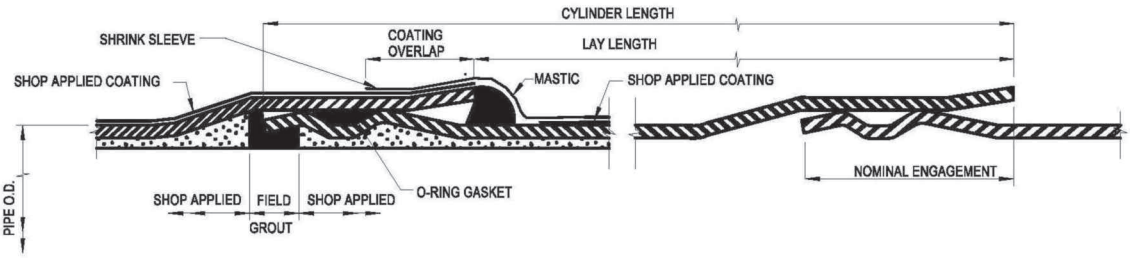
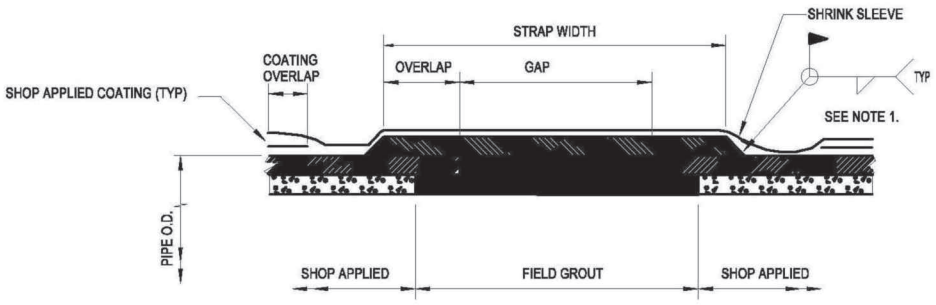
TYPICAL JOINT DETAILS



STANDARD WELD BELL JOINT DETAIL



STANDARD O-RING JOINT DETAIL



STANDARD BUTT STRAP DETAIL

NOTES:

1. JOINTS CAN BE WELDED INSIDE AND / OR OUTSIDE DEPENDING ON SPECIFIC PROJECT REQUIREMENTS.
2. REFER TO THE PROJECT SUBMITTAL PACKAGE FOR SPECIFIC JOINT DIMENSIONS PRIOR TO INSTALLATION.

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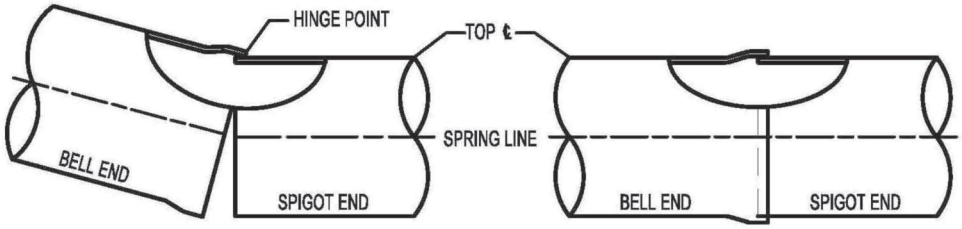
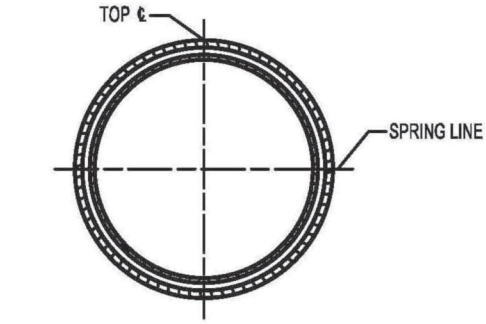
FIELD SERVICE GUIDE

WELDED LAP JOINT ASSEMBLY

NOTE: THE FOLLOWING ARE SUGGESTED GUIDELINES FOR TRAINED PERSONNEL EXPERIENCED IN ASSEMBLY OF WELDED LAP JOINT PIPE. IF REQUIRED, AMERICAN SPIRALWELD PIPE CAN PROVIDE TRAINING ON THE RECOMMENDED PROCEDURE TO ASSEMBLE THIS TYPE OF JOINT.



STEP 3 STEP 4



STEP 5

STEP (1) CLEAN PIPE ENDS AND CHECK FOR DAMAGE.

STEP (2) MEASURE THE REQUIRED JOINT LAP ON THE TOP CENTERLINE (HINGE POINT) AND EACH SIDE OF THE SPRING LINE OF THE SPIGOT END. PLACE A MARK OR STOP AT THESE POINTS.

STEP (3) ALIGN TOP CENTERLINES WHILE PLACING THE BELL OVER THE SPIGOT AT A SLIGHT ANGLE AS SHOWN. PLACE A TACK WELD (OPTIONAL) APPROXIMATELY 3" - 4" LONG AT THE TOP CENTERLINE.

STEP (4) SLOWLY LOWER BELL OVER SPIGOT MAINTAINING STRAIGHTNESS. MAKE SURE THAT THE SPIGOT END DOES NOT "CATCH" ON THE BELL END. IF THIS HAPPENS, USE OF A PRY BAR, PORTA POWER JACK, OR WELD DOGS MAY BE NECESSARY TO FACILITATE ASSEMBLY.

STEP (5) AFTER COMPLETING THE ENGAGEMENT, CHECK THE RESULTING JOINT FOR GAPS. IF NECESSARY, THE GAP CAN BE EQUALIZED BY DRIVING SHIMS AROUND THE CIRCUMFERENCE, OR THE SPIGOT END CAN BE "JACKED-AND-TACKED" AROUND THE CIRCUMFERENCE. REGARDLESS OF THE METHOD USED, THE GAP SHOULD NOT EXCEED THE CONTRACT REQUIREMENTS AFTER WELDING.

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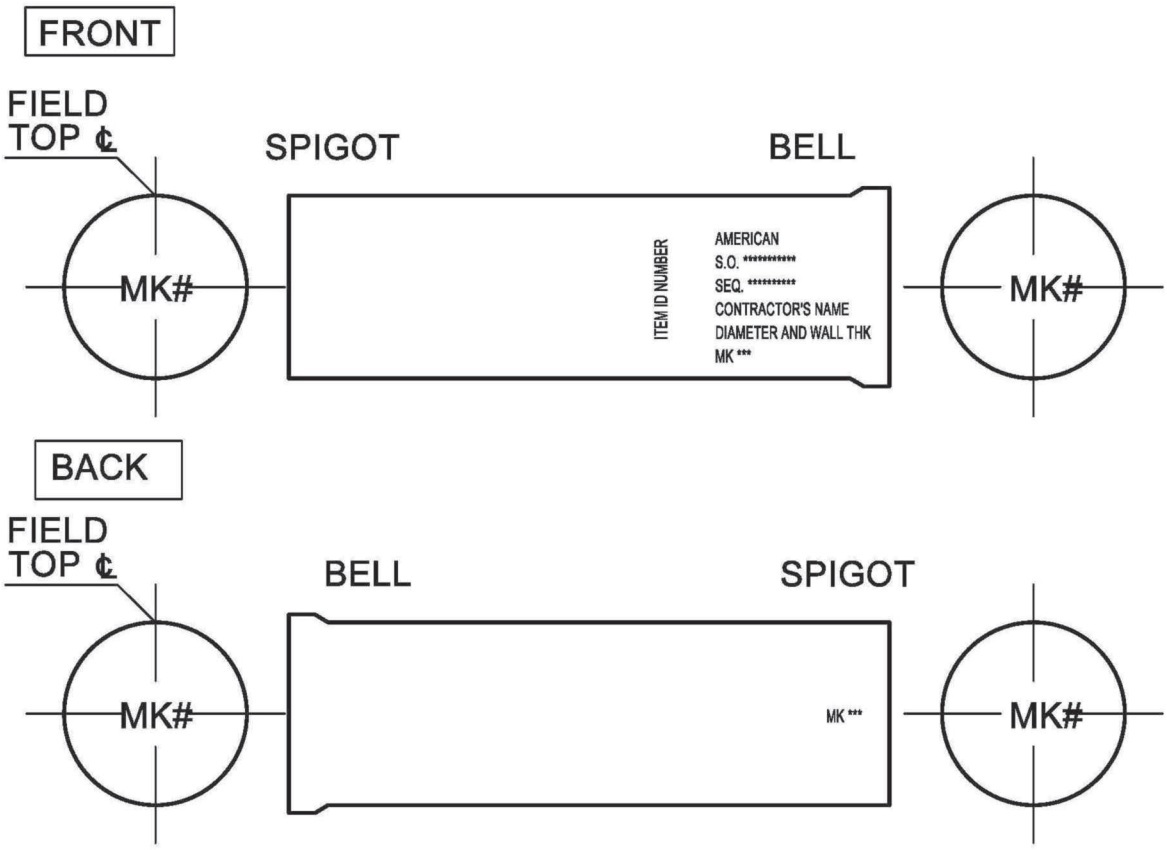
TYPICAL PIPE IDENTIFICATION



DEFINITIONS:

S.O.: IDENTIFIES THE ASWP PROJECT NUMBER

SEQ.: IDENTIFIES THE CYLINDER FOR INTERNAL TRACKING AND DOCUMENTATION

MK#: RELATES TO PLACEMENT ON LAYING DIAGRAM

NOTES:

1. THE STANDARD LABEL SHALL BE PLACED USING NON-FADING BLACK PAINT. THE LETTERS AND MARK NUMBERS SHALL BE 2" IN HEIGHT.
2. FITTINGS SHALL HAVE SAME MARKINGS AS STRAIGHT PIPE.
3. MARK END CAPS WITH MARK # USING NON-FADING BLACK PAINT (NOT APPLICABLE TO PIPE WITHOUT END CAPS). LETTERS SHALL BE 12" IN HEIGHT.
4. MARK PIPE AS SHOWN RELATIVE TO FIELD TOP ℄ WHEN APPLICABLE.

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Exterior Joint Protection

I. Joint Coating

Two primary methods are used for field coating the joints of steel pipe. One method uses heat-shrinkable sleeves. The second uses cold applied tape. Reference to, and compliance with, the contract documents with respect to external joint protection is the contractor's responsibility.

II. Heat-Shrinkable Sleeves

When heat-shrinkable sleeves are being utilized, please refer to our submittal package to confirm which type of sleeve is being furnished. The specific application requirements of the sleeve manufacturer should be followed. The recommendations for three types of shrink sleeves have been attached to this document for your reference.

III. Cold Applied Tape

Recommendations vary slightly depending on whether the joints are gasketed, welded prior to coating, or welded after coating (weld after backfill method).

Materials:

a. Rags - required to thoroughly clean area
b. 4" paint brush
c. Primer
d. Filler tape (if required)
e. Tape "wrapster" (if required)
f. Approved solvent (if required)
g. Wire brush (if required)

1. Pipe surface should be free of mud, wax, grease, oil, or any other foreign material. Visible oil or grease should be removed using an approved solvent that will leave no residue on the pipe surface. When the joint has been welded on the outside, all flash rust, burrs and weld slag should be removed using a wire brush. Pipe surface to be taped should be completely dry and clean prior to the application of the primer/adhesive (primer).

2. The primer should be thoroughly mixed and agitated prior to application. Apply the primer by brush, sprayer, or roller (most common is brush application). Cover the entire exposed pipe surface and for a distance of 4" beyond the limits of the area to be tape coated. Primer coverage should be uniform without floods, drips, runs, or sags. Primer shall be completely dry upon tape application.

3. Where required by the shrink sleeve manufacturer or the contract documents, a filler material compatible with the tape system should be applied in the step down area of the mating joint surfaces.

4. Joint tape should be stored in a relatively warm area (ideal tape temperature is a minimum of 70° F). The joint wrap tape should be applied circumferentially and, where required, should have a minimum overlap of 1" onto itself. 6" joint tape may be applied by hand, but wider tape must be applied using a hand-held tape wrapster. The joint tape must extend a minimum of 3" onto the shop-applied tape and bond to it. Wrapping should proceed clockwise, starting at the 10 o'clock position and extending to the 2 o'clock position, to prevent backfill pulling at the tape ends. Two layers should be applied at the joint with no primer between layers.

5. Where a weld after backfill method is used, the joint should be prepared and coated as described above. Following the application of the two tape layers, a third layer of a high-shear tape should be applied (without additional primer) completely covering the previous tape. **The pipe must be completely backfilled prior to welding on the inside.**

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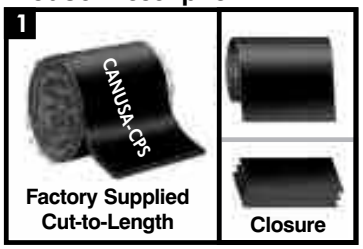
Aqua-Shield™ AQW

Two-piece protective bulk roll with separate closure

Product Description



Aqua-Shield™ AQW is typically shipped in pre-cut lengths. Closures are shipped either in bulk rolls or pre-cut. The adhesive is protected from contamination by an inner liner.

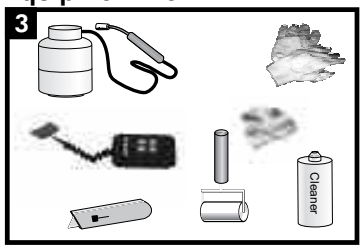
Storage & Safety Guidelines

2

To ensure maximum performance, store Canusa products in a dry, ventilated area. Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements. Avoid prolonged storage at temperatures above 35°C *(95°F)* or below -20°C *(-4°F)*. Product installation should be done in accordance with local health and safety regulations.

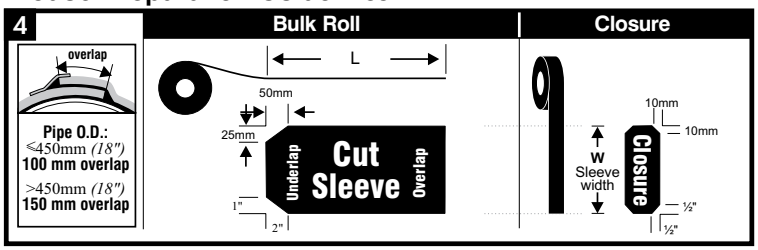
These installation instructions are intended as a guide for standard products. Consult your Canusa representative for specific projects or unique applications.

Equipment List



Propane tank, hose, torch & regulator.
Appropriate tools for surface abrasion.
Knife, roller, rags & approved cleaner.
Digital thermometer with suitable probe.
Standard safety equipment; gloves, goggles, hard hat, etc.

Product Preparation Guidelines



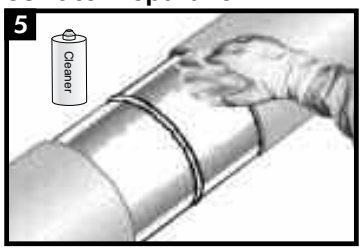
As a guideline, cut the required lengths of Sleeve material (L) and Closure material (W) from the bulk roll as follows

L = Coated Pipe circumference + overlap dimension **W = Sleeve Width**

Refer to chart below for pipe O.D. and overlap dimensions

Ensure that the sleeve and closure are not damaged or contaminated. Trim corners as shown (optional).

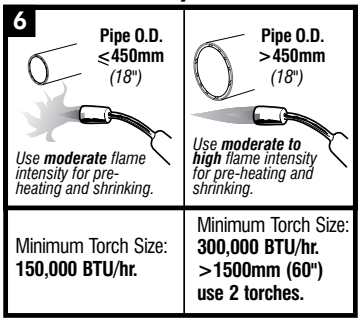
Surface Preparation



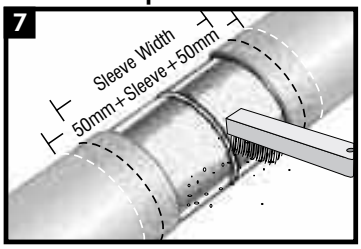
Clean exposed steel and adjacent pipe coating with cleaner to remove the presence of oil, grease, and other contaminants. Changes in profile at butt-weld straps and bell & spigot details should be filled with an approved filler tape sealant prior to sleeve application.

Pipe O.D.	Overlap
≤ 450 mm (18")	100 mm (4")
450 mm - 1500 mm (18"-60")	150 mm (6")
1500 mm - 3800 mm (60"-150")	300 mm (12")
>3800 mm (150")	600 mm (24")

Flame Intensity & Torch Size



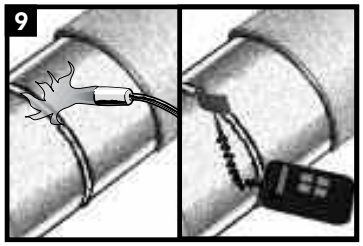
Surface Preparation



Ensure that the pipe is dry before cleaning. The steel joint area must be cleaned to a minimum of a wire brush finish. It is recommended to lightly abrade (with a hand tool) the pipe coating adjacent to the weld area to a distance of 50mm (2") beyond each end of the sleeve width.

Wipe clean or air blast the steel and pipe coating to remove foreign contaminants.

Pre-Heat



Pre-heat the steel joint area using propane torches such that no moisture is visible (typically temperatures of 40-60°C *(100-140°F)* are recommended on sleeve area). On pipe diameters greater than ***1220mm (48")***, use two torches on opposite sides. Apply the sleeve rapidly to minimize loss of pre-heat.

CANUSA-CPS is registered to **ISO 9001:2000**.

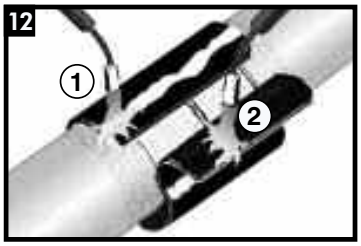
Part No. 99060-047

Aqua-Shield™ AQW

Sleeve Installation

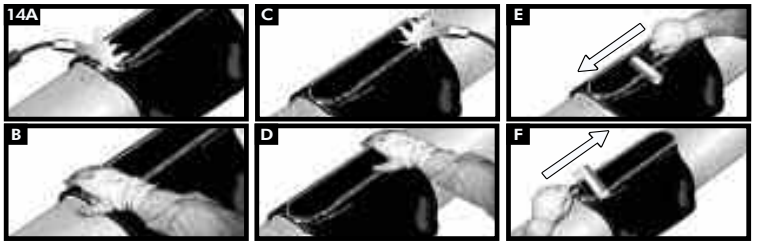
Partially remove the release liner and gently heat the underlap approximately 150 mm (6") from the edge.

Centre the sleeve over the joint so that the sleeve overlaps between the 10 and 2 o'clock positions. Press the underlap firmly into place and remove the remaining release liner.

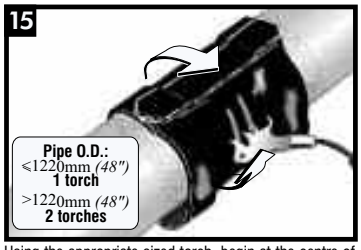


Wrap the sleeve loosely around the pipe, ensuring the appropriate overlap. Gently heat the backing of the underlap and the adhesive side of the overlap. Press the overlap into place.

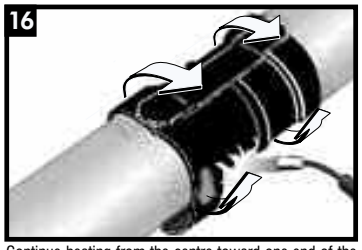
Remove any release liners from the closure. Centre the closure on the overlapping sleeve. Press down firmly.



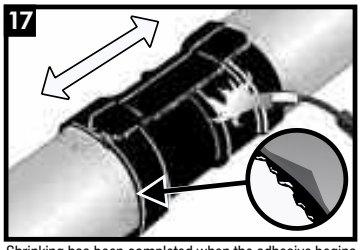
Gently heat the closure and pat it down with a gloved hand. Repeating this procedure, move from one side to the other. Smooth any wrinkles by gently working them outward from the centre of the closure with a roller.



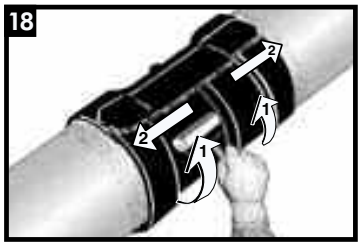
Using the appropriate sized torch, begin at the centre of the sleeve and heat circumferentially around the pipe. Use broad strokes. If utilizing two torches, operators should work on opposite sides of pipe.



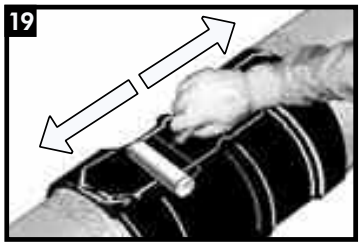
Continue heating from the centre toward one end of the sleeve until recovery is complete. In a similar manner, heat and shrink the remaining side.



Shrinking has been completed when the adhesive begins to ooze at the sleeve edges all around the circumference. Finish shrinking the sleeve with long horizontal strokes over the entire surface to ensure a uniform bond.

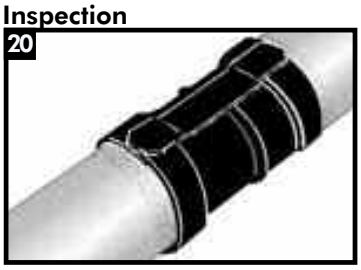


While the sleeve is still hot and soft, use a hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve, as shown above. If necessary, reheat to roll out air.



Continue the procedure by also firmly rolling the closure with long horizontal strokes from the weld outwards.

Inspection



Visually inspect the installed sleeve for the following:
- Sleeve is in full contact with the steel joint.
- Adhesive flows beyond both sleeve edges.
- No cracks or holes in sleeve backing.

Backfilling Guidelines

After shrinking is complete, allow the sleeve to cool prior to backfilling. To prevent damage to the sleeve, use selected backfill material, (no sharp stones or large particles) otherwise an extruded polyethylene mesh or other suitable shield should be used.

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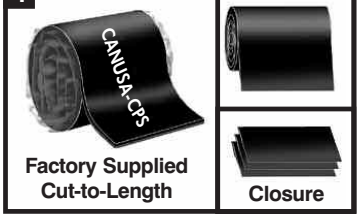
IG-AW-rev013

Aqua-Shield™ AQW-WAB System

Dual, Two-piece protective sleeves with separate closures (W-A-B Option)

Product Description

1



Aqua-Shield™ AQW is typically shipped in bulk rolls. The adhesive is protected from contamination by an inner liner. Closures are shipped either in bulk rolls or pre-cut.

Storage & Safety Guidelines

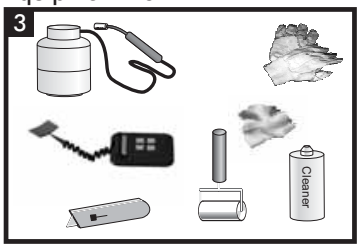
2

To ensure maximum performance, store Canusa products in a dry, ventilated area. Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements. Avoid prolonged storage at temperatures above 35°C *(95°F)* or below -20°C *(-4°F)*. Product installation should be done in accordance with local health and safety regulations.

These installation instructions are intended as a guide for standard products. Consult your Canusa representative for specific projects or unique applications.

Equipment List

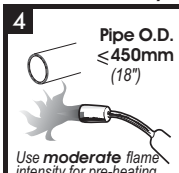
3



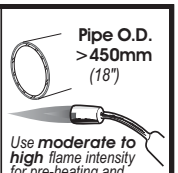
Propane tank, hose, torch & regulator
Appropriate tools for surface abrasion
Knife, roller, rags & approved cleaner
Digital thermometer with suitable probe
Standard safety equipment; gloves, goggles, hard hat, etc.

Flame Intensity & Torch Size

4



*Use **moderate** flame intensity for pre-heating and shrinking.*



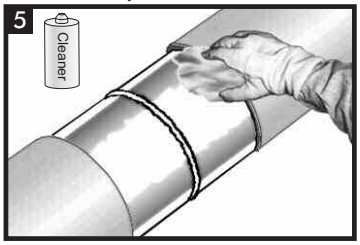
*Use **moderate to high** flame intensity for pre-heating and shrinking.*

Minimum Torch Size:
150,000 BTU/hr.

Minimum Torch Size:
300,000 BTU/hr.
>1500mm (60") use 2 torches.

Surface Preparation

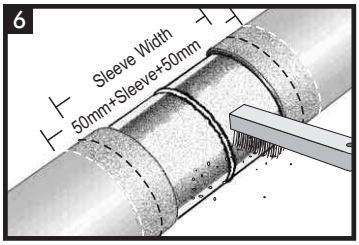
5



Ensure that the coating edges are beveled to 30°. Clean exposed steel and adjacent pipe coating with cleaner to remove the presence of oil, grease, and other contaminants if present.

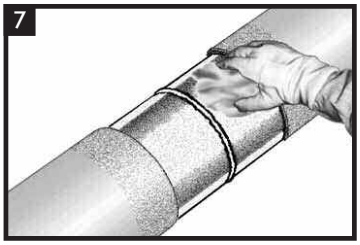
Pipe O.D.	Overlap
≤ 450 mm (18")	100 mm (4")
450 mm - 1500 mm (18"-60")	150 mm (6")
1500 mm - 3800 mm (60"-150")	300 mm (12")
>3800 mm (150")	600 mm (24")

6



Ensure that the pipe is dry before cleaning. The steel joint area must be cleaned to a minimum of a wire brush finish. It is recommended to lightly abrade (with a hand tool) the pipe coating adjacent to the weld area to a distance of 50mm (2") beyond each end of the sleeve width.

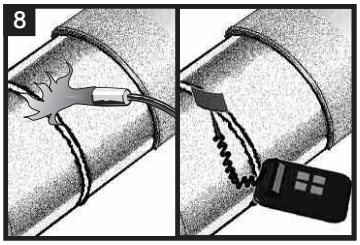
7



Wipe clean or air blast the steel and pipe coating to remove foreign contaminants.

Pre-Heat

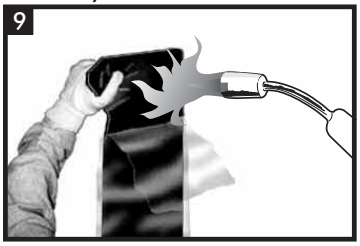
8



Pre-heat the steel joint area using propane torches such that no moisture is visible (typically temperatures of 40-60°C *(100-140°F)* are recommended on sleeve area). On pipe diameters greater than **1220mm (48")**, use two torches on opposite sides. Apply the sleeve rapidly to minimize loss of pre-heat.

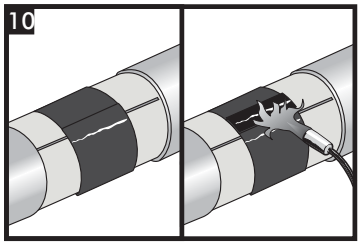
Underlay Installation

9



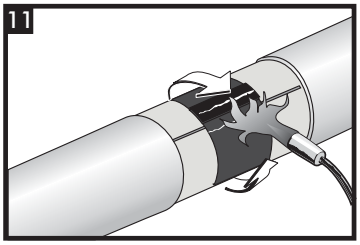
Partially remove the release liner and **gently** heat the underlap approximately 150mm (6") from the edge.

10



Remove the remaining release liner and loosely wrap the underlay sleeve around the pipe, ensuring the overlap is sufficient. Centre the closure on the overlapping sleeve and apply by warming with the torch and pressing down firmly.

11



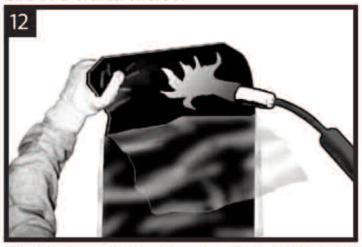
Using the appropriate torch, use broad strokes and heat circumferentially around the pipe to recover and adhere the underlay sleeve.

CANUSA-CPS is registered to **ISO 9001:2008**.

Part No. 99060-138

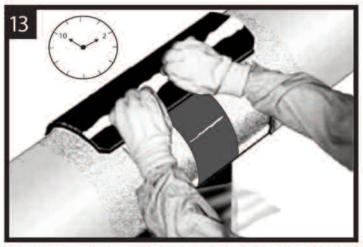
Sleeve Installation

12



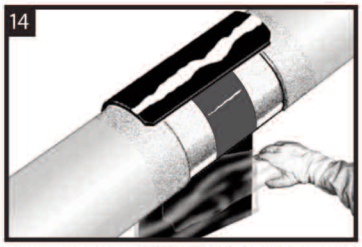
Partially remove the release liner and gently heat the underlap approximately 150 mm (6") from the edge.

13



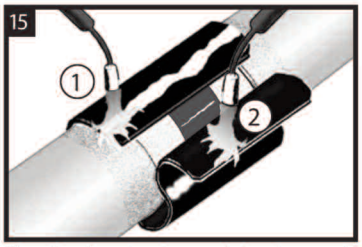
Centre the sleeve over the joint so that the sleeve overlaps between the 10 and 2 o'clock positions. Press the underlap firmly into place.

14



Remove the remaining release liner and the hold-down strip tape on the underlap of the closure.

15

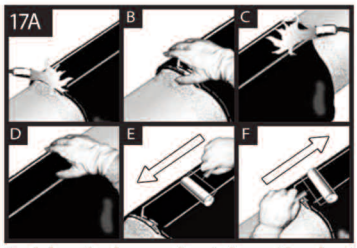


Wrap the sleeve loosely around the pipe, ensuring the appropriate overlap. Gently heat the backing of the underlap and the adhesive side of the overlap. Press the overlap into place.

16

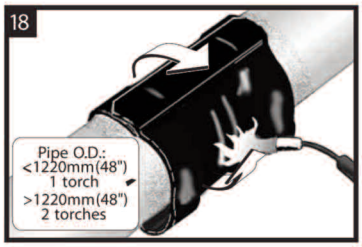
Remove any release liners from the Closure Strip . Centre the closure on the overlapping sleeve. Press down firmly.

17A



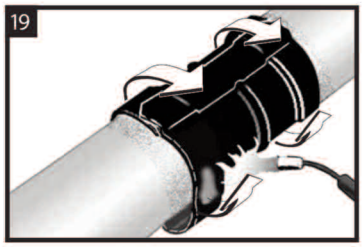
Gently heat the closure and pat it down with a gloved hand. Repeating this procedure, move from one side to the other. Smooth any wrinkles by gently working them outward from the centre of the closure with a roller.

18



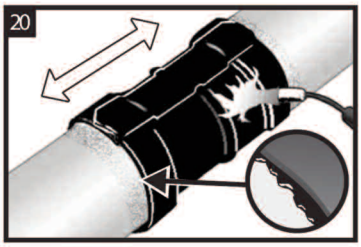
Using the appropriate torch, begin at the centre of the sleeve and heat circumferentially around the pipe. Use broad strokes. If utilizing two torches, operators should work on opposite sides of pipe.

19



Continue heating from the centre toward one end of the sleeve until recovery is complete. In a similar manner, heat and shrink the remaining side.

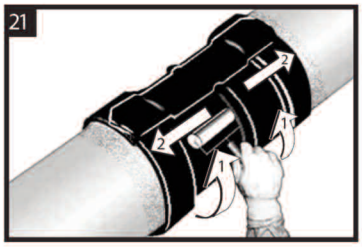
20



Shrinking has been completed when the adhesive begins to ooze at the sleeve edges all around the circumference. Finish shrinking the sleeve with long horizontal strokes over the entire surface to ensure a uniform bond.

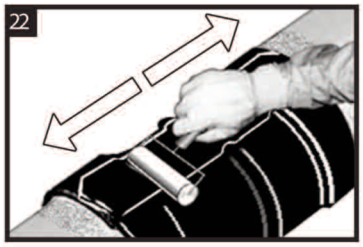
Inspection

21



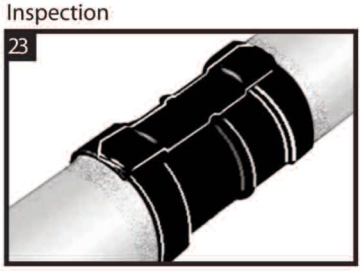
While the sleeve is still hot and soft, use a hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve, as shown above. If necessary, reheat to roll out air.

22



Continue the procedure by also firmly rolling the closure with long horizontal strokes from the weld outwards.

23



Visually inspect the installed sleeve for the following:
- Sleeve is in full contact with the steel joint.
- Adhesive flows beyond both sleeve edges.
- No cracks or holes in sleeve backing.

Backfilling Guidelines

24 After shrinking is complete, allow the sleeve to cool prior to backfilling. To prevent damage to the sleeve, use selected backfill material (no stones or large particles). Otherwise, an extruded polyethylene mesh or other suitable shield should be used.

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IG-NA-AQW(WAB-2pc)-rev012

Covalence®
Heat Shrinkable Products

WaterWrap - B

Wrap-around Pipe Sleeve with Thermal Indicators (ideal for large diameter water pipe where internal welding will take place) Installation Instructions

AG-WW-Rev7-Sep10 LEX0020

Materials and equipment

1. Appropriate size WaterWrap and WPCP IV closure patch
2. When recommended (see data sheet), appropriate size of 939 filler
3. Covalence torch (or equivalent)
4. Propane gas tank, hose, regulator and gauge
5. Standard safety equipment such as gloves, goggles, hard hat, etc.

Installation has to be done according to local government regulations and usual safety precautions.

For proper selection of Berry Plastics CPG joint protection materials, see Product Selection Guide or contact Berry Plastics CPG.

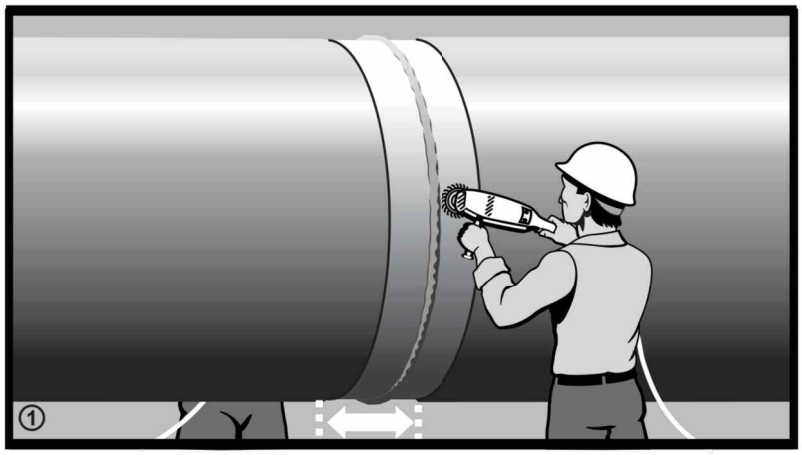
Sleeve application

① Surface preparation:

- **a** Consult Coating Manufacturer if any type Storage Coating is in place.
- **b** Clean pipe surface and adjacent coating of all mud, oil, grease, rust and other foreign contaminates in accordance with SSPC-SP3, Power Wire Brush Cleaning.
- **c** Remove all grease contamination by solvent cleaning the pipe and adjacent coating in accordance with SSPC-SP1.
- **d** Clean the full circumference of the pipe a minimum of 4 inches onto the existing coating and lightly abrade this area using Wire Brush or 60 grit approved sand paper.

Note:

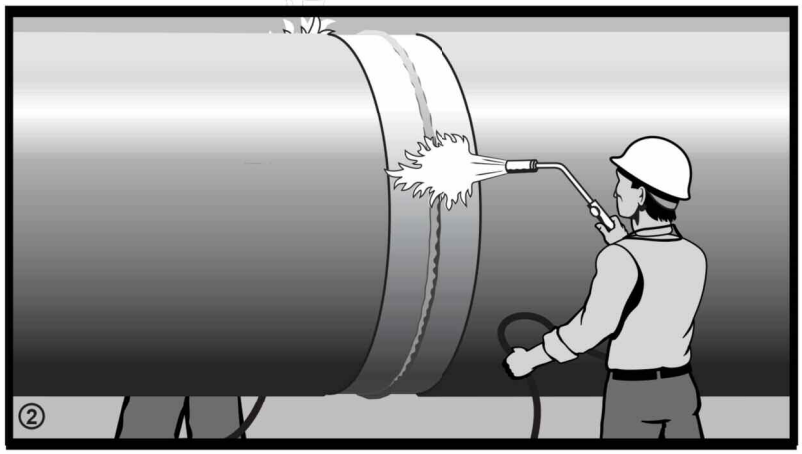
Coal tar - remove outer paper wrap 5" (125 mm) to 6" (150 mm) adjacent to cut-back to expose coal tar.
Painted coatings - remove whitewash paint on the surface of coating to be covered by WaterWrap.



② Preheat joint area of most primary coatings, approximately 68°F (20°C) minimum. Under no circumstances shall the WaterWrap sleeve be installed on pipe surface with visible moisture.

For PU coating, preheat must be in range of 100°F (37.7°C)-140°F(60°C) to ensure ultimate performance of the Waterwrap on the PU.

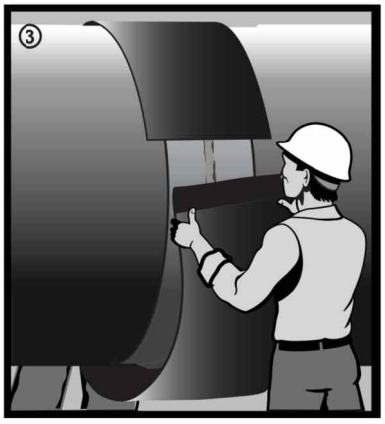
Note:
The function of preheat for the WaterWrap is primarily to remove excess moisture. When recommended (refer to data sheet), apply the 939 filler on the step down of the weld bead (if step down >=1/4"), then follow the instructions to apply the sleeve (step 3).

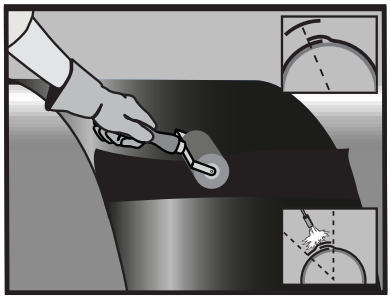


③. Remove the protective release plastic from the coated sleeve. Center sleeve over the weld so it is evenly overlapping adjacent pipe coating. Wrap snuggly around pipe so that the Covalence logo runs around the pipe. **Note**: • **a** *Clean overlap area of the sleeve to remove dirt and other foreign materials.* • **b** *Edges of sleeve should extend 2" or more onto adjacent pipe coating* • **c** *Overlapping ends of sleeve should align evenly.*• **d** *Position overlap to permit easy access for installing closure.* • **e** *Ensure that the overlap onto the adjacent coating is 2-4" (50 to 100mm) for diameters up to 48". For larger diameters, use a 6-8" (150 t0 200mm) overlap.*

④ For Application during Cold Climate Conditions follow tthe recommended steps:

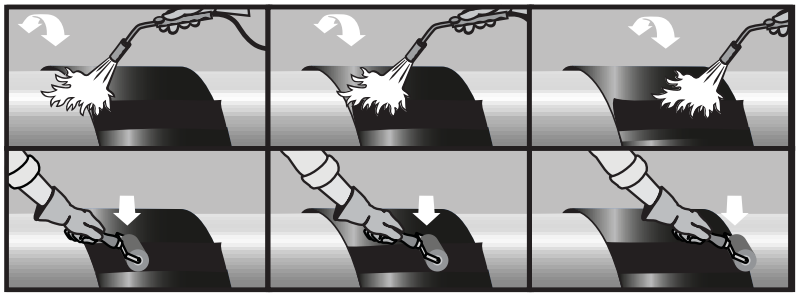
1. Pipe MUST be preheated to 122˜F-140°F (50°C-60°C); at ambient temperature of -40°F (-40°C), the pipe temperature needs to be on the high side of the range close to 140°F(60°C)
2. Preheat the pipe with tiger torches with output of 500,000 BTU but WaterWrap (step 3) use these torches for preheating.
3. Heating the HSS for shrinkage use standard and conventional torches at 250,00 BTU and keep the flame moving all the time.
4. For pipe >40" use 4 men to heat and apply the HSS; for pipe <40", can use 2 men to heat and apply the HSS.
5. Contact Convalence Field Service to review any of the material heating and application procedures.
6. WaterWrap shall be at a minimum of 68°F (20°C) at time of application. To maintain temperature, the HSS shall be kept in heated vehicle/storage until time to install on pipe.
7. Flame the edge of the mainline coating before installation of the HSS; Heat the pre-coated pipe at the edge to remove moisture and to provide some residual heat to the edges of the mainline coating.
8. Apply the HSS in the same manner as required for the standard Application of WW-IW/HSS.





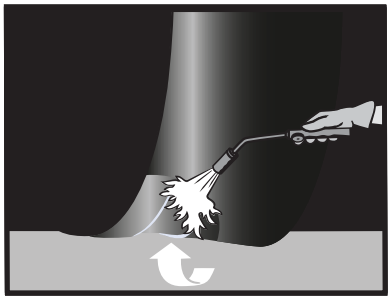
WPCP IV closure application

1. Press WPCPIV closure in position, centering over the exposed sheet end. (For UNISLEEVE products, the closure is pre-attached and already centered in position.)
The sheet should overlap the sheet (excluding closure) by 2" (50 mm) minimum.



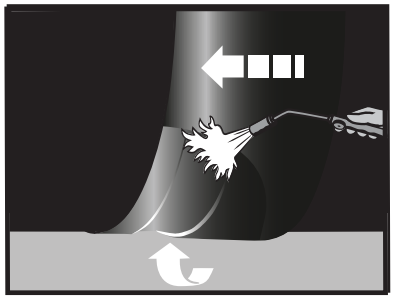
2. Using a Covalence torch (or equivalent), adjust flame length to approximately 20" (500 mm) to produce a blue tipped yellow flame. Using the yellow portion of the flame, heatthe closure evenly until the pattern of the fabric reinforcement is visible.

With gloved hand and roller, smooth any wrinkles by working outward from the center. Roller accessory should additionly be used to force out entrapped air both on the closure and sleeve.

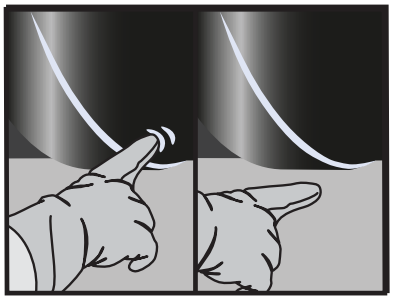


Sleeve recovery

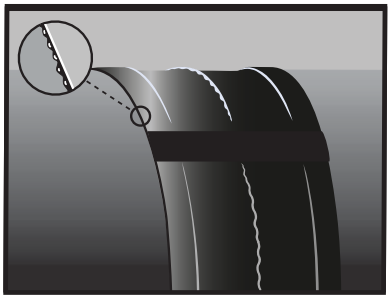
1. Using the Covalence torch (or equivalent), begin at the center of the sleeve and heat circumferentially around the pipe, using a constant paintbrush motion, until the embossed pattern on the sheet surface has changed to a smooth surface.



2. Continue heating toward one end of the sleeve, followed by the other.
Note:
Sleeve may be recovered starting at one end and proceeding toward the opposite end, depending on conditions (i.e., wind).



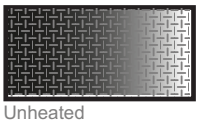
3. During shrinkdown, occasionally check adhesive flow with a finger. Wrinkles should disappear automatically. Remember to wear gloves.
Note:
While sleeve is hot, press or roll overlap and closure area to remove any air voids.



4. Sleeve is fully recovered when all of the following have occured:
1) The WaterWrap has a smooth surface.
2) There are no cold spots on the sleeve surface.
3) Weld bead profile can be seen through the sleeve.
4) After sleeve is cool, mastic flow is evident on both edges.
5) The sleeve has fully conformed to the pipe and adjacent coating.
6) The pattern on the backing has disappeared and the backing has a smooth surface.

Note: The Water Wrap has a permanent change indicator (PCI).

PCI The Dimpled or Embossed Backing, when heated with the minimum adequate heat to install the WaterWrap, becomes smooth, but remains black.



Unheated

Adequate Heat

* WaterWrap is a trademark of Covalence CPG

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Covalence®
Heat Shrinkable Products

WaterWrap - WAB

Weld After Backfill

Wrap-around Pipe Sleeve with Thermal Indicators (ideal for large diameter water pipe where internal welding will take place) Installation Instructions

AG-WW-WAB-Rev6-16Sep2009 DCC09/23

Materials and equipment

1. Appropriate size WaterWrap and WPCP IV closure patch
2. When recommended (see data sheet), appropriate size of 939 filler
3. Torch
4. Propane gas tank, hose, regulator and gauge
5. Standard safety equipment such as gloves, goggles, hard hat, etc.

Installation has to be done according to local government regulations and usual safety precautions.

For proper selection of Berry CPG joint protection materials, see Product Selection Guide or contact Berry CPG.

Sleeve application

① Surface preparation:

a Consult Coating Manufacturer if any type Storage Coating is in place.

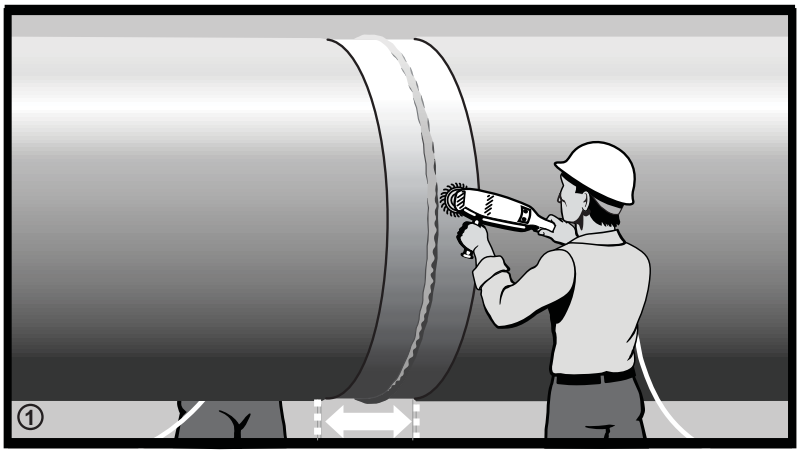
b Clean pipe surface and adjacent coating of all mud, oil, grease, rust and other foreign contaminates in accordance with SSPC-SP11, Power Tool Cleaning to Bare metal.

c Remove all grease contamination by solvent cleaning the pipe and adjacent coating in accordance with SSPC-SP1.

d Clean the full circumference of the pipe a minimum of 4 inches onto the existing coating and lightly abrade this area using Wire Brush or 60 grit approved sand paper.

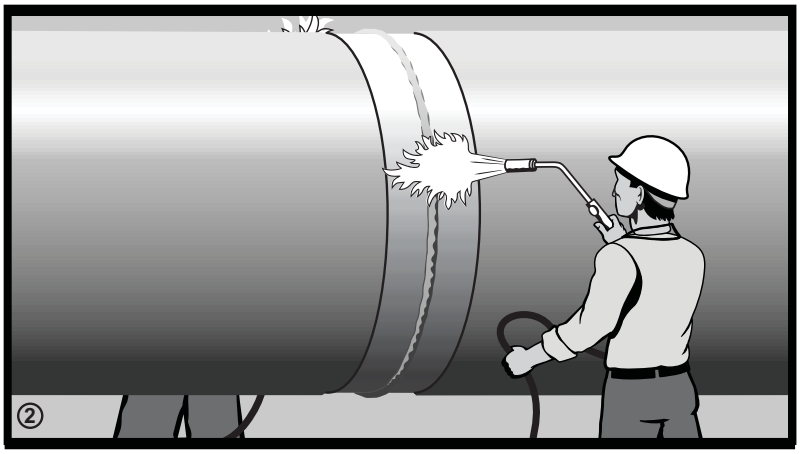
Note:

Coal tar - remove outer paper wrap 5" (125 mm) to 6" (150 mm) adjacent to cut-back to expose coal tar.
Painted coatings - remove whitewash paint on the surface of coating to be covered by WaterWrap.



② Preheat joint area of most primary coatings, approximately 68°F (20°C) minimum. Under no circumstances shall the WaterWrap sleeve be installed on pipe surface with visible moisture.

For PU coating, preheat must be in range of 100°F (37.7°C)-140°F(60°C) to ensure ultimate performance of the Waterwrap on the PU.

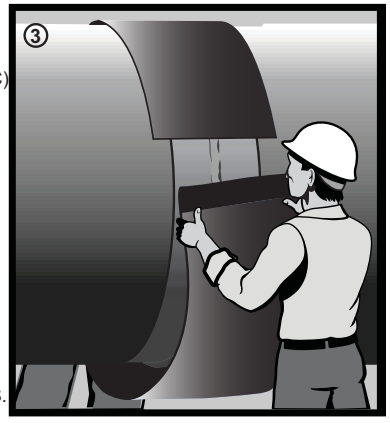


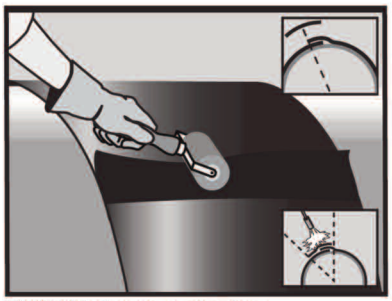
Notes:
a) Two people working on opposite sides of thepipe are recommended for installing sleeves on pipe 16" (400 mm) in diameter and larger.
b) When recommended (refer to data sheet), apply the 939 filler on the step down of the weld bead (if step down >=1/4"), then follow the instructions to apply the sleeve (step 3)

③. Remove the protective release plastic from the coated sleeve. Center sleeve over the weld so it is evenly overlapping adjacent pipe coating. Wrap snuggly around pipe so that the Covalence logo runs around the pipe. **Note**: • **a** *Clean overlap area of the sleeve to remove dirt and other foreign materials.* • **b** *Edges of sleeve should extend 2" or more onto adjacent pipe coating* • **c** *Overlapping ends of sleeve should align evenly.* • **d** *Position overlap to permit easy access for installing closure.* • **e** *Ensure that the overlap onto the adjacent coating is 2-4" (50 to 100mm) for diameters up to 48". For larger diameters, use a 6-8" (150 t0 200mm) overlap.*

④ For Application during Cold Climate Conditions follow tthe recommended steps:

1. Pipe MUST be preheated to 122˜F-140°F (50°C-60°C); at ambient temperature of -40°F (-40°C), the pipe temperature needs to be on the high side of the range close to 140°F(60°C)
2. Preheat the pipe with tiger torches with output of 500,000 BTU but ONLY use these torches for preheating.
3. Heating the HSS for shrinkage use standard and conventional torches at 250,00 BTU and keep the flame moving all the time.
4. For pipe >40" use 4 men to heat and apply the HSS; for pipe <40", can use 2 men to heat and apply the HSS.
5. Contact Convalence Field Service to review any of the material heating and application procedures.
6. WW-WAB/HSS and 939 Filler materials shall be at a minimum of 68°F (20°C) at time of application. To maintain temperature, the HSS and the 939 Filler shall be kept in heated vehicle/storage until time to install on pipe.
7. Flame the edge of the mainline coating before installation of the HSS; Heat the pre-coated pipe at the edge to remove moisture and to provide some residual heat to the edges of the mainline coating.
8. Apply the HSS in the same manner as required for the standard Application of WW-WAB/HSS.





WPCP IV closure application

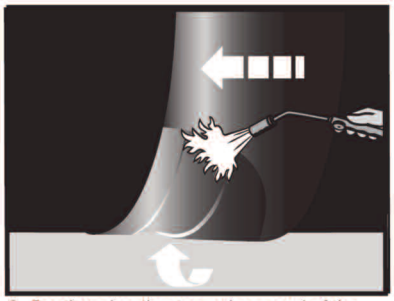
1. Press WPCPIV closure in position, centering over the exposed sheet end. (For UNISLEEVE products, the closure is pre-attached and already centered in position.)
The sheet should overlap the sheet (excluding closure) by 2" (50 mm) minimum.

2. Using a torch, adjust flame length to approximately 20" (500 mm) to produce a blue tipped yellow flame. Using the yellow portion of the flame, heatthe closure evenly until the pattern of the fabric reinforcement is visible.

With gloved hand and roller, smooth any wrinkles by working outward from the center. Roller accessory should additionly be used to force out entrapped air both on the closure and sleeve.

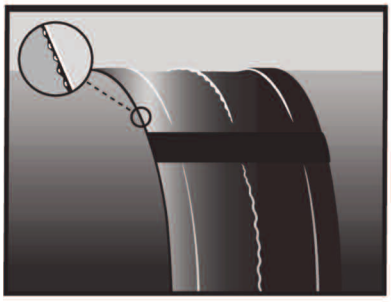
Sleeve recovery

1. Using the torch , begin at the center of the sleeve and heat circumferentially around the pipe, using a constant paintbrush motion, until the embossed pattern on the sheet surface has changed to a smooth surface.



2. Continue heating toward one end of the sleeve, followed by the other.
Note:
Sleeve may be recovered starting at one end and proceeding toward the opposite end, depending on conditions (i.e., wind).

3. During shrinkdown, occasionally check adhesive flow with a finger. Wrinkles should disappear automatically. Remember to wear gloves.
Note:
While sleeve is hot, press or roll overlap and closure area to remove any air voids.



4. Sleeve is fully recovered when all of the following have occured:
1) The WaterWrap has a smooth surface.
2) There are no cold spots on the sleeve surface.
3) Weld bead profile can be seen through the sleeve.
4) After sleeve is cool, mastic flow is evident on both edges.
5) The sleeve has fully conformed to the pipe and adjacent coating.
6) The pattern on the backing has disappeared and the backing has a smooth surface.

Note: The Water Wrap has a permanent change indicator (PCI).

PCI The Dimpled or Embossed Backing, when heated with the minimum adequate heat to install the WaterWrap, becomes smooth, but remains black.

Unheated

Adequate Heat

* WaterWrap is a trademark of Berry Plastics

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AMERICAN
SPIRALWELD PIPE

Interior Joint Grouting Recommendations

I. Materials

1. Portland cement conforming to ASTM C150, Type I, Type II, or Type V, or as required by the contract documents.
2. Sand meeting the requirements of ASTM C33 or C35.
3. Water shall be clean, colorless, and free from objectionable quantities of organic matter, alkali, salt, or other impurities.
4. An admixture, such as SikaLatex or SikaLatex R.
5. A bonding agent conforming to ASTM C881, Type II, such as Sikadur 32, Hi-Mod; Sikadur 31, Hi-Mod Gel; or Sikadur AnchorFix 4.

Note: When required by specifications, cured cement mortar must conform to NSF-61. Products listed above should be verified for NSF-61 conformance. It is the contractor's responsibility to confirm compliance with the applicable standards and specifications.

II. Material Preparation

1. Cement mortar should consist of not less than one part cement to not more than two parts sand (by volume), dry mixed thoroughly and then moistened with sufficient water and, if desired, an admixture. The consistency should be such that when the mortar is rolled into a ball it will hold its shape.

   Example:
   124 lbs. of masonry sand (8 heaping shovels)
   54 lbs. of cement (4 heaping shovels)
   1½ gals. of water (varies with initial wetness of sand)
   1 pint of admixture (optional)

2. The bonding agent should be prepared as recommended by the manufacturer. Normal pot life is approximately 1 hour at 70° F. Read the warning label as epoxy mixtures may be toxic to the skin.
3. A grout slurry should be prepared.

   Example:
   7 pints of water
   1 pint of admixture (if desired)
   4 pints (5.3 lbs.) of cement

III. Interior Joint Pointing

The interior joint recess is to be completely filled with cement mortar.

1. Clean joint area thoroughly with a brush or rags and water, allow surface to dry.
2. If the lining in the joint area has been damaged, chip away all loose material keeping edges of sound mortar essentially vertical. Clean area as noted in (1) above.
3. When a bonding agent is desired, apply the mixture evenly over the area to be patched, including the vertical edges of the existing lining, using either a brush or wood shingle. Allow the bonding agent to become tacky.
4. Apply a coat of grout slurry to all surfaces that will contact the hand placed cement mortar.
5. Apply the cement mortar tightly into the joint recess, completely filling the void.
6. Screed off the excess mortar so that the patched area is even with the surfaces of the adjacent lining.
7. Trowel the patch surface to a smooth finish.
8. A slurry mixture may be brushed over the mortar and troweled as necessary to smooth the patch.
9. Allow mortar to cure sufficiently prior to the introduction of water to the patch area.

Note: These recommendations are for informational purposes only. American SpiralWeld Pipe Company, LLC (ASWP) assumes and accepts no responsibility for proper assembly, installation, or quality of workmanship performed by the installing contractor.

Polyken®
Tape Technology
SEALFORLIFE

YGIII Coating System – Repair Application Specifications and Installation Procedure

Anodeflex® – Stopaq® – Polyken® – Covalence® – Powercrete®

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YGIII COATING SYSTEM
COATING REPAIR SPECIFICATIONS

This procedure pertains to the field repair application where damage has occurred to the cold applied Polyken YGIII coating systems that meets AWWA C-214.

One of the advantages of using steel pipe that has been coated with an AWWA C-214 coating system is the ease with which it can be repaired in all field conditions. This 50 or 80 mil coating system consists of a liquid adhesive layer, an anti-corrosion layer and 1 or 2 polyethylene outer wrap layers.

The pipe is initially prepared by blasting the exterior and applying a very thin but evenly applied coat of liquid adhesive to the prepared pipe surface. The first layer of tape that actually bonds to the pipe is a black 20 mil inner wrap known as the "anti-corrosion layer". The outer wrap on a 50-mil system is white, containing a higher percentage of high-density polyethylene. The outer wrap on an 80-mil system is two layers of tape. The first outer wrap layer is usually gray, containing a higher percentage of higher percentage of high-density polyethylene, with the second outer wrap layer being white, also containing a higher percentage of high-density polyethylene. The 30 mils thick outer wraps provide high impact and abrasion resistance for the protection of the anti-corrosion layer during shipping, handling and installation, as well as long term in-ground performance. The different colors assigned to each layer are by design, and aid in the visual examination to determine the extent of any coating damage that may have occurred.

Please contact your Seal For Life representative to clarify any application procedures.

REQUIRED REPAIR MATERIALS

- Power or hand wire brushes to clean surfaces
- Rags to clean area
- 2" (50 mm), or 4" (100 mm) paint brushes or rollers as required
- Knife to cut back tape layers
- Propane tank regulator, torch and heat resistant gloves (For PERP repairs only)

AVAILABLE REPAIR LAYERS

A. **Polyken Liquid Adhesive: #1019, 1019SY, 1027, 1033A or 1039.**
The Liquid Adhesive must cover the bare and exposed areas as well as onto the good coating by a minimum of 4" (102 mm).

B. **Base Layer: #939 Filler Material (125 mils)**
This material covers the bare steel and extends over the 20 mil inner layer of black inner wrap. This material comes in several sizes including a 2" x 20' roll.

C. **Corrosion and Mechanical Layer: #930-35, 930-50, 932-35, 932-50, 934-35, 934-50 or 936-35**
Apply to exposed (primed) area in the circumferential direction and extend 4" (100mm) in all directions onto the shop applied coating system. These rolls are available 2",4" and 6**"** (51, 102 and 153 mm) wide.

D. **Tie-Down Strips: #932-35, 932-50, 934-35, 934-50 or 936-35**
Apply at 90-degree angle to the cover layer at the top and bottom of the repair to help control delayed wrinkling of the repair. These rolls are available 2", 4" and 6" (51, 102 and 153 mm) wide. If 6" wide rolls are used, cut into 3" (76 mm) wide strips.

E. **Full Circumferential Wrap: #905-30, 954-15, 955-15, 955-20 or 955-30**
Apply circumferentially, in either a spiral wrap configuration using a 1" (25 mm) overlap or cigarette wrap, around the pipe barrel.

F. **Polyethylene Repair Patch: PERP60, FILLER**

REPAIR APPLICATION METHODS

For damage that less than 4" in size the "Patch Technique" method can be used to create a permanent repair to the YGIII coating. Depending on the depth of the damage, the appropriate procedure from the following list must be followed.

1. If damage is apparent in the outer layer only, use steps #1 through #4, #7 and then #9 through #11 from the procedure below using layers A, C & D from above. Use a one-inch longitudinal overlap on layer C. If Polyken 932, 934 or 936 are being used as Layer C, step #7 (application of the primer) can be skipped.
2. If damage is apparent through the second outer wrap layer (gray), use steps #1 through #5, #7 and then #9 through #11 from the procedure below using layers A, C & D from above. Use a 55% overlap on layer C. If Polyken 932, 934 or 936 are being used as Layer C, step #7 (application of the primer) can be skipped.
3. If the damage extends to bare steel, use steps #1 through #11 from the procedure below using materials A, B, C and D from above. Use a 55% overlap on layer C.

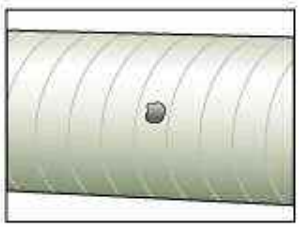
For damage that greater than 4" in size it is strongly recommended to use the "Patch Technique" described above in combination with a circumferential wrap. Using the circumferential wrap in addition to the "Patch Technique" is the preferred method for damage greater than 4" unless it is not practical to do so (i.e. pipe in trench). Depending on the depth of the damage, the appropriate "patch technique" procedure listed above should be used with the following change.

1. The tie down strips, Layer D, are replaced with a circumferential wrap material listed in Layer E from above. The circumferential wrap can use either a spiral wrap configuration or a cigarette wrap around the pipe barrel. Make sure tension is kept on the coating wrap during application. The spiral or cigarette wrap should be made with a 1" (25mm) overlap, but if required, a 55% overlap configuration can also be used.

An alternate method for repairing damage of any size is the use of a Polyethylene Repair Patch (PERP). The repair procedure for using PERP is at the end of this document.

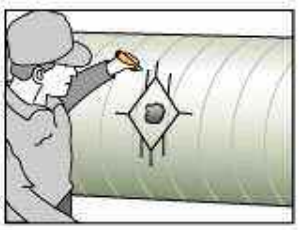
"PATCH TECHNIQUE" REPAIR PROCEDURE

Inspect the damaged area and determine the depth of the repair that will be required. Lightly lift damaged coating sections until adhesive contact is solid against inner coating layers of the wraps or primer. Remove all rocks, dirt or moisture or any other foreign materials from the damaged area, and then, using a flexible wallpaper knife or equal type knife, cut the damaged portions of the coating at an angle tangent to the pipe surface. **When making the repair no air bubbles or voids will be permitted under the repair system materials.**



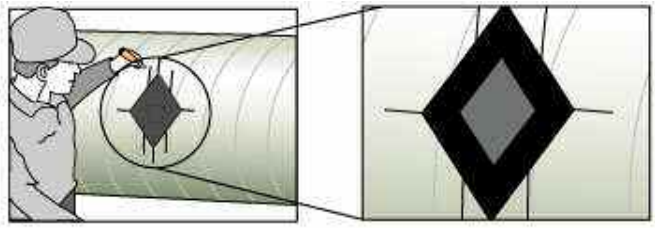
Step #1
Determine the extent of the damage to the coating layers. Found by visual or electrical holiday detection.

Step #2
Cut out the damaged coating. Using a diamond shape.

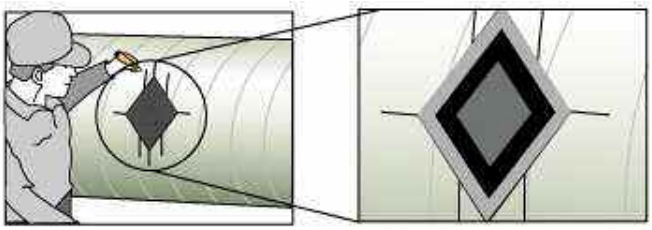


Step #3
Cut 1" slits in the outer layer, at the top, bottom and sides to relieve tension. Being careful not to cut into any underlying, good layers

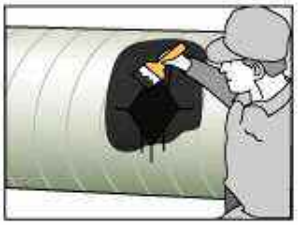
Step #4
Remove all damaged coating materials from surface. Cutting relief points as shown to release the tension of the wraps.



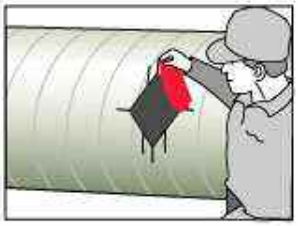
Step #5
On a 50-mil system, if damage is to the steel surface, remove all damaged coating and step down, leaving 2" of the next existing layers



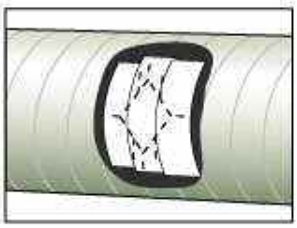
Step #6
On an 80-mil system, if the damage is to the steel surface, remove all damaged coating and step down, leaving 2” of the next existing layers.



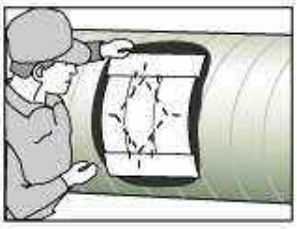
Step #7
Clean and dry all the areas to be repaired. Prime the area to be repaired with the recommended, Polyken Liquid Adhesive. Extend a minimum of 5” past the damaged area, in all directions.



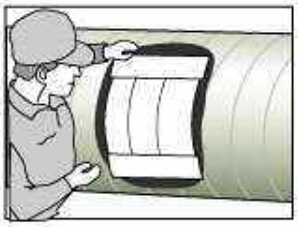
Step #8
If damage is to the steel, filler material is needed to build up the layers as needed for the thickness on both the 50 and 80-mil system



Step #9
Apply the coating materials at the 1” overlap or the 55% overlap configuration as required. Covering the damaged area.



Step #10
Showing the patch materials and the crosshatch materials over the damage area.



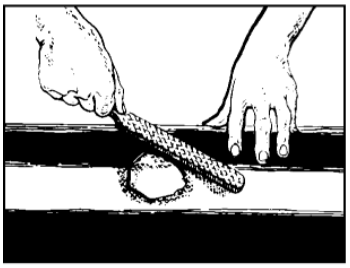
Step #11
This should be the finished patch and repair procedure appearance.

Polyethylene Repair Patch (PERP) Repair Procedure

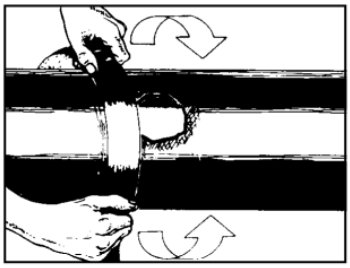
PERP-012/IP/6-01/01

Materials and equipment
1. Roll of PERP repair tape
2. Roll of PERPFILLER tape
3. Wire brush, knife
4. Propane tank regulator, Raychem torch or equivalent
5. Contact pyrometer
6. Standard safety equipment as prescribed by local regulations

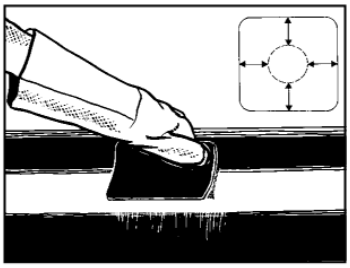
Installation has to be done according to local government regulations and usual safety precautions.



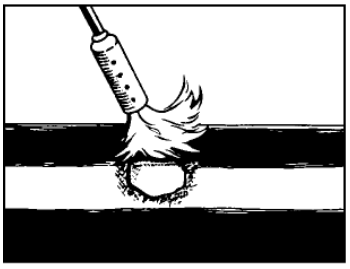
Preparation
1. Remove loose coating from the damaged area with a knife, scraper or wire brush. Eliminate all sharp edges and clean the damaged area and adjacent coating to remove all foreign material such as dirt, rust, oil, grease and moisture.



2. Abrade adjacent PE coating extending 100mm (4") beyond the damage.



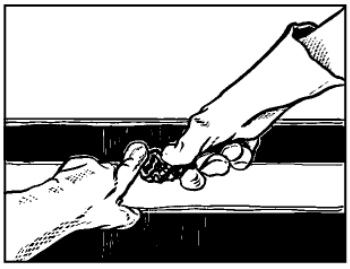
3. Cut a patch from the PERP tape so that it extends at least 50 mm (2") beyond the damaged area. Round off the corners.



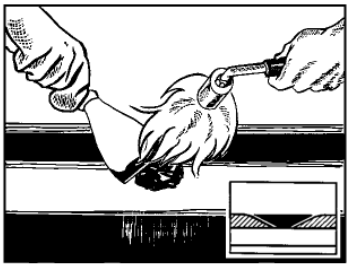
Preheating
1. Preheat the exposed bare metal and adjacent pipe coating to following temperatures:

	line coating	bare metal
PERP	70-80°C (158-176°F)	70-80°C (158-176°F)
PERP 80	90-100°C (194-212°F)	70-80°C (158-176°F)
PERP 120	150-180°C (302-356°F)	70-80°C (158-176°F)

Note (*): PERP 120 only suitable for FBE and PE line coatings.

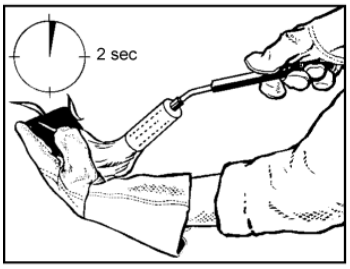


PERPFILLER application
1. Cut PERPFILLER to size and apply it to all areas of exposed steel.

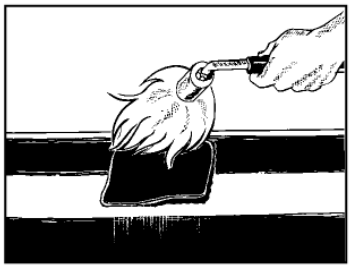


2. Heat the mastic and smooth it down with a paint scraper to cover all bare metal without air entrapments. Avoid traces of PERPFILLER on top of the PE coating.

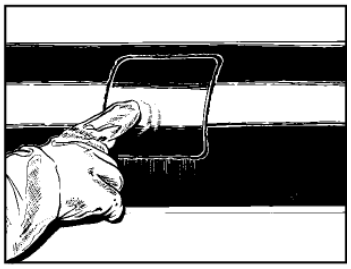
PERP*



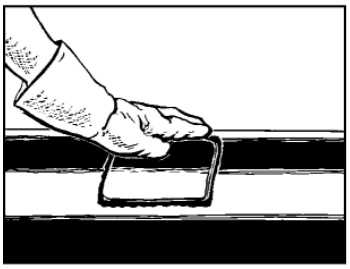
PERP application
1. Flame brush the adhesive side of the PERP patch until the adhesive becomes glossy.



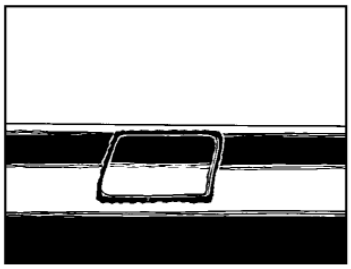
2. Position the precut PERP patch over the damaged area and heat until the adhesive melts. Roll out any entrapped air with a silicone roller.



3. Check that adhesive is soft to the touch of a gloved finger.



4. Smooth the repair patch with a gloved hand to eliminate air entrapments and ensure good bonding. Avoid squeezing filler between PERP and the line coating.



Completed installation.
Patch is correctly installed when all of the following have occurred:
1) There are no upstanding edges.
2) After patch is cool, adhesive flow is evident on the edges.
3) The patch has fully conformed to the coating.

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Installation Guide

Pipeline Repair Products

Repair Patch, Melt Stick, Epoxy Primer and Mastic Filler

Pipeline Repair Products

1

The Coating Repair Patch (CRP) is typically shipped in bulk rolls and can be cut-to-size in the field. Melt Sticks and Mastic Fillers are used to repair holidays and/or fill voids. Canusa Epoxy Primer is supplied in pre- measured quantities.

Storage & Safety Guidelines

2

To ensure maximum performance, store Canusa products in a dry, ventilated area. Keep products sealed in original cartons and avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental elements. Avoid prolonged storage at temperatures above 35°C *(95°F)* or below -20°C *(-4°F)*. Product installation should be done in accordance with local health and safety regulations.

These installation instructions are intended as a guide for standard products. Consult your Canusa representative for specific projects or unique applications.

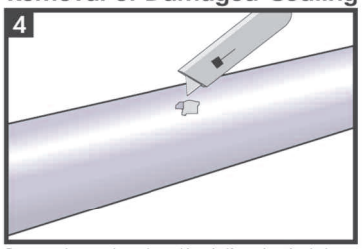
Equipment List

3

Propane tank, hose, torch & regulator.
Appropriate tools for surface abrasion and cleaning, including wire brush, abrasive paper, rags & approved cleaner.
Temperature measuring device. Misc. tools such as; knife, putty knife, roller, paint brush or paint roler, tape measure, and marker.
Standard safety equipment; gloves, goggles, hard hat, etc.

Removal of Damaged Coating

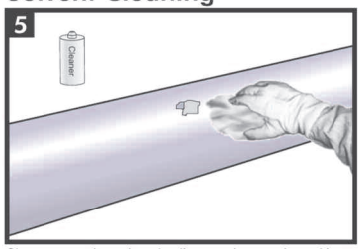
4



Remove damaged coating with a knife or hand grinder to prevent crack propagation in the coating.

Solvent Cleaning

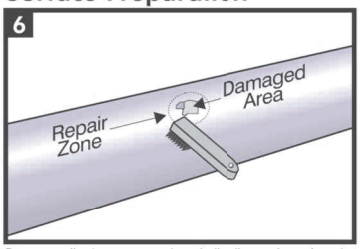
5



Clean exposed steel and adjacent pipe coating with an approved cleaner (as per SSPC-SP-1) to remove the presence of oil, grease and other contaminants.

Surface Preparation

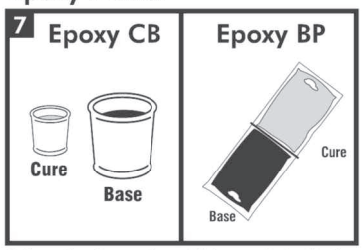
6



Remove adhering rust, coating chalk, dirt, and roughen the mill applied coating in the repair zone using an abrasive paper/cloth or wire brush.

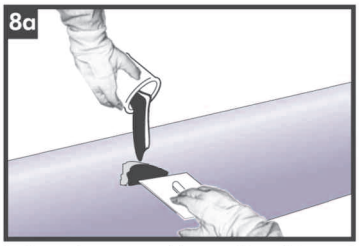
Epoxy Primer

7



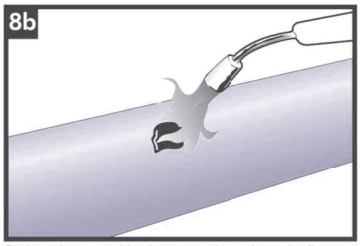
Follow the Preparation, Mixing and Application instructions provided with the supplied Canusa Epoxy Pack. For bulk quantities: mix the primer cure with the primer base (4 parts base to 1 part cure **by volume**). Stir for a minimum of 30 seconds to assure uniform mixture.

8a



Apply mixed epoxy to a minimum uniform thickness of 100microns (4 mils) on all exposed bare metal.

8b

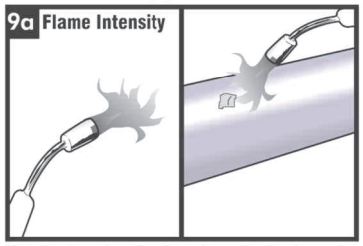


Preheat the area with a low to moderate intensity flame to substantially cure the epoxy and warm the surface.

Skip to box 10

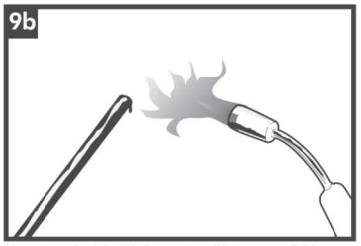
Melt Stick Application For Damage Up To 10mm x 10mm

9a **Flame Intensity**



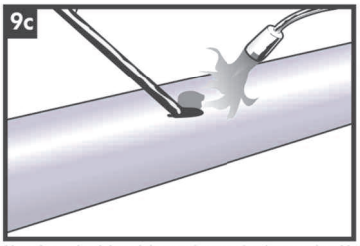
Use a low intensity yellow flame for pre-heating the coating and applying the repair products. With quick back and forth strokes, pre-heat the repair zone sufficiently to remove moisture and assist in adhesion.

9b



Heat the melt stick with the torch until it becomes fluid.

9c



Heat the melt stick and the repair zone simultaneously with the torch and spread the melt stick over the damaged area. Keep the flame moving to prevent damage to the coating. Some ignition of the melt stick is acceptable.

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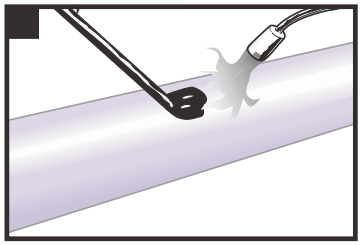
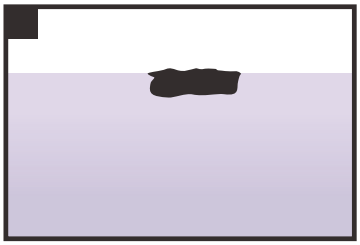
Part No. 99060-011

Pipeline Repair Products

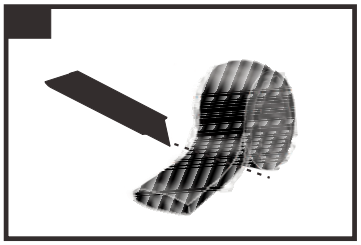


Continue spreading the melt stick over the repair zone until the entire area is covered. After sufficient melt stick material is on the surface, apply additional heat in quick back-and-forth strokes to create a smooth surface.

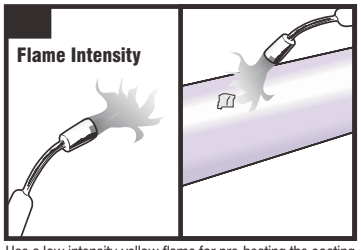


Ensure that the melt stick material completely covers the repair zone. The melt stick material should be spread liberally so that the material is raised above the coating surface.

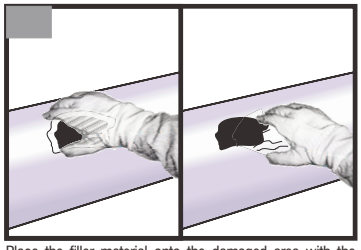
Mastic Filler Installation



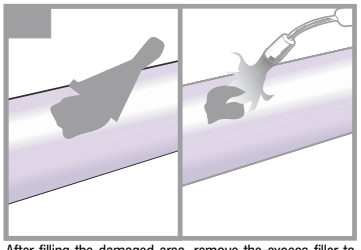
Fill deeper crevices with Canusa Mastic Filler (MF). Unroll the filler material and cut off the required amount, leaving the release paper in place.



Use a low intensity yellow flame for pre-heating the coating and applying the repair products. With quick back and forth strokes, pre-heat the repair zone sufficiently to remove moisture and assist in adhesion.

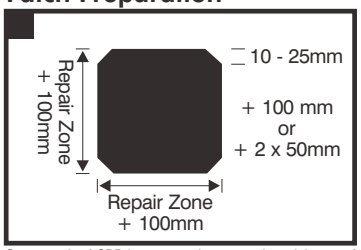


Place the filler material onto the damaged area with the release paper facing up. Firmly press the material into the damaged area by hand and remove the release paper.



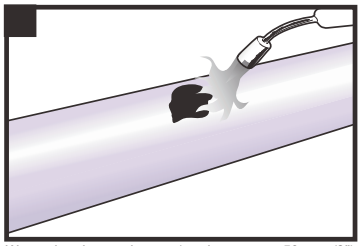
After filling the damaged area, remove the excess filler to create a smooth surface. As an option, use a low intensity yellow flame to warm the filler material and assist in smoothing it out.

Patch Preparation



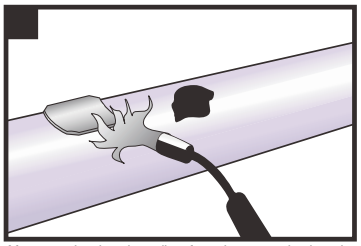
Cut a patch of CRP large enough to extend a minimum of 50mm (2") beyond the edge of the repair zone. Trim each corner of the patch about 10-25mm (½" - 1") at a 45° angle. If the damage has a diameter greater than 10cm (4"), use an appropriate heat-shrinkable sleeve.

Pre-Heat

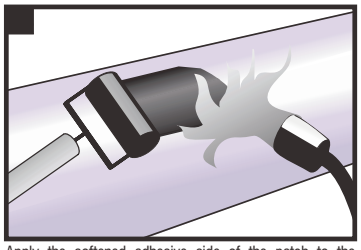


Warm the damaged area (repair zone + 50mm (2") overlap) to remove moisture and assist in adhesion.

Patch Installation

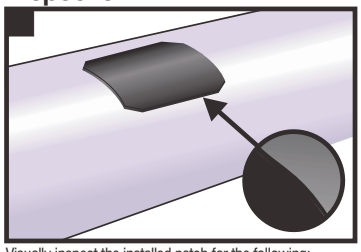


After removing the release liner from the cut patch, place the patch with the adhesive side up on a gloved hand, or on top of the pipe, and heat gently. Heat until the adhesive softens and the surface becomes glossy. Also, reheat the damaged area to keep it warm.



Apply the softened adhesive side of the patch to the damaged area and press down firmly. Heat the patch with a low intensity flame, and using a roller or a gloved hand, pat down and remove wrinkles. Roll to ensure a good bond.

Inspection



Visually inspect the installed patch for the following:
1. Patch is in full contact with the pipe coating.
2. There are no loose edges.
3. A successful patch has adhesive flow on the edges.
4. The patch has fully conformed to the coating.
5. No cracks or holes in patch backing.

Backfilling Guidelines

After application, allow the repaired area to cool before backfilling. To prevent damage to the repaired material, use selected backfill material (no sharp stones or large particles).

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IG-PRP-rev013

AMERICAN
SPIRALWELD PIPE

Field Cement Mortar Lining Recommendations

Cement Mortar Repair

I. Materials

1. Portland cement conforming to ASTM C150, Type I, Type II, or Type V, or as required by the contract documents.
2. Sand meeting the requirements of ASTM C33 or C35.
3. Water shall be clean, colorless, and free from objectionable quantities of organic matter, alkali, salt, or other impurities.
4. An admixture, such as SikaLatex or SikaLatex R.
5. A bonding agent conforming to ASTM C881, Type II, such as Sikadur 32, Hi-Mod; Sikadur 31, Hi-Mod Gel; or Sikadur AnchorFix 4.

Note: When required by specifications, cured cement mortar must conform to NSF-61. Products listed above should be verified for NSF-61 conformance. It is the contractor's responsibility to confirm compliance with the applicable standards and specifications.

II. Material Preparation

1. Cement mortar should consist of not less than one part cement to not more than two parts sand (by volume), dry mixed thoroughly and then moistened with sufficient water and, if desired, an admixture. The consistency should be such that when the mortar is rolled into a ball it will hold its shape.

   Example:

   124 lbs. of masonry sand (8 heaping shovels)
   54 lbs. of cement (4 heaping shovels)
   1½ gals. of water (varies with initial wetness of sand)
   1 pint of admixture (optional)
2. The bonding agent should be prepared as recommended by the manufacturer. Normal pot life is approximately 1 hour at 70° F. Read the warning label as epoxy mixtures may be toxic to the skin.
3. A grout slurry should be prepared.

   Example:

   7 pints of water
   1 pint of admixture (if desired)
   4 pints (5.3 lbs.) of cement

III. Lining Repair

A. Cracks

Cracks in cement mortar lined steel pipe are a common occurrence. These cracks are normally caused by shrinkage and minor flexure. They may be propagated by hot, dry weather, removal of pipe caps for an extended period, rough handling, and thermal stresses caused by uneven warming. Cracks no larger than 1/16" do not require repair. Experience has shown that cracks of 1/8" and larger will likely heal autogenously when the pipe is filled with water. For larger cracks, this process may take several months. Below is the procedure to repair cracks that are too large to heal:

1. Using a prospector's pick or slag hammer, remove the cracked area to the full depth of the lining, leaving vertical edges.
2. Remove all loose lining particles with a stiff wire brush. The surface to be patched should be free from dirt, oil, and grease.
3. Fill the crack with a joint mortar mix after first applying epoxy and/or slurry to all contact surfaces.

B. Broken and/or Loose Lining

Chip away all loose material keeping edges of sound mortar essentially vertical. If the area to be repaired exceeds 12" in any direction, a wire mesh must first be applied. Patch the exposed area using the same guidelines as that for interior joint grouting.

C. Curing

Do not fill the pipe for at least 24 hours after the last repair has been completed.

Note: These recommendations are for informational purposes only. American SpiralWeld Pipe Company, LLC (ASWP) assumes and accepts no responsibility for proper assembly, installation, or quality of workmanship performed by the installing contractor.

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