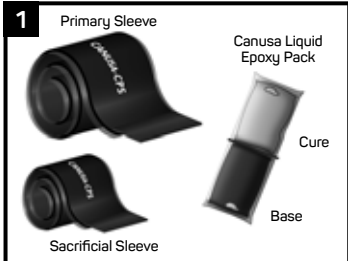


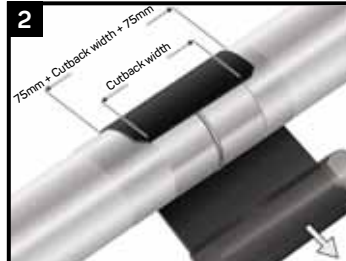
DDX

Advanced girth-weld protection for pipes used in directionally drilled applications.

Product Description



Canusa's Directional Drilling Kit - DDX system is composed of two sleeves and an epoxy kit. The epoxy kit includes: application accessories, latex gloves and pre-measured quantities of Liquid Epoxy.



As a guideline, DDX sleeves shall extend 75mm min beyond the edge of the cutback (both sides) onto the mainline coating or according to customer specification.
DDX Width = 75mm + Cutback width + 75mm (min)

Equipment List

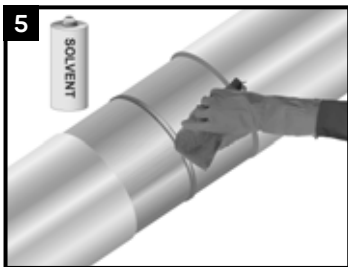


Canusa torch, propane tank, hose & regulator; Temperature measuring device, roller, knife; Appropriate surface abrasion device, solvent; Standard safety equipment (gloves, goggles, hard hat, etc.); Wet film thickness gauge

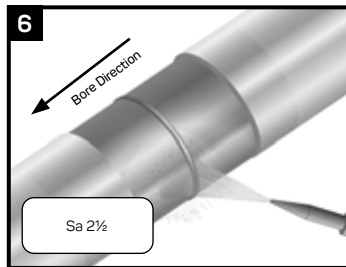
Flame Intensity & Torch Size

<p>Pipe O.D. ≤ 450mm (18')</p> <p>Use moderate flame intensity for pre-heating and shrinking.</p> <p>Minimum Torch Size: 150,000 BTU/hr.</p>	<p>Pipe O.D. > 450mm (18')</p> <p>Use moderate to high flame intensity for pre-heating and shrinking.</p> <p>Minimum Torch Size: 300,000 BTU/hr.</p>
--	---

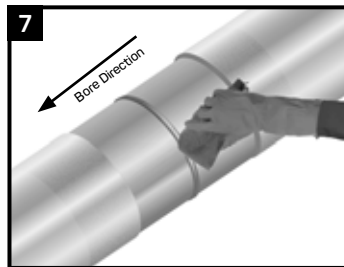
Surface Preparation



Ensure that the mainline coating edges are bevelled to 30°. If there is the presence of oil, grease, or other surface contaminants; clean the exposed steel and adjacent pipe coating with a solvent cleanser.

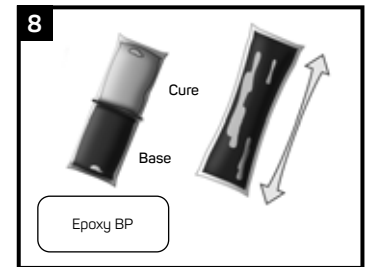


Ensure the pipe is dry before abrading. Thoroughly clean the weld area with a sand or grit blaster to "near white metal" SIS Sa 2½ or equivalent. Lightly abrade the mainline coating adjacent to the cutback edge to a distance that is at least 25 mm beyond the edge of all joint coating, which includes the primary and sacrificial sleeves.



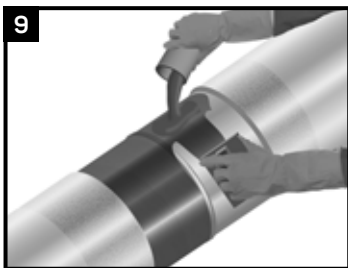
Using a dry, grease and lint-free cloth, wipe clean or air blast the steel and coated areas to remove foreign materials. If necessary, provide additional heat to ensure the surface temperature is 40-50°C (104-120°F).

Liquid Epoxy



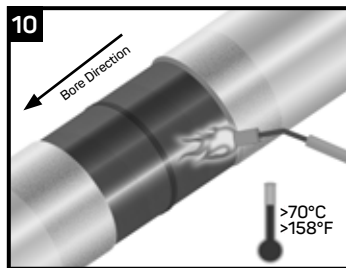
Follow the Preparation, Mixing and Application instructions provided with the supplied Canusa Epoxy Pack. For bulk quantities: mix the epoxy cure with the epoxy base (4 parts base to 1 part cure **by volume**). Mix for a minimum of 1 minute to assure uniform mixture.

Liquid Epoxy Application



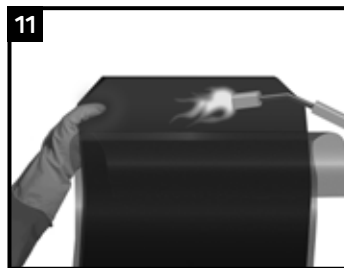
Apply mixed epoxy to a uniform specified thickness of 4-6 mils (100-150 microns) on all exposed bare metal using the applicator pads as supplied or an approved tool. Do not apply the epoxy to the mainline coating.

Epoxy Curing & Pre-Heat

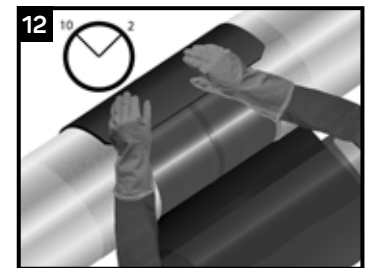


Using a high intensity flame, pre-heat the epoxy and abraded coating to a minimum temperature of 70°C with an appropriate propane torch. The flame shall be kept perpendicular to the surface of the epoxy and the abraded coating during pre-heating. **Ensure that the epoxy is dry to the touch prior to sleeve installation.** Additional preheat or time may be required for epoxy to become dry. If a film develops on the mainline coating because of preheat, use a surface abrasion tool to remove it.

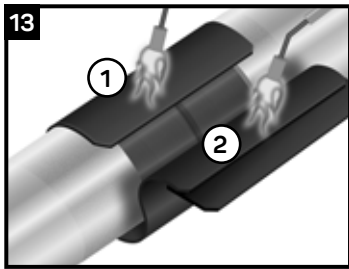
Primary Sleeve Installation



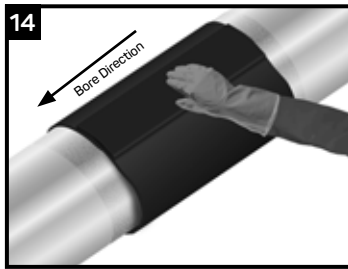
Partially remove the release liner on the primary sleeve and gently heat the underlap approximately 150 mm (6") from the edge.



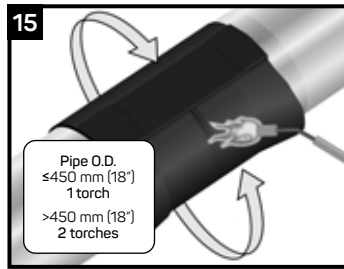
Place the underlap of the sleeve onto the joint, centering the sleeve such that the sleeve overlap is positioned at either the 10 or 2 o'clock position. Press the underlap firmly into place and use a roller to work out any trapped air. Feed the remaining length of sleeve under the pipe. Press the underlap firmly into place. Remove the remaining release liner.



Wrap the sleeve loosely around the pipe, ensuring the appropriate overlap. Use high intensity flame to quickly heat the backing of the underlap (1) and then gently heat the adhesive side of the overlap (2).

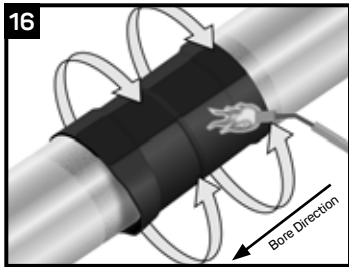


Press the closure firmly into place. Gently heat the closure and pat it down with a gloved hand. Repeating this procedure, move from one side to the other. Smooth any wrinkles by gently working them outward from the centre of the closure with a roller.

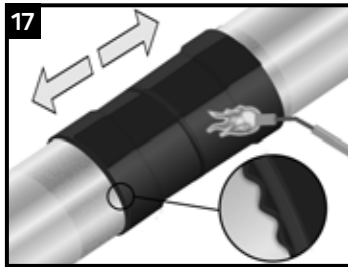


Using the appropriate sized torch, begin at the centre of the sleeve and heat circumferentially around the pipe. Use broad strokes. If utilizing two torches, operators should work on opposite sides of pipe.

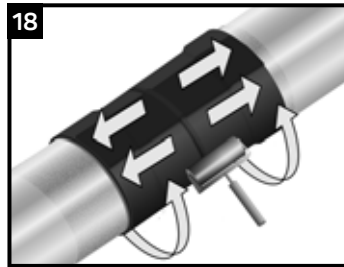
Pipe O.D.
 ≤450 mm (18")
 1 torch
 >450 mm (18")
 2 torches



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.

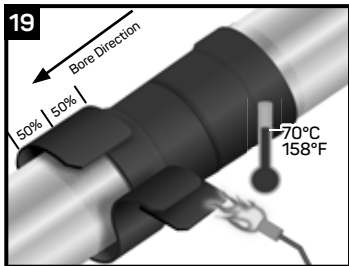


Shrinking has been completed when the adhesive begins to ooze at the sleeve edges all around the circumference. Finish shrinking the sleeve with long horizontal strokes over the entire surface to ensure a uniform bond.

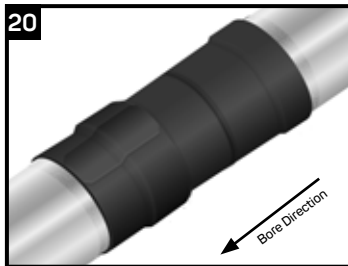


While the sleeve is still hot and soft, use a hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve, as shown above. Continue the procedure by also firmly rolling the closure with long horizontal strokes from the weld outwards.

Sacrificial Sleeve Installation

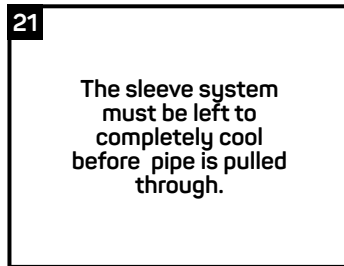


Ensure that the front 100 mm (4") of the primary sleeve and 100 mm (4") onto the coating is at the required temperature. Completely remove any release liners from the sacrificial sleeve. Wrap the sacrificial sleeve so that half of the sleeve overlaps the primary sleeve and half of the sleeve extends onto the coating. Recover the sleeve as in steps 11 through 17, but position the closure on the opposite side of the pipe relative to the primary sleeve closure.



Visually inspect the installed system to ensure that:

- Sleeve is in full contact with the steel joint.
- Adhesive flows beyond all sleeve edges.
- No cracks or holes in sleeve backing.



The sleeve system must be left to completely cool before pipe is pulled through.

Storage & Safety Guidelines

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.

Canusa-CPS A division of Shawcor Ltd.

Head Office

25 Bethridge Road
 Toronto, ON, Canada M9W 1M7
 Tel: +1 416 743 7111
 Fax: +1 416 743 5927

Canada

Dome Tower St. 2200,
 333-7th Avenue SW
 Calgary, AB, Canada T2P 2Z1
 Tel: +1 403 218 8207
 Fax: +1 403 264 3649

Americas

5875 N. Sam Houston Pkwy W.,
 Suite 200
 Houston, TX, USA 77086
 Tel: +1 281 886 2350
 Fax: +1 281 886 2353

Middle East

Plot # 37-WR43, Sector no.: ICAD III
 Musaffah South, PO Box 2621
 Abu Dhabi, The United Arab Emirates
 Tel: +971 2 204 9800

Europe, Africa & Russia

Dellaertweg 9-E, Gebouw
 "Le Carrefour"
 2316 WZ Leiden,
 The Netherlands (NL)
 Tel: +31 71 80 802 70
 Fax: +31 71 80 802 71

Asia-Pacific

101 Thomson Road,
 #11-03 United Square
 307591 Singapore
 Tel: +65 6749 8918
 Fax: +65 6749 8919

Quality Management system registered to ISO 9001

Canusa warrants that the product conforms to its chemical and physical description and is appropriate for the use stated on the installation guide when used in compliance with Canusa's written instructions. Since many installation factors are beyond our control, the user shall determine the suitability of the products for the intended use and assume all risks and liabilities in connection therewith. Canusa's liability is stated in the standard terms and conditions of sale. Canusa makes no other warranty either expressed or implied. All information contained in this installation guide is to be used as a guide and is subject to change without notice. This installation guide supersedes all previous installation guides on this product. E&OE

Part No. 99060-237
 IG_DDX_rev016