P.O. Box 523, Manlius, NY 13104-0523, Phone: 315-656-2277, Fax: 315-656-2170, www.Insul-Tek.com
Preinsulated Piping Systems

SUBMITTAL

Note: Insul-Tek® must receive a complete original stamped approved copy of the product submittal with a signed field verified drawing prior to releasing the order.

Project: **Eureka Tank Farm**

Mech. Contractor: Sifec North
Box 556, Rankin Inlet, Nunavut
X0C 0G0 Canada
Phone: 866-437-4001

Material Submitted: Preinsulated Piping System

Manufacturer: Insul-Tek® Piping Systems, Inc.
PO Box 523
Manlius, NY 13104
Phone: 315-656-2277
Fax: 315-656-2170

Date: May 6, 2014

Product Description: **Insul-Tek® Fiberclad Containment**

Fuel Oil Containment Piping

Carrier Pipe:	4" Schedule 40 A333 Grade 6 SMLS Carbon Steel ✓
Casing:	6" Schedule 40 A333 SMLS Carbon Steel Fiberglass Reinforced Plastic ✓ wound directly onto the outer conduit.
Fittings:	N/A
End Seals:	Prefabricated with a vent and drain located at terminating ends. ✓
Field Joints:	Field Joints will consist of 6" schedule 40 A333 Half Shells and Heat Shrink ✓

Note: Insul-Tek® must receive a complete original stamped approved copy of the product submittal with a signed field verified drawing prior to releasing the order.

INSUL® TEK

Fiberclad containment piping utilizes an outer steel containment casing protected with a totally non-corrosive outer layer of Fiberglass Reinforced Plastic (F.R.P.)

Features

Corrosion proof double wall containment piping system, pressure testable, leak detection / location systems available.

Fiberclad containment piping utilizes a totally non-corrosive exterior Fiberglass Reinforced Plastic (F.R.P.) cladding which is filament wound directly to the steel containment casing, thus eliminating the need for expensive and maintenance oriented cathodic protection systems

Carbon steel, stainless steel, or other types of carrier pipe utilized inconjuction with Fiberclad carbon steel or stainless steel containment casings.

Systems are prefabricated to job-site dimensions

Available Options

Multiple carrier pipe systems

Leak Detection / Location Systems

Heat Traced Systems

Black carbon steel, stainless steel or galvanized steel containment casings

Preinsulated Containment Piping Systems

Prefabricated valve pits and manholes

INSUL-TEK® Fiberclad Containment Piping

Insul-Tek® Fiberclad Containment Piping

- Hydrocarbons
- Process Fluids
- Chemical Transfer

Insul-Tek® Fiberclad Containment Piping

- Pressure testable double wall containment piping system
- Outer steel containment casing jacketed with 100 mils of corrosion proof Fiberglass Reinforced Plastic (F.R.P.) cladding
- No need for expensive and maintenance oriented cathodic protection systems

Insul-Tek® Fiberclad containment piping systems utilize a corrosion proof exterior cladding of Fiberglass Reinforced Plastic (F.R.P.). The F.R.P. cladding is filament wound directly on to the exterior steel containment casing thus providing a 100 mil thick corrosion barrier on the steel containment casing. The composite material; ***steel and fiberglass***, provides the ***durability and strength of steel*** and the ***corrosion resistance of Fiberglass Reinforced Plastic (F.R.P.)***. Insul-Tek® Fiberclad piping is an alternative to the outdated type of steel containment piping that is dependant upon some type of coating that is applied to the surface of the steel casing. Such coatings are highly susceptible to damage during loading, off-loading and during installation. Coated steel systems also require expensive and maintenance oriented cathodic protection systems. ***Fiberclad piping systems*** gives the installers the ***weldability of steel*** and the end user the ***corrosion resistance of Fiberglass Reinforced Plastic (F.R.P.)*** - the best of both worlds.

PRODUCT DESCRIPTION

Carrier Pipe

The carrier pipe(s) can be any type of pipe commercially available, including; carbon steel, stainless steel, F.R.P., or other types depending upon application. Please contact factory for recommendations.

Secondary Containment

The secondary containment casing can be carbon steel or stainless steel depending upon application. The secondary containment casing is protected by a corrison-proof barrier of Fiberglass Reinforced Plastic (F.R.P.) The F.R.P. cladding is filament wound directly on to the secondary containment casing after it has been sand blasted to an SP-7 surface finish. The cladding is a minimum of 100 mils in thickness.

Pipe Supports

The pipe supports will be constructed of steel and will be designed to permit complete draining of the outer containment casing in the event of a leak. All pipe(s) within the secondary containment casing will be supported at not more than 10' intervals. When utilized in conjunction with a leak detection/ location system, the pipe supports will have flared end stainless steel guide tubes to facilitate cable pulling and to avoid damage to the cable during the pulling process.

Leak Detection / Location Systems

Fiberclad containment piping systems can be fitted with a leak detection / location system that is capable of not only providing notification of a leak, but is also able to pinpoint the exact location of the leak. This is accomplished by utilizing a continuous sensing cable in-conjunction with an alarm / locator module. There are (3) three different types of sensing cables available; one detects water, one detects aqueous liquids (acids, bases and water), and one detects hydrocarbons (fuels and solvents) but is insensitive to aqueous liquids. Please consult factory for additional information pertaining to leak detection / location systems.

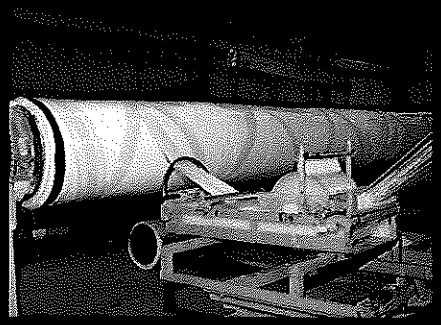
Available Options

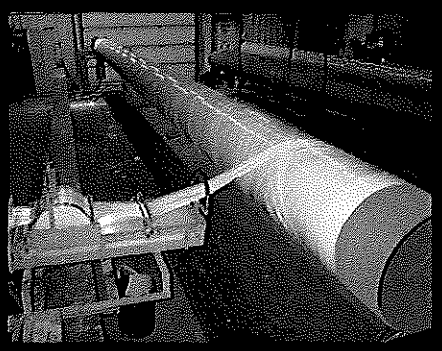
Insul-Tek® Fiberclad containment piping systems can be designed to incorporate more than (1) one carrier pipe within a single containment casing. Insul-Tek® can also supply preinsulated, and/or heat traced containment piping systems to suit the customers needs. Leak detection / location systems and low point monitoring systems are available as well. All leak detection systems are completely engineered and supplied as turn-key systems, Totally prefabricated containment valve pits and manholes are also available. Please consult factory for other options.

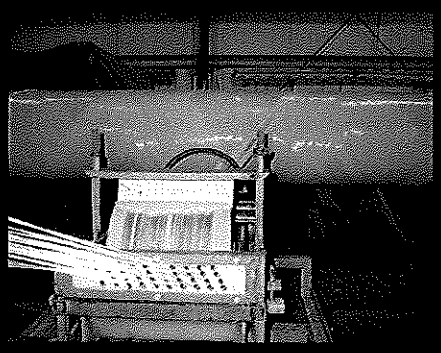
Key Features of Insul-Tek® Fiberclad Containment Piping Systems

- Totally non-corrosive fiberglass clad steel containment casing
- Systems totally prefabricated to job site dimensions
- Engineered drawings and part numbered installation drawings furnished for all projects
- Factory field service available
- Optional leak detection / location systems available

Filament Winding Process







Fiberclad Containment Piping

Specifications for
Insul-Tek® Fiberclad Double Wall Containment Piping

General

All double wall containment piping shall be Fiberclad Containment Piping as manufactured by Insul-Tek® Piping Systems, Inc. All straight lengths pipe, fittings and accessories shall be factory prefabricated by the manufacturer. No field fabrication of fittings or accessories will be allowed. All secondary containment welds completed at the factory shall be 100% air tested prior to shipment. The containment piping system shall be drainable and air pressure testable. Contractor fabricated systems, whether fabricated on-site or off-site shall not be allowed The containment piping manufacturer shall supply a complete design submittal including; engineered drawings, catalog cut sheets, and a full pipe stress analysis in accordance with ANSI B31.3 latest edition. The calculations shall be stamped by a Registered Professional Engineer.

Carrier Pipe

The carrier pipe shall be carbon steel, beveled for welding. Pipe sizes 2" through 10" shall be Schedule 40 A53 Grade B, ERW Steel. Sizes larger than 10" shall be standard wall thickness. Pipe sizes 1-1/2" and smaller shall be A106/A53 seamless type. All joints for pipe 2-1/2" and larger in size shall be butt welded. Sizes 2" and smaller shall be socket welded.

Secondary Containment Casing

The secondary containment casing shall be carbon steel, in accordance with ASTM A-139 Grade B, ASTM A-135 Grade B, or ASTM A-53 Grade B. The containment casing shall be the thickness as listed below

Conduit Size	Conduit Thickness
3"- 4"	Sch 10 or .120"
5"-26"	10 Gauge or .134"
28"-36"	06 Gauge or .187"

The carbon steel containment casing shall have a Fiberglass Reinforced Plastic (F.R.P.) external cladding of not less than 100 mils thickness. The F.R.P. Cladding shall be filament wound directly on to the carbon steel casing after it has been sand blasted to a SP-7 surface finish. All field joints on the containment casing shall be welded, air-tested and covered with a heat shrink sleeve or covered with a hand lay-up of fiberglass cloth and polyester resin. All containment casing will be subjected to a holiday test utilizing a 10,000 volt electrical resistance holiday detector.

Pipe Supports

All pipe within the containment casing shall be supported at not more than 10' intervals. The supports shall be designed to allow for draining of the containment casing in the event of a leak.

Leak Detection / Location Systems

The leak detection / location system shall utilize a continuous monitoring cable in conjunction with an alarm / locator module. The leak detection system shall be capable of not only detecting a leak, but also be able to pinpoint the exact location of the leak. The leak detection cable shall be capable of detecting water, aqueous liquids (acid, bases and water), or hydrocarbons, depending the type of fluid being conveyed. The containment piping system shall be designed to allow pulling of a leak detection cable into the containment casing. To facilitate pulling of the cable, pull ports shall be located a maximum of 500 feet apart for straight runs and reduced by 150 feet for every 90° change in direction.

Installation

The installing contractor shall weld the carrier pipe in accordance with ANSI B31.3 latest edition. After welding, the carrier pipe shall be hydrostatically tested to 50 psig or 1 1/2 times the operation pressure, whichever is greater. The containment casing shall be air tested to 10 psig after welding. The test pressures shall be held for no less than (1) one hour. The containment casing shall be kept clean and dry at all periods during the installation. The installing contractor must adhere to all directions relating to the installation provided by the containment piping system manufactoring.

Backfill

A 4" layer of sand or fine gravel shall be tamped in the trench to provide a stable and uniform bedding for the conduit system. Once the conduit system is in place, the trenches shall be carefully backfilled and hand tamped in 6" layers until a cover of at least 24" from the top of the pipe has been achieved. The first 12" of backfill shall be sand or fine gravel less than the 1/2" in diameter. The remainder of the backfill shall be void of rocks, frozen earth and foreign material over 6" in diameter. The trench shall be compacted to comply with H-20 Highway loading.

Corporate Office
Manufacturing Facility
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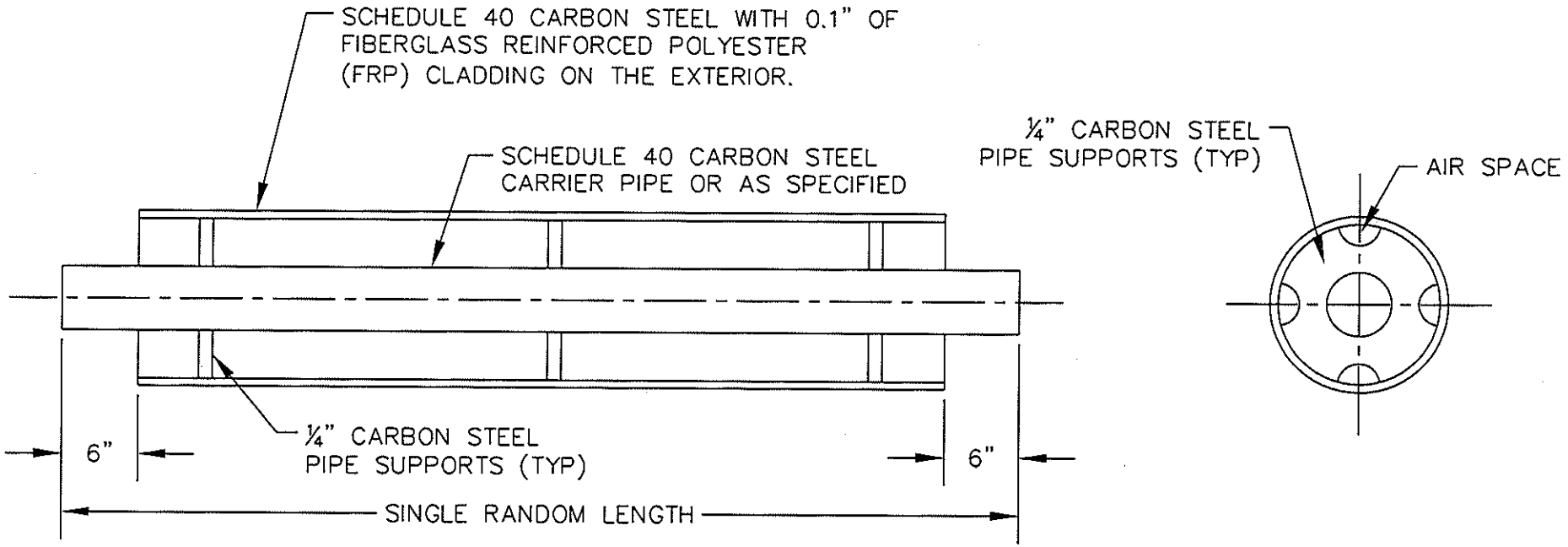
E-Mail: Info@insul-tek.com
Web Site: www.insul-tek.com



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Revise and Re-Submit	( )
Not Reviewed	( )

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Per,

WILLIAMS ENGINEERING CANADA INC.

WILLIAMS ENGINEERING CANADA

By: Trace Grunerud, P.Eng.

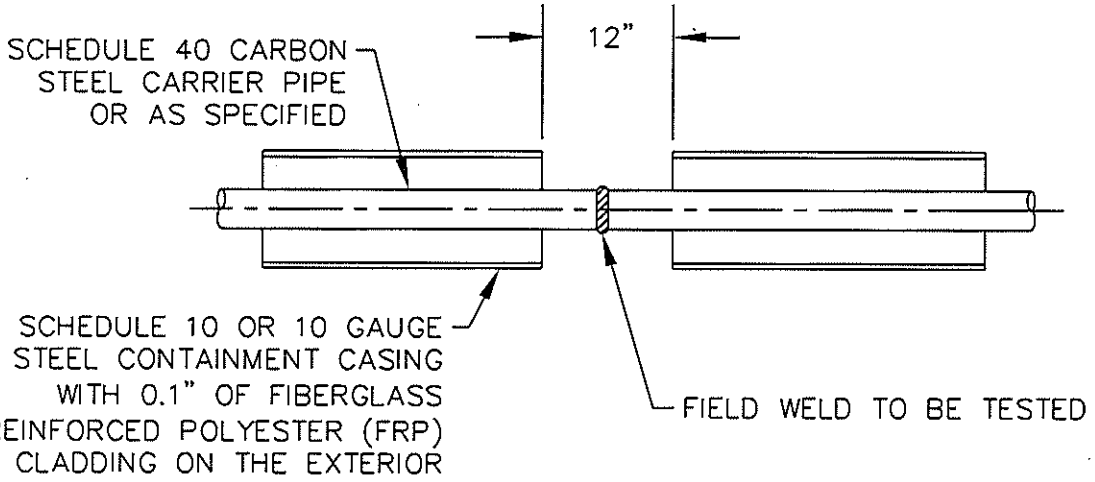
Date: 09/05/2014

INSUL-TEK®

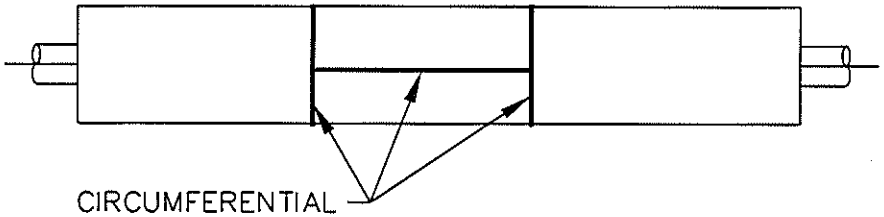
Post Office Box 523 * Manlius, New York 13104-0523
Telephone (315) 656-2277 * Facsimile (315) 656-2170

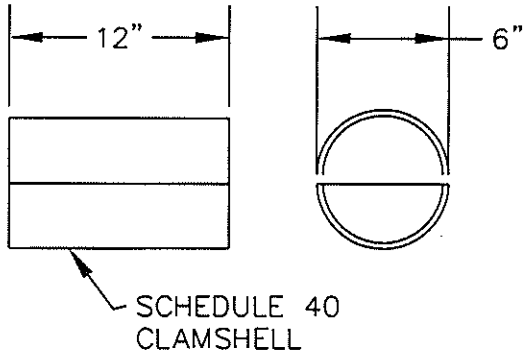
SCALE	DRAWN BY
NTS	

ENVIRO-TEK SINGLE RANDOM PIPE LENGTH WITH FIBERGLASS REINFORCED POLYESTER CLADDING



NOTES:
1. WELD THE CARRIER PIPE.
2. TEST AS REQUIRED.
3. PLACE CLAMSHELL IN PLACE.
4. WELD THE CIRCUMFERENTIAL SEAMS AS WELL AS THE LONGITUDINAL SEAMS.
5. COVER WITH A HEAT SHRINK SLEEVE. (SEE CANUSA INSTALLATION INSTRUCTIONS).





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Date: 09/05/2014

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Telephone (315) 656-2277 * Facsimile (315) 656-2170

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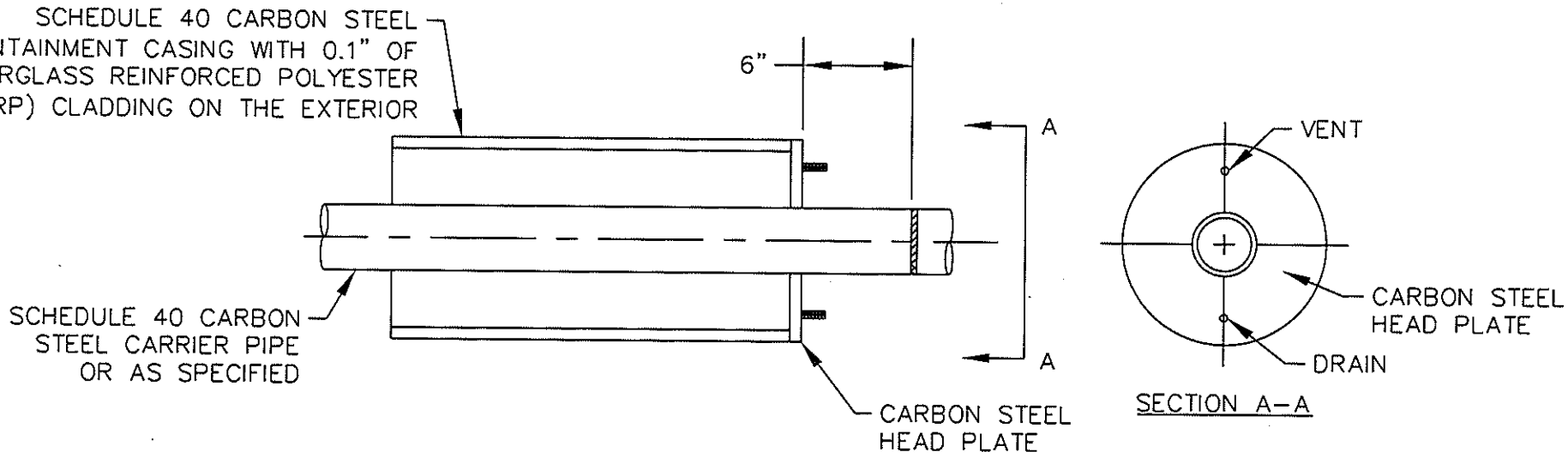
NTS		

ENVIRO-TEK CLAMSHELL FIELD JOINT DETAIL WITH FIBERGLASS REINFORCED POLYESTER CLADDING



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WILLIAMS ENGINEERING CANADA INC.

By: Trace Grunerud, P.Eng.

Date: 09/05/2014

WILLIAMS ENGINEERING CANADA

INSUL TEK ®
Post Office Box 523 * Manlius, New York 13104–0523
Telephone (315) 656–2277 * Facsimile (315) 656–2170

SCALE	DRAWN BY
NTS	

ENVIRO–TEK PREFABRICATED WELD END DETAIL WITH FIBERGLASS REINFORCED POLYESTER CLADDING

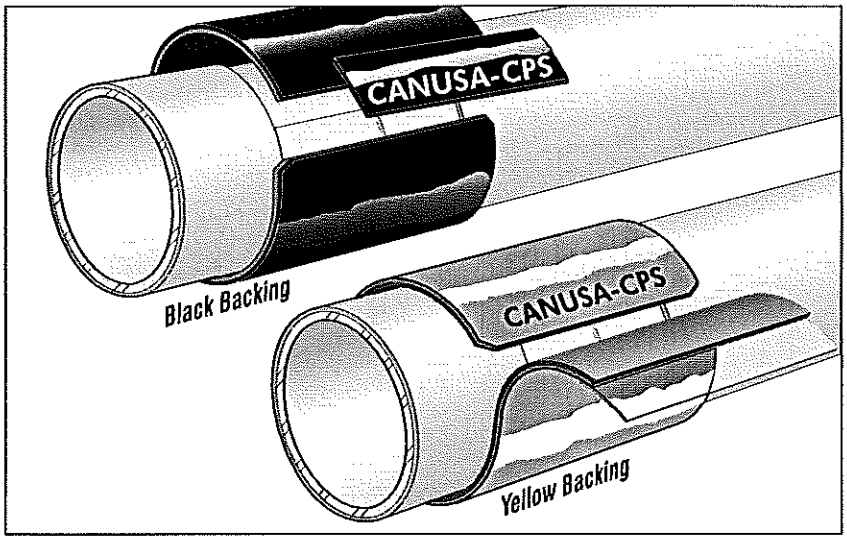
CANUSA-CPS

A SHAWCOR COMPANY

Product Data Sheet

K-60

Corrosion protective heat-shrinkable sleeve



For more than 35 years, Canusa-CPS has been a leading developer and manufacturer of specialty pipeline coatings for the sealing and corrosion protection of pipeline joints and other substrates. Canusa-CPS high performance products are manufactured to the highest quality standards and are available in a number of configurations to accommodate many specific project applications.

Product Description

The Canusa K-60 wraparound sleeve is designed for corrosion protection of buried and exposed steel pipelines operating up to 60°C (140°F). K-60 consists of a crosslinked polyolefin backing, coated with a technologically advanced corrosion protective adhesive, which effectively bonds to steel substrates and common pipeline coatings including polyethylene and fusion bonded epoxy.

Features & Benefits

Rapid & Reliable Installation

K-60 has a patented one-piece Wrapid Sleeve™ construction that incorporates a pre-attached closure strip as part of the sleeve. Because the closure has been factory applied, quick and reliable field installation is easy to accomplish. For added flexibility, CanusaWrap™ two-piece cut sleeves or bulk rolls are also available. K-60 is supplied with a yellow polyethylene backing for buried pipelines or a black backing with added UV resistance for above ground pipelines.

Long-Term Corrosion Protection

K-60 provides excellent resistance to cathodic disbondment resulting in effective long term corrosion protection. Once installed, K-60 provides the structural integrity of a seamless tube, and provides the substrate with durable protection against abrasion and chemical attack.

Saves Time & Money

K-60 can be supplied with a pre-attached closure or in bulk roll / cut sheet format with a separate closure. This versatility provides contractors choice and convenience depending on the type of project. For large projects, the unique construction of a pre-attached closure allows for quicker installation time versus handling, positioning and installing separate closures. For smaller projects or where multiple pipeline diameters are present, the convenience of bulk rolls or pre-cut sleeves with separate closures provides for maximum flexibility and minimizes inventory costs.

Applications

- 2LPE Pipeline Coatings
- Fusion Bonded Epoxy
- Pre-Insulated Pipes

Configurations

- Wrapid Sleeve™
- 2-Layer
- Standard Shrink

Pipe Sizes

55 - 610 (2" - 24")

Temperature Range

Up to 60°C (140°F)

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WILLIAMS ENGINEERING CANADA INC.

By: Trace Grunerud, P.Eng.

Date: 09/05/2014

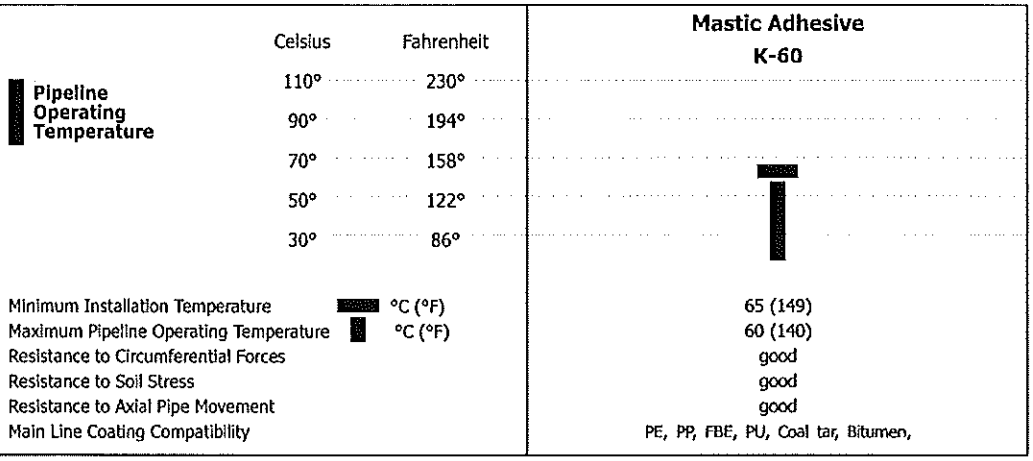
WILLIAMS ENGINEERING CANADA

The product selection chart shown here is intended as a guide for standard products.
Consult your Canusa representative for specific projects or unique applications.

K-60

Product Selection Guide

Sleeve Operating Characteristics



	Mastic Adhesive K-60
Minimum Installation Temperature °C (°F)	65 (149)
Maximum Pipeline Operating Temperature °C (°F)	60 (140)
Resistance to Circumferential Forces	good
Resistance to Soil Stress	good
Resistance to Axial Pipe Movement	good
Main Line Coating Compatibility	PE, PP, FBE, PU, Coal tar, Bitumen,

Typical Product Properties

	Test Standard	Unit	
Adhesive			
Softening Point	ASTM E28	°C (°F)	87 (189)
Lap Shear	ASTM D1002	N/cm² (psi)	35 (51)
Backing			
Specific Gravity	ASTM D792		.93
Tensile Strength	ASTM D638	MPa (psi)	20 (2900)
Elongation	ASTM D638	%	600
Hardness	ASTM D2240	Shore D	46
Abrasion Resistance	ASTM D1044	mg	45
Volume Resistivity	ASTM D257	ohm-cm	10^{17}
Dielectric Voltage Brkdwn.	ASTM D149	kV/mm	20
Sleeve			
Impact	ASTM G14	J	10
Indentation	ASTM G17	Holiday Test	pass @ 10 kV
Peel Adhesion	ASTM D1000	N/cm (pli)	88 (50)
Cathodic Disbondment	ASTM G8	mm rad	8
Water Absorption	ASTM D570	%	0.05
Low Temp. Flexibility	ASTM D2671C	°C (°F)	-20 (-4)

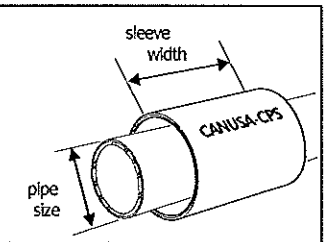
How To Order[1]:

Dimensions & Ordering Info

K-60 230-450 YE

- Colour ▸
- Sleeve Width ▸
- Pipe Size ▸
- Adhesive (min. thickness as supplied) ▸
- Backing (min. thickness as supplied) ▸
- Product Name ▸

Standard Ordering Options		
	T Thickness	L Thickness
	T	L
Colour ▸	YE-Yellow, BK - Black	
Sleeve Width ▸	300mm, 450mm, 600mm, 900mm (12", 18", 24", 36")	
Pipe Size ▸	55 - 610mm (2" - 24")	
Adhesive (min. thickness as supplied) ▸	1.1 mm (0.045")	1.4 mm (0.055")
Backing (min. thickness as supplied) ▸	0.6 mm (0.025")	0.9 mm (0.035")
Product Name ▸	K-60	



Min. Sleeve Width =
Bare Steel Dimension + **50 mm** (2") min. on each side of the pipe joint.

The above represent standard Wrapid Sleeve™ ordering options. Consult your Canusa representative for any unique project requirements.

[1] For CanusaWrap™ bulk rolls, consult you Canusa representative. K-60 requires CLW closures.

CANUSA-CPS
A SHAWCOR COMPANY

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Fax: +65-6749-8919

CANUSA-CPS

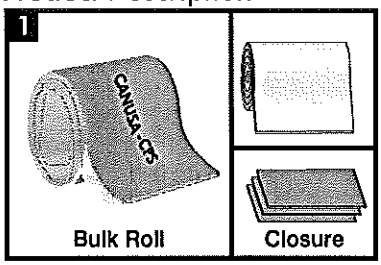
A SHAWCOR COMPANY

Installation Guide

K-60 CanusaWrap™

Two-piece protective bulk roll with separate closure

Product Description



K-60 CanusaWrap™ is typically shipped in bulk rolls or as precut sleeves. The adhesive is protected from contamination by an inner liner. Closures are shipped either in bulk rolls or pre-cut.

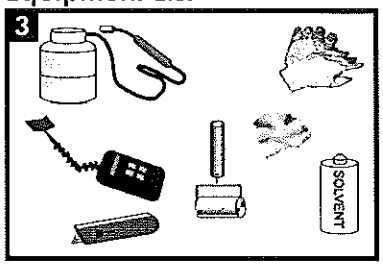
Storage & Safety Guidelines

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.

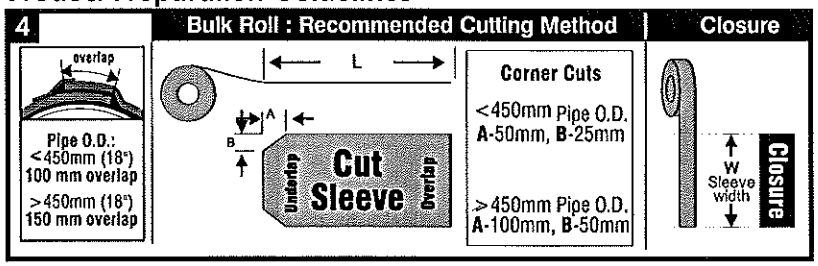
These installation instructions are intended as a guide for standard products. Consult your Canusa representative for specific projects or unique applications.

Equipment List



Propane tank, hose, torch & regulator
Appropriate tools for surface abrasion
Knife, roller, rags & approved solvent cleanser
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

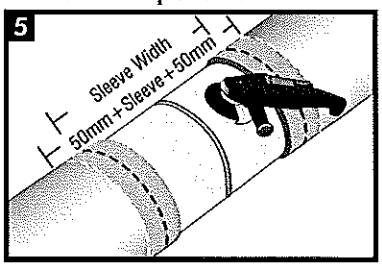
L = Coated Pipe circumference + overlap dimension

W = Sleeve Width

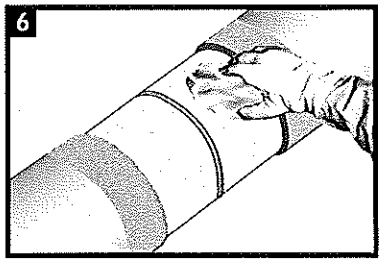
Ensure that the sleeve and closure are not damaged or contaminated. Trim corners as shown.

Please see **"CanusaWrap™ Sleeve Cutting Guideline"** for more information on alternative cutting methods.

Surface Preparation

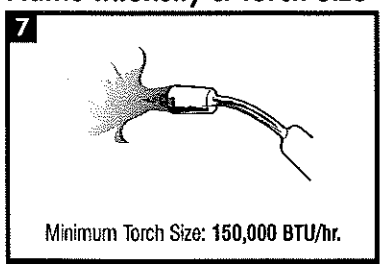


Ensure that the coating edges are beveled to at least 30° and that the pipe is dry before cleaning. Using a hand or power wire brush, abrade the pipe to a minimum of St3/SP3. Lightly abrade the pipe coating adjacent to the cutback area to a distance of 50mm (2") beyond each end of the sleeve width.



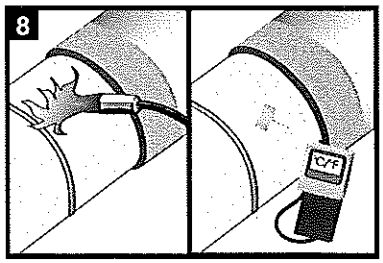
Wipe clean or air blast the steel and pipe coating to remove foreign contaminants.

Flame Intensity & Torch Size



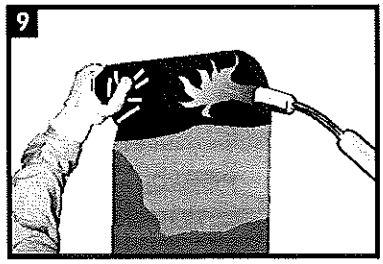
Use **moderate** flame intensity for pre-heating and shrinking.

Pre-Heat

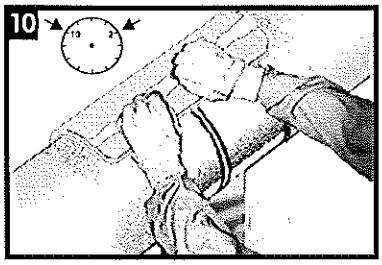


Pre-heat the joint area to the minimum of 65°C (150°F). Using a temperature measuring device, ensure that the correct temperature is reached on the steel and at least 50mm (2") on each side of the sleeve.

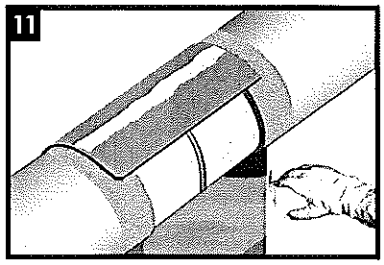
Sleeve Installation



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

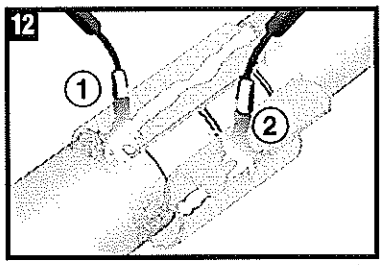


Centre the sleeve over the joint so that the sleeve overlaps between the 10 and 2 o'clock positions. Press the underlap firmly into place.

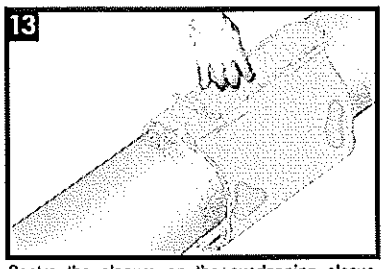


Remove the remaining release liner.

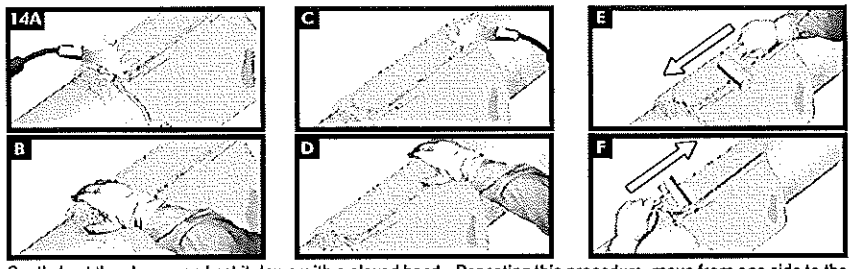
K-60 CanusaWrap™



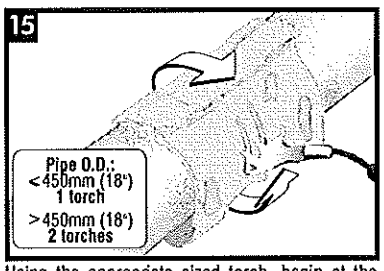
Wrap the sleeve loosely around the pipe, ensuring the appropriate overlap. Gently heat the backing of the underlap and the adhesive side of the overlap. Press the overlap into place.



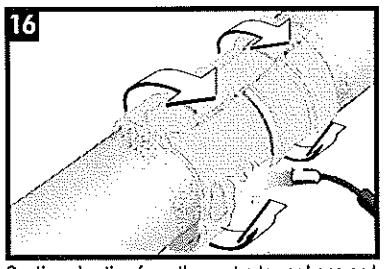
Centre the closure on the overlapping sleeve. Press down firmly.



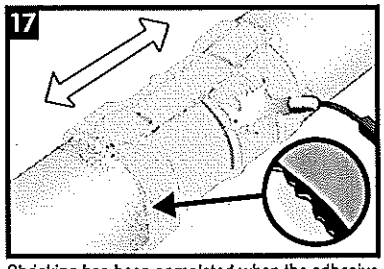
Gently heat the closure and pat it down with a gloved hand. Repeating this procedure, move from one side to the other. Smooth any wrinkles by gently working them outward from the centre of the closure with a roller.



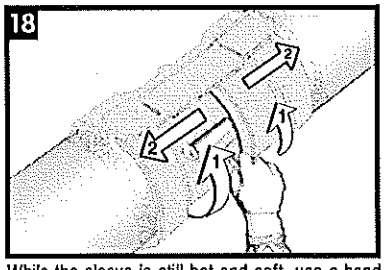
Using the appropriate sized torch, begin at the centre of the sleeve and heat circumferentially around the pipe. Use broad strokes. If utilizing two torches, operators should work on opposite sides of pipe.



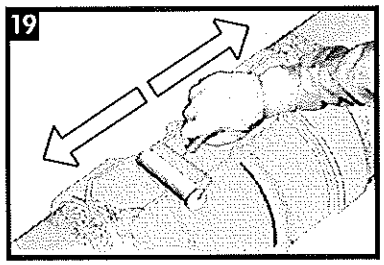
Continue heating from the centre toward one end of the sleeve until recovery is complete. In a similar manner, heat and shrink the remaining side.



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.

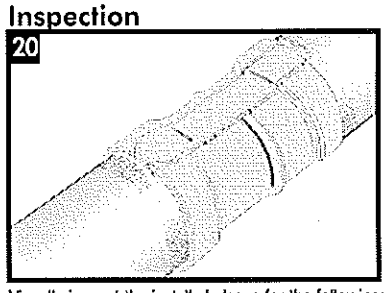


While the sleeve is still hot and soft, use a hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve, as shown above. If necessary, reheat to roll out air.



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 for 2 hours prior to lowering and 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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SHIPPING & HANDLING INSTRUCTIONS

HANDLE INSULATED PIPE WITH CARE! THIS PIPE CAN BE DAMAGED WHEN HANDLED, MOVED OR STORED IMPROPERLY!

1. **INSPECT SHIPMENT FOR DAMAGE:**
   Make an overall inspection of load, checking all bands and braces to see if they are intact. Also, check the load for shifting. If the load has shifted, or if the braces and bands are broken, examine pipe for damage and note on the delivery receipt and have it signed by the driver.

2. **CHECK ENTIRE LOAD AGAINST PACKING SLIP:**
   Note any shortages or discrepancies on signed receipt.

3. **UNLOAD PIPE IN THE FOLLOWING MANNER:**

a.	Skids or Hand Passing	½" to 3"
b.	Ropes and Skids or Fork Lift‡	3½" to 6"
c.	Fork Lift‡ or Crane and Nylon Webbed Sling	8" to 20"
d.	Crane and Nylon Webbed Sling	20" to 48"

4. **STORE PIPE IN THE FOLLOWING MANNER:**
   - **a.** Pipe should be stored on level ground. Place supports of ample size (1" x 8") under insulated pipe, so that pipe does not rest on ground (pallets with solid, smooth surfaces can be used in place of supports).
   - **b.** Insulated pipe stored outside for long periods of time should be covered with canvas tarpaulin for protection from elements (plywood can be used also). Do not prevent airflow, as jacket can be deformed from heat build up.

5. **KITS AND MOLDS SHOULD BE STORED IN A *COOL, DRY* PLACE, OUT OF THE DIRECT SUNLIGHT.**

6. **ENSURE THE FOLLOWING CONDITIONS ARE MET:**
   - **a.** Do not drag or drop units
   - **b.** Prevent any dirt or debris from entering pipe prior and during installation.
   - **c.** Prevent any damage to pipe ends with careful handling.
   - **d.** Keep thermal insulation dry.
   - **e.** Do not use chains or other devices, which might puncture jacket.

‡ Forklift – When using a forklift, a large flat surface must cover the forks so that damage will not occur to coated pipe.

* Use two slings and spreader bar on all lengths 30 ft. or longer

BE VERY CAREFUL NOT TO DROP THE PIPE!!