

Rovanco® Piping Systems

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INS-CTMA-SPOOLED OUT (with Red Mil)

Above Ground Red Mil Steel Containment Spooled Out Installation Instructions

Revised 03/26/26

This instruction manual will give you all the information needed in terms of techniques, tools, and accessories required to install ROVANCO Above Ground Steel Containment. If you follow the instructions carefully, the end result will be a high quality, pressure testable containment piping system. Thank you for showing your confidence in ROVANCO by purchasing its products. We sincerely appreciate your business and we will provide you with quality products with a fair price and “great” service to deserve your future business. Please consult your local ROVANCO Manufacturer’s Representative for information about all of the products provided by ROVANCO.

INSPECTION

Inspect all shipments on receipt. Examine all pipe and accessories as they are unloaded. Check to insure that every item on the packing list is received. Check the contents of the cartons to insure that the materials have arrived safely. Do not throw the cartons from the vehicle. Handle all materials carefully. Have the freight carrier make out a damage or short receipt if any discrepancies are found. Keep a signed copy of this receipt and notify ROVANCO immediately. All spool pieces shipped have individual part numbers labeled on each end. Refer to your packing list to be sure you have all spool pieces shown. With your paperwork, you will receive two copies of the installation drawings. These drawings will show the location of each piece of ROVANCO Above Ground Steel Containment.

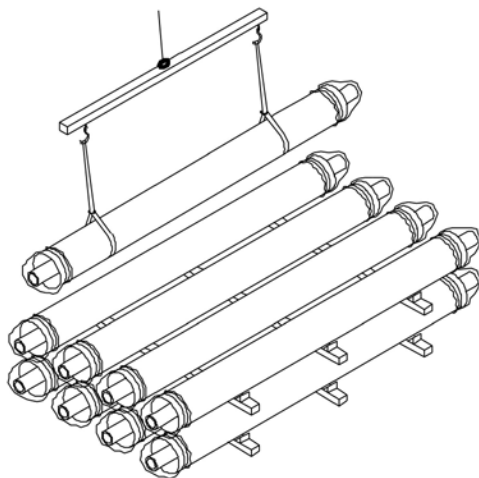
UNLOADING

ROVANCO piping systems are manufactured to withstand normal field handling but, like any piping material, damage can occur from careless handling. The spool pieces should be unloaded from the truck using a cherry picker or other suitable equipment. Lift the pieces with nylon slings and spreader bars so as not to damage the piping, insulation, jacket, conduit or coating. Do not use chains or chokers in direct contact with the piping. **Do not drop spool pieces because this can damage the the piping, insulation, jacket, conduit or coating.**

STORAGE

Use dunnage material under the pipe and between successive layers to protect the casing from foreign objects. Do not stack more than four layers high to avoid excessive weight on the bottom layer. Prior to installation cover the pipe ends with a white tarp or white visqueen to keep out water, excessive dust and debris. If the pipe will be stockpiled in direct sunlight or at temperatures exceeding 90°F, cover the entire system with a white tarp or white visqueen. Do not use opaque, clear or any other color other than white. If these steps are not taken, warranty will be void. There should be a layer of wood dunnage between the pipe and visqueen. Cartons of material (i.e. glue,

foam kits, fiber glass adhesives, etc.) should be stored in a dry area at 60° to 80°F. Liquid foam has a shelf life of 6 months after delivery. Freezing or high temperatures may affect the product’s ability to perform their functions. IF these steps are not taken, warranty will be void.



TESTING

All carrier pipe must be hydro tested prior to insulating, pouring thrust blocks or backfilling the system. Failure to comply with testing procedures will void warranty.

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Testing

All carrier pipe must either be air or hydro tested per specifications prior to insulating and pouring thrust blocks around anchors or backfilling the system. Failure to comply with testing procedures will void warranty. Plastic carrier pipe must be hydro tested only, do not air test.

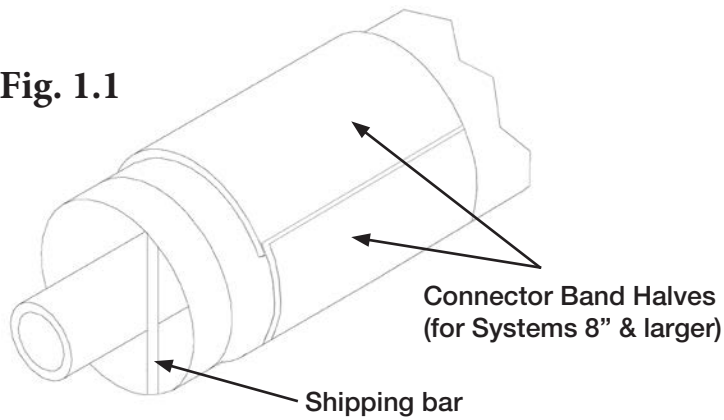
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For additional Leak Detection Installation Instructions, contact Rovanco for INS-RAT

Section Installation of Spool Pieces

Fig. 1.1



* Note: Shipping bar needs to be removed prior to installation

Fig. 1.2

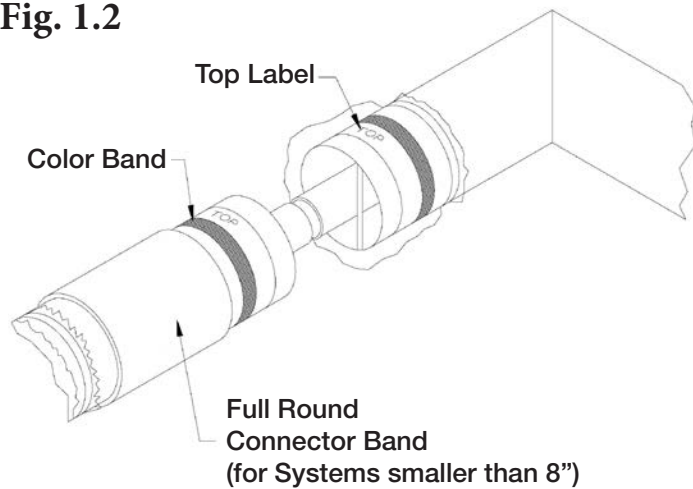


Fig. 1.3



Fig. 1.4

ROVANCO
Piping systems, inc.

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-- THE LEADER IN PRE-INSULATED PIPING SYSTEMS --

SHOP ORDER NUMBER:		
PART NUMBER:		INSPECTED BY:
MATCH THIS END TO PART NUMBER:		

After the ditch has been opened, the spool pieces should be installed in accordance with the installation drawings bearing the latest revision number. Each spool piece has its own part number which will match the drawing showing its approximate length. There should be a full round connector band (if less than 8" system) over one end of each spool. If not, the connector bands halves (8" and larger system) will come in a crate. It is important that if full round connector bands included that one be on the containment at each joint before welding carrier pipes together. **See Figure 1.1**

If the containment is not going to be installed immediately, leave the plastic bag over the end of the pipe. Plastic garbage bags with the bottoms cut out or plastic sheeting can be taped over the connector band to help prevent water from entering the system should the trench flood. Test cans can be used at the open ends of the systems to prevent water from entering the system. It is very important that the insulation is kept dry during installation!

ROVANCO suggests that you dig bell holes for field welding before lowering the pieces in the ditch. Lower the containment into the trench, using a spreader bar and nylon slings. As pieces are lowered into the ditch, make sure that the trench bottom is free of sharp objects or rocks. If no bedding is specified, ROVANCO recommends 6" of sand or other clean granular material 1/4" or smaller. At no time is wood allowed to be buried as a pipe stand in the ditch. That is a potential failure point on all containment systems. Bags of sand should be used.

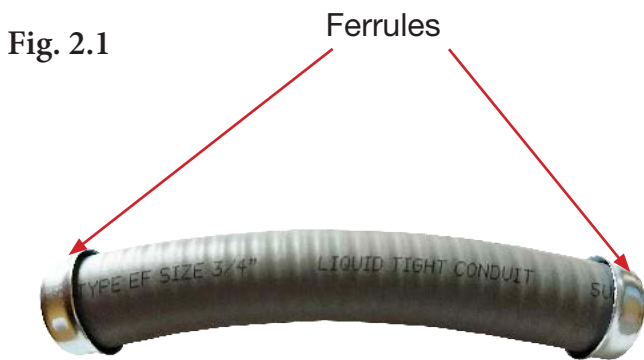
Notice that there are colored bands located on the end of some spool pieces. This band is to match an identical colored band of the adjacent piece at the field joint location **See Figure 1.2**

This is to ensure that expansion pipe supports are located in the proper areas. Also note that straight lengths coming off an expansion loop or elbow have a ROVANCO label marked TOP on the containment end. This designates that these spool pieces have a top. This must be at the 12 o'clock position before the pipe is welded. This insures that the service pipe can move laterally within this special support. **See Figure 1.3**

See Figures 1.4 for example labels.

Section 2: Installing Flexible EMT for Pull Rope/Pulling Cable On Straight Joint

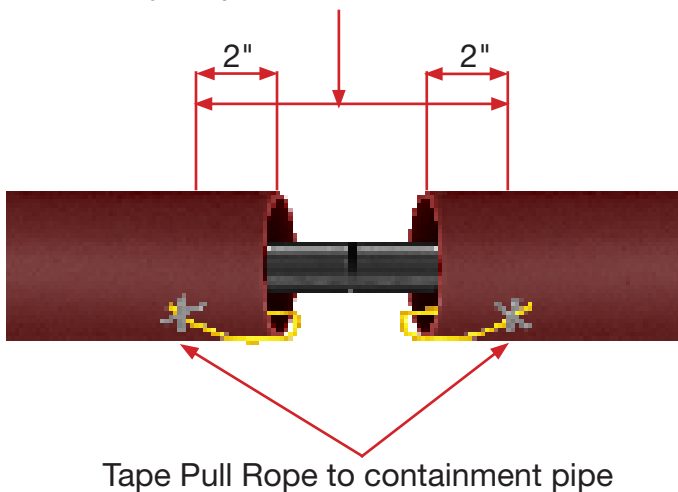
Note: Pre-Fabricated Fittings will have the Flexible EMT already installed with pull rope extended out both ends.



1. Rovanco will provide a roll(s) of Flexible EMT required for the installation of your piping system. Also provided will be a box(es) of ferrule ends. **After measuring the length of flexible EMT required for the joint, the ferrules are to be installed in both ends of the flexible EMT.** The ferrules should be bottomed-out as shown. **See Figure 2.1**

Fig. 2.2

Total length to cut Flexible EMT should be width of joint plus an additional 2" on each end

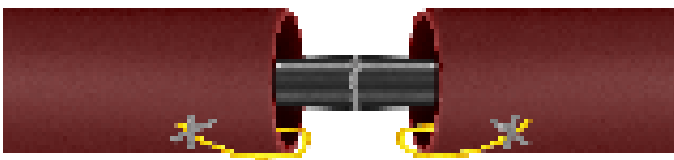


2. Slide straight lengths of pipe together. Tape back pull rope to each spool so it is not damaged during the welding of the carrier pipe. **See Figure 2.2**

Measure length of joint and cut Flexible EMT to length. The section of Flexible EMT should be long enough so each end extends 2" past edge of joint. **See Figure 2.2**

Attach metal ferrules to each end of the cut to length Flexible EMT. Make sure ferrules are bottomed-out as shown in **See Figure 2.1**

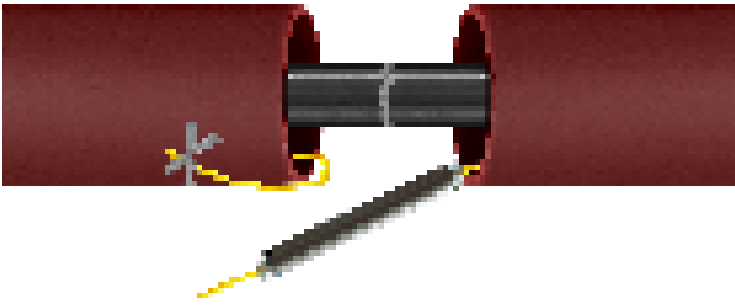
Fig. 2.3



3. Weld carrier pipe and test in accordance with engineering specifications. **Figure 2.3**

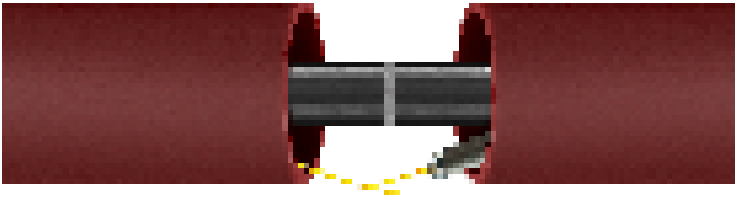
NOTE: If your carrier pipe is insulated, you should install insulation according to instructions now

Fig. 2.4



4. Slide Flexible EMT fitted with ferrules onto one end of the pull rope. Slide the EMT into the air space on that side of the pipe. **See Figure 2.4**

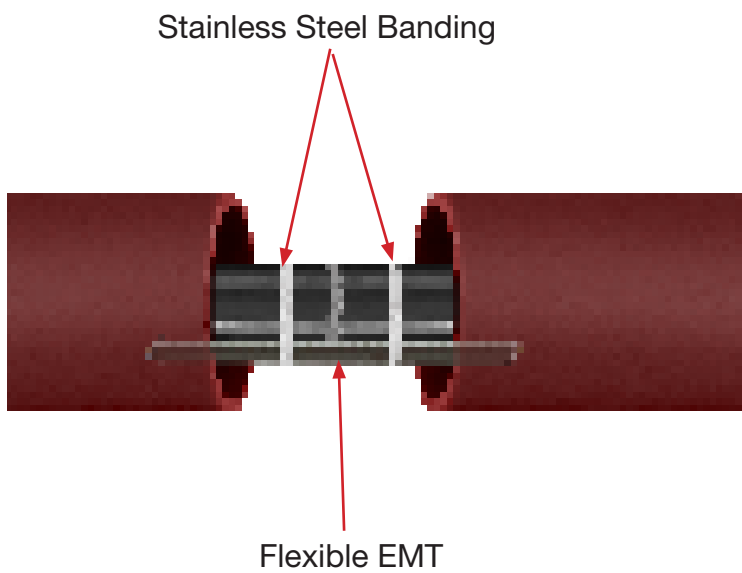
Fig. 2.5



5. Tie the two ends of the pull rope together in the middle of the joint and trim any loose ends.

NOTE: Be sure knot is strong enough to hold but small enough so it slides easily within the Flexible EMT. It is suggested you test the knot by pulling on each end of the pull rope to assure knot does not slip. **See Figure 2.5**

Fig. 2.6



6. Center the Flexible EMT in the joint on the bottom of the carrier pipe (on top of insulation if insulation is used on your system and secure in place with the provided stainless steel banding in 2 places. If insulation is on system, do not over-tighten banding so it does not damage insulation. **See Figure 2.6**

Once finished, the provided containment closures can be installed according to instructions or specifications and fully welded on all seams. Containment then to be tested per instructions or specifications and if no leaks are present, coated or shrink wrapped according to system requirements and/or as specified.

Section 3: Pull Rope for Leak Detection Cable Installation Instructions

Fig. 3.1



Fig. 3.2

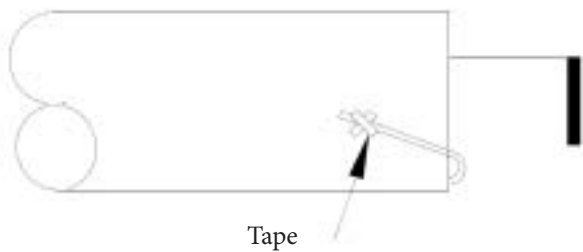


Fig. 3.3

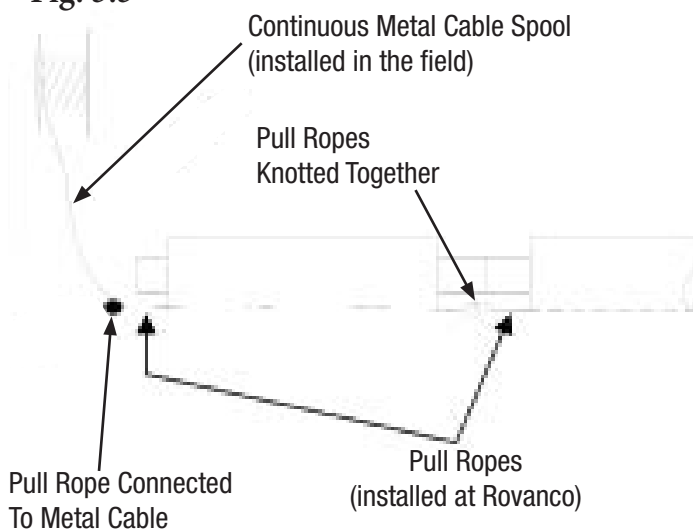
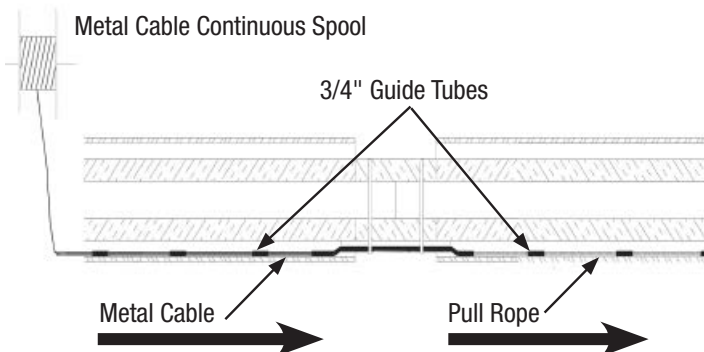


Fig. 3.4



Note: During any welding processes do **NOT** use anti-splatter or any type of lubricant **IF** your system has leak detection. These materials can cause the leak detection to fail.

Preparation – Before Carrier Pipe Welding

1. Each piece of pipe will be supplied with its own pull rope which has been threaded through a series of semi-flexible 3/4" guide tubes that are positioned at intervals inside the length of pipe. The end of the rope is taped to the carrier pipe at both ends. Do not cut the rope loose until the pipe is in the trench and carrier pipe is ready to be joined.

See Figure 3.1

2. Once the pipe is in the trench and carrier is ready to be joined, carefully cut the tape loose and tape the rope back to the jacket so the rope does not get burned when welding and free of glue, epoxy or resin on PVC or fiberglass systems. **See Figure 3.2**

Proceed with joining the carrier pipe. If the joints are to be exposed overnight or for any period of time, use a white tarp or white visqueen to seal the joints.

Preparation – Before Pulling Metal Cable

3. Once all of the carrier pipe joints are welded and tested, you are ready to connect the pull rope from one pipe length to the pull rope of another. Use a loop or slip knot to connect pull ropes. Use electrical tape to flatten down any loose ends and to secure knot so the two rope do not pull apart during pulling process.
4. Set up the spool of metal cable at one end of the system. Then connect the pull rope end to the cable.

See Figure 3.3

The pipe has centering supports with sections of 3/4" conduit guides for the pull ropes and metal cable to run through. Make sure the pull rope/metal cable connection does not get bound up in these guides, **it is strongly recommended to tie the pull rope end to the continuous metal cable using the procedure shown on page 6.** This method will minimize issues during the pulling process.

5. Once rope and cable are connected at one end, pull the opposite, loose end of the rope so the continuous metal cable is pulled the full length of the pipe section and follows the rope through the 3/4" guide tubes. The continuous metal cable needs to be pulled enough to move the rope out of the joint area prior to welding conduit connector bands. **See Figure 3.4**

TT-Aircraft to TT-PR (Pull Rope) Connection Installation Instructions



Wrap approximately 4 inch end of TT-PR with electrical tape forming a point.



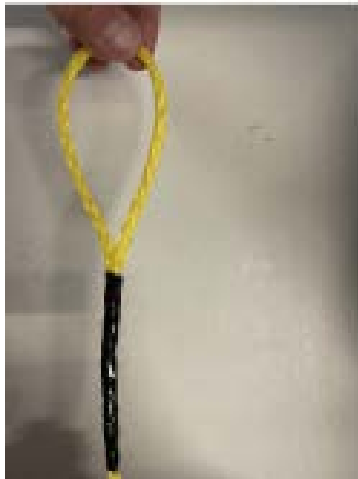
Open up hollow braid approximately 12-14 inches from end to insert taped point into the braiding.



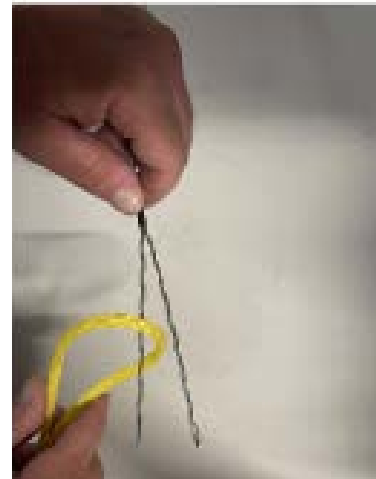
Insert entire taped portion of pull rope end into the braiding.



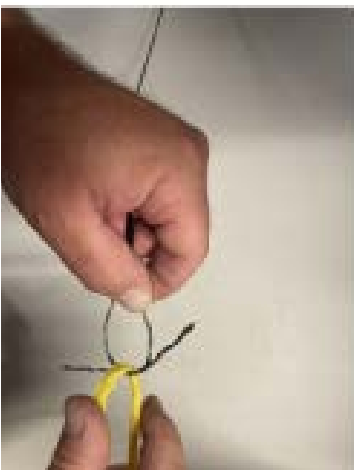
Loop should look like this.



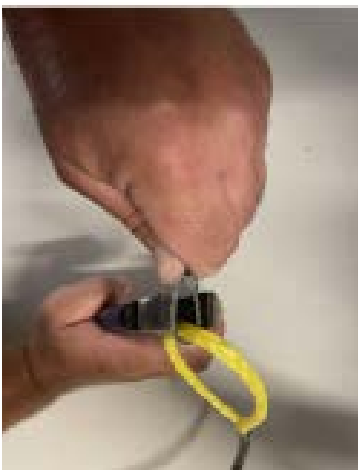
Use Scotch 33+ electrical tape to wrap section where point was inserted into the braid tightly.



Uncoil steel aircraft cable into 2 halves approximately 5 inches long and tape at base of this "V" with electrical tape ("V" hidden under top thumb in this photo). Insert braided loop between these sections.



Loop steel cable around braided cable from each end in opposite directions twisting steel cable end around itself at least 2 times on each side forming a steel cable loop.



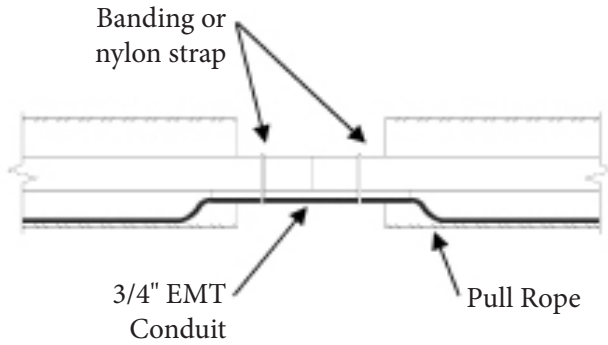
Use pliers to pinch steel cable loop.



Stretch both cables and apply electrical tape from one end to the other, then back to starting point. Note: While wrapping electrical tape, pull to make this tight in order to lower the profile of the section for ease of pulling.

NOTE: Steel aircraft cable to be pulled prior to welding 10 gauge. After 10 gauge has been welded and tested per spec, then the leak detection cable can be pulled.

Fig. 3.5



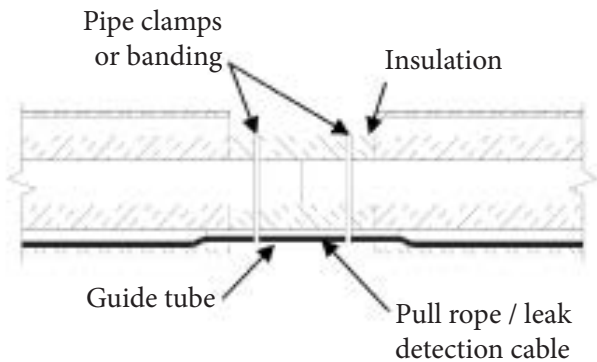
6. The center 15" of the guide tube is flexible. Use banding or nylon strap to position that portion of the guide tube system away from the edges of where the connector bands will be welded. **See Figure 3.5**

Make sure the cable is not stuck or bound up by pulling it in each direction at least 20-ft. If the cable does not move freely check all guide tubes to see if you can find where the issue is and make necessary adjustments.

NOTE: Do not pull the actual Leak Detection Cable through until the connector band welding is complete and system has been tested. This is to prevent the possibility of damage or contamination to the leak detection cable.

Preparation – Before Pulling Leak Detection Cable

Fig. 3.6



7. After the continuous cable is pulled and properly positioned in the joint area, begin the conduit connector bands process. **See Figure 3.6**

See Figure 3.6

NOTE: Refer to the pipe installation instruction section for details associated with that procedure. Any other procedures such as fitting, end seal and outer jacket insulating & coupling are covered in their respective sections in the instructions.

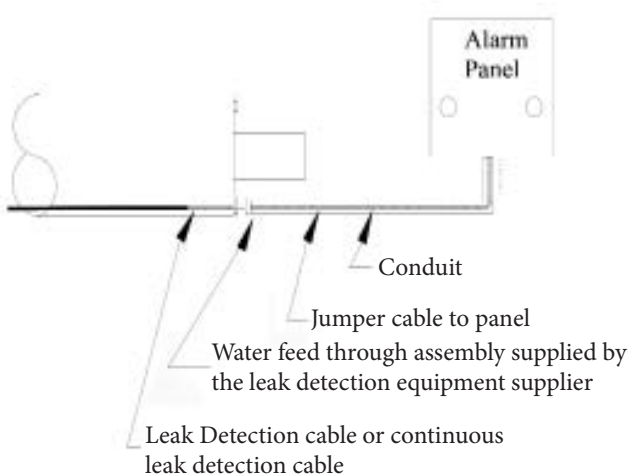
8. After conduit connector bands are fully welded and tested, move cable back & forth again to be sure it is still free. Then connect end of metal cable to leak detection cable. You can utilize the same connection process suggested for connecting pull rope to metal cable on **page 7**.

Pull metal cable, now attached to leak detection cable, through the system. This is to be done before insulating and making the outer jacketing joints.

It will depend on the pipe run as to whether you pull leak detection the entire length of a straight pipe run or to a pull port. See specs for details.

It is extremely important to pull the Leak Detection cable and test it prior to backfilling! See Figure 3.7

Fig. 3.7

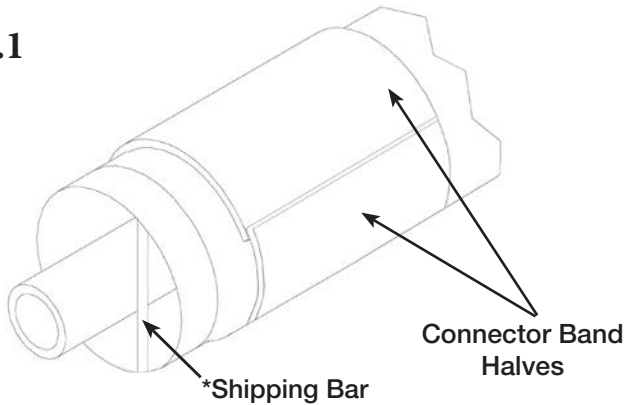


Section 4: Field Alteration of Spool Pieces

Although the ROVANCO spool pieces have been fabricated in accordance with contractor field measurements, sometimes obstructions or errors can require field alteration. Prior to making any field alterations, contact ROVANCO's Customer Service Department in Joliet, Illinois (815) 741-6700, so that we can instruct you in this process and insure that the resulting layout will function properly. This prior notification will also maintain the ROVANCO warranty.

Section 5: Welding of Carrier Pipe

Fig. 5.1



* Note: Shipping bar needs to be removed prior to installation

Fig. 5.2

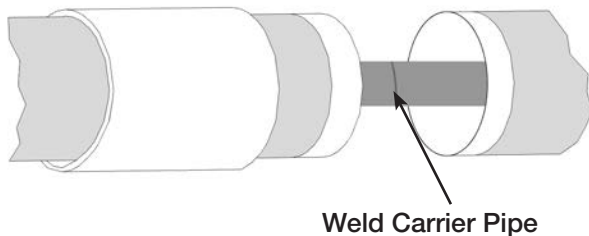
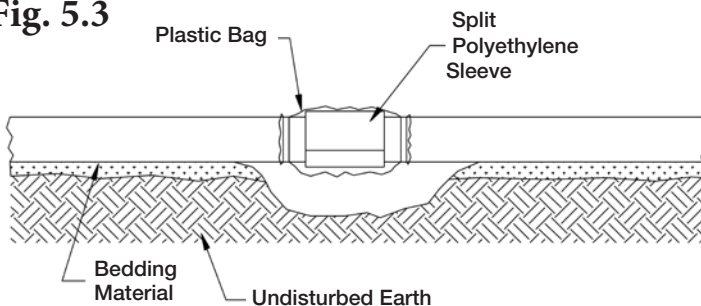


Fig. 5.3



NOTE: Prior to any carrier field welds, pipe ends must be prepped in the field by contractor.

NOTE: During the welding process do NOT use anti-splatter or any type of lubricant IF your system has leak detection. These materials can cause the leak detection to fail.

Prior to the welding of the carrier pipe, remove the shipping bar attached between the carrier pipe and outer containment and clean up any remaining weld debris on it. **The shipping bars have been put there to keep the pipe from sliding out of the containment during transit, unloading, and lowering into the trench. These bars must be removed to allow the service pipe to expand during operation. See Figure 5.1.**

After removing the shipping bar, you will find it easier to align the inner pipe. Align and weld the carrier pipe. **See Figure 5.2**

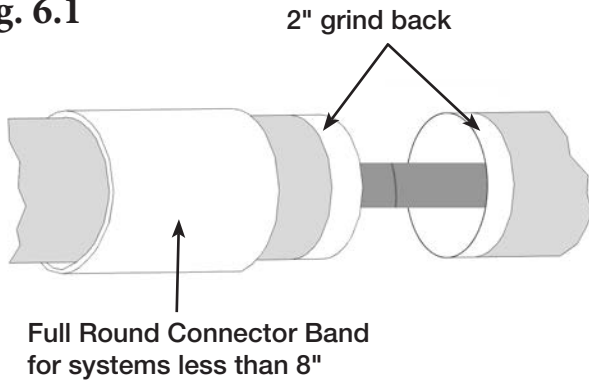
If the carrier pipe is not welded immediately, slide the connector band(s) over the joint, and cover the entire joint with a plastic bag or sheeting as described in Section 1. **See Figure 5.3**

If a hydrostatic test of the carrier pipe is not specified in the contract, ROVANCO recommends that a hydrostatic test be run on the internal pipe at 1½ times the job working pressure. This test should be done prior to insulating the field joints and welding the connector bands closed, to allow inspection and repair of welds if necessary.

If the installing contractor or owner does not want to conduct a hydrostatic pressure test then Rovanco will not be responsible for the cost to excavate and repair any carrier pipe leaks in the system regardless of who made the weld (Rovanco or the installing contractor).

Section 6: Welding and Air Testing of Connector Bands

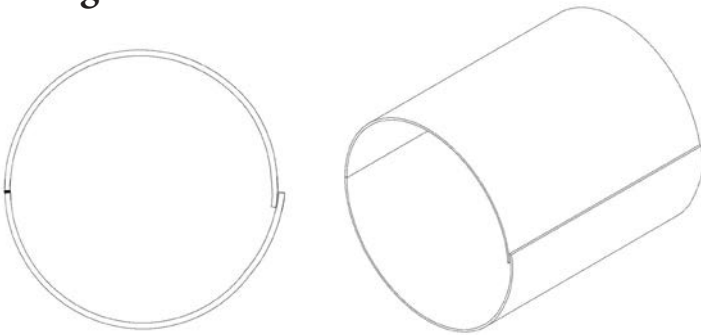
Fig. 6.1



NOTE: During the welding process do NOT use anti-splatter or any type of lubricant IF your system has leak detection. These materials can cause the leak detection to fail.

NOTE: It is the responsibility of the contractor to grind back both ends of the joint by 2" before installing the connector bands.

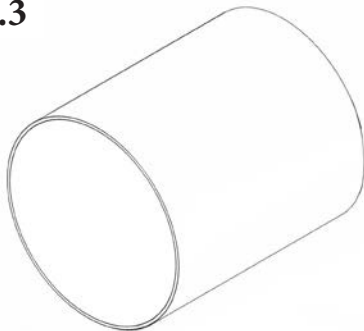
Fig. 6.2



Ends should be ground to clean, bare metal that is free of any coatings to allow the welding of the connector bands. **It is suggested the grinding of the ends be done BEFORE lowering pipe into trench. See Figure 6.1**

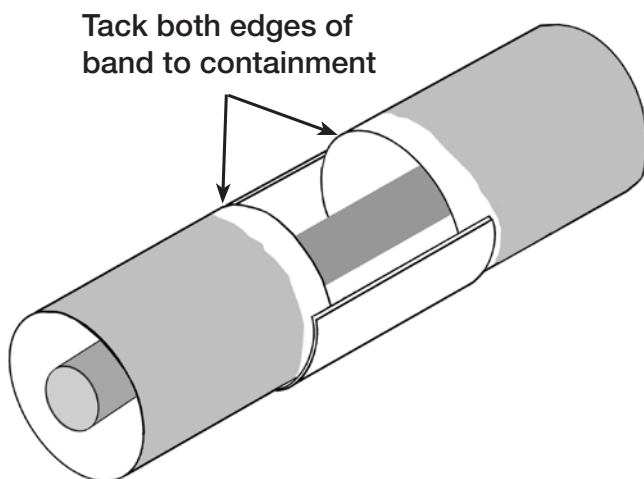
NOTE: Connector bands DO NOT come coated. They are sent bare unless otherwise stated in specifications.

Fig. 6.3



The length of each connector band is 15" to allow an overlap on your 12" joint area. The connector band is supplied in 2 equal length halves so there is no top or bottom half. Once the two bands are in place, centered over the joint, please note that one seam will be a butt fit and the other seam will be an overlap fit. This is the intended fit of the connector band. **See Figure 6.2**

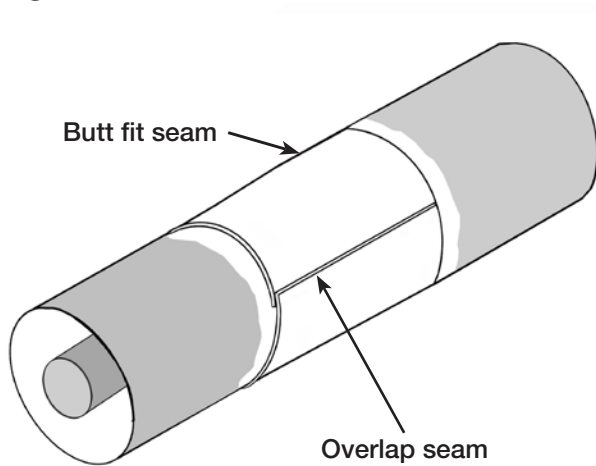
Fig. 6.4



NOTE: If the system is 4" or 6" containment, you will receive full round connector bands that will arrive banded to spools. **See Figure 6.3**

To start (on 8" & larger systems), center one half over the bottom of the joint area. Tack that half in place with a couple quick tacks on each side of the connector band half along the same edge so it is semi-secured to the containment. **See Figure 6.4**

Fig. 6.5

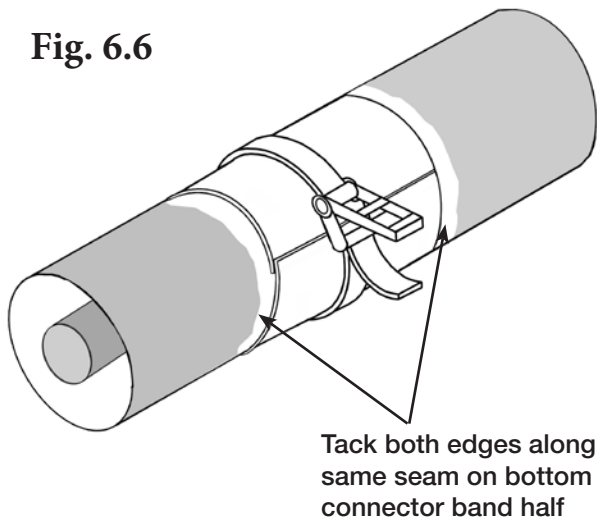


Place the other half of the connector band on top. Remember, one seam will butt fit and the other will overlap. The top half should fit inside the bottom half on the side that overlaps as shown. **See Figure 6.5**

Apply a ratchet tool or chain grips and tighten both halves of the connector band at once until they are pulled tight against the outer containment. Tack top half in place with welds until the whole connector band is secure and will not move. **See Figure 6.6**

Now fully weld the butt fit and overlap seams on the connector band as well as the full perimeter on both ends of the connector band where it meets the containment. When done welding, joint should be air tight. **See Figure 6.7**

Fig. 6.6

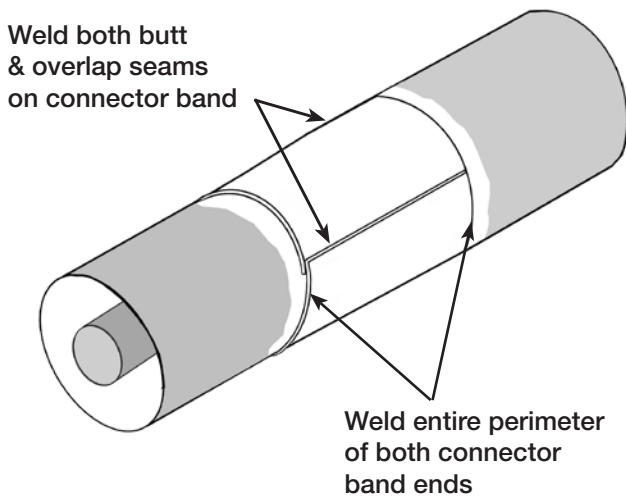


If it is a 4" or 6" system with full round connector band, slid band so centered over joint, apply ratchet tool or chain grips to secure and tack weld in several spots so band will not move. Then weld the full perimeter on both ends of the connector band. There will be no seams to weld.

NOTE: Connector bands DO NOT come coated. They are sent bare unless otherwise stated in specifications. If system is coated, use Rovanco supplied material to coat connector bands after fully welding them.

After all connector bands are fully welded, a 15 psi air test should be put on the inner casing prior to pouring thrust blocks or backfilling the system. Each connector band, gland seal, and testing apparatus should be checked for leaks with a soap and water test. If bubbles appear, a leak exists.

Fig. 6.7



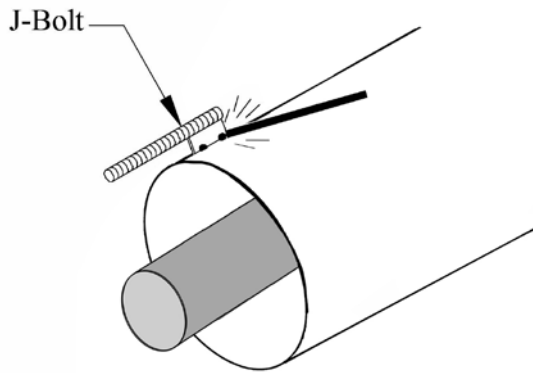
NOTE: Depressurize prior to repairing leak. If you try to repair with the pressure still on the system, you are subject to blowing a larger hole at the leak area. After leak is repaired, retest that area by re-soaping the repaired joint to ensure the leak has been fixed.

If possible, air test system as you install. ROVANCO can provide test cans in case you need to do an air test on only part of the system or on a watershed.

NOTE: After passing the pressure test, if specifications call for the field coating of connector bands, apply coating supplied by Rovanco in accordance to the instructions accompanying the coating.

Section 7: Test Can Applications

Fig. 7.1



After Rovanco receives a release to manufacture, Rovanco's customer service will email test can purchase form to customer. Test cans need to be ordered before the first truck ships so they can ship with the job to save money on freight.

Remove any burrs on containment ends that may have been caused by removing the shipping bar to ensure a proper seal. J bolts are then welded to the outer edge of the containment. **See Figure 7.1**

The test can butts up to an open end unit, is sealed with a gasket, and tightened down with bolts. **It is helpful if a little contact cement or repositionable adhesive is applied to the gasket to help it stay in position on the test can.** Attach a safety chain around the test can and to other end of containment. **See Figures 7.2 and 7.3**

CAUTION: No one in the area is to step in front of the test can during pressurization.

After testing is complete, remove the test can and gasket and cut the J bolts off of containment and grind or file down any burrs.

Fig. 7.2

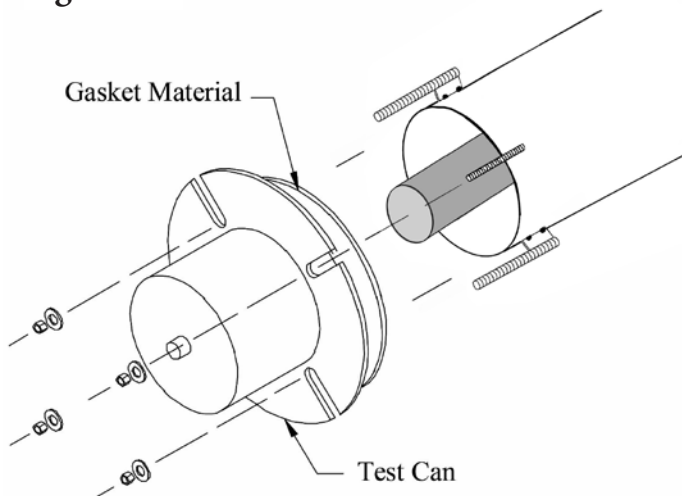
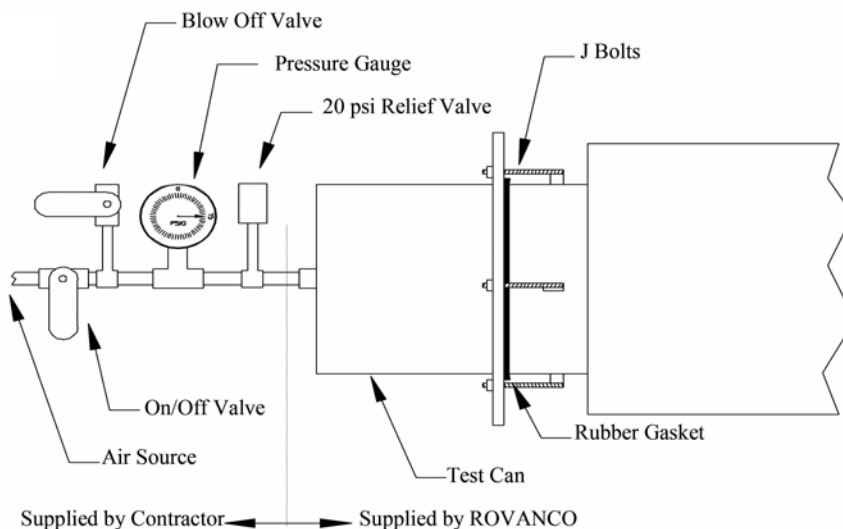


Fig. 7.3



Section 8: Repairs to Containment

When damage to the coating has been located, it must be repaired. Small areas should be covered with field applied coating provided by ROVANCO of like material as system coating. Coat, let dry, and then re-inspect the repaired area. For large areas with damage to the coating or piping, please contact ROVANCO for assistance.

A. Surface Preparation

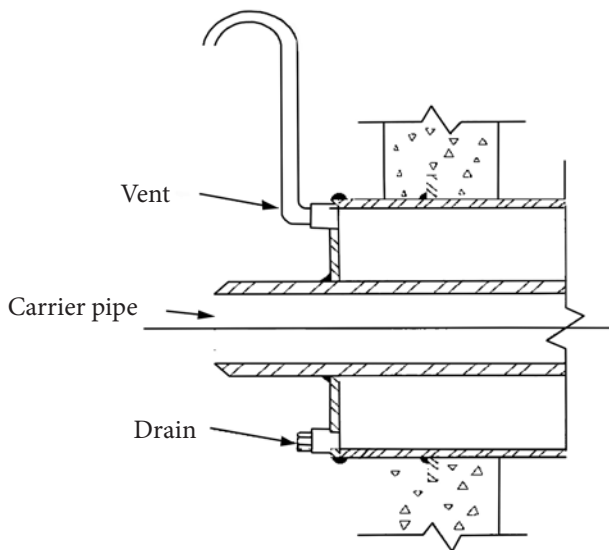
The performance of any coating is dependent on the cleanliness of the surface. The coating must come in contact with the clean, bare metal surface itself. Metal must be clean, dry, and free of loose rust, paint, oils, grease etc. Metal surfaces should be either blasted to NACE near-white metal, or cleaned with a surface grinder. Remove all oxidation from the area to be coated, and some of the coating around it. Bare metal surfaces should be coated as soon after cleaning as possible. For red mil coating, apply supplied coating using a brush to approximately the same thickness as the rest of the coating on the spool.

B. Handling Precautions

Avoid eye and skin contact; use protective clothing, gloves and eye protection. Avoid breathing vapors. In a non-ventilated area the operator should wear a paint mask. If coating is applied in an enclosed or confined area, operator should wear a positive air mask, and precautions should be taken to prevent the solvent vapor from reaching explosive limits. Remove contaminated clothing and launder before reuse.

Section 9: Building Entries

Fig. 9.1



See Figure 9.1 for the proper building entry detail. Also, as mentioned in the previous section, be sure before turning the job over to the owner that the vent on each end of the system is piped up above any potential water level and goose necked for venting. This is done so that water can not get high enough to enter the system. The drains should remain closed. It is recommended that at least 2" of containment enter through the wall before our system ends.

Section 10: Operation & Maintenance for Containment

Annual: Remove the drain plugs to check for the presence of water in the air space yearly. When removing the drain plug, be alert for a possible steam flash. If water is found follow the repair procedure outlined below. The drain plugs must be replaced after the inspection to insure water does not inadvertently enter the air space from a flooded manhole or mechanical room.

CAUTION: Extreme caution must be exercised when entering steam manholes and opening vents and drains.

Also do an air test of the containment yearly. Using an air compressor, pressurize the air space to 15 psig and hold for one (1) hour. If the pressure can not be maintained, see the repair procedure below. Warranty will void if this is not done and logged year to year.

Repair: If a leak in the casing is found, it should be repaired, tested, coated, and backfilled as it was originally installed.

If a leak in the carrier pipe is found, at least a 2' section of pipe should be removed and replaced. The carrier pipe should then be hydrostatically tested at 1½ times its operating pressure, not to exceed 500 psig. Re-insulate the carrier pipe as specified. Repair the inner containment casing using a split sleeve, similar to the connector band used in assembling the field joints. Air test the inner containment casing, then insulate as specified. Cover with polyethylene sleeve and seal with a wrap around shrink sleeve.

Insulation: If insulation within the conduit becomes wet, then force ventilate the air space in the system at a rate of not less than 3 cubic feet per minute, and apply heat through the internal piping. Introduce the air through the system's high point vent, and force out the low point drain. Caution personnel regarding the possibility of a steam flash out of the low point drain while air is being forced through the system. Place a cool mirror at the exhaust point for a short time at appropriate intervals and position to indicate maximum fogging due to moisture. Continue ventilation until the mirror exhibits no visible fogging.

System Shutdown: If the system is shut down for any length of time, seal the system vents by plugging the goose neck or removing it and installing a plug. Purge with dry nitrogen before sealing system. The vents must be opened and the goose neck replaced before the system is turned on again. This will prevent moisture entry during shutdown.

Manholes: Automatic sump pumps, if any, should be thoroughly inspected for proper operation annually. Steam traps, if any, should be routinely inspected and/or replaced, based upon the recommendations of the manufacturer. All flanges should be checked for leakage and tightened if necessary. Any evidence of groundwater leakage should be investigated and repaired. Gland seals, end seals, and the inside wall of prefabricated steel manholes should be routinely inspected for leaks and/or corrosion. Sand and repaint any corrosion to match the existing coating. Check valves routinely for leaks and repack when necessary. Insulation and jacketing of internal piping and equipment should routinely be checked and replaced when necessary. Warranty will void if manholes flood over Rovanco's piping systems.

If you have any questions about anything in this instruction manual, or have any difficulty in completing the work please feel free to contact ROVANCO's Customer Service Department at our main office in Joliet, Illinois (815) 741-6700.

Thank you once again for showing your confidence in ROVANCO by purchasing our Hi-Temp Insul-8 products. We want you to know that we have a full line of pre-insulated and pre-fabricated piping systems for almost any temperature, pressure, or site condition.

If you are not familiar with our complete product line and you would like to know more about our product or would like to have our local Manufacturer's Representative call on you, call ROVANCO at (815) 741-6700, at rovanco.com, or email us at marketing@rovanco.com

Section 11: Parameters For Properly Installing & Operating Systems

Rovanco's pre-insulated and pre-fabricated products are carefully engineered to function as intended. If these products are properly installed, fully-tested, maintained and operated within the parameters for which they were designed, these systems should provide the user with years of trouble-free, efficient operation

Refer to Rovanco's Installation Instruction(s) and the associated documentation from Rovanco's Engineering Department for important information and instructions that will carefully detail installation, testing, operating, and maintenance procedures. If needed, you are always welcome to contact Rovanco for assistance.

Failure to comply with the procedures as outlined in the Installation Instructions and Engineering support documentation could result in product damage, reduced product service life, costly repairs due to product failure, hazardous conditions which could result in injury to people, property and/or equipment. In addition, it will void Rovanco's warranty.

If any Rovanco product does not perform as it is intended to, please inform Rovanco immediately.

Some problems and their potential causes are listed below. Although this list is not all-inclusive, you may be able to find additional information in Rovanco's Installation Instruction(s) and/or the Engineering Department documentation.

General Piping System Care:

- Wet insulation does not perform as intended and causes the premature failure of the system. Therefore, it is important the system's insulation is kept dry at all times. This includes during storage, installation and when system is operating.
- Our systems have been engineered to operate within a specific temperature & pressure range and under appropriate environmental conditions. Therefore, do not install or put our systems into service if these parameters are not within the product's specifications
- If you find it is necessary to alter a Rovanco piping system, review the planned alterations with Rovanco or a qualified piping system designer before making any changes.
- Maintenance plays an important role in assuring you get the full service-life out of the system. Rovanco systems are designed to provide years of trouble-free operation, but changing conditions can affect that. So, systems should be inspected regularly to verify they are in good operating condition and functioning as intended. If repairs are required, make them promptly.

Pre-Insulated Foam Systems:

- Piping systems must be kept dry. Moisture of any amount can corrode carrier pipe and prematurely breakdown insulation. This will shorten piping system service-life and/or prevent it from operating properly. Keep all piping system dry during storage, installation and when it is operating.
- Assure field joints are completed correctly. This includes the proper field insulating and enclosing the outer jacket in the joint area. Improper completion of field joints could result in water ingress affecting carrier pipe and/or insulation.
- Damage to jacketing must be repaired immediately. Failure to do so could allow moisture to reach the insulations and/or carrier pipe.
- When installing piping systems designed for underground use that require external expansion pads, you must assure these expansion pads are properly installed according to specifications. Proper installation will allow for associated thermal expansion. Improperly installed expansion pads will put unwanted stress on a piping system that could damage it.

Conduit & Containment Systems:

- Moisture negatively affects a systems functionality and shortens its service-life. Moisture will corrode carrier, conduit & containment piping, leak detection or pull cables and it will degrade insulation. It is important that the air space in these systems is kept dry. If any type of moisture is detected, it must be dried immediately so system is returned to a dry state during installation and operation.
- A combination of moisture in the air space and high operating temperatures will accelerate the destruction of piping, its coating and any insulation. This can result in costly repairs, system damage and possibly system failure. Therefore, do not ever operate these systems under the negative conditions of moisture presence and high temperatures.
- Gland seals provide a seal against a service pipe while still allowing that service pipe to have axial movement. Therefore, it is important all gland seals are adjusted properly to these conditions are met and there is no binding of the service pipe.
- End seal vents and drain piping play an important role in keeping the air space dry. They allow the annular air space to vent and drain as well as prevent moisture ingress. So it is important end seal vents and drain piping is installed properly. This will allow them to function as intended.
- One important detail that will help keep the air space dry and drainable is to assure the piping system is installed with the proper slope so any moisture can drain as intended.

Systems Intended For Underground Installation:

- Plan for adverse weather conditions prior to installation. If trenches gather water, they must be drained prior to the installation of the piping.
- Inspect all steel piping that will be buried prior to backfilling using a Holiday teste . Any holidays or damage to coating must be repaired in accordance with Rovanco's installation instructions prior to backfilling Failure to repair voids or damage to coating will promote premature corrosion and effect system performance and length of service.
- Prior to backfilling, all carrier pipe, conduit and containment piping must be tested. If piping system integrit is not tested prior to backfilling, it will esult in costly excavating and will not be Rovanco's responsibility.
- Cathodic protection system must be installed with thin-coated steel conduit or containment that will be direct buried. The cathodic protection will prevent the premature corrosion of thin-coated steel piping system.
- Line trench accordingly before piping installation. Backfill and compact post-installation in acco dance with Rovanco's installation instructions. If these procedures are performed properly, it will help prevent damage to the system when the ground settles.
- Manholes must be kept dry at all times. Installing sump pumps, keeping end seals above water levels and not installing manholes in low points will help prevent water from draining into them.