

TECHNICAL BULLETIN

WLS001
11/12/2018

IMPORTANT APPLICATION METHODS WHEN INSTALLING LINESETS WITH TUBOLIT WLS

Abstract

Installation practices observed in the field have been found to compromise the integrity and performance of copper pre-insulated linesets with coated polyethylene insulation material installed and sold primarily into the HVAC industry. A number of key installation deficiencies are identified, and straightforward methods for correctly terminating materials are described.

Introduction

Pre-Insulated linesets have taken the insulation installation out of the field installer's responsibilities, but there are still critical elements that should be looked after in the field to prevent moisture ingress into the system between the copper tube and the insulation.

It has been brought to our attention over recent months that there are concerns with corrosion, and or pitting of the copper line under the polyethylene insulation. While Armacell materials offer excellent resistance to water vapor transmission (wvt) and moisture absorption the Armacell WLS product provides multiple levels of protection as properly installed by lineset manufactures, unsealed terminations and damaged insulation have led to instances where the integrity of the system has been compromised from moisture ingress.

The purpose of this document is to ensure that the most important details relating to the installation of pre-insulated polyethylene linesets, and contractors take steps to ensure that this guidance is adopted into their standard working practices. This is covered in the following sections of this bulletin:

1. Historical Performance Concerns
2. General Site Observations
3. Basic Installation Methods

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Section 1: Historical Performance Concerns

Lineset failures with white polyethylene insulation installed by various manufactures have been reported due the tubes being exposed to corrosive environments causing system failure. Field samples have been provided and examined by both third party testing agencies and our internal engineering staff concluding that the insulation was manufactured to all associated ATSM requirements and complied with all applicable performance requirements. The localized corrosion was associated with conditions involving retained moisture between the insulation and the copper tube. The samples showed no signs of the installed closed cell insulation being damaged or compromised and it has been concluded that the **leading cause for moisture ingress is consistent with entry from the termination ends of the insulation between the tube and the insulation.** Long term stagnation has been cited as an industry known conditions conducive to the corrosion or pitting of copper and copper alloys.

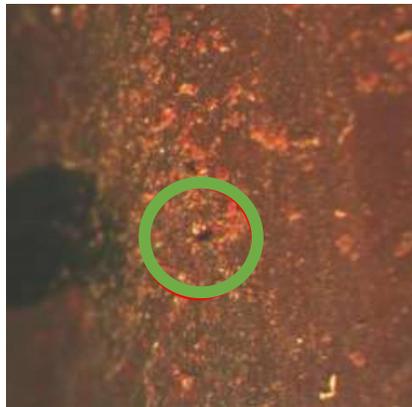


Figure 1: Localized corrosion/pitting on outside diameter of copper tube (magnified image)

Section 2: General Site Observations

It has been determined that there are only a couple ways for moisture ingress to occur in a pre-insulated lineset. The first focus area can take place at the **unsealed termination points** of the installed white polyethylene insulation on the copper lineset. The **gap between the outside diameter of the tube and the inside diameter to the insulation, if unsealed, is a pathway for moisture to enter the system.** The second area would be through any tears or breaches in the insulation material as it was pulled through the installation. Lastly moisture can develop as condensation on under insulated lines.

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Figure 2: Examples of gaps at the termination ends of polyethylene linesets

Section 3: Basic Installation Methods

1. Installation of pre-insulated white polyethylene linesets for HVAC and refrigeration should follow the lineset manufacture's Installation Guidelines.
2. Proper termination of the insulation ends to prevent moisture ingress should be made by sealing the insulation to the tube.
 - a. **Option 1-** Apply an approved exterior grade spray Insulation Foam Sealant to the inside gap between the WLS and the pipe, be certain to completely fill the void, moisten fingers and smooth out the outside edge of the sealant, fill any voids as needed.
 - b. **Option 2-** Fill the entire gap between the pipe, and the inside of the WLS tube with an approved exterior grade silicone sealant, be certain to fill the entire gap, moisten fingers and smooth out the outside edge of the sealant, fill any voids as needed.
 - c. **Option 3-** Apply Armacell 520 Adhesive to the faceplate of the termination substrate, and to the butt edge of the WLS, and when the adhesive is tacky to the touch, apply pressure to the WLS and adhere up against the endplate that it butts up against, sealing the end piece completely, if needed, apply a bead of exterior grade sealant around the outside edge of the end piece, and insure that the end is under compression fit.



Figure 3: (Top) Option 1
Figure 4: (Bottom) Option 2

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3. Joining two continuous sections of insulation to prevent moisture ingress and a thermal short. This would be for replacement of damaged sections or when joining multiple sections together in a run.
 - a. **Step 1-** Apply Armacell 520 Adhesive to the butt ends of the insulation, and when the adhesive is tacky to the touch, bring both ends together and apply pressure compressing the WLS sections together to ensure proper adhesion, sealing the end pieces completely. If needed, apply a bead of exterior grade sealant around the outside seam to fill any voids or gaps.
 - b. **Step 2-** Use approved tape in addition to the 520 adhesive, to secure all butt joints together as needed during the installation of the WLS product.



Figure 5: Adhesive applied to butt ends of insulation



Figure 6: Sealed Butt joint with additional butt joint tape

4. Inspection of the installation should be made to ensure there were no tears or damage to the insulation during installation of the lineset. Any damage should be repaired for proper system performance and retardation of moisture Ingress.
5. Approved products for the installation of Armacell WLS:
 - Armacell 520 Adhesive
 - Gorilla Brand Paintable Silicone Sealant White - 9 oz. tube
 - DAP Brand DAPtex plus Multi -Purpose Foam Sealant - 12 oz. can
 - 3M Brand White Duct Tape - 1.88" x 20 yd. roll