

**DOCKETED**

<b>Docket Number:</b>	19-BSTD-03
<b>Project Title:</b>	2022 Energy Code Pre-Rulemaking
<b>TN #:</b>	237076
<b>Document Title:</b>	Howard Ahern Airex Manufacturing Comments - Comment to Change 1603Ci & 16043a Pipe insulation protection
<b>Description:</b>	N/A
<b>Filer:</b>	System
<b>Organization:</b>	Howard Ahern Airex Manufacturing
<b>Submitter Role:</b>	Public
<b>Submission Date:</b>	3/9/2021 3:39:45 PM
<b>Docketed Date:</b>	3/9/2021

*Comment Received From: Howard Ahern Airex Manufacturing  
Submitted On: 3/9/2021  
Docket Number: 19-BSTD-03*

## **Comment to Change 1603Ci & 16043a Pipe insulation protection**

160.3 ( c ) i and 160.4( 3) A must be edited to require protection cover be removable for the first 8ft.

This would be consistent with same reasons tape is not acceptable as removal would destroy insulation. In addition to the CMC requirement to visually inspect piping and joint before being covered. Removable would allow access for inspection. This would also allow equipment maintenance and allow repairs from maintenance.

(b) Insulation Protection. Pipe Insulation shall be protected from damage due to sunlight,

moisture, equipment maintenance physical damage and wind. Protection shall, at minimum, include the following:

1. Pipe insulation exposed to weather shall be protected by a cover suitable for outdoor service. Cover shall be removable for the first 8 feet from heating or cooling equipment for maintenance. Cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be used to provide this protection.

2. Pipe insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include, or be protected by, a Class I or Class II vapor retarder. All penetrations and joints shall be sealed.

This change will clarify the intent of Section 120.3

A removable cover for the first 8 feet will allow inspection of the insulation as well as provide insulation

to be removed for visual inspection. With a removable cover maintenance as well as equipment

replacement can be performed without destroying or having to replace the pipe insulation.

This is in the same requirement not to use adhesive tape as removing tape for maintenance will destroy the insulation.

Leading cause for corrosion, and or pitting of piping and failure of pipe insulation systems is from moisture ingress consistent with entry from the termination ends of the insulation between the tube and the insulation.

Removing protection without damaging the insulation is stated in both 2019 compliance manuals.

*Additional submitted attachment is included below.*

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(b) Insulation Protection. Pipe Insulation shall be protected from damage due to sunlight, moisture, equipment maintenance physical damage and wind. Protection shall, at minimum, include the following:

1. Pipe insulation exposed to weather shall be protected by a cover suitable for outdoor service. Cover shall be removable for the first 8 feet from heating or cooling equipment for maintenance. Cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be used to provide this protection.

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Leading cause for corrosion, and or pitting of piping and failure of pipe insulation systems is from moisture ingress consistent with entry from the termination ends of the insulation between the tube and the insulation.

Removing protection without damaging the insulation is stated in both 2019 compliance manuals.

The intent of these sections is not only protection of pipe insulation from weather but to insure the integrity of the insulations thermal conductivity energy savings from weather and physical

damage and allow for equipment maintenance in that the insulation can last the life of the mechanical system as per the intent of the code.

In order to remove the opportunity for confusion or misunderstanding and to harmonize with other codes and standards the term “equipment maintenance” must be clarified. Its meaning is to not only to protect from physical damage caused by maintenance but that maintenance can be performed without damage to the insulation system. To the insulation or equipment system. Using the words physical damage will give greater clarity to this requirement as it will provide protection from birds, rodents and landscape maintenance as well.

The compliance manuals and ASHRAE state that the protection be removable for maintenance.

California Mechanical Code Chapter 11 CMC 1109.

Refrigerant pipe joints erected on the premise shall be exposed for visual inspection prior to being covered or enclosed. ASHRAE 15.8.9

This requirement makes it crucial that protective coverings be able to be removed to comply with visual inspection without destroying the insulation.

Changes should be made to the Compliance manuals

2019 Residential Compliance Manual January 2019 page 4-15

Source: Table 120.3-A of the Energy Standards

Insulation used for refrigerant suction lines located outside a conditioned space, must include a Class I or Class II vapor retarder. The vapor retarder and insulation must be protected from physical damage, UV deterioration, and moisture. Cover must be removable for the first 8 feet from the Heating or cooling equipment for equipment maintenance.

Insulation is typically protected by aluminum, sheet metal jacket, painted canvas, or plastic cover. Adhesive tape shall not be used as insulation protection because removal of the tape will damage the integrity of the original insulation during preventive maintenance.

2019 Nonresidential Compliance Manual January 2019 page 4-71

The Energy Standards also require that exposed pipe insulation be protected from

damage by moisture, UV and physical abrasion including but not limited to the following:

1. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. The cover shall be water retardant and provides shielding from solar radiation that can cause degradation of the material. Insulation must be protected by an external covering unless the insulation has been approved for exterior use using a recognized federal test procedure. Adhesive tape shall not be used as protection for insulation exposed to weather

This sentence must be removed as its misleading and the fact is there is no federal test or a consensus test for pipe insulation outdoor exposure. In fact, it could not be just one test anyways as the requirements are to be water repellent, protect from UV and solar radiation which includes heat, wind and physical damage.

Pipe manufactures all state that their product must be protected when exposed outdoors.

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(This language highlighted in blue from the manual should be changed as there is no approved of consensus testing for insulation exposed to weather. There are so many test that are 1 year 3 year 5 year

etc. Is the manual saying just a 1 year UV test is acceptable, of course not? UV testing is unreliable as exposure depends on many factors and depends where material is located as such no UV test or standard is in any of the California codes or any codes for energy or mechanical in the US.

Heat is major factor in the degrading of insulation that is part of the solar radiation as such not covered by any consensus testing. In addition, the code call for protecting against physical damage which again is not covered by a test, but this is just a suggestion not part of my comment change)

2. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Just as Adhesives Tape are not permitted as it will limit maintenance and damage insulations permeability characteristics as Removal of tape damages the integrity of the original insulation into pieces, specially, if the insulation has reached thermoset state, and adhesives will prevent water vapor from escaping to keep the insulation dry, the

protective cover should be removable.

Protective covering must also protect from physical damage so if the protection covering does get damaged from stepping on it, dropping tools on it, birds, lawn trimmers etc. it can be replaced, keeping the insulation's thermal conductivity integrity and insuring the insulation system lasts the life of the mechanical system and avoiding the costly replacement of the insulation.

Removable protection also allows less costly maintenance and replacement of any damaged insulation.

Example of saving from protecting the insulation can be measured in Dr Kourmohammadi PE, Ph.D. CPD, CIPE, CFPE LEED AP Impact and Advantages of Removable Insulation Protective Covers.

Paper on Protective covers which calculated the BTU and Electrical energy saving of exposed Freon lines for residential and multifamily purposes that had exposed lines due to no protective covering and degraded insulation.

Freon lines exposed 3 ft to 5 ft

0.15/kwhr cost of electricity (peak demand cost can be at

0.25\$/kwhr)

10 hours operation

365 days

¾" Freon line

½" insulation property 0.020227 Btu/(hr F ft)

For the California region it amounted to a \$1.00 per foot annual savings

Example of cost saving average 5ft per unit in California with a population of 39 million and

If only half of the population for example had a heating and /Cooling system with an average of 5ft exposed piping with degraded or no insulation, Protected pipe insulation would amount to an yearly electrical saving of \$975,000,000

This is electrical saving and does not include the saving to home and building owners from not having a costly expense of replacing the insulation for maintenance.

Bibliography:

Impact and Advantages of

Removable Insulation Protective Covers

Dr. "Saum" K. Nourmohammadi, PEx3, Ph.D. CPD, CIPE, CFPE,

Bibliography:

Impact and Advantages of

2017 ASHRAE Handbook

Cost Impact:

There are a wide variety of removable protective coverings by over 40 manufactures and are available at most supply distributors. These can be as simple as a bent piece of sheet metal or plastic channels, cladding, PVC covers, Jackets, aluminum covers etc.

Many covering require much less labor compared to painting or banding and they are currently being used in California and all over the US so there no increase cost.

Thank you

Howard Ahern

760-250-1625

howard.ahern@airexmfg.com