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Comment Received From: Darrell Peil
Submitted On: 10/10/2017
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Mechanical Insulation Requirments

Dear CEC Staff:

I am writing in relation to Pre-Rulemaking documents and actions in relation to pipe insulation for SUBCHAPTER 3 NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, HOTEL/MOTEL OCCUPANCIES, AND COVERED PROCESSESâ€”MANDATORY REQUIREMENTS

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Items for Discussion:
TABLE 120.3-A PIPE INSULATION THICKNESS
COMMENT:
The column of the table of thicknesses titled â€œINSULATION MEAN RATING TEMPERATURE (Â°F)â€ is not pertinent to the second most common mechanical insulation material in the industry, flexible elastomeric pipe insulation, that is tested for thermal conductivity in accordance with the requirements of ASTM C 534, Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form. The testing

temperatures of ASTM C 534 are as follows:
-150Â°C [-238Â°F]
-100Â°C [-148Â°F]
-29Â°C [-20Â°F]
-18Â°C [0Â°F]
24Â°C [75Â°F]
50Â°C [120Â°F]
86Â°C [150Â°F]
150Â°C [300Â°F]
There is no material performance requirement to test flexible elastomeric at the majority of the mean temperatures given in the CA table. This requires a specific financial expenditure on any producer of flexible elastomeric insulation to meet the requirements of the State of California. As it happens, I made sure to have our product tested at the mean temperatures detailed by the State of California, since our parent company owns a certified testing lab, and we do have thermal conductivities that apply. Suggest adding this set of thermal conductivities to the standards.

Page 154, 2019 Building Energy Efficiency Standards, SECTION 120.3 â€“ REQUIREMENTS FOR PIPE INSULATION
COMMENT:
ASTM C 534, Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form allows for determining of thermal conductivity using test methods ASTM C 518, ASTM C 177 ASTM C 1114, or ASTM C 335. ASTM C 591 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation uses ASTM C 518, ASTM C 177 ASTM C 1114, C 1363, or ASTM C 335. We use flat sample testing because of accuracy of results, critical to effective calculations of thickness for condensation control. ASTM C 335 allows for measurements of system features that may or may not exist, like air gaps, depending on the product used. ASTM C 335 appears to artificially build the energy efficiency of the product, delivering inaccurate energy savings calculations. Suggest adding ASTM C 518, ASTM C 177, ASTM C 1114, and ASTM C 1363 as acceptable methods for determining thermal conductivity of a material. Another option would be to delete the reference to ASTM C 335, in recognition of other standardized methods of determining accurate thermal conductivity of a material.

Page 154, 2019 Building Energy Efficiency Standards, SECTION 120.3 â€“ REQUIREMENTS FOR PIPE INSULATION
1. Pipe insulation exposed to weather shall include, or be installed with protected by, 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.
COMMENT:
EPDM flexible elastomeric insulation products exist that provide water and UV protection against degradation from weathering by the nature of the insulation material without added treatments. This resistance is demonstrated by standardized direct-weather exposure testing, and is a key reason that EPDM rubber was developed in the early 20th century. This requirement unfairly restricts market competition based on technology utilization that has existed in the polymers industry for years. The synthetic rubber compounds have existed for decades, and have been applied to mechanical insulation elsewhere for decades. Aeroflex USA started marketing these products for North and South America in 1999, and other elastomeric insulation producers have followed with EPDM products of their own. This technology has been heavily promoted since 1999 in North America, for mechanical insulation. Suggest changing this requirement to apply to materials that are not inherently weather resistant, having weather resistance demonstrated using direct-exposure ASTM testing.

2. Pipe insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include, or be protected by, have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed. Adhesive tape shall not be used to provide this protection

COMMENT:
This requirement ignores cost-saving and system-life extending technology that has existed in the mechanical insultion industry for years. Flexible elastomeric insulation products provide the protection of Class I vapor retarders without the addition of any other vapor retarder materials. Cellular glass insulation also provides this same vapor retarder property. Aeroflex USA just introduced a new product that exceeds the performance of current elastomeric insulation, with water vapor transmission properties below .01 perm, at .005 perm, far below the .1 perm that is required of class I vapor retarders. An exclusion from requiring a class I vapor retarder for insulation materials, that have perm ratings of .1 or lower, should be allowed. The ASHRAE Handbook of Fundamentals and the ASHRAE Refrigeration Handbook both recognize that materials with perm ratings of .02 perm or less may be used without the addition of vapor retarders or vapor barriers for below-ambient operating systems.

Vapor retarder materials that are converted to tapes are valuable in the mechanical insulation industry for completing and creating vapor retarding systems. These products have existed for decades because of the problems that mechanical installations present with complex configurations, incomplete vapor retarders from factory-applied vapor retarders, like the jacketing on fiberglass, and are effective when installed correctly. This provision essentially eliminates common practice that is detailed in all industry resource materials, including the ASHRAE Handbooks, ASTM Standards, and the National Commerical and Industrial Insulation Standards Manual. This provision, eliminating the used of pressure-sensitive-adhesive(PSA) tapes significantly increases the cost of installations, while deteriorating the quality that can be achieved.

EXCEPTION 3 to Section 120.3:
Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Metal piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to as sure that no contact is made with the metal framing.
Uninsulated areas cause some of the biggest failures in the building industry and are particularly prevalent in HVAC and plumbing piping applications, where it is perceived not to impact performance of the insulation system. This is a specific allowance to establish contributing to a framing failure due to soaked and rotted framing members, the establishment of microbiological growth like mold or mildew, and a prospective water source to support insect infestations such as termites, ants, or cockroaches. Methods have been developed to make mechanical insulation systems continuous through penetrations and support systems, like pipe and duct hangers. Suggest deleting the allowance of not insulating through framing penetrations.

Regards,
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Currently a member of ASHRAE and ASTM
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committees for ASTM C 534, C 1534, and C 1427
ASHRAE TC 1.8-Mechanical Insulation for HVAC Systems
TC 10.3-Refrigeration Piping
Past Chair - ASHRAE TC 1.8 Handbook Subcommittee
Chair - National Insulation Associationâ€™s Technical Information Committee
Member, Editorial Staff - National Commercial and Industrial Insulation Standards Manual.