



FIGURE 4 Water-repellent mineral wool allows for moisture to dissipate quickly, limiting the potential for corrosion to develop.

Making periodic checks of piping could be one way to prevent water or moisture from entering insulation at a site of external damage (Figure 4).

Work Smarter, Not Harder, by Choosing Better Insulation

As the focus on insulation shifts from short-term cost savings to the development of an insulation system intended for long-term use and prevention of CUI, select pipe insulation that is intended to help facilities mitigate CUI, conserve energy and reduce noise, and can be used in fire-resistant applications. The mineral wool should not pose the same weight-related challenge as wet calcium silicate, which increases in weight and can put unanticipated strain on pipe hangers.

Ensure that the material can manage high-temperature situations when tested according to ASTM C411⁹ and ASTM C447.¹⁰ Establish a limit for insulation water adsorption that is tested in accordance with EN 13472 (Figure 5).¹¹

To minimize the risk of corrosion, the mineral wool pipe insulation sections, while dry, are chemically inert to steelwork. The content of water-leachable ions such as chlorides, sodium, silicates, and fluorides in the pipe insulation should not exceed 10 ppm and meet the standards of ASTM C795.¹²

Water Wicking (EN 13472)

Change in weight after 24 h
in 20-mm deep water

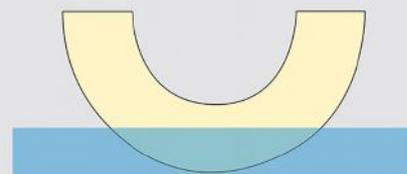


FIGURE 5 Materials that meet EN 13472 are generally considered to be “water resistant.”

If the pipe insulation is used in coating facilities and during painting operations, make sure the insulation is certified according to the requirements of the coating compatibility standard VDMA 24364.¹³

Owens Corning has developed Thermafiber[®] Pro Section WR Pipe Insulation[†] that meets the above tests. It has a maximum use temperature of 649 °C, maintains water repellency up to 300 °C, and absorbs <0.1 kg/m² when tested in accordance with EN 13472, meaning it takes in 10 times less water than the requirements of that tough standard.

Conclusions

The long-term benefits yielded from approaching the use of insulation as a system rather than value engineered for short-term cost cutting includes a sustained lifespan for equipment and facilities, time savings, reduced need for surprise repairs, and an improved safety profile for the facility and company.

Selecting an insulation that is water repellent and able to shed moisture quickly and effectively reduces the chance for corrosion to form. Adding jacketing of the necessary thickness—and installing the insulation correctly—supports the long-term functionality of the insulation. Creating and instituting a policy of periodic review and maintenance for the insulation fosters the understanding that insulation is meant to function over time and helps ensure it does so.

References

- 1 G. Koch, et al., “International Measures of Prevention, Application, and Economics of Corrosion Technologies Study” (Houston, TX: NACE International, March 1, 2016).

[†]Trade name.

- 2 “Corrosion Under Insulation AKA CUI: The Silent Killer,” Owens Corning Technical Bulletin, Pub. No. 10024144, May 2020.
- 3 G. Koch, et al., “Corrosion Costs and Preventive Strategies in the United States,” National Technical Information Service, FHWA-RD-01-156, 2002.
- 4 ASTM C1729 (latest revision), “Standard Specification for Aluminum Jacketing for Insulation” (West Conshohocken, PA: ASTM International).
- 5 ASTM C1767 (latest revision), “Standard Specification for Stainless Steel Jacketing for Insulation” (West Conshohocken, PA: ASTM).
- 6 G. Whittaker, “Specifying for Industrial Insulation Systems,” *Insulation Outlook* (July 2003).
- 7 “NIA Establishes New Industry Certification: The Thermal Insulation Inspector Certification,” *Insulation Outlook* (July 2019).
- 8 “Corrosion Under Insulation,” *Process Safety Beacon* 6 (2019): p. 1.
- 9 ASTM C411 (latest revision), “Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation” (West Conshohocken, PA: ASTM).
- 10 ASTM C447 (latest revision), “Standard Practice for Estimating the Maximum Use Temperature of Thermal Insulations” (West Conshohocken, PA: ASTM).
- 11 BS EN 13472.1 (latest revision), “Determination of short-term water absorption by partial immersion of preformed pipe insulation” (London, U.K.: British Standards Institution).
- 12 ASTM C795 (latest revision), “Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel” (West Conshohocken, PA: ASTM).
- 13 VDMA 24364, “Testing for paint wetting impairment substances [LABS-conformity]” (Berlin, Germany: Beuth Publishing DIN).

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