529 14th Street, NW, Suite 750
Washington, DC 20045
Phone: (202) 591-2466
Website: www.xpsa.com

LONG TERM BELOW-GRADE INSULATION PERFORMANCE STUDY PUBLISHED BY THE EPS INDUSTRY IS NOT CONSISTENT WITH EXTENSIVE PRIOR RESEARCH IN THE FIELD

The results of a 15-Year Below-Grade Insulation Performance Study reported in Technical Bulletins published by the EPS Industry Alliance ("EPS Study") is not well supported and is inconsistent with previous significant research in this field. The most comprehensive and objective review of the in-service performance of polystyrene foam insulations used in below-grade applications was conducted by the American Society of Civil Engineers ASCE 32 Committee.

A peer-reviewed analysis of information in the EPS Study, "Below-Ground Performance of Rigid Polystyrene Foam Insulation: Review of Effective Thermal Resistivity Values Used in ASCE Standard 32-01 -Design and Construction of Frost-Protected Shallow Foundations," calls into question key aspects of the EPS Study:

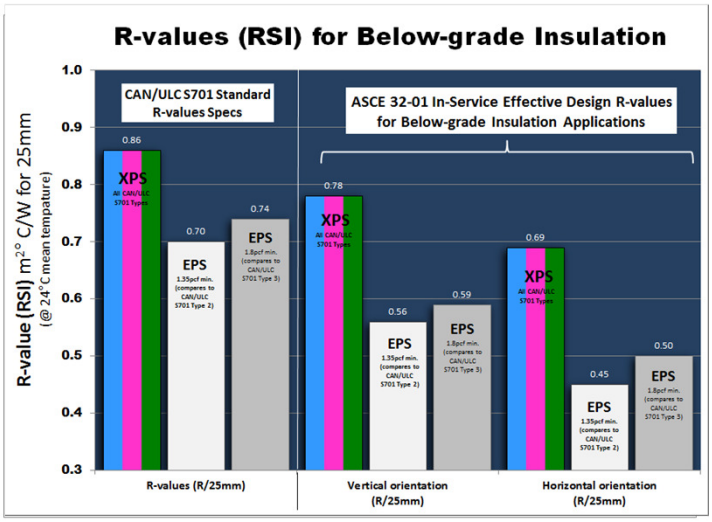
> "the reported XPS [extruded polystyrene insulation] performance does not appear to be consistent with in-field performance generally and more extensively reported by others. The reasons for this outcome do not appear to be sufficiently explained by this limited study which included only two XPS samples at one study site. Furthermore, the details of the study and the original laboratory report have not been publicly disclosed at the time of this writing." *Journal of Cold Regions Engineering*, Vol. 24, No. 2, June 1, 2010, p. 50.

The data used in the EPS Study was reportedly conducted by the same test lab and at the same test site as apparently used in two prior studies [SPI, 1994; AFM Corp., 1996]. There are unanswered questions on data reliability from these previous studies that may also carry forward into the EPS Study.

> "The reason for the abnormally high (as compared to other studies) moisture intake of the one XPS sample in this study [AFM Corp.,1996] is unexplained. Given the anecdotal nature of this study (particularly with only one sample of XPS), other sources were considered as more authoritative by the ASCE 32 committee in establishing design values for XPS. In addition, some samples incurred damage during execution of the test methodology, which raised questions regarding reliability of the test data as a whole, particularly given the small sample size." *Journal of Cold Regions Engineering*, Vol. 24, No. 2, June 1, 2010, p. 48.

Based on their critical review for frost-protected shallow foundation designs, the ASCE 32 Committee recommends using an in-service R-value equal to 90% of the rated R-value of XPS (CAN/ULC S701 Types 2, 3, and 4) and 80% of the rated R-value for EPS (CAN/ULC S701 Type 2 and Type 3) used in vertical below-grade orientation because of the potential for water absorption. See the Chart and Table below for additional information for vertical applications (i.e. walls) and horizontal applications (i.e. under slabs).

Long-Term R-value is Critical in Below-grade Applications



Retention of R-values After Long-Term Exposure in Below-Grade Applications

(ASCE 32-01 values as a % of CAN/ULC S701 R-values)

	Vertical orientation Below-grade	Horizontal orientation Below-grade
XPS (Represented in CAN/ULC S701 Type 2, 3, and 4)	90%	80-81%
EPS (Represented in CAN/ULC S701 Type 2 and Type 3)	80%	65-67%

Extreme thermal and moisture gradients together can drive moisture into all insulations, including EPS and XPS. Because extreme conditions may affect outcomes, a single study with unanticipated results that is not independently reviewed or does not provide appropriate transparency to allow for further scientific analysis is not sufficient to alter conclusions supported by extensive peer-reviewed industry data. Thus, the ASCE 32 Committee recommendations provide the most reliable conclusions on the long term in-service performance of polystyrene foam insulations used in below-grade applications, and the ASCE recommendations affirm that XPS foam insulation demonstrates higher in-service moisture resistance and higher in-service retained R-value as compared to EPS.