STUDY SUMMARY
Moisture No. 102

Exterior Foundation Wall Insulation.

The impact of moisture absorption on the performance of polystyrene foam insulations used for below grade applications is an important design consideration. It has been scientifically proven that water absorption into polystyrene foam insulations will diminish R-values.

This Study Summary provides the results of a research project conducted in 1988 by the Energy Division of The Minnesota Department of Public Service. The project report is entitled "A Survey of Minnesota Home Exterior Foundation Wall Insulation: Moisture Content and Thermal Performance".

Two molded polystyrene and fourteen extruded polystyrene (XPS) insulation samples were removed 6-24 inches below grade from the foundations of Minnesota homes. The objective of the study was to survey the performance of below grade insulation 2-5 years after initial installation.

Summary of 1988 Study Test Results[1]

Material	Age (Years)	Thickness (Inches)	Density (pcf)
Molded Polystyrene	6.50	1.39	1.27
XPS	2.86	2.00	2.01

Material	Moisture Content (Volume %)	R-value (°F.ft².h/Btu)	
		per inch	% Loss2
Molded Polystyrene	0.49	3.55	1.4
XPS	0.47	4.91	1.9

[1] Average of samples.
[2] Based upon R-value of 3.6 for Molded polystyrene and 5.0 for XPS.

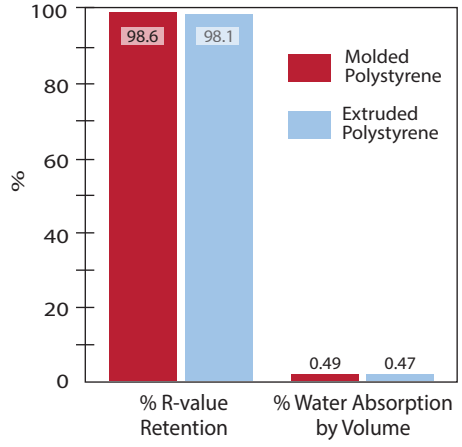
The results indicate that the below grade moisture absorption of the molded polystyrene and XPS samples are comparable. It is interesting to note that the molded polystyrene samples exhibited similar water absorption results even though they were installed for more than twice the length of time.

These results suggest very clearly that short term laboratory tests of water absorption for molded polystyrene and XPS do not necessarily reflect the long term below grade performance of these materials.

FOAM CONTROL®

FOAM FACTS:
Below Grade Water Absorption

WATER ABSORPTION AND R-VALUE RETENTION[1]



Retained thermal resistance and water absorption of insulations subjected to below grade exposure

[1] Testing was conducted by Energy Division of The Minnesota Department of Public Service.

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