

# STUDY SUMMARY

## Moisture No. 104

### Environmental Cycling and Drying Potential.

The impact of moisture gain and loss on the performance of polystyrene foam insulation in below grade applications is an important consideration. It is well known that water gain and loss in polystyrene foam insulations will effect their R-value. Any change in R-value as a result of water gain and loss should be accounted for in the design of below grade applications.

The EPS Industry Alliance commissioned a study by Intertek, an independent test laboratory to conduct environmental cycling tests using ASTM C1512-07, *Standard Test Method for Characterizing the Effect of Exposure to Environmental Cycling on Thermal Performance of Insulation Products*. This study summary provides the test results related to drying potential.

Three molded polystyrene and one extruded polystyrene (XPS) insulation samples were tested in accordance with ASTM C1512. ASTM C1512 determines the moisture gain and loss of insulation when exposed to the rigors of environmental cycling. Tests were performed on 1" (25mm) thick specimens.

### Summary of ASTM C1512 Test Results

ASTM C1512 Environmental Cycling Moisture Results					
Material	Before Cycling	After Cycling	% Moisture Retained	% Moisture Lost	Drying Observed ?
Molded polystyrene Type I	4.7 %	2.7 %	57	43	Yes
Molded polystyrene Type II	3.2 %	1.7 %	53	47	Yes
Molded polystyrene Type IX	2.1 %	1.6 %	76	24	Yes
XPS Type X	0.8 %	0.8 %	100	0	No

The results provided important information on the wetting and drying performance of molded polystyrene and XPS insulation under the severe ASTM C1512 conditions.

- All polystyrene foams retain a very low percentage of moisture by volume after environmental cycling.
- All molded polystyrene insulation types dried significantly during the cycling stage, demonstrating long-term drying potential.
- The XPS insulation did not exhibit drying potential in the cycling stage.



## FOAM FACTS: ASTM C512 Water Retention

