EPS Insulation Advancements
& Technology Innovations

**TECHNICAL BULLETIN**
EPS Below Grade Series 102

# **Freeze-Thaw Cycling Tests** Show No Loss of R-Value or Strength

One of the top priorities in construction is thermal design. Escalating energy costs have made it even more important to evaluate a material's performance over long term environmental conditions—an investment in insulation must be returned in operating energy savings for it to be effective.

The EPS Industry Alliance commissioned a study by Intertek EL SEMKO, an independent test laboratory. Intertek conducted 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.*

ASTM C1512 assesses the effect of freeze-thaw cycling on thermal performance and also determines the moisture absorption of insulation when exposed to the rigors of environmental cycling. Tests were performed on 1" (25mm) thick specimens of EPS product Type I, Type II and Type IX.

It is important to note that the use of other ASTM test procedures to evaluate the effects of freeze-thaw conditioning on foam insulations have led to confusion. Reporting the results of tests designed for concrete or other materials and applications are inappropriate and unsuitable. ASTM C1512 was developed specifically to address the need to evaluate building insulations under exposure to moisture and freeze-thaw cycles.

These independent tests confirm the freeze-thaw and moisture resistance properties of EPS insulation. Test results confirm no loss in R-value or change in compressive strength for EPS. Additionally, the results clearly demonstrate that EPS insulation does not absorb excessive amounts of moisture.

| ASTM C578 Minimum Performance Properties | | | |
|---|---|---|---|
| EPS Type | Compressive Strength, psi. | R-value, F•ft²•h/BTU | Moisture Content, Volume % |
| I | 10.0 | 3.6 | 4.0 |
| II | 15.0 | 4.0 | 3.0 |
| IX | 25.0 | 4.2 | 2.0 |

| After ASTM C1512 Environmental Cycling | | | |
|---|---|---|---|
| EPS Type | Compressive Strength, psi. | R-value, F•ft²•h/BTU | Moisture Content, Volume % |
| I | 13.7 | 3.7 | 2.7 |
| II | 21.6 | 4.0 | 1.7 |
| IX | 32.0 | 4.4 | 1.6 |