


## MPS No. 1027

**Subject: Elastic Modulus**

**Date: January 2018 (Revised January 2019)**

Foam-Control® insulation is manufactured in compliance with ASTM C578, “Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation”. This standard covers the minimum requirements for flexural strength, compressive strength, and other select properties of polystyrene foam. Some engineered systems such as Structural Insulated Panels (SIPs), insulated concrete forms (ICF’s) and exterior insulation and finish systems rely on Foam-Control as a key structural component.

Foam-Control has conducted extensive tests to determine the elastic modulus of Foam-Control products. Elastic modulus was determined in accordance with ASTM D1621, “Standard Test Method for Compressive Properties of Rigid Cellular Plastics”.

PRODUCT							
		100	130	150	250	400	600
Elastic Modulus, typical ASTM D1621	psi (kPa)	360 (2500)	580 (4000)	730 (5000)	1090 (7500)	1500 (10300)	1860 (12800)

**Note:** The values are based upon testing at laboratory conditions (72F/50%RH) under short term load durations as specified by the ASTM test method.



Foam-Control products are manufactured by AFM Corporation licensees.

Copyright © 2019 AFM Corporation. All rights reserved. Printed in USA. Foam-Control and the Foam-Control logo are registered trademarks of AFM Corporation, Lakeville, MN.

## MPS No. 1028

**Subject: Exposure to Moisture**

**Date: November 2018 (Revised January 2019)**


Foam-Control® is a molded polystyrene insulation with high compressive strength, high R-value, and superior moisture resistance. Foam-Control insulation is a closed cell foam manufactured to resist moisture absorption in wetting conditions and release absorbed moisture quickly during drying periods.

Foam-Control, like all insulation, may be exposed to challenging moisture conditions in building insulation applications. The behavior of any insulation when exposed to moisture is critical to understanding the potential impact of water absorption on the insulation's R-value.

The exposure of insulation to moisture varies widely in the most common building insulation applications:

- Roof insulation is protected by a membrane and is not exposed to rain
- Wall insulation is protected by a weather resistive barrier and is not exposed to rain
- Below Grade insulation installed with ground sloping away from the foundation and drainage at footings experiences little moisture exposure

The insulation industry for years has conducted water absorption testing as a means of quality control. ASTM C578<sup>1</sup> has very specific requirements for testing the water absorption of polystyrene insulation following ASTM C272<sup>2</sup>. The ASTM C272 test method involves placing a 1 in. x 12 in. x 12 in. sample of polystyrene insulation under water for 24 hours. After 24 hours the sample is taken out of the water, surface water on the sample is removed, and a determination of the water absorption by volume is made. The ASTM C578 requirements for this quality control test are as follows:


	100	130	150	250	400	600
Water Absorption max., volume %, ASTM C272	4.0	3.0	3.0	2.0	2.0	2.0

Some building industry representatives have long referenced these ASTM C578 short-term quality control test results and inappropriately considered the values as the expected water absorption in building applications.

Researchers from Dow Chemical<sup>3</sup> as early as 1983 concluded "that moisture gain in perimeter insulation cannot be predicted accurately by any one laboratory test". More recently, building science professionals rely on complex software, such as WUFI<sup>4</sup>, to attempt to predict the transient heat and moisture transport in buildings.

More useful information on the performance of Foam-Control insulation when subjected to the normal wetting and drying conditions of building applications is now available.

Foam-Control insulation samples which completed 24 hours of submersion in water in accordance with ASTM C272 testing were stored for an additional 24 hours in 50% RH air immediately upon removal from the water. This additional time period provides critical insight into the full cycle of Foam-Control insulation wetting and drying behavior.

	100	130	150	250	400	600
Water Absorption max., volume %, ASTM C272 & additional 24 hour in 50% RH air.	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

The results above from the full cycle of a 24 hour under water exposure followed by a 24 hour air exposure clearly demonstrates Foam-Control insulation resists moisture absorption in wetting conditions and releases absorbed moisture quickly during drying periods, which means Foam-Control insulation will maintain R-value performance under the most demanding building applications.