TEMPRECISION® FOAM

DATA SHEET:

Main Benefits:

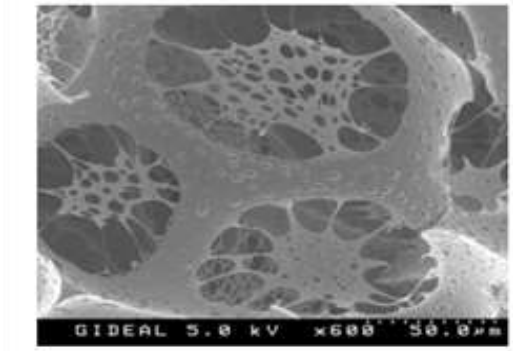
- Our TEMPRECISION® Foam can be cut into any shape and size at Smithers-Oasis; which allows us to create tailor-made cooling elements and packaging solutions to exactly fit our customer's shipping products.

- TEMPRECISION® Foam is more powerful as a cooling element compared to a rigid plastic bottle due to its 95% to 99% absorbent efficiency. This benefits the shipper designer in ways they can design packaging with more cooling power per unit volume than comparable bottles, thus giving them more cooling capacity in the same packaging solution. The designer can also reduce the dimensions of the cooling elements (for the same quantity of fluids) and gain significant payload capacity. (Case study supplied upon request)
- Excellent strength to density relationship for temperature controlled shipping containers.
- Excellent thermal properties.
- Environmentally friendly foam options are available in some markets.
- THERMABRICK® is cost effective when compared to rigid plastic bottles.

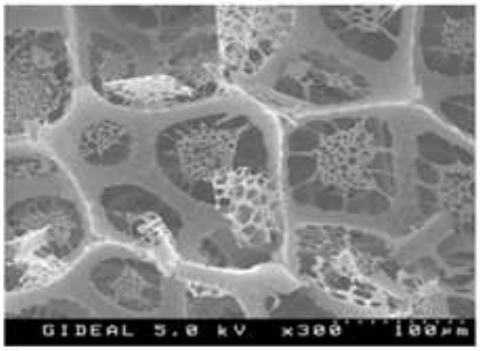
Applications:

- TEMPRECISION® Foam and THERMABRICK® are used in temperature controlled packaging as cooling elements to keep sensitive items from temperature excursions while in transit without externally powered refrigeration.
- TEMPRECISION® Foam is also used for dry foam insulation.

Microscopic View of the TEMPRECISION® Foam



Close-up of closed-cell phenolic foam



Close-up of open-cell phenolic foam

Macroscopic View of the TEMPRECISION® Foam and THERMABRICK®

TEMPRECISION® FOAM

THERMABRICK®

TEMPRECISION® FOAM ENGINEERED PRODUCTS

ThermaBrick®

Properties:

Engineered Products	Application	Compression (PSI)	Density (PCF)	Fluid Absorption %	Size (L x W x H)
TEMPRECISION® FOAM	Foam used as a passive refrigerant	7.0 to 12	1.2 to 2.0	95% to 99%	Any custom size up to the following dimensions 48" x 48" x 24"
THERMABRICK®	Sealed and delivered passive refrigerant	7.0 to 12 (when thawed)		Based on Customer criteria	Varied - based on Smithers-Oasis markets and customer specifications

Common Materials of Construction of Temperature Controlled Packaging

Testing Method: ASTM C518

	Thermal Conductivity @20C	Density		
Foam Type	**(W/mK)**	**(Kg/m3)**	**(pcf)**	**Material Source**
Poly Urethane (PU) (Marketplace Shipper)	0.0240	31.83	1.99	market specimen
Expanded Polystyrene (EPS) (Marketplace Shipper)	0.0453	28.92	1.81	market specimen
High Density HD Phenolic Panel (Thermally Treated)	0.0358	44.56	2.78	Smithers Oasis dedicated product
TEMPRECISION(R) foam	0.0397	20.48	1.28	Smithers Oasis dedicated product

TEMPRECISION® FOAM ENGINEERED PRODUCTS

ThermaBrick®

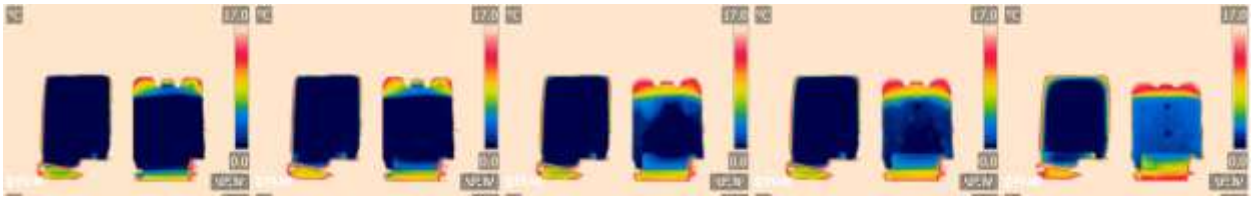
Uniform Thermal Stability Testing:

Description: Compare the surface temp of SO THERMABRICK® and Rigid Plastic filled with water.
Specimen Size: 7" x 5" x 1 for both the THERMABRICK® and Fluid Filled Plastic Bottle

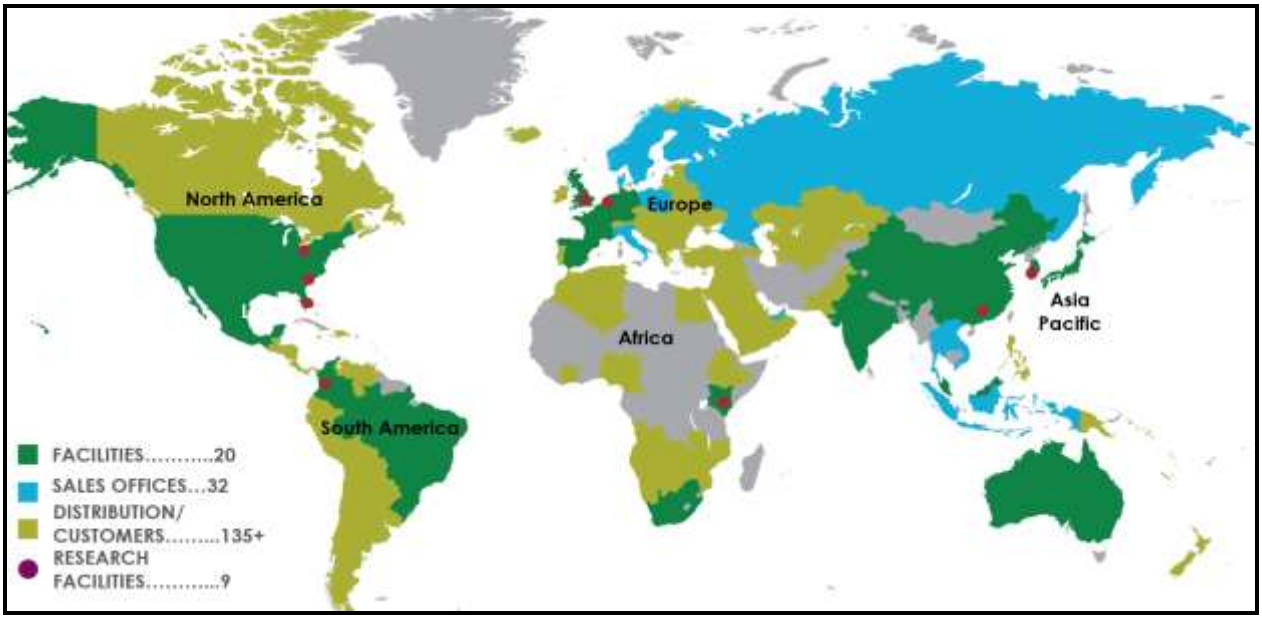
Conditioning: SO THERMABRICKS® are conditioned at -19 ˚C for 48 hours prior to testing.
Chamber was conditioned at 25 ˚C and 50% humidity.
Specimens were tested in a vertical position.
IR Camera was located at 1m of distance.

Equipment: FLIR GF320 - IR Camera

Thermography results:
Smithers-Oasis Engineered Products THERMABRICK® on the Left and a standard fluid filled bottle on the right in the images below



Smithers - Oasis Global Foot Print:



TEMPRECISION® FOAM ENGINEERED PRODUCTS

ThermaBrick®