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APPLICATIONS,
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LISTING # 1224-1

LISTING & TESTING DIVISION

PRODUCT: EXPANDED POLYSTYRENE BOARD

Issued: May 1988
Revised: March 2009
Renewed: May 2008

MANUFACTURER: **DREW FOAM COMPANIES, INC.**
1093 Highway 278 East
Monticello, AR 71655

PLANT LOCATION: 1093 Highway 278 East (1224-1)
Monticello, AR 71655

CATEGORY: FOAM PLASTIC INSULATION BOARDS

APPLICATION: Insulation for Wall & Exterior Finish Systems, Floor & Roof/Ceiling Systems

SECTION 1: INTRODUCTION
At the request of Drew Foam Companies, Inc., **RADCO** investigated the possibility of listing Expanded Polystyrene (EPS) Foam Insulation Board Material produced by Drew Foam Companies, Inc., and for conformance to the requirements of the model codes, and ASTM C-578-06.

SECTION 2: DESCRIPTION
The listed products are molded, closed cell, expanded polystyrene(EPS) foam insulation boards made from modified beads to achieve a Class 1 flame spread rating in various densities, thicknesses and thermal values and are available in a variety of sizes and configurations.
Note: The modified beads which are used are listed by one or more of the Code Bodies for a Class I flame spread rating and smoke development at the thickness and densities stated in the Code Body evaluation report or listing. **RADCO** only permits the use of modified expandable polystyrene beads covered by a current valid Code Body evaluation report or listing.

The Boards are used as insulation in roof systems; as part of exterior wall coating systems; and for interior wall and ceiling systems. The types of foam boards listed are identified in Table I. Testing of the various types of foam boards is in accordance with applicable sections of ASTM C-578.

SECTION 3: INSTALLATION
Installation of EPS boards is to be in accordance with Manufacturer's Specifications and with the respective Model Code Requirements for protection and separation of foam products from the interior of buildings and for maximum thickness limitations, fastening and installation of exterior finish products over the foam as defined in Evaluation Service Reports.

SECTION 4: EVIDENCE SUBMITTED
A) Flame Spread: Reports of tests in compliance with ASTM Standard E84 (UBC Standard 8-1) for the various bead suppliers, densities, and thicknesses.
B) Thermal Values - Laboratory tests performed by **RADCO** in accordance with ASTM Standard C-518.
C) Densities, Flexural, Compressive, Dimensional, Dimensional Stability, Water Absorption and Water Vapor Transmission values, Oxygen Index; - Laboratory tests performed by **RADCO** in accordance with ASTM C-578.
D) Quality Control - Quality control manuals for each listed facility have been developed and evaluated along with an in-plant certification check by **RADCO** made to determine capability to control and develop products in accordance with the requirements and specifications contained in the quality control manual.
E) Ongoing Audit - Ongoing audits of procedures and tests of products are maintained by **RADCO** through unannounced visits to the facilities. Samples of listed products are selected for testing to applicable sections of ASTM C-578. In addition **RADCO** conducts annual thermal testing from a random selection of these samples.

SECTION 5: MARKINGS / IDENTIFICATION
Boards are to be identified with one of the following criteria:
A) For expanded polystyrene foam used as a component of an Exterior Wall Coating System each insulation board must be identified along one edge (for approved products see Table I) and one board in each package shall be marked on both faces with the following information:
   1) Exterior Coating Company name and Evaluation Report number (where applicable).
   2) Flame Spread and Smoke Developed Rating (FS<25, SD<450)
   3) **RADCO** listing number
   4) **RADCO** name and compliance agency number, (AA-650)
B) For all other applications, the acceptable markings will either be applied to each bundle of EPS boards through use of at least one label or stamped on at least one board per bundle. The marking label is to include:
   1) The Molder's Identification (logo, etc)
   2) The Molder's name and location
   3) "Class I flame Spread Rating"
   4) Flame Spread Rating E-84. Less Than 25
   5) Smoke Developed E-84) - Less Than 450
   6) The **RADCO** logo and compliance agency number (AA-650)
   7) **RADCO** identifying listing number
   8) Material identification lot number

   In addition the following information is to be included: "Flame Spread and Smoke Developed Ratings derived are not intended to reflect hazards under actual fire conditions".

SECTION 6 - RECOMMENDATIONS
RADCO recommends that the board produced by the Drew Foam Companies, Inc., molder facilities be accepted for the applications described provided that:
1) Installation is in conformance with manufacturer's requirements and applicable sections of the Basic Building Code: Southern Building Code and the Uniform Building Code, as applied to foam products.
2) Boards and/or bundles are marked as identified in this listing and/or applicable Model Code Evaluation Reports.
3) The Quality Control system be maintained in the plant and all changes to the system approved by **RADCO.**
4) **RADCO's** follow up plant audit and testing program be continued at the prescribed frequencies.

SECTION 7: APPROVAL:
This listing is subject to annual re-examination and renewal.

DREW FOAM
Companies, Inc.

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MATERIAL SAFETY DATA SHEET
EPS BLOCK AND BOARD

SECTION I.

CHEMICAL NAME	EXPANDED POLYSTYRENE FOAM (EPS)
CHEMICAL FAMILY	POLYSTYRENE
FORMULA	$(C_8H_8)N$ WITH FLAME RETARDANT ADDITIVE

SECTION II. HAZARDOUS INGREDIANTS

NONE WHEN RESIDUAL PENTANE BLOWING AGENT IS REDUCED TO LEVEL DESCRIBED IN SECTION IX.

SECTION III. PHYSICAL DATA

BOILING POINT	NOT APPLICABLE
SOLUBILITY IN WATER	NONE
SPECIFIC GRAVITY	APPARENT DENSITY 1.0 TO 2.0 PCF DENSITY
PERCENT BY VOALTILE BY VOLUME	(PENTANE & WATER) 0.18% (SEE SECTION IX)
EVAPORATION RATE	NOT APPLICABLE
APPEARANCE AND ODOR	RIGID CELLUAR FOAM BLOCK OR BOARD – NO ODOR

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA	WATER, FOG, CO_2, DRY CHEMICAL
SPECIAL FIRE FIGHTING PROCEDURES	NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS	MAY EMIT LARGE VOLUME OF DENSE BLACK SMOKE

SECTION V. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	NONE
EFFECTS OF OVER EXPOSURE	NONE
EMEGENCY AND FIRST AID PROCEDURES	NONE

SECTION VI. RADIOACTIVITY DATA

STABLE	YES
INCOMPATABILITY	NONE
HAZARDOUS DECOMPOSTION PRODUCTS	NONE
HAZARDOUS POLYMERIZATION	WILL NOT OCCUR
CONDITIONS TO AVOID	NONE

SECTION VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: NORMAL GOODHOUSKEEPING SHOULD BE OBSERVED IN DISPOSING OF SCRAP MATERIAL

WASTE DISPOSAL METHOD: ACCORDING TO LOCAL ORDINANCES

SECTION VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	NONE- MAY ACT AS OBSTRUCTION IF SWALLOWED
VENTILATION	NONE
PROTECTIVE GLOVES	NONE
EYE PROTECTION	SAFETY GLASSES RECOMMENDED TO AVOID MECHANICAL IRRITATION FROM DUST IF SAW FABRICATING

SECTION IX. SPECIAL PRECAUTIONS

IMMEDIATLEY AFTER MOLD EXPANDED POLYSTYRENE INTO BLOCKS, THE RESIDUAL BLOWING AGENT, PENTANE, ENTRAPPED WITHIN THE BLOCKS RANGES FROM ABOUT 2.0 TO 3.0% BY WEIGHT. THE BLOCKS ARE THEN STORED AT ROOM TEMPERTAURE OR AT AN ELEVATED TEMPERATURE (E.G., 130°F) TO REDUCE THE ENTRAPPED PENTATANE AND MOISTURE TO LESS THAN 1% BY WEIGHT (0.18% BY VOLUME) FOR DIMENSIONAL STABILIZATION. THE BLOCK STORAGE AREAS MUST BE, THEREFORE, ADEQUATELY VENTILATED TO AVOID BUILDUP OF PENTANE VAPORS.

IF THE PRODUCT IN BLOCK FORM IS TO BE FABRICATED BY HOT-WIRE CUTTING, WORK AREAS SHOULS BE VENTILATED TO AVOID A BUILDUP OF PROCESSING FUMES.

SPI MEMBER EPS EPS Packaging

Drew Expanded PolyStyrene Insulation & Flotation

EPS is a resilient, lightweight, foamed plastic which has a density range between 1.0 and 3.0 pcf for most construction applications. Within that range, EPS can be molded to achieve varying densities, providing the mix of strength and insulating properties to meet specific application requirements at minimum cost.

EPS has a successful thirty-year history of efficient use in construction for industrial, commercial, residential and low-temperature buildings. In Europe, where energy efficiency has long been a primary design consideration, architects have made EPS the dominant thermal insulation.

Long-term insulation value.
EPS insulation (1.0 pcf) provides a typical R value of 3.9 per inch (K factor = 0.26) at a mean temperature of 75°F (R = 4.17 per inch at 40°F). The R value of EPS insulation is permanent because the cellular structure of EPS contains only stabilized air. Its R value will not decrease as it ages.

Cost efficiency.
EPS insulation typically costs less than other commonly used materials when compared on the basis of R value.[1]

Moisture resistance.
A new study by the Energy Materials Testing Laboratory (EMTL)[2] has shown that EPS insulation installed in well-constructed roofs does not absorb appreciable moisture, even under conditions characteristic of prolonged, cold, damp winters. The small amount of moisture that may be absorbed (an average of 0.2% by weight) has little or no effect on the compressive or flexural strength, and EPS insulation will retain between 95% and 97% of its thermal efficiency.

Temperature cycling.
EPS is able to withstand the abuse of temperature cycling, assuring long-term performance. In a series of tests conducted by Dynatech Research and Development Co., Cambridge, Mass., core specimens removed from existing freezer walls, some as old as 16 years, prove that EPS withstands freeze-thaw cycling without loss of structural integrity or other physical properties.

Strength characteristics.
EPS insulation with a minimum 1.0 pcf density provides the dimensional stability and compressive strength necessary to withstand light roof traffic and equipment weight at reasonably high surface temperatures. Compressive strengths up to 25 psi are available. Consult the EPS manufacturer for recommendations.

Permanence.
EPS insulation is an inert, organic material. It provides no nutritive value to plants, animals or micro-organisms. It will not rot and is highly resistant to mildew.

Fabrication and installation ease.
EPS insulation can be installed quickly and easily. It can be cut to shape with ordinary tools to assure a tight fit and to eliminate heat loss channels. And its light weight allows easy handling and storage.

Additional information.
Additional information on EPS insulation can be obtained by contacting manufacturers listed with Sweet's Buyline 800.

Flammability.
Like many construction materials, EPS is combustible. It should not be exposed to flame or other ignition sources. Applicable building codes must be met for adequate protection.

Solvent attack.
EPS is subject to attack by petroleum-based solvents. Care should be taken to prevent contact between EPS and these solvents or their vapors.

Ultraviolet degradation.
Prolonged exposure to sunlight will cause a slight discoloration and surface dusting of EPS insulation. The insulating properties will not be significantly affected under normal usage. EPS stored outside should be protected with a light-colored, opaque tarp.

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Buoyancy
Nominal Density 1 pcf

Volume of Expanded Polystyrene	Buoyancy lbs.	kg.
1 Cubic Foot	61.4	27.85
1 Cubic Meter	2,170	984.52

Water Vapor Permeability
ASTM C-355

Nominal Density, pcf	Fusion	Perm-In. Plaques	Perm-In. Blocks	Perm-Cm. Plaques	Perm-Cm. Blocks
1.0	Optimum	0.8-2.0	1.5-2.8	1.34-3.34	2.5-4.68
1.4	Optimum	—	1.5-2.5	—	2.5-4.17
2.2	Optimum	0.5-1.4	1.3-2.4	0.83-2.34	2.17-4.01
2.5	Optimum	—	1.0-2.4	—	1.67-4.01
1.0	Minimum	1.5-3.0	1.6-3.5	2.5-5.01	2.67-5.84
2.3	Minimum	1.0-2.0	1.0-2.8	1.67-3.34	1.67-4.68

Property		Units	ASTM Test	Density (pcf) 1.0	1.25	1.5	2.0
Thermal Conductivity K Factor	at 25F	BTU/(hr.)	C177 or	0.23	0.22	0.21	0.20
	at 40F	(sq. ft.) (F/in.)	C518	0.24	0.235	0.22	0.21
	at 75F			0.26	0.255	0.24	0.23
Thermal Resistance Values (R)	at 25F	per inch		4.35	4.54	4.76	5.00
	at 40F	thickness	—	4.17	4.25	4.55	4.76
	at 75F			3.85	3.92	4.17	4.35
Strength Properties							
Compressive 10% Deformation		psi	D1621	10-14	13-18	15-21	25-33
Flexural		psi	C203	25-30	32-38	40-50	55-75
Tensile		psi	D1623	16-20	17-21	18-22	23-27
Shear		psi	D732	18-22	23-25	26-32	33-37
Shear Modulus		psi	—	280-320	370-410	460-500	600-640
Modulus of Elasticity		psi	—	180-220	250-310	320-360	460-500
Moisture Resistance							
WVT		perm. in.	C355	1.2-3.0	1.1-2.8	0.9-2.5	0.6-1.5
Absorption (vol.)		%	C272	less than 2.5	less than 2.5	less than 2.0	less than 1.0
Capillarity		—	—	none	none	none	none
Coefficient of Thermal Expansion		in./(in.) (F)	D696	0.000035	0.000035	0.000035	0.000035
Maximum Service Temperature		°F	—				
Long-term				167	167	167	167
Intermittent				180	180	180	180