

CITY OF SACRAMENTO

Permit No: 9809557

1231 I Street, Sacramento, CA 95814

Insp Area: 2

Site Address: 1045 EAST LANDING WY SAC

Sub-Type: NSFR

Parcel No: 0311400040

Housing (Y/N): N

CONTRACTOR

FORTE BUILDERS
1455 RESPONSE RD
SACRAMENTO CA

95815

OWNER

HO RAYMOND & CHING MARGRET
EAST LANDING WAY 1045
SACRAMENTO CA

95758

ARCHITECT

CHINN DARRYL
2612 J ST #2
SACRAMENTO CA

95816

Nature of Work: NEW SINGLE FAMILY DWELLING, 7 ROOMS

CONSTRUCTION LENDING AGENCY: I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C).

3200 Southwest Freeway RT. 2420

Lender's Name Bank United

Lender's Address Houston Texas, 77027

LICENSED CONTRACTORS DECLARATION: I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class B License Number 713512 Date 11/19/98 Contractor Signature [Signature]

OWNER-BUILDER DECLARATION: I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code; any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500.00);

I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.)

I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law).

I am exempt under Sec. B & PC for this reason:

Date Owner Signature

IN ISSUING THIS BUILDING PERMIT, the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and hereby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 11/19/98 Applicant/Agent Signature [Signature]

WORKER'S COMPENSATION DECLARATION: I hereby affirm under penalty of perjury one of the following declarations:

I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, for the performance of work for which the permit is issued.

I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier ASSURANCE Company of Calif. Forw... Policy Number WDN59067A Exp Date 5/30/99

(This section need not be completed if the permit is for \$100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date 11/14/98 Applicant Signature [Signature]

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000) IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.

THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.

98 04557

ELEVATION CERTIFICATE

FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM

O.M.B. No. 3067-0077

Expires July 31, 1999

ATTENTION: Use of this certificate does not provide a waiver of the flood insurance purchase requirement. This form is used only to provide elevation information necessary to ensure compliance with applicable community floodplain management ordinances, to determine the proper insurance premium rate, and/or to support a request for a Letter of Map Amendment or Revision (LOMA or LOMR). You are not required to respond to this collection of information unless a valid OMB control number is displayed in the upper right corner of this form. Instructions for completing this form can be found on the following pages.

SECTION A PROPERTY INFORMATION		FOR INSURANCE COMPANY USE	
BUILDING OWNER'S NAME <u>Raymond Ho & Margaret Ching</u>		POLICY NUMBER	
STREET ADDRESS (Including Apt., Unit, Suite and/or Bldg. Number) OR P.O. ROUTE AND BOX NUMBER <u>1045 E. Landing way</u>		COMPANY NAIC NUMBER	
OTHER DESCRIPTION (Lot and Block Numbers, etc.) <u>031 0140 040 Eastshore @ Riverlake Lot #36</u>			
CITY <u>Sacramento</u>	STATE <u>CA</u>	ZIP CODE <u>95831</u>	

SECTION B FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM (See Instructions):

1. COMMUNITY NUMBER <u>060266</u>	2. PANEL NUMBER <u>0030</u>	3. SUFFIX <u>F</u>	4. DATE OF FIRM INDEX <u>July 6, 1998</u>	5. FIRM ZONE <u>AR</u>	6. BASE FLOOD ELEVATION (in AO Zones, use depth) <u>19</u>
--------------------------------------	--------------------------------	-----------------------	--	---------------------------	---

7. Indicate the elevation datum system used on the FIRM for Base Flood Elevations (BFE): NGVD '29 Other (describe on back)
8. For Zones A or V, where no BFE is provided on the FIRM, and the community has established a BFE for this building site, indicate the community's BFE: feet NGVD (or other FIRM datum—see Section B, Item 7).

SECTION C BUILDING ELEVATION INFORMATION

1. Using the Elevation Certificate Instructions, indicate the diagram number from the diagrams found on Pages 5 and 6 that best describes the subject building's reference level 3.
- 2(a). FIRM Zones A1-A30, AE, AH, and A (with BFE). The top of the reference level floor from the selected diagram is at an elevation of feet NGVD (or other FIRM datum—see Section B, Item 7).
- (b). FIRM Zones V1-V30, VE, and V (with BFE). The bottom of the lowest horizontal structural member of the reference level from the selected diagram, is at an elevation of feet NGVD (or other FIRM datum—see Section B, Item 7).
- (c). FIRM Zone A (without BFE). The floor used as the reference level from the selected diagram is feet above or below (check one) the highest grade adjacent to the building.
- (d). FIRM Zone AO. The floor used as the reference level from the selected diagram is feet above or below (check one) the highest grade adjacent to the building. If no flood depth number is available, is the building's lowest floor (reference level) elevated in accordance with the community's floodplain management ordinance? Yes No Unknown
3. Indicate the elevation datum system used in determining the above reference level elevations: NGVD '29 Other (describe under Comments on Page 2). (NOTE: If the elevation datum used in measuring the elevations is different than that used on the FIRM [see Section B, Item 7], then convert the elevations to the datum system used on the FIRM and show the conversion equation under Comments on Page 2.)
4. Elevation reference mark used appears on FIRM: Yes No (See Instructions on Page 4)
5. The reference level elevation is based on: actual construction construction drawings
(NOTE: Use of construction drawings is only valid if the building does not yet have the reference level floor in place, in which case this certificate will only be valid for the building during the course of construction. A post-construction Elevation Certificate will be required once construction is complete.)
6. The elevation of the lowest grade immediately adjacent to the building is: feet NGVD (or other FIRM datum—see Section B, Item 7).

SECTION D COMMUNITY INFORMATION

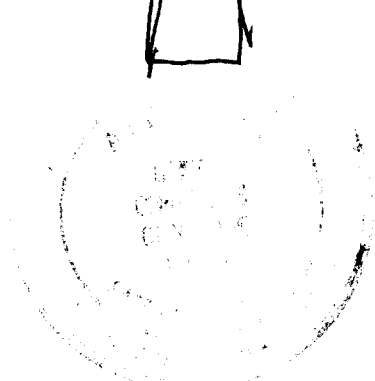
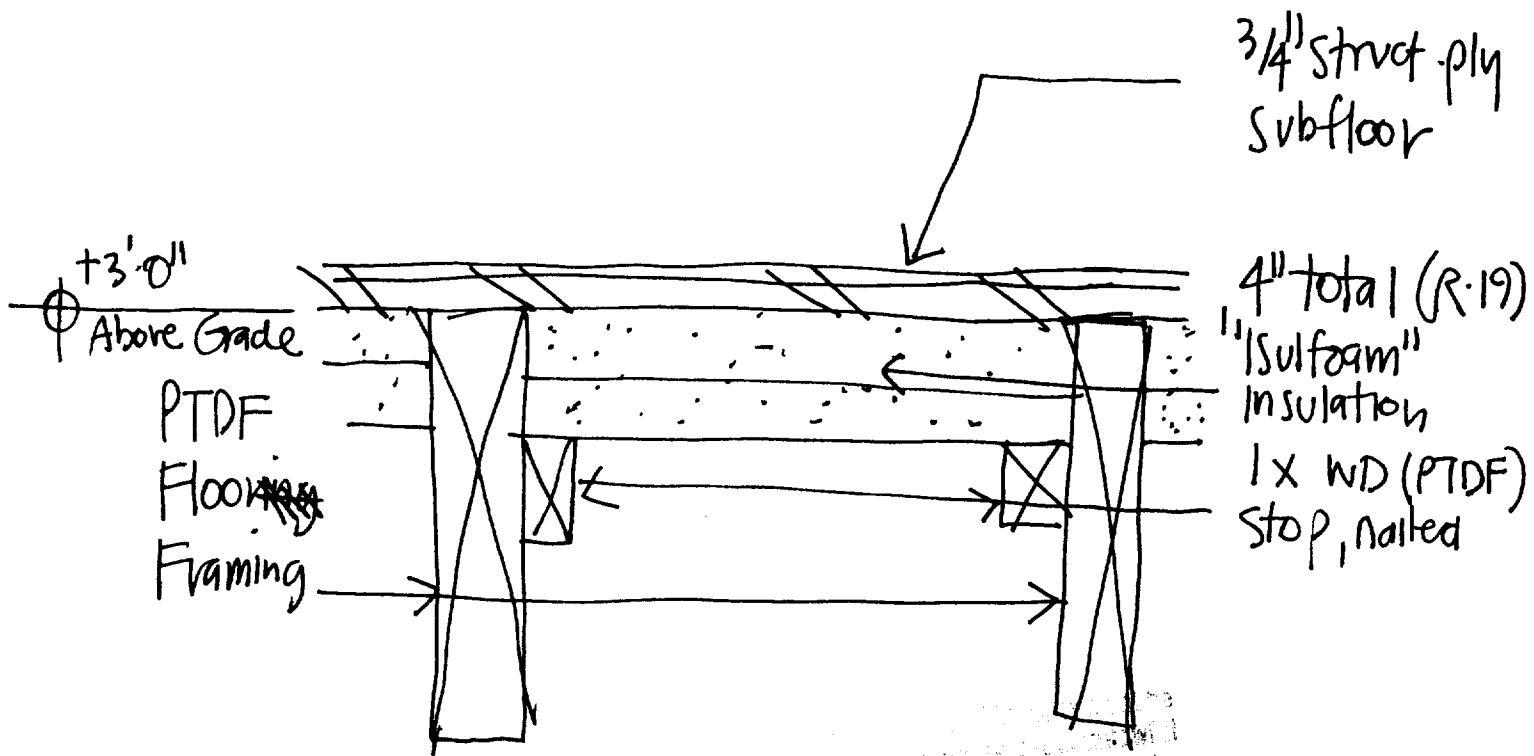
1. If the community official responsible for verifying building elevations specifies that the reference level indicated in Section C, Item 1 is not the "lowest floor" as defined in the community's floodplain management ordinance, the elevation of the building's "lowest floor" as defined by the ordinance is: feet NGVD (or other FIRM datum—see Section B, Item 7).
2. Date of the start of construction or substantial improvement Oct 15, 1998

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

CERTIFICATION OF COMPLIANCE

SCHOOL DISTRICT DEVELOPMENT FEES

PROPERTY OWNER'S NAME		Raymond Ho & Margaret Ching	
OWNER'S ADDRESS		P.O. Box 22784 Sacramento CA 95822	
PROJECT ADDRESS		1045 East Landing Way, Sacramento CA 95831	
PARCEL NUMBER	031400040	LOT NUMBER	36
SUBDIVISION NAME		East Shore	
NUMBER OF UNITS		1	
APPLICANT'S SIGNATURE		<i>[Signature]</i>	
TITLE OF APPLICANT		Owner	
DATE	10/21/98	TELEPHONE NUMBER	684-2908
SCHOOL DISTRICT DEVELOPMENT FEES			
PLAN IDENTIFICATION NUMBER		9809557	
BUILDING TYPE (CHECK ONE)			
<input checked="" type="checkbox"/> RESIDENTIAL <input type="checkbox"/> APARTMENT/CONDOMINIUM <input type="checkbox"/> COMMERCIAL/INDUSTRIAL			
SQUARE FEET OF CHARGEABLE BUILDING AREA		3045	
SIGNATURE		<i>[Signature]</i>	
TITLE		BUILDING INSPECTOR	
		DATE 9-25-98	
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT			
DISTRICT CERTIFICATION NUMBER		10485	
EXEMPT	COMMENTS		
RESIDENTIAL / APARTMENT / ETC.	3045	SQ. FT. X \$ 1.72	= \$ 5237.40
COMMERCIAL / INDUSTRIAL		SQ. FT. X \$	= \$
OTHER FEE	MELLO-RIO TYPE	CREDIT	SQ. FT. X \$ = \$ -942.00
TOTAL FEES COLLECTED.....			\$ 4295.40
<p><i>This certification covers only the amount of square footage indicated above. Any additions or corrections to the square footage for this project will require an amendment to the Certificate of Compliance.</i></p> <p><i>As the authorized school district official, I hereby certify that the requirements of Government Code Section 65995 and any other authorized requirements have been complied with by the above signed applicant.</i></p>			
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT			
SIGNATURE		<i>[Signature]</i>	
TITLE		SCHOOL DISTRICT DEVELOPMENT FEES	
		DATE 10/21/98	



...from the
...from the
...and specification
...to permit or approve the
...City Ordinance or State Law.

Floor Insulation Detail Revised by Mott R
12/4/98

NO Scale
1045 East Landing Way
PC #9809557 R

DC Architects 12/4/98



EXPANDED POLYSTYRENE PRODUCTS

Western INSULFOAM is a pioneer in molded polystyrene foam products. With manufacturing plants from Anchorage to Phoenix, Western INSULFOAM is the oldest and largest producer of expanded polystyrene in the West.

Insulfoam EPS (expanded polystyrene) is a closed cell, rigid cellular plastic made from petroleum derived from crude oil. For most construction/insulation applications, it is manufactured with a density of 1.0-2.5 pounds per cubic foot. Insulfoam is best known for its thermal efficiency, versatile applications and ease of installation.

Insulfoam EPS is manufactured in a two stage process from expandable polystyrene beads. In the first stage, these small spheres are subjected to high temperature steam, causing the incorporated blowing agent to volatilize and the individual beads to expand. The "pre-puff" is allowed to stabilize and then fed into a large closed mold. Steam is reintroduced and the heat produces a secondary expansion that fuses the beads into a homogenous block of expanded polystyrene. The standard block is molded in width 2' to 4' and length 8' to 24' with any thickness available up to 33".

All Western Insulfoam's facilities are members of the Associated Foam Manufacturers (AFM Corp.).

AFM was created to provide a centralized new product development arm for a nationwide group of expanded polystyrene molders. New products of national scope demand national approvals and the AFM successfully fills that need, with a growing list of FM, UL, and ICBO numbers to its credit.

With AFM products the owner, architect and applicator are assured of qualified design assistance, consistent quality control and service consistent with today's market demands.

Unbeatable Qualities!

Insulfoam offers a unique combination of qualities, making it your ideal insulating material.

- No CFC's
- No Formaldehyde
- No Thermal Drift
- UL, FM, Code Listed
- Low water absorption
- Environmentally safe and inert
- Highest R-value per dollar
- 20 Year R-Value Warranty
- Non Corrosive, Non Friable
- Independently QC Certified
- Proven System Compatibility

The Choice In Residential and Commercial Insulation Applications

- Perimeter Foundation Insulation
- Stress Skin Super Insulated Structural Building Panels
- Exterior Wall Insulation
- Sub Slab Insulation
- Retrofit Insulation
- Cold Storage
- Tapered Roof Systems
- Flotation
- Packaging
- Special Shapes

Physical Properties of Insulfoam Expanded Polystyrene, EPS

FEDERAL SPECIFICATIONS: INSULFOAM PRODUCTS MEET ASTM C578 (Supersedes Federal Specification HH-1-524C)

PROPERTY	ASTM TEST	TYPE I	TYPE VIII	TYPE II	TYPE IX
TYPICAL TESTED R-Values for use in thermal resistance design calculations					
R-Value* Normal density (lb/ft ³) Thermal Resistance per 1.00 in. thickness	C177/C 518	1.00	1.25	1.5	2.0
	AT 40° F	4.17	4.25	4.55	4.76
	AT 75° F	3.85	3.92	4.17	4.35
PHYSICAL REQUIREMENTS OF INSULFOAM Thermal Insulation Meeting ASTM C 578 Minimum and Maximum allowable values.					
Density, Minimum (lb/ft ³)	C303/D 1622	0.9	1.15	1.35	1.8
Thermal Resistance 1.00 in. (25.4mm) thickness Minimum* R-in ² -ft ² /Btu	C177/C 518 AT 40° F AT 75° F	4.0 3.8	4.2 3.8	4.4 4.0	4.6 4.2
Compressive resistance at yields or 10% deformation, whichever occurs first (with skins intact, minimum psi)	C 185/D 1621	10.0	13.0	15.0	25.0
Flexural strength, minimum psi	C 203	25.0	30.0	40.0	50.0
Water Vapor permeance of 1.00 in (25.4 mm) thickness max. perm	E 96	5.0	3.5	3.5	2.0
Water Absorption by total immersion maximum volume %	C272	4.0	3.0	3.0	2.0
Dimensional Stability (change in dimensions) maximum %	D 2128	2.0	2.0	2.0	2.0
Oxygen Index, minimum %	D 2863	24.0	24.0	24.0	24.0
Maximum Use Temperature Continuous Exposure Transient Exposure	T. P. -	187° 180°	187° 180°	187° 180°	187° 180°
Fungus & Bacterial Resistance	FMA Test Procedure	Will not support bacteria or fungus No food value			
Subsidence-Relaxation	lb./cu. ft.	60 lbs./cubic foot			

BUILDING CODE CLASSIFICATION

OSO Research Report No. 4189

Factory Mutual No. 4450

* Typical Tested R-Values are based on data provided by ARCO Chemical Co., BASF Corp. and Huntsman Chemical Company

FLAMMABILITY PROPERTIES

Board Thickness	1" Max.	2" Max.	4" Max.	1" Max.
Board Density, PCF	1.0	1.0	1.0	1.5
FIRE HAZARD CLASSIFICATIONS				
Flame Spread	5-10	5-10	10-15	5-10
Fuel Contributed	ND	ND	ND	ND
Smoke Developed	15-125	40-125	40-125	15-50

All test data are based upon test results and describe properties in response to heat and flame under controlled laboratory conditions. These boards have been tested and found to meet the requirements of the specifications listed herein. The standard INSULFOAM density will range between 1 lb. and 1.25 lb. per cubic foot and is generally more than adequate relative to compressive strength, thermal insulation, and water vapor transmission. However, under certain conditions, higher densities may be desirable, i.e., concentrated loading areas, and/or under high impact traffic loads. FIRE HAZARD CLASSIFICATION (UL Procedure T2), ASTM E-84

LIMITED WARRANTY AND REMEDY

Western Insulation warrants to the original purchaser for a period of one year from the date of delivery to that purchaser that our expanded polystyrene (EPS) products are manufactured in accordance with the specifications and are free from defects in workmanship and materials using those specifications as standards. Western Insulation makes no other representation or warranty of any kind, and does not warrant, in fact or in law, including, without limitation, the warranty of merchantability or warranty of fitness for a particular purpose, equal to or greater than the express warranty set forth in the preceding paragraph. Western Insulation's sole obligation to the purchaser is to supply an equivalent amount of product for any material returned to us within one year of shipment to the original purchaser and found to be defective and defective remedy for our factory shall be to supply an equivalent amount of product for any material returned to us within one year of shipment to the original purchaser and found to be defective by UL, regardless of whether the defect was latent or obvious. Replacement of a nonconforming product is the purchaser's of user's exclusive remedy and we will not be responsible for any consequential damage, loss or injury of any kind. Western Insulation does not practice engineering or architecture. No agent, salesman, or representative is empowered to change, alter, or amend the above statements unless done in writing by a duly authorized officer of Western Insulation.

FLAMMABILITY WARNING

Western Insulation's expanded polystyrene (EPS) products are combustible, as are all organic materials. They must not be stored or installed near open flame or any other source of ignition. In addition, every EPS insulation board is labeled in the interior of any occupied structure. It must be protected by a proper thermal barrier, and the installer must review applicable local, state and federal building codes to determine the proper thermal barrier for the particular installation.

ADJOINING MATERIALS WARNING

Expanded polystyrene (EPS) is subject to attack by liquid solvents or by most solvent based adhesives and other liquid products such as gas, diesel, etc. Care should also be taken to separate any EPS insulation or board from other materials which may come in direct contact with EPS foam.

Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation¹

This standard is issued under the fixed designation C 578; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This specification has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This specification² covers the types, physical properties, and dimensions of cellular polystyrene intended for use as thermal insulation for temperatures from -65 to $+165^{\circ}\text{F}$ (-53.9 to $+73.9^{\circ}\text{C}$). This specification does not cover cryogenic applications. Consult the manufacturer for specific recommendations and properties in cryogenic conditions.

1.2 The use of thermal insulation materials covered by this specification may be regulated by building codes that address fire performance. For some end uses, specifiers should also address the effect of moisture. Guidelines regarding these end use considerations are included in Appendix X1.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 165 Test Method for Measuring Compressive Properties of Thermal Insulations³
- C 168 Terminology Relating to Thermal Insulating Materials³
- C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus³
- C 203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation³
- C 236 Test Method for Steady-State Thermal Performance of Building Assemblies by means of a Guarded Hot Box³
- C 272 Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions⁴

- C 303 Test Method for Density of Preformed Block-Type Thermal Insulation³
- C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots³
- C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus³
- C 550 Practice for Measuring Trueness and Squareness of Rigid Block and Board Thermal Insulation³
- C 870 Practice for Conditioning of Thermal Insulating Materials³
- C 976 Test Method for Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box³
- C 1045 Practice for Calculating Thermal Transmission Properties from Steady-State Heat Flux Measurements³
- C 1058 Practice for Selecting Temperatures for Reporting and Evaluating Thermal Properties of Thermal Insulation³
- C 1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus³
- D 1600 Terminology Relating to Abbreviated Terms Relating to Plastics⁵
- D 1621 Test Method for Compressive Properties of Rigid Cellular Plastics⁵
- D 1622 Test Method for Apparent Density of Rigid Cellular Plastics⁵
- D 2126 Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging⁵
- D 2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-like Combustion of Plastics (Oxygen Index)⁶
- E 84 Test Method for Surface Burning Characteristics of Building Materials⁷
- E 96 Test Methods for Water Vapor Transmission of Materials³
- E 176 Terminology Related to Fire Standards⁷

3. Terminology

3.1 Definitions:

3.1.1 Terms used in this specification are defined in Terminology C 168.

3.1.2 Terms used in this specification that relate to fire standards are defined in Terminology E 176.

3.2 Descriptions of Terms Specific to This Standard:

3.2.1 RCPS—letter designations for the rigid cellular

¹ This specification is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C 16.22 on Organic and Nonhomogeneous Inorganic Thermal Insulations.

Current edition approved Oct. 10, 1995. Published November 1995. Originally published as C 578 - 65T. Last previous edition C 578 - 92.

² This specification is similar to ISO 4898-1984, "Cellular Plastics—Specification for Rigid Cellular Materials Used in the Thermal Insulation of Buildings," in its entirety. The scope and technical content are significantly different.

ISO standards are available from ANSI, 11 W. 42nd St., 13th Floor, New York, NY 10036.

³ Annual Book of ASTM Standards, Vol 04.06.

⁴ Annual Book of ASTM Standards, Vol 15.03.

⁵ Annual Book of ASTM Standards, Vol 08.01.

⁶ Annual Book of ASTM Standards, Vol 08.02.

⁷ Annual Book of ASTM Standards, Vol 04.07.

TABLE 1 Physical Property Requirements of RCPS Thermal Insulation

NOTE 1—The values for properties listed in this table may be affected by the presence of a surface skin which is a result of the manufacturing process. Where boards are tested with skins-in-place, this condition shall be noted in the test report.
 NOTE 2—Type III has been deleted because it is no longer available.
 NOTE 3—Classifications are used to cross-reference Fed. Spec. HH-524C (see X1.6.1).

Property	0.70 (12)	0.90 (15)	1.15 (18)	1.20 (19)	1.30 (21)	1.35 (22)	1.60 (26)	1.80 (29)	1.80 (29)	2.20 (35)	3.00 (48)
Density, min, lb/ft ³ (kg/m ³)											
Thermal resistance of 1.00-in. (25.4-mm) thickness, min, F·R ² ·h/Btu (K·m ² /W)											
Mean temperature:											
25°F (-3.9°C)	3.45 (0.61)	4.20 (0.74)	4.40 (0.77)	5.20 (0.92)	5.80 (0.99)	4.60 (0.81)	5.60 (0.99)	4.80 (0.84)	5.60 (0.99)	5.60 (0.99)	5.60 (0.99)
40°F (4.4°C)	3.30 (0.58)	4.00 (0.70)	4.20 (0.74)	5.00 (0.88)	5.40 (0.95)	4.40 (0.77)	5.40 (0.95)	4.60 (0.81)	5.40 (0.95)	5.40 (0.95)	5.40 (0.95)
75°F (23.9°C)	3.10 (0.55)	3.60 (0.63)	3.80 (0.67)	4.60 (0.81)	5.00 (0.88)	4.00 (0.70)	5.00 (0.88)	4.20 (0.74)	5.00 (0.88)	5.00 (0.88)	5.00 (0.88)
110°F (43.3°C)	2.90 (0.51)	3.25 (0.57)	3.45 (0.61)	4.30 (0.76)	4.65 (0.82)	3.65 (0.64)	4.65 (0.82)	3.85 (0.69)	4.65 (0.82)	4.65 (0.82)	4.65 (0.82)
Compressive resistance at yield or 10 % deformation, whichever occurs first (with skins intact), min, psi (kPa)	5.0 (35)	10.0 (69)	13.0 (90)	15.0 (104)	15.0 (104)	15.0 (104)	25.0 (173)	25.0 (173)	40.0 (276)	60.0 (414)	100.0 (690)
Flexural strength, min, psi (kPa)	10.0 (70)	25.0 (173)	30.0 (208)	40.0 (276)	40.0 (276)	40.0 (276)	50.0 (345)	50.0 (345)	60.0 (414)	75.0 (517)	100.0 (690)
Water vapor permeance of 1.00-in. (25.4-mm) thickness, max, perm (ng/Pa·s·m ²)	5.0 (287)	5.0 (287)	3.5 (201)	1.1 (63)	1.1 (63)	3.5 (201)	1.1 (63)	2.0 (115)	1.1 (63)	1.1 (63)	1.1 (63)
Water absorption by total immersion, max, volume %	4.0	4.0	3.0	0.3	0.3	3.0	0.3	2.0	0.3	0.3	0.3
Dimensional stability (change in dimensions), max, %	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Oxygen index, min, volume %	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Classification	Type XI	Type I	Type VIII	Type XII	Type X	Type II	Type IV	Type IX	Type VI	Type VII	Type V

TABLE 2 Common Dimensions of RCPS Thermal Insulation

Type	XI, I, VIII, II, IX	X, IV	VI, VII	V
Width, in. (mm)	12 to 48 (305 to 1219)	16, 24, 48 (406, 610, 1219)	24 (610)	16 (406)
Length, in. (mm)	48 to 192 (1219 to 4877)	48, 96, 108 (1219, 2438, 2743)	48, 96, (1219, 2438)	96 (2438)
Thickness, in. (mm)	¾ to 24 (9.5 to 610)	½ to 4 (13 to 102)	1 to 4 (25 to 102)	1 to 4 (25 to 102)

polystyrene thermal insulation classified by this specification that identifies the product as rigid cellular polystyrene.

3.2.2 PS—used in this specification to represent polystyrene in accordance with Terminology D 1600.

4. Classification

4.1 This specification covers types of RCPS thermal insulations currently commercially available as described by the physical property requirements in Table 1.

5. Ordering Information

5.1 Acquisition documents shall specify the following:

5.1.1 Title, number, and year of this specification,

5.1.2 Type (see Table 1),

5.1.3 R-value or thickness required (see Tables 1 and 2),

5.1.3.1 Thermal Resistance/Thickness Relationship—The thermal resistance (R-value) and the thermal resistivity (R-value/inch) of RCPS thermal insulation may vary with thickness. Therefore, when ordering, specify the R-value or the thickness, or both. For additional information, see Test Methods C 177, C 518, C 236, C 976, and C 1114 or Practice C 1045.

5.1.4 Density, if other than specified in Table 1,

5.1.5 Tolerance, if other than specified (see 8.2),

5.1.6 Length and width required (see Table 2),

5.1.7 If other than straight edges are required (see 8.3),

5.1.8 If either ship-lap or tongue-and-groove edges are required (see 8.6),

5.1.9 Tapered Insulation—special ordering information. In addition to other applicable requirements in Section 5

(Note 1), acquisition documents for tapered RCPS thermal insulation shall specify the following:

5.1.9.1 Minimum starting thickness,

5.1.9.2 Slope, in./ft (mm/m),

5.1.9.3 Average R-value,

5.1.9.4 Minimum thickness,

5.1.9.5 Shop Drawings—The tapered insulation supplier shall provide shop drawings to illustrate installation patterns and dimensions for each tapered module,

5.1.10 Sampling, if different (see 10.1),

5.1.11 If a certificate of compliance is required (see 14.1), and

5.1.12 If marking is other than specified (see 15.1).

NOTE 1—Physical properties of tapered insulation should be determined on blocks of RCPS thermal insulation before the insulation is tapered.

6. Materials and Manufacture

6.1 RCPS thermal insulation shall be formed by the expansion of polystyrene resin beads or granules in a closed mold, or by the expansion of polystyrene base resin in an extrusion process. RCPS thermal insulation shall be of uniform density and have essentially closed cells. All RCPS thermal insulation shall contain sufficient flame retardants to meet the oxygen index requirements of Table 1.

7. Physical Requirements

7.1 Inspection Requirements:

7.1.1 The physical requirements listed in this section are defined as inspection requirements (refer to Criteria C 390).

7.1.2 All dimensional requirements are described in Section 8.

7.1.3 All workmanship, finish, and appearance requirements are described in Section 9.

7.1.4 Density shall be in accordance with Table 1.

NOTE 2—For lots of 150 units or less, the tightened inspection sampling plan in Criteria C 390 will be followed.

7.2 *Qualification Requirements:*

7.2.1 The physical properties listed in this section of the specification are defined as qualification requirements (refer to Criteria C 390). Thermal resistance, compressive resistance, flexural strength, water vapor permeance, water absorption, dimensional stability, and oxygen index shall be in accordance with Table 1.

7.2.2 The mean thermal resistance of the material tested shall not be less than the minimum value identified in Table 1. The thermal resistances of individual specimens tested shall not be less than 90 % of the minimum value identified in Table 1.

7.2.3 Compliance with qualification requirements shall be in accordance with Criteria C 390.

7.3 Table 1 describes types of RCPS thermal insulation. However, it does not cover all available products on the market. The values stated in Table 1 should not be used as design values. It is the buyer's responsibility to specify design requirements and obtain supporting documentation from the material supplier.

7.4 *Combustibility Characteristics*—RCPS thermal insulation is an organic material and is, therefore, combustible. It should not be exposed to flames or other ignition sources. The values obtained by the oxygen index test (see Table 1 and 11.10) do not necessarily indicate or describe the fire risk of the materials and are used in this specification primarily to distinguish between insulations formulated with flame retardants and those not so formulated.

8. *Dimensions and Permissible Variations*

8.1 The materials covered by this specification are commonly available in the sizes shown in Table 2. Other sizes may be agreed upon between the supplier and the user.

8.2 *Dimensional Tolerances*—Unless otherwise specified, the length tolerance shall not exceed ± 0.03 in./ft (± 2.5 mm/m) of length; the width tolerance shall not exceed ± 0.06 in./ft (± 5.0 mm/m) of width; and the thickness tolerance shall not exceed ± 0.06 in./in. (± 59.5 mm/m) of thickness. For products less than 1.00 in. (25.4 mm) in thickness, the thickness tolerance shall not exceed ± 0.06 in. (1.5 mm).

8.3 *Edge Trueness*—Unless otherwise specified, RCPS thermal insulation shall be furnished with true edges. Edges shall not deviate more than 0.03 in./ft (2.5 mm/m) of length or width.

8.4 *Face Trueness*—RCPS thermal insulation shall not deviate from absolute trueness by more than 0.03 in./ft (2.5 mm/m) of length or width.

8.5 *Squareness*—RCPS thermal insulation shall not deviate from squareness by more than 0.06 in./ft (5.0 mm/m) of length or width.

8.6 *Ship-Lap and Tongue-and-Groove Edges*—When specified, RCPS thermal insulation shall be furnished with either ship-lap or tongue-and-groove edges.

8.6.1 For RCPS thermal insulation manufactured with

ship-lap edges, the depth of the ship-lap cut shall be one half the board thickness $+0.06, -0$ in. ($+1.5, -0$ mm). The minimum width of the cut for RCPS thermal insulation of 1.00-in. (25.4-mm) thickness or greater shall be 0.50 ± 0.06 in. (12.7 ± 1.5 mm). For RCPS thermal insulation less than 1.00 in. (25.4 mm) in thickness, the minimum width of the cut shall be 0.25 ± 0.06 in. (6.4 ± 1.5 mm). The ship-lap cut shall be made on opposite faces of the board for both length and width. The resulting joint shall be smooth and uniform.

8.6.2 For RCPS thermal insulation manufactured with tongue-and-groove edges, the tongue of one shall fit snugly into the groove of a second. The resulting joint shall be smooth and uniform.

9. *Workmanship, Finish, and Appearance*

9.1 *Defects*—RCPS thermal insulation shall have no defects that will adversely affect its service qualities. RCPS thermal insulation shall be of uniform texture and free of foreign inclusions, broken edges and corners, slits, and objectionable odors.

9.2 *Crushing and Depressions*—RCPS thermal insulation shall have no crushed or depressed areas on any surface exceeding 0.13 in. (3.3 mm) in depth on more than 10 % of the total surface area.

9.3 The total number of voids on the board surface shall not exceed an average of 1 per square foot with dimensions larger than 0.13 by 0.13 by 0.13 in. (3.3 by 3.3 by 3.3 mm).

10. *Sampling*

10.1 Unless otherwise specified in the purchase order or contract, the material shall be sampled in accordance with Criteria C 390.

11. *Test Methods*

11.1 *Conditioning and Aging:*

11.1.1 Samples shall be conditioned as required by the test method to either preconditioned moisture equilibrium or conditioned moisture equilibrium, using procedures defined by Practice C 870. Samples shall be held at equilibrium conditions until they are transferred into the testing equipment. Samples to be used for density test, dimensional stability test, and water vapor transmission test shall be conditioned at $73.4 \pm 4^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$) and $50 \pm 5\%$ relative humidity for a minimum of 40 h prior to the start of tests. Samples to be used for the compressive resistance test, oxygen index test, water absorption test, flexural strength test, and thermal resistance test shall be conditioned as specified in the applicable test procedure.

11.1.2 RCPS thermal insulations that incorporate a blowing agent other than air or pentane shall be aged for either 90 days at $140 \pm 2^\circ\text{F}$ ($60 \pm 1^\circ\text{C}$) or six months at ambient conditions prior to conditioning and thermal resistance testing. Air circulation shall be provided so that all surfaces of the insulation are exposed to the surrounding environmental conditions.

11.1.3 Where boards are tested with skins-in-place, this condition shall be noted in the test report.

11.2 *Dimensions and Density*—Test in accordance with Test Method C 303 or Test Method D 1622.

11.3 *Trueness and Squareness*—Test in accordance with Practice C 550.

11.4 *Thermal Resistance*—Test in accordance with Test Methods C 177, C 236, C 518, C 976, C 1114, or C 1045. Tests shall be conducted with a temperature differential of $50 \pm 2^\circ\text{F}$ ($28 \pm 1^\circ\text{C}$). In case of dispute, Test Method C 177 shall be the referee method.

11.4.1 See Practice C 1058.

11.5 *Compressive Resistance*—Test in accordance with Test Method C 165, Procedure A, at a crosshead speed of 0.1 in./min/in. of thickness (100 mm/min/m) at yield or 10 % deformation, whichever occurs first (with skins intact), or test in accordance with Test Method D 1621.

11.6 *Flexural Strength*—Test in accordance with Test Methods C 203, Method I, Procedure A. All test specimens shall be 1.00 ± 0.06 in. (25.4 ± 1.5 mm) or less in thickness. For samples less than or equal to 1.00 ± 0.06 in. in thickness (Note 2), cut test specimens from samples keeping both original major surfaces intact. If skins are present on only one major surface, test specimens with that surface in tension. For samples of greater thickness, trim test specimens to 1.00 ± 0.06 in. thickness retaining one original major surface. Specimens shall be tested with the original major surface in tension. For anisotropic products run the tests for both the length and cross directions of the sample. Report the average of these two series of tests as the value for flexural strength.

11.6.1 Specimens less than 1.00 ± 0.06 in. (25.4 ± 1.5 mm) in thickness may continue to flex without specimen failure (break). In such cases, flexural strength testing shall be performed using thicker specimens and the thickness shall be noted in the test report.

11.7 *Water Vapor Permeance*—Test in accordance with Test Methods E 96, using anhydrous calcium chloride as the desiccant at $73.4 \pm 4^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$).

11.8 *Water Absorption*—Test in accordance with Test Method C 272. The immersion time shall be 24 h and the test specimens shall be 12 by 12 by 1 in. (305 by 305 by 25 mm).

11.9 *Dimensional Stability*—Test in accordance with Test Method D 2126 for 7 days (168 h) using the following conditions:

Temperature, °F (°C)	Relative Humidity, %
158 ± 4 (70 ± 2)	97 ± 3
-40 ± 6 (-40 ± 3)	ambient

11.10 *Oxygen Index*—Test in accordance with Test Method D 2863.

12. Inspection

12.1 Unless otherwise specified, Criteria C 390 shall govern the inspection of material for conformance to inspection requirements. Exceptions to these requirements shall be stated in the purchase contract.

13. Rejection and Rehearing

13.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of any test, the producer shall have the right to reinspect the rejected shipment and resubmit the lot after removal of that portion not conforming to requirements.

14. Certification

14.1 Unless otherwise specified in the purchase order or contract, Criteria C 390 shall be the basis for the certification. When specified in the purchase order or contract, a report of the test results shall be furnished.

15. Product Marking

15.1 The following shall be marked on each shipping container, bundle, or board:

15.1.1 Insulation specification number,

15.1.2 Type,

15.1.3 Manufacturer's name or trademark, and

15.1.4 *R*-value.

15.1.5 Instructions governing the *R*-value at 75°F (23.9°C) mean temperature for the thermal insulation thickness supplied, as follows: *R* means the resistance to heat flow; the higher the value, the greater the insulation power. This insulation must be installed properly to get the marked *R*-value. Follow the manufacturer's instructions carefully. If a manufacturer's fact sheet is not provided with the material shipment, request this and review it carefully.

16. Keywords

16.1 block/board; cellular polystyrene; foam plastic; polystyrene; RCPS; rigid cellular polystyrene; thermal insulation

APPENDIX

Nonmandatory Information

XI. END-USE CONSIDERATIONS

X1.1 Combustibility Characteristics

X1.1.1 The fire performance of the material should be addressed through standard end-use fire test methods established by the appropriate governing documents.

X1.2 Test Method E 84/UBC Standard No. 8-1/UL 723

X1.2.1 These tests do not define the hazard that may be presented by RCPS thermal insulation under actual fire conditions. It is retained for reference in this specification as laboratory test data required by some building codes.

X1.3 Water Vapor Transmission

X1.3.1 Most thermal insulations function where there is both a temperature and moisture vapor pressure differential across the insulation. The water vapor permeability of RCPS thermal insulation may be a significant element to be considered when developing the specification for the vapor retarder component of the thermal package for a specific end use condition.

X1.4 Water Absorption

X1.4.1 This characteristic may have significance when this specification is used to purchase material for end uses requiring extended exposure to water. The water absorption of thermal insulations is an important property to the degree that significant content can degrade thermal performance.

X1.5 Freeze/Thaw Exposure

X1.5.1 RCPS insulating boardstock is sometimes used in applications that may subject the insulation to various types of freeze/thaw exposure conditions. These conditions may vary significantly in service. Exposure conditions to be considered include actual temperatures, liquid water availability, and freeze/thaw cycle frequency and duration. Boardstock integrity, as well as thermal/physical property retention may be affected by actual end-use conditions. Consult the manufacturer for specific product, insulation system, and application recommendations.

X1.6 Specification C 578/HH-I-524C Cross Reference

X1.6.1 Federal Specification HH-I-524C was cancelled on Jan. 17, 1985. For the convenience of specifiers who may have contracts written in terms of HH-I-524C, the following is a cross-reference table. The letters NA indicate that the type designation has been deleted because products meeting the requirements are no longer available.

HH-I-524C Type Designation	Specification C 578 Type Designation
I	I
II	II
III	NA
IV	IV
V	V

X1.6.2 Additional type designations have been established since the cancellation of HH-I-524C to better define the variety of RCPS thermal insulations available.

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.



ICBO Evaluation Service, Inc.

5360 WORKMAN MILL ROAD • WHITTIER, CALIFORNIA 90601-2299

A subsidiary corporation of the International Conference of Building Officials

EVALUATION REPORT

Copyright © 1996 ICBO Evaluation Service, Inc.

Report No. 3414
Reissued April 1, 1998

Filing Category: INSULATION (12B)

INSULFOAM EXPANDED POLYSTYRENE INSULATION

PREMIER INDUSTRIES, INC./dba INSULFOAM
1819 PACIFIC AVENUE, SUITE 1801
TACOMA, WASHINGTON 98402

I. Subject: Insulfoam Expanded Polystyrene Insulation.

II. Description: A. Insulfoam EPS Types I, II, VIII and IX Boards: Insulfoam EPS is a molded, closed-cell, expanded polystyrene foam plastic in the form of boards and architectural shapes. Densities, thermal resistance (R-value), minimum flexural strength and minimum compressive strength for the different types are shown in Table 1. The maximum thickness for boards is 6 inches. Boards have a maximum flame-spread rating of 25 and a maximum smoke-density rating of 450 as determined by U.B.C. Standard 8-1.

B. Insulfoam EIFS Grade (IEG) Board: These boards are Type I with a minimum density of 0.90 pcf and are used as a component in exterior insulation and finish systems (EIFS). Other properties are similar to EPS Type I, with more restrictive requirements for conditioning, product dimensions, marking and packaging.

C. Uses: Insulfoam EPS is used as a general, nonstructural, thermal insulation material (i.e., walls (exterior and cavities), roofs, panels (sandwich or structural), door cavities, perimeter of foundations and basements (outside or inside)). The interior of the building must be protected by a thermal barrier as required by Section 2602.4 of the code.

D. Special Use: Insulfoam Type I EPS boards may be used on walls of crawl spaces without covering provided all of the following conditions are met:

1. Entry to the crawl space is only to service utilities.
2. There are no interconnected basement areas.
3. Air in the crawl space is not circulated to other parts of the building.
4. Boards do not exceed 3 inches in thickness.
5. Ventilation complying with Section 2317.7 of the code is provided.

6. Boards used in crawl spaces are limited to those manufactured from BASF Styropor expandable polystyrene BF grade beads and labeled as shown in Figure 1.

E. Board Production: The boards and architectural shapes are produced at the Western Insulfoam plants following the Premier Industries, Inc./Western Insulfoam Quality Control Program. Quarterly, unannounced inspections are conducted by Underwriters Laboratories Inc. (NER-UA403).

F. Identification: Examples of marking for the six types of boards are shown in Figure 1. A certificate noting the material type, manufacturer's name, plant identification number, project name, project location, UL label, surface-burning characteristics and physical characteristics of the EPS board is issued to the owner of the project.

III. Evidence Submitted: Data submitted in accordance with the ICBO ES Acceptance Criteria for Foam Plastic Insulation dated January 1996.

Findings

IV. Findings: That the Insulfoam Expanded Polystyrene Insulation manufactured by Western Insulfoam under PII's/1's quality control program complies with Section 2602 of the 1994 Uniform Building CodeSM, subject to the following conditions:

1. Insulation boards are limited to nonstructural applications with other materials used to brace walls and resist horizontal forces.
2. Insulation boards are separated from the interior of the building with a thermal barrier complying with Section 2602 of the code, such as minimum 1/2-inch-thick gypsum wallboard installed in accordance with Chapter 25 of the code.
3. Insulation boards are manufactured at the Western Insulfoam facilities listed in Table 2 with quality control inspections by Underwriters Laboratories Inc.

This report is subject to re-examination in two years.

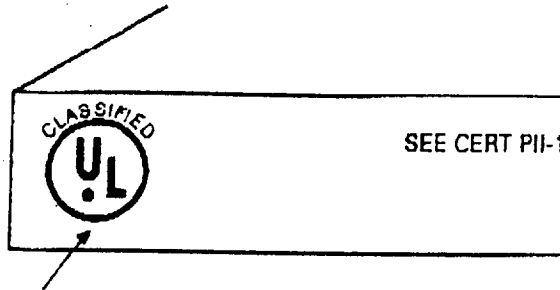
Evaluation reports of ICBO Evaluation Service, Inc., are issued solely to provide information to Class A members of ICBO, utilizing the code upon which the report is based. Evaluation reports are not to be construed as representing aesthetics or any other attributes not specifically addressed nor as an endorsement or recommendation for use of the subject report.

This report is based upon independent tests or other technical data submitted by the applicant. The ICBO Evaluation Service, Inc., technical staff has reviewed the test results and/or other data, but does not possess test facilities to make an independent verification. There is no warranty by ICBO Evaluation Service, Inc., express or implied, as to any "Finding" or other matter in the report or as to any product covered by the report. This disclaimer includes, but is not limited to, merchantability.

ALL INSULFOAM PLANTS PRODUCING TYPE I EPS BOARDS WILL DISPLAY THE FOLLOWING ON EACH BOARD.

SHORT EDGE OF BOARD:

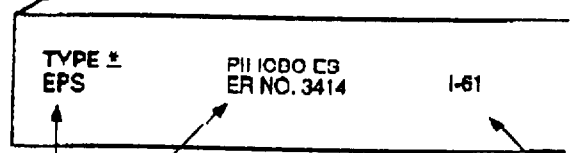
PII'S QA AGENCY



LONG EDGE OF TYPE I:

MEETS MINIMUM STANDARDS OF ASTM C 578-87A FOR TYPES I, II, VIII, OR IX—VARIES WITH PRODUCTS BEING PRODUCED

LONG EDGE OF BOARD:



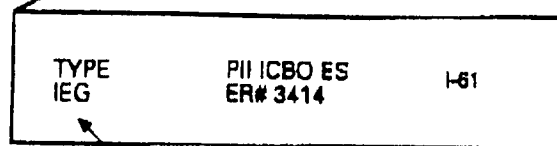
PLANT IDENTIFICATION NUMBERS (I-41, I-42 AND I-61 THROUGH I-67 FOR I PLANTS)

PII EVALUATION REPORT NUMBER

LONG EDGE OF TYPE IEG:

MEETS MINIMUM STANDARDS OF ASTM C 578-87A FOR TYPE I EPS

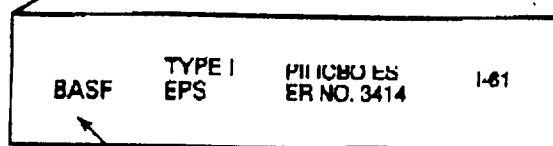
LONG EDGE OF BOARD:



LONG EDGE OF TYPE I FOR CRAWL SPACES:

MANUFACTURED FROM BASF STYROPOR EPS BEADS

LONG EDGE OF BOARD:



PII - PREMIER INDUSTRIES, INC.
I - INSULFOAM

FIGURE 1—MARKING