

## Proposed Language: Underline/Strikeout Version

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### DEPARTMENT OF CONSUMER AFFAIRS

Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation

#### Article 3. Standards for Insulating Material APPLICATION AND SCOPE

##### Sec. 12-13-1551.

(a) This article establishes standards governing the quality of insulation materials sold ~~within the state after September 22, 1981~~, including those properties which affect the safety and thermal performance of insulation materials during application and in ~~the use~~ their intended use.

(b) The provisions of this article shall apply ~~only to the following types of~~ insulating material sold or installed within California.:

1. ~~Aluminum foil (reflective foil);~~
2. ~~Cellular glass (board form);~~
3. ~~Cellulose fiber (loose fill and spray applied);~~
4. ~~Mineral aggregate (board form);~~
5. ~~Mineral fiber (blankets, board form, loose fill);~~
6. ~~Perlite (loose fill);~~
7. ~~Polystyrene (board form, molded and extruded);~~
8. ~~Polyurethane (board form and field applied);~~
9. ~~Polyisocyanurate (board form and field applied);~~
10. ~~Urea formaldehyde foam (field applied);~~
11. ~~Vermiculite (loose fill).~~

(c) ~~The provisions of this article shall apply to the sale of insulating material within the state. The provisions of this article shall not apply to insulating material manufactured in California, but sold at wholesale for delivery outside the state, nor to insulating material manufactured outside California and sold wholesale in California for final retail sale outside the state. For the purpose of this article, the sale of a building or an appliance which contains installed insulating material is not considered the sale of the insulating material.~~

(c) Insulating material shall not be sold in California unless it is certified by the Bureau. For any insulating material not specifically identified in this article, where challenges of testing values have been submitted to the Bureau or are initiated by the Bureau, the Bureau, in consultation with the California Energy Commission, may certify the

insulating material by applying testing and rating provisions similar to those defined in section 12-13-1553 as it deems most appropriate on a case by case basis.

~~(d) Any type of insulating material not listed in subsection (b) may be sold within California notwithstanding any other provision of this article.~~

(d) All insulating material subject to this article shall also meet California's Energy Efficiency Standards for Residential and Nonresidential Buildings, Title 24, Part 6, and Appliance Efficiency Regulations, Title 20, California Code of Regulations.

**Authority:** Sections ~~25920 and 25922~~, Public Resources Code 19034 and 19164, Business and Professions Code.

**Reference:** Sections ~~25910, 25920, 25921 and 25922~~, Public Resources Code 19070, 19073, 19164 and 19165 Business and Professions Code.

## DEFINITIONS

### **Sec. 12-13-1552.**

Terms, phrases, words and their derivatives shall be defined as specified in this section. Terms, phrases, words and their derivatives not found in Section 12-13-1552 shall be defined as specified in Title 24, Part 2, Chapter 2 of the California Code of Regulations. Unless the context requires otherwise, any undefined term shall have its ordinary meaning. For purposes of this article, the following definitions shall apply:

“**Aerogel**” — a porous structure characterized by continuous, interconnected pores that have an average pore size below the mean free path of air molecules at standard atmospheric pressure and temperature.

“**Apparent thermal conductivity**” — a thermal conductivity assigned to a material the exhibits thermal transmission by several modes of heat transfer resulting in property variation with specimen thickness, or surface emissivity.

“**Approved**” — acceptable to the Bureau.

(a) “**Approved laboratory**” means — any testing facility including a facility owned or operated by a manufacturer which has been approved pursuant to Section 1554 of this **article**.

“**Approved product evaluation agency**” — an established and recognized agency regularly engaged in conducting product evaluations when such agency has been approved.

~~(b) “**ANSI**” means the American National Standards Institute.~~

~~(c) “**ASTM**” means — the ASTM International.~~

“ASHRAE” — American Society of Heating, Refrigerating and Air-Conditioning Engineers.

“Blackbody” — the ideal, perfect emitter and absorber of thermal radiation. It emits thermal radiation energy at each wavelength at the maximum rate possible as a consequence of its temperature, and absorbs all incident radiance.

“Batt” or “batting” — blanket insulation manufactured to dimensions as required by a specific application.

“Blanket” — a flexible insulation product, supplied rolled or flat.

“Block insulation” — rigid insulation preformed into rectangular units.

“Board insulation” — semi-rigid insulation preformed into rectangular units having a degree of flexibility particularly related to their geometrical dimensions.

“Bureau” — the Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation.

“Building insulation” — insulation materials used in walls, ceilings, roofs and floors of buildings.

(d) “Building materials” means — insulation materials used in walls, ceilings, roofs and floors of buildings.

“Calcium silicate” — insulation composed principally of hydrous calcium silicate, and which usually contains reinforcing fibers.

“Calcium silicate board” — an insulation board composed of hydrated calcium silicate with natural or manmade fibers or fillers, or a combination thereof.

“CalGreen” — the 2016 California Green Building Code.

“CBC” — the 2016 California Building Code.

“Cellular glass” — insulation composed of glass processed to form rigid foam having a predominantly closed-cell structure.

“Cellular glass board” — an insulation board composed of glass which has been foamed or cellulated under molten conditions, annealed and set to form a rigid material with hermetically sealed cells.

“Cellular polyolefin” — a cellular plastic composed primarily of olefin material, processed to form a flexible foam with a closed cell construction.

“Cellulosic fiber” — insulation composed principally of cellulose fibers usually derived from paper, paperboard stock, or wood, with or without binders.

“Cement bonded wood fiber” — a composite material consisting of cellulosic fiber or wood waste combined with Portland cement.

“Ceramic fiber batting” — a batting whose basic material is a lightweight, efficient high temperature alumina-silica insulation that offers stability at elevated temperatures with high resistance to thermal shock

“Ceramic fiber board” — an insulation board composed of lightweight, efficient high temperature alumina-silica insulation that offers stability at elevated temperatures with high resistance to thermal shock.

“Cotton batting” — a batting whose basic material is an unfaced batt insulation consisting of a blend of recycled-cotton and polyester fibers.

“CMC” — the 2016 California Mechanical Code.

“Design density” — a density at which the properties of the insulation are determined.

“Duct board” — a rigid or semi-rigid board which has a composition that permits precise cutting and abutment to create tight fitting corners. Duct board typically has an aluminum foiled facings and has flame retardant as well as thermal and acoustical insulating properties.

“Duct liner” — a liner that is used either as an air barrier inside of a flex-duct or is used as a thermal and acoustical insulation on the inside of sheet metal ductwork.

“Duct system” — a system that provides either collectively or individually heating, ventilating, or cooling within or associated with conditioned spaces in a building. Components include all air-distribution system ducts and plenums.

“Duct wrap” — a flexible, resilient blanket which is applied to the exterior of sheet metal ducts. It may be easily cut and fitted to achieve a neat, thermally effective exterior insulation blanket over rectangular, round, oval or irregularly shaped duct surfaces.

“Elastomeric sheet” — a cellular elastomeric foam composed of a closed-cell foam made of natural or synthetic rubber, or a mixture of the two, and containing other polymers, other chemicals, or both, which is permitted to be modified by organic or inorganic additives.

(e) **“Exposed application”** means — any interior application of the product in which it is not used in a construction assembly imposing a material which meets the requirements of Chapter 8 of the *California Building Code* CBC in substantial contact with the facing or membrane surface.

(f) **“Installed design density”** means the proven density for loose fill insulation other than cellulose which has been determined by the manufacturer to constitute the density whereby settlement of no more than 2 percent shall occur over the first three years, or no more than 4 percent over the first 15 years of installation.

**“Facing”** — a protective or decorative (or both) surface applied as the outermost layer of an insulation system.

**“Field applied”** — a blown or spray-applied insulation product applied at the final work site.

**“Flexible air duct”** — an air duct typically consisting of the following; (A) a round flexible core duct made of corrugated aluminum or flexible plastic/fabric over a metal wire coil; (B) a layer of fiberglass insulation that covers the core duct, and (C) a thin plastic/metalized layer that protects the insulation.

**“Framed assembly”** — one or more building components added in layers within or onto standard wood or metal framing members to create a finished wall, roof/ceiling, or floor.

**“Framing percent”** — the amount of surface area (expressed as percentage) of wood or metal framing making up a typical exterior wall, roof/ceiling, or floor assembly.

**“ICC-ES”** — the ICC Evaluation Service, Inc.

**“Insulating concrete forms”** — concrete forming systems that use stay-in-place panels made from a variety of insulating materials for constructing cast-in-place solid concrete systems.

**“Insulated panels”** — a construction that uses:

a) Liquid polyurethane, polyisocyanurate or phenolic foam applied between metal or plastic skins in individual molds; or

b) Rigid foamed polystyrene, polyisocyanurate or phenolic sheets to which metal skins are adhered.

(g) **“Insulating material,” “Insulation material” or “insulation”** means any — those materials listed defined in §section 19019 of the California Business and Professions Code and includes low emittance materials 1551 (b) of this article and placed within or contiguous to a wall, ceiling, roof or floor of a room or building, or contiguous to the surface of any appliance or its intake or outtake mechanism, for the purpose of reducing heat transfer or reducing adverse temperature fluctuations of the building room or appliance.

**“Insulation system”** — an entire assembly of individual components making up a wall, ceiling, roof, or floor for the purpose of reducing heat transfer or reducing adverse

temperature fluctuations of the building. The overall heat transfer is expressed as U-FACTOR.

“ISO” — the International Organization for Standardization.

“Long-Term Thermal Resistance (LTTR)” — the predicted long-term resistance of a fifteen-year time weighted average value for the passage of heat in (h-ft.2-°F)/Btu of an unfaced or permeably faced closed-cell foam insulation specimen obtained by reducing the specimen thickness to accelerate aging under controlled laboratory conditions.

“Loose-fill cellulose” — an insulation for which the basic material consists of virgin or recycled wood-based cellulosic fiber that may be made from re-lated paper or paperboard stock.

“Loose-fill mineral fiber (rock, slag, glass)” — insulation made from mineral substances such as rock, slag or glass processed from a molten state into fibrous form.

“Loose-fill perlite” — an insulation produced by the expanding of natural perlite or by heating.

“Loose-fill vermiculite” — an insulation produced by the expanding or exfoliating of natural vermiculate or by grading and heating.

“Loose-fill wool” — an insulation made from sheep’s wool.

“Loose-fill polyester” — an insulation made from 100% recycled polyester.

(h) “Manufacturer” means — any person or entity that meets the definition for “insulation manufacturer” contained in section 19022 of the California Business and Professions Code, who either:

1. Produces insulating material in the final composition either for use in the form sold or to be further dimensionally modified; or
  2. In the case of polyurethane, polyisocyanurate and urea formaldehyde foam formed at the installation site, produces the primary components of the material.
- “Manufacturer” shall not include any building contractor or any other person whose sole activity is to install insulation at the installation site.

“Mass insulation” — an insulating material that fills a space with fibrous or particulate material to reduce heat transfer into or out of a building, including, but not limited to, cellulose, fiberglass, rock wool, polystyrene, urethane foam, wool and vermiculite.

“Material R-value” — an R-value associated with a material.

“Melamine foam” — low-density, semi-rigid, open-cell foam made from a melamine-formaldehyde or aldehyde polymer.

**“Mineral aggregate board”** — an insulation board that is mineral in nature, crushed, dried, and graded to the proper particle size and expanded by the application of heat to form a spherical, cellular type of aggregate.

**“Mineral fiber (rock, slag, glass)”** — fibers made from mineral substances such as rock, slag or glass processed from a molten state into fibrous form.

**“Mineral fiber board (rock, slag, glass)”** — an insulation board that is made from mineral substances such as rock, slag or glass processed from a molten state into a fibrous form.

**“Mutual recognition arrangement (MRA)”** — an agreement between the National Voluntary Laboratory Accreditation Program (NVLAP) and the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and the Inter American Accreditation Cooperation (IAAC) to allow the acceptance of calibration and/or test results within the respective scopes of accreditation for laboratories accredited by any of the MRA signatory partners.

**“Neoprene foam”** — synthetic rubber foam produced by polymerization of chloroprene.

**“Other insulation”** — insulation not specifically covered by this section.

**“Phenolic board”** — an insulation board made from a rigid cellular foam insulation material with a substantially closed cell structure, whose polymer structure is made primarily from the poly-condensation of phenol, its homologues and/or derivatives with aldehydes and ketones.

**“Polyester batting”** — unfaced batt insulation consisting of polyester fibers that may be treated to resist flame and smoke development and inhibit mold, mildew, bacteria and fungi growth.

**“Polyimide board”** — an insulation board that is a cellular product in which the bonds formed between monomers during polymerization are imide or amide bonds.

**“Polyurethane or Polyisocyanurate foam”** — foam insulation based on the reaction of diphenylmethane diisocyanate (MDI) with a polyol resin.

**“Polyurethane board”** — an insulation board the manufacture of which shall be based on the reaction of MDI with a polyol resin, and includes laminated composite boards.

**“Polyisocyanurate block or board”** — an insulation board the manufacture of which shall be based on the reaction of MDI with itself and with a polyol resin.

**“Polystyrene board”** — an insulation board formed by the expansion of polystyrene resin beads by molding the insulation board resulting in expanded polystyrene foam

(EPS boards), or formed by the expansion of polystyrene resin by an extrusion process resulting in a closed, multicellular structured board (extruded polystyrene XPS or XPS).

(i) “Quality assurance program.” (Reserved) — a system of procedures as defined in section 19021 of the California Business and Professions Code.

“Radiant barrier” — a highly reflective, low emitting material with an emissivity of 0.05 or less facing a ventilated space.

(j) “Recommended wall density” means — the density used for pressure fill retrofit wall applications to prevent settling.

“Reflective insulation” — thermal insulation consisting of one or more low emittance surfaces, bounding one or more enclosed air spaces.

(k) “Representative sample” means — a sample of insulating material with the same characteristics (other than thickness) as the entire batch of insulating material produced and using the same facing imposed on the insulating material manufactured for final use.

(l) “Representative thickness” means — a thickness of insulating material at which the change in thermal performance per inch unit thickness will vary no more than plus or minus 2 percent with increases in thickness.

“R-value” — a measure of thermal resistance of material or composite materials as defined in section 19020 of the Business and Professions Code.

“Specific heat capacity” — the quantity of heat that must be added to a unit mass of a material to increase its temperature by one degree. Typical units are Btu/°F-lb.

“Settled density” — the mass per unit volume of a loose-fill insulation after which time or forces, or both, have exerted their effect upon thickness.

“Spray-applied cellulose” — loose-fill cellulose mixed with an adhesive and installed pneumatically in closed cavities or exposed surfaces.

“Spray-applied foam” — insulation based on the reaction of an organic chemical (A side) with a polyol resin (B side), the sides of which are mixed and sprayed directly to the substrate to be insulated (two component spray insulation) or pre-mixed and supplied as a one component system prior to being spray applied to the substrate to be insulated.

“Spray-applied mineral fiber” — loose-fill mineral fiber mixed with an adhesive and installed pneumatically in closed cavities or exposed surfaces.



**“Spray polyurethane foam”** — insulation based on the reaction of an organic polyisocyanate (A side) with a polyol resin (B side), the sides of which are mixed and sprayed directly to the substrate to be insulated (two component spray insulation) or pre-mixed and supplied as a one component system prior to being spray applied to the substrate to be insulated.

**“Structurally insulated panels (SIPS)”** — a construction system that consists of block or board insulation, or spray-applied foam insulation sandwiched between two structural facings.

**“Structural insulated sheathing (SIS)”** — a construction system that consists of rigid foam insulation faced on one side with a material that provides bracing or other lateral structural support. The facing may be organic or inorganic material.

**“System R-value”** — an R-value associated with a system or construction of materials.

(m) **“TAPPI”** means — the Technical Association of Pulp and Paper Industry.

**“Thermal conductance (C-Value)”** — the quantity of heat that will flow through a unit area of a unit area of a material or construction per hour when the temperature difference between the body surfaces is one degree.

**“Thermal conductivity (k-Value)”** — the quantity of heat that will flow through a unit area of a homogeneous material per hour when the temperature difference through the material is one degree.

**“Thermal emittance”** — the ratio of the radiant heat flux emitted by a sample to that emitted by a blackbody radiator at the same temperature.

(n) **“Thermal performance”** means — the tested apparent thermal conductivity, thermal conductance, U-factor, design density or thermal resistance (R-value), as appropriate, of an insulating material.

**“Thermal resistance (R-value)”** — the resistance of a material or building component to the passage of heat in  $(h \cdot ft^2 \cdot ^\circ F) / Btu$ .

**“TITLE 24”** — all of the building standards and associated administrative regulations published in Title 24 of the California Code of Regulations.

**“U-FACTOR”** — the overall coefficient of thermal transmittance of a construction assembly, in  $Btu / (h \cdot ft^2 \cdot ^\circ F)$ , including air film resistance at both surfaces.

(o) **“Urea formaldehyde foam”** means — a cellular plastic insulation material generated in a continuous stream by mixing the components which are a urea formaldehyde resin, air and a foaming agent.

“Vacuum panel” — a vacuum insulation panel (VIP) consisting of a special core panel enclosed in a gas-tight envelope, to which a vacuum is applied.

“Vapor Retarder Class” — a measure of the ability of a material or assembly to limit the amount of moisture that passes through the material or assembly.

“Water vapor retarder” — a material or system that significantly impedes the transmission of water vapor under specified conditions.

“Wool batting” — sheep wool fibers garneted into blanket or batt form, and may contain polyester fiber and/or a latex coating for strength and to resist vermin.

Authority: Sections 25920 and 25922, Public Resources Code Section 19164, Business and Professions Code.

Reference: Sections 25915 (a), 25920, 25921 and 25922, Public Resources Code 19018, 19019, 19020, 19021, 19022, 19034, 19164, and 19165, Business and Professions Code.

## **REFERENCED TEST AND MATERIAL STANDARDS**

Sec. 12-13-1552.10. The testing procedures and material standards specified in this article are listed in this section.

“ASTM C 167” — ASTM document entitled “Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations.” (ASTM C 167-09)

“ASTM C 177” — ASTM document entitled “Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.” (ASTM C 177-13)

“ASTM C 272” — ASTM document entitled “Standard Test Method for Water Absorption of Materials for Structural Sandwich Constructions,” [ASTM C 272/C272M-12]

“ASTM C 302” — ASTM document entitled “Standard Test Method for Density and Dimensions of Preformed Pipe-Covering-Type Thermal Insulation.” [ASTM C 302-13]

“ASTM C 303” — ASTM document entitled “Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.” (ASTM C 303-10)

“ASTM C 335” — ASTM document entitled “Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation,” (ASTM C 335/C 335M-10e1)

“ASTM C 516” — ASTM document entitled “Standard Specification for Vermiculite Loose Fill Thermal Insulation.” [ASTM C 516-08 (2013)e1]

“ASTM C 518” — ASTM document entitled “Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.” (ASTM C 518-10)

“ASTM C 520” — ASTM document entitled “Standard Test Methods for Density of Granular Loose Fill Insulations.” [ASTM C 520-04 (2010)]

“ASTM C 533” — ASTM document entitled “Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.” (ASTM C 533-13)

“ASTM C 534” — ASTM document entitled “Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.” (ASTM C 534/C 534M-14)

“ASTM C 547” — ASTM document entitled “Standard Specification for Mineral Fiber Pipe Insulation.” (ASTM C 547-15)

“ASTM C 549” — ASTM document entitled “Standard Specification for Perlite Loose Fill Insulation.” (ASTM C 549-06(2012))

“ASTM C 552” — ASTM document entitled “Standard Specification for Cellular Glass Thermal Insulation.” (ASTM C 552-15)

“ASTM C 553” — ASTM document entitled “Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.” (ASTM C 553-13)

“ASTM C 567” — ASTM document entitled “Standard Test Method for Determining Density of Structural Lightweight Concrete.” (ASTM C 567/C567M-14)

“ASTM C 578” — ASTM document entitled “Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.” (ASTM C 578-15)

“ASTM C 591” — ASTM document entitled “Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.” (ASTM C 591-15)

“ASTM C 592” — ASTM document entitled “Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type.)” (ASTM C 592-13)

“ASTM C 610” — ASTM document entitled “Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation.” (ASTM C 610-15)

“ASTM C 656” — ASTM document entitled “Standard Specification for Structural Insulating Board, Calcium Silicate.” [ASTM C 656-07(2013)]

“ASTM C 665” — ASTM document entitled “Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufacture Housing.” (ASTM C 665-12)

“ASTM C 687” — ASTM document entitled “Standard Practice for Determination of Thermal Resistance of Loose-Fill Building Insulation.” (ASTM C 687-12)

“ASTM C 726” — ASTM document entitled “Standard Specification for Mineral Fiber Roof Insulation Board.” (ASTM C 726-12)

“ASTM C 739” — ASTM document entitled “Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation.” (ASTM C 739-11)

“ASTM C 764” — ASTM document entitled “Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation.” (ASTM C 764-11)

“ASTM C 1014” — ASTM document entitled “Standard Specification for Spray-Applied Mineral Fiber Thermal and Sound Absorbing Insulation.” [ASTM C 1014-08(2013)]

“ASTM C 1029” — ASTM document entitled “Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.” (ASTM C 1029-13)

“ASTM C 1045” — ASTM document entitled “Standard Practice for Calculating Thermal Transmission Properties under Steady-State Conditions.” [ASTM C 1045-07(2013)]

“ASTM C 1071” — ASTM document entitled “Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).” (ASTM C 1071-12)

“ASTM C 1104” — ASTM document entitled “Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.” (ASTM C 1104 / C1104M-13a)

“ASTM C 1114” — ASTM document entitled “Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus.” [ASTM C 1114-06(2013)]

“ASTM C 1126” — ASTM document entitled “Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.” (ASTM C 1126-15)

“ASTM C 1149” — ASTM document entitled “Standard Specification for Self-Supported Spray Applied Cellulosic Thermal Insulation.” (ASTM C 1149-11)

“ASTM C 1224” — ASTM document entitled “Standard Specification for Reflective Insulation for Building Applications.”(ASTM C 1224-11)

“ASTM C 1258” — ASTM document entitled “Standard Test Method for Elevated Temperature and Humidity Resistance of Vapor Retarders for Insulation.”[ASTM C 1258-08(2013)]

“ASTM C 1289” — ASTM document entitled “Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.” (ASTM C 1289-15)

“ASTM C 1290” — ASTM document entitled “Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.” (ASTM C 1290-11)

“ASTM C 1303” — ASTM document entitled “Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation.” (ASTM C 1303/C 1303M-14)

“ASTM C 1304” — ASTM document entitled “Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.” [ASTM C 1304-08(2013)]

“ASTM C 1313” — ASTM document entitled “Standard Specification for Sheet Radiant Barriers for Building Construction Applications.” (ASTM C 1313/C 1313M-13)

“ASTM C 1338” — ASTM document entitled “Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.” (ASTM C 1338-14)

“ASTM C 1363” — ASTM document entitled “Standard Test Method for the Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.” (ASTM C 1363-11)

“ASTM C 1371” — ASTM document entitled “Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.” [ASTM C 1371-15]

“ASTM C 1374” — ASTM document entitled “Standard Test Method for Determination of Installed Thickness of Pneumatically Applied Loose-Fill Building Insulation.” (ASTM C 1374-14)

“ASTM C 1393” — ASTM document entitled “Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks.” (ASTM C 1393-14)

“ASTM C 1410” — ASTM document entitled “Standard Specification for Cellular Melamine Thermal and Sound-Absorbing Insulation.” (ASTM C 1410-14)

“ASTM C 1427” — ASTM document entitled “Standard Specification for Extruded Preformed Flexible Cellular Polyolefin Thermal Insulation in Sheet and Tubular Form.” (ASTM C 1427-13)

“ASTM C 1482” — ASTM document entitled “Standard Specification for Polyimide Flexible Cellular Thermal and Sound Absorbing Insulation.” (ASTM C 1482-12)

“ASTM C 1484” — ASTM document entitled “Standard Specification for Vacuum Insulation Panels.” (ASTM C 1484-10)

“ASTM C 1497” — ASTM document entitled “Standard Specification for Cellulosic Fiber Stabilized Thermal Insulation.” (ASTM C 1497-12)

“ASTM C 1534” — ASTM document entitled “Standard Specification for Flexible Polymeric Foam Sheet Insulation Used as a Thermal and Sound Absorbing Liner for Duct Systems.” (ASTM C 1534-14)

“ASTM C 1594” — ASTM document entitled “Standard Specification for Polyimide Rigid Cellular Thermal Insulation.” (ASTM C 1594-11)

“ASTM C 1617” — ASTM document entitled “Standard Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals.” (ASTM C 1617-15)

“ASTM C 1639” — ASTM document entitled “Standard Specification for Fabrication Of Cellular Glass Pipe And Tubing Insulation.” (ASTM C 1639-10a)

“ASTM C 1668” — ASTM document entitled “Standard Specification for Externally Applied Reflective Insulation Systems on Rigid Duct in Heating, Ventilation, and Air Conditioning (HVAC) Systems.” (ASTM C 1668-13a)

“ASTM C 1728” — ASTM document entitled “Standard Specification for Flexible Aerogel Insulation.” (ASTM C 1728-13)

“ASTM E 84” — ASTM document entitled “Standard Test Method for Surface Burning Characteristics of Building Materials.” (ASTM E 84-15a)

“ASTM E 96” — ASTM document entitled “Standard Test Methods for Water Vapor Transmission of Materials.” (ASTM E 96/E 96M-14)

“ASTM E 283” — ASTM document entitled “Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across The Specimen.” [ASTM E 283-04(2012)]

“ASTM E 408” — ASTM document entitled, “Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.” [ASTM E 408-13]

“ASTM E 1269” — ASTM document entitled “Standard Test Method for Determining Specific Heat Capacity by Differential Scanning Calorimetry.” (ASTM E 1269-11)

“ASTM E 1677” — ASTM document entitled “Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Building Walls.” (ASTM E 1677-11)

“ASTM E 1680” — ASTM document entitled “Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.” (ASTM E 1680-11)

“ASTM E 2178” — ASTM document entitled “Standard Test Method for Air Permeance of Building Materials.” (ASTM E 2178-13)

“ASTM E 2231” — ASTM document entitled “Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics.” (ASTM E 2231-15)

“ASTM E 2357” — ASTM document entitled “Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.” (ASTM E 2357-11)

“ASTM E 2716” — ASTM document entitled “Standard Test Method for Determining Specific Heat Capacity by Sinusoidal Modulated Temperature Differential Scanning Calorimetry.” [ASTM E 2716-09(2014)]

“CAN/ULC S770” — the Underwriters Laboratories of Canada document entitled, “Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams.” (CAN/ULC S770-15)

“ICC-ES AC187” — the ICC-ES document entitled “Acceptance Criteria for Polyester Loose-Fill and Blanket Insulations”. (Revised May 2006)

“ISO 3998” — ISO document entitled “Textiles - Determination of resistance to certain insect pests.”(ISO 3998:1977)

“UL 181” — the Underwriters Laboratories document entitled “Standard for Factory-Made Air Ducts and Air Connectors,” 1996.

“UL 723” — the Underwriters Laboratories document entitled “Standard for Fire Tests of Building Construction and Materials.” (September 2008)

**Authority:** 19164, Business and Professions Code.

**Reference:** Sections 19018,19019,19020,19021, 19022, 19034, 19164, and 19165, Business and Professions Code.

## QUALITY STANDARDS

### **Sec. 12-13-1553. Testing of specimens of insulating material.**

~~The manufacturer shall cause the testing of samples of insulating material for conformity with the quality standards described in this section.~~

(a) **General testing provisions.** In testing any material pursuant to this section, the following general procedures or a report from an approved product evaluation agency providing all relevant sample information shall be used.

1. All tests with the exception of the ~~ANSI/ASTM, E 84-79, or UL 723 tests~~ shall be conducted using representative samples at the representative thickness of the insulation, except that when the final use of an insulating material entails a thickness less than the representative thickness, then the insulating material will be tested at the lesser thickness.

2. Where uniformity of product ensures consistency of test results across a product grouping, test results for one may be used for certification of other products within that product group. The manufacturer shall provide ~~sufficient~~ documentation to ~~establish a valid basis for applying~~ demonstrate uniformity of product in order to apply a particular test result to other products within the group.

~~The Executive Director Bureau shall determine on a case by case basis whether a valid basis exists for grouping products for testing pursuant to this subsection. If it is the Bureau determines that a valid basis does not exist for grouping products for testing, the Bureau may order that individual tests shall be required performed.~~

~~A manufacturer may appeal the Executive Director's determination to the full Commission. The Bureau shall determine the adequacy of the test used to determine thermal performance and emittance. Where challenges of testing values have been submitted to the Bureau or are initiated by the Bureau, the Bureau, in consultation with the California Energy Commission, may certify the insulating material by applying testing and rating provisions similar to those defined in this section as it deems most appropriate on a case by case basis.~~

3. Thermal performance of building insulations shall be stated in *R* value or LTTR. Other insulations materials shall use apparent thermal conductivity, conductance, ~~or~~ *R* value, LTTR, U-factor, or thermal emittance as the Bureau deems appropriate on a case by case basis.

4. All thermal performance tests shall be conducted on materials which have been conditioned at  $73.4^{\circ} \pm 3.6^{\circ}\text{F}$  and a relative humidity of  $50 \pm 5$  percent for 24 hours immediately preceding the tests. ~~The average testing temperature shall be  $75^{\circ} \pm 2^{\circ}\text{F}$  with at least a  $40^{\circ}\text{F}$  temperature difference.~~



5. All types of insulation and insulating systems except metal foil or metalized film and other reflective insulations must be tested with ASTM C 177, ASTM C 518, ASTM C 1363, ASTM C 1114, ASTM C 1303 or CAN/ULC S770. The tests must be performed at a mean temperature of  $75^{\circ} \pm 2^{\circ}$  F and with a temperature difference of  $50^{\circ} \pm 10^{\circ}$  F. The tests must be done on the insulation material alone (excluding any airspace). R-values (“thermal resistance”) based upon heat flux measurements according to ASTM C 177 or ASTM C 518 must be reported only in accordance with the requirements and restrictions of ASTM C 1045. Building Assembly framing percentages shall be based on the values set forth by the California Energy Commission or by a value determined by the California Energy Commission.

56. Aluminum foil insulation ~~Metal foil or metalized film and other reflective insulations shall be tested according to ANSI/ASTM C 236-66 1363 to determine the thermal performance in horizontal, upward and downward directions. For framed assemblies, a 25% framing percentage shall be used. The tested thermal performance in the heat-flow direction or directions of the intended application shall be labeled on the material. The manufacturer shall test once in each direction of intended application, except that for products labeled with only one heat-flow direction, the manufacturer shall test two samples in that direction. Single sheet systems of aluminum foil and other reflective insulations claiming a thermal emittance value must be tested with ASTM C 1371 or ASTM E 408 with normal emittance converted to hemispherical emittance.~~

67. Insulation (other than aluminum foil reflective insulation materials) for which additional R-value is claimed for facings and air spaces shall be tested for thermal performance as a material without the air space pursuant to this article. The manufacturer may elect to report additional thermal performance values of a given construction tested according to ANSI/ASTM C 236-66 for that construction as long as full details of that construction are also disclosed in the certification statement and pursuant to Section 1557 (c) of this article. If a manufacturer elects to report a thermal performance value for a material plus an air space (as supplemental information to the required material thermal performance), but not necessarily for a full construction, the manufacturer must also disclose the conditions of the test and the limitations to the attainment of that result.

78. Except as provided in Items 56 and 67, the thermal performance test results certified under Section 13-13-1555 of this article shall be the average of the values obtained from at least three tests.

89. The average ~~No single~~ measured thermal performance result of the tests required by Items 56, 67 and 78 shall ~~not~~ be more than 5 percent below the value specified on the product. In addition, all insulation material sold within the state after September 22, 1981, shall have a measured thermal performance not more than 10 percent below the value specified on the product.

9. All numbered test descriptions shall be contained in the document “Test Descriptions for Insulating Material” dated February 27, 1981.

10. Facings on representative samples may be removed or modified by slitting for the ANSI/ASTM C 177-76 and ANSI/ASTM C 518-76, ASTM C 1303, or CAN/ULC S770 tests.

11. All thermal performance testing equipment used for testing insulating materials, which requires reference samples to maintain calibration, shall be calibrated with samples referenced to the United States National ~~Bureau~~ Institute of Standards and Technology.

12. Manufacturers of loose fill insulations for which no settled density test is required by this section shall ~~be required to include the installed design density in the identifying information described in Section 12-13-1557.~~ The manufacturer shall provide sufficient design density test documentation to establish a valid basis for the determination of ~~installed design density~~.

The ~~Executive Director~~ Bureau shall determine on a case by case basis whether a valid basis exists for the ~~installed design density claimed by the manufacturer.~~ If it is determined that a valid basis for the claimed design density does not exist, the ~~director~~ Bureau may ~~assign an appropriate installed design density or may require an appropriate order the manufacturer to perform a test to determine the installed design density.~~ The manufacturer may appeal the Executive Director's determination to the full Commission.

13. Within 180 days after the availability of appropriate representative thickness calibration samples from the National ~~Bureau~~ Institute of Standards and Technology, all insulating materials thicker than 1 inch, which have not previously been tested at the representative thickness of a representative sample, shall be tested at representative thickness or greater and recertified. ~~Test~~ The manufacturer shall submit test results and a revised certification statement will be submitted to the Executive Director. ~~The Executive Director shall determine if and when an appropriate representative thickness calibration sample is available from the National Bureau of Standards and shall publish a list of available representative thickness calibration samples. The manufacturer may appeal the Executive Director's determination to the full Commission.~~

14. All products which may be used for pressure fill retrofit wall application shall be separately tested for thermal performance using a sample specimen prepared at the manufacturer's recommended wall density for such applications.

15. All water heater insulation kits and nonpreformed pipe insulation shall be tested for thermal performance at the installed compressed thickness of a typical application. ~~Installed compressed thickness shall be determined according to Test Description Number 6.~~ All nonpreformed duct insulation shall be labeled, in accordance with Section 12-13-1557(c), with an installed  $R$ -value equal to the  $R$ -value of the uncompressed insulation ~~times~~ multiplied by 0.75.

16. Insulation claiming to meet Tier 1 or Tier 2 Pollutant control VOC values shall meet CalGreen codes Appendix A4 section A4.504.3.

17. Vapor retarder class shall be determined using the desiccant method with Procedure A of ASTM E96 and classified as follows:

Class I: 0.1 perm or less

Class II:  $0.1 < \text{perm} < 1.0$  perm

Class III:  $1.0 < \text{perm} < 10$  perm

Not a vapor retarder:  $> 10$  perm

**(b) Aluminum foil.**

~~1. **Composition.** The insulation shall have uniform flat surfaces and shall not be crumpled, torn or punctured. Aluminum foil shall contain not less than 99 percent aluminum. Kraft paper and flangeboard shall meet the requirements of ANSI/TAPPI T400-0S75. Flangeboard used for more than two insulation layers shall be of 28 point grade minimum, if single sheet flangeboard is used or 14 point grade minimum if double sheet flangeboard is used.~~

~~Adhesive used in bonding shall be waterproof and shall show no sign of bleeding when tested in accordance with the following test procedure. Bleeding at cut edges may be disregarded.~~

~~Specimens for tests shall consist of pieces of insulation cut to approximately 3 by 6 inches, suspended in a vertical position and heated to a temperature of  $180^{\circ}\text{F} \pm 5^{\circ}\text{F}$  for at least five hours. At the end of heating period, examine the reflective surfaces to determine whether the adhesive has bled or extruded through the surface, or delamination has occurred.~~

~~2. **Thermal performance.** Thermal performance shall be determined according to ANSI/ASTM C 236-66. The test panel shall consist of a panel utilizing a wooden frame of 2 by 6 inches construction covered with  $\frac{3}{4}$ -inch plywood on both sides. The resultant thermal performance shall be based on the insulation only.~~

~~3. **Size.** Layers of insulation composed of unsupported foil that is exposed shall have a minimum thickness of 0.0004 inch. Unsupported foil that is sandwiched in a multilayer sheet shall have a minimum thickness of 0.00035 inch. Foil bonded to kraft paper shall have a minimum thickness of 0.00025 inch. Minimum space between layers of a multilayer sheet shall conform with the United States General Services Administration insulation standard HH-1-1252B dated August 18, 1976.~~

~~4. **Resistance to combustion.** Surface burning characteristics shall be determined according to the ANSI/ASTM E 84-79, and shall not exceed the following values:~~

Flame spread	25
Smoke developed	50

~~5. **Pliability.** Foil shall be folded and the folded edge smoothed using a light finger pressure. The finished insulation shall not crack when folded to  $180^{\circ}$  bend at a temperature of  $70^{\circ} \pm 2^{\circ}\text{F}$  and a relative humidity of  $50 \pm 5$  percent.~~

**(c) Cellular glass in board form.**

1. ~~**Composition.** The material shall consist of a glass composition which has been foamed or cellulated under molten conditions, annealed and set to form a rigid material with hermetically sealed cells.~~
2. ~~**Thermal performance.** Determination of the thermal performance shall be based on a representative sample and shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#), or [ANSI/ASTM C 518-76](#) at the manufacturer's option.~~
3. ~~**Resistance to combustion.** Surface-burning characteristics shall be determined according to [ANSI/ASTM E 84-79](#), and shall not exceed the following values:~~

Flame spread	25
Smoke developed	50

~~(d) **Cellulose fiber in loose fill form.**~~

1. ~~**Composition.** The basic material shall consist of virgin or recycled wood-based cellulosic fiber and may be made from related paper or paperboard stock, excluding contaminated materials and extraneous foreign materials such as metals and glass which may reasonably be expected to be retained in the finished product. Suitable chemicals may be introduced to improve flame resistance, processing and handling characteristics. The particles shall not be so fine as to create a dust hazard, and the added chemicals shall not create a health hazard. The materials used must be capable of proper adhesion to the additive chemicals.~~
2. ~~**Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#), or [ANSI/ASTM C 518-76](#) at the manufacturer's option.~~
3. ~~**Density.** The density shall be determined according to the United States General Services Administration insulation standard HH-1-515D dated June 15, 1978, or as amended October 11, 1979, at the manufacturer's option. Cellulose insulation made from newsprint may use a 13 percent settling percentage along with the drop box procedure in place of the humidity cycling procedure described in HH-1-515D dated June 15, 1978. All other tests for loose fill cellulose fiber insulation prescribed by this section shall be conducted at the settled density as determined herein.~~
4. ~~**Resistance to combustion.** Flammability characteristics shall comply with the standard for flammability and smoldering combustion in 44 Fed. Reg. pages 39966-39973.~~
5. ~~**Resistance to fungi.** Resistance to fungi shall be determined according to Method 508 of the March 10, 1975, edition of the Military Standard for Environmental Test Methods known as MIL-STD-810C, except the spore suspensions shall be prepared using distilled water. The core of gypsum wall board shall be used as the control. After the test exposure, the test samples shall show no more fungal growth than the control material when examined at 40 times magnification.~~
6. ~~**Corrosiveness.** The product shall comply with the standard for corrosiveness set forth in 44 Fed. Reg. pages 39966-39973.~~
7. ~~**Odor emission.** Odor emission shall be determined according to Test Description Number 3. A detectable odor of objectionable nature observed by two or more of the panel members shall be cause for rejection.~~

~~8. **Identification.** Each insulation container shall be marked with the type (pouring or pneumatic), net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and settled density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the *California Electrical Code* Section 410-66. Insulation which may be used for pressure fill retrofit wall application shall be marked with the recommended wall density to prevent settling and separately marked with the tested thermal performance for such applications.~~

~~(e) **Cellulose fiber spray applied.**~~

~~1. **Composition.** The basic material shall consist of virgin or recycled wood-based cellulosic fiber and may be made from related paper or paperboard stock, excluding contaminated materials and extraneous foreign materials such as metals and glass which may reasonably be expected to be retained in the finished product. Suitable chemicals may be introduced to improve flame resistance, processing, adhesive and cohesive qualities, and handling characteristics. The added chemicals shall not create a health hazard.~~

~~The basic material shall be processed into a form suitable for installation by pneumatic conveying equipment and simultaneous mixing with water and/or adhesive at the spray nozzle.~~

~~2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.~~

~~3. **Resistance to combustion.** Flammability characteristics shall comply with the standard for flammability and smoldering combustion in 44 Fed. Reg. pages 39966-39973.~~

~~4. **Corrosiveness.** The product shall comply with the standard for corrosiveness set forth in 44 Fed. Reg. pages 39966-39973.~~

~~5. **Bond strength.** The bond strength shall be determined by Test Description Number 3 and the bond shall support a force five times the weight of the sample for one minute.~~

~~6. **Bond deflection.** The bond deflection shall be determined by Test Description Number 4 and shall be greater than  $\frac{1}{60}$ th of the length of the sample.~~

~~7. **Air erosion.** The air erosion shall be determined by Test Description Number 5 and shall withstand an air velocity of 800 ft/min.~~

~~8. **Odor emission.** Odor emissions shall be determined by Test Description Number 1. A detectable odor of objectionable nature observed by two or more panel members shall be cause for rejection.~~

~~9. **Fungi resistance.** Resistance to fungi shall be determined according to Method 508 of the March 10, 1975, edition of the Military Standard for Environmental Test Methods known as MIL-STD-810C, except the spore suspensions shall be prepared using distilled water, and observations shall be made at seven-day intervals during the 28-day cycle to determine the minimum length of time required for fungal growth to appear. Viability of the spore organisms shall be determined by injecting or inoculating a separate bottle of culture medium with the spore preparation for each organism and observing for growth and individual viability. The back side of  $\frac{1}{2}$ -inch standard commercial grade gypsum wall board grayback paper surface shall be used as the control. After the test exposure, the test samples shall be examined at 40 times~~

magnification for evidence of fungal growth. The material shall show no more fungal growth than the control material.

10. Test procedures described in Items 5, 6 and 7 are not required of products which are installed in such a manner that physical restrictions imposed by the construction elements preclude any possibility of subsequent delamination, erosion, or dusting and the product is identified only for such installations.

**(f) Mineral aggregate in board form.**

1. **Composition.** The basic material shall be mineral in nature, crushed, dried, and graded to the proper particle size and expanded by the application of heat to form a spherical, cellular type of aggregate. It shall be composed of spherical cellular beads of expanded aggregate and fibers formed into rigid, flat, rectangular units and shall have an integral water proofing treatment. It shall be clean, dry and free of extraneous material. Fibers shall be evenly distributed and insulation and facings shall be sufficiently coherent to be unaffected by handling and installation.

2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.

3. **Resistance to combustion.** Surface-burning characteristics of materials with facings and membranes intended for exposed applications shall be determined according to [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	25
Smoke developed	450

Facings and membranes of materials intended for exposed applications shall be exposed to the flame during the [ANSI/ASTM E 84-79](#) test.

Insulation boards exclusive of facings and membranes shall not exceed the following values:

Flame spread	25
Smoke developed	50

**(g) Mineral fiber in blanket form.**

1. **Composition.** The basic material shall be fibers made from mineral substances such as rock, slag or glass processes from a molten state into fibrous form.

2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.

3. **Size.** The thickness shall be determined according to [ANSI/ASTM C 167-64](#).

4. **Resistance to combustion.** Surface-burning characteristics of materials with facings and membranes intended for exposed applications shall be determined according to [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	25
Smoke developed	450

Facings and membranes of materials intended for exposed applications shall be exposed to the flame during the [ANSI/ASTM E 84-79](#) test.

Insulation blankets not intended for exposed applications shall comply with the United States General Services Administration insulation standard HH-I-521F dated September 4, 1980, for flammability and smoldering combustion testing.

5. ~~**Corrosiveness.**~~ Corrosiveness shall be determined according to Test Description Number 2. The steel test plate in contact with the insulation shall show no greater corrosion than a steel plate in contact with sterile cotton.

6. ~~**Resistance to fungi.**~~ Resistance to fungi shall be determined according to Method 508 of the March 10, 1975, edition of the Military Standard for Environmental Test Methods known as MIL-STD-810C except the spore suspensions shall be prepared using distilled water. The core of gypsum wall board shall be used as the control. After the test exposure, the test samples shall show no more fungal growth than the control material when examined at 40 times magnification.

7. ~~**Odor emission.**~~ Odor emission shall be determined according to Test Description Number 1. A detectable odor of objectionable nature observed by two or more of the panel members shall be cause for rejection.

~~(h) **Mineral fiber in board form.**~~

1. ~~**Composition.**~~ The basic material shall be made from mineral substances such as rock, slag or glass processed from a molten state into a fibrous form. Insulation shall be composed of mineral fibers with water resistant binder added and formed into flat, rectangular units. Insulation boards shall be uniform in quality, free from defects, such as broken edges, splits or loose materials which would impair its intended use. Roof insulation boards shall have either integral waterproofing treatment or a waterproof coating on one surface. The coating shall be flush with the edges of the sides and may be flush with or extend over both ends.

2. ~~**Thermal performance.**~~ Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.

3. ~~**Resistance to combustion.**~~ Surface burning characteristics of materials with facings and membranes intended for exposed applications shall be determined according to [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	25
Smoke developed	450

Facings and membranes of materials intended for exposed applications shall be exposed to the flame during the [ANSI/ASTM E 84-79](#) test.

Insulation boards exclusive of facings and membranes shall not exceed the following values:

Flame spread	25
Smoke developed	50

~~(i) **Mineral fiber in loose fill form.**~~

1. ~~**Composition.**~~ Mineral fiber insulation shall be made from mineral substances such as rock, slag or glass processed from a molten state into fibrous form. The insulation shall be mechanically processed to produce a mineral fiber suitable for pneumatic or poured application.

~~2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.~~

~~3. **Density.** The density shall be determined according to installed design density. All tests shall be conducted at the installed design density.~~

~~4. **Resistance to combustion.** Loose fill insulation shall comply with the United States General Services Administration insulation standard HH-I-1030B dated August 12, 1980, for flammability and smoldering combustion testing.~~

~~5. **Corrosiveness.** Corrosiveness shall be determined according to Test Description Number 2. The steel plate in contact with the insulation shall show no greater corrosion than a steel plate in contact with sterile cotton.~~

~~6. **Resistance to fungi.** Resistance to fungi shall be determined according to Method 508 of the March 10, 1975, edition of the Military Standard for Environmental Test Methods known as MIL-STD-810C, except the spore suspensions shall be prepared using distilled water. The core of gypsum wall board shall be used as the control. After the test exposure, the test samples shall show no more fungal growth than the control material when examined at 40 times magnification.~~

~~7. **Odor emission.** Odor emission shall be determined according to Test Description Number 1. A detectable odor of objectionable nature observed by two or more of the panel members shall be cause for rejection.~~

~~8. **Identification.** Each insulation container shall be marked with the type (pouring or pneumatic), the net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and installed design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the *California Electrical Code* Section 410-66.~~

~~Products which may be used for pressure fill retrofit wall application shall be marked with the recommended wall density to prevent settling and separately marked with the tested thermal performance for such applications.~~

~~(j) **Perlite in loose fill form.**~~

~~1. **Composition.** Expanded perlite loose fill insulation shall be produced by the expanding of natural perlite or by heating.~~

~~2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option.~~

~~3. **Density.** Density shall be determined according to installed design density. All tests except the [ANSI/ASTM E 84-79](#) test shall be conducted at the installed design density.~~

~~4. **Resistance to combustion.** Resistance to combustion shall be determined by the use of the Attic Floor Radiant Panel Test, as described in the United States General Services Administration insulation standard HH-I-515D Section 3.1.9 as amended October 11, 1979.~~

~~5. **Identification.** Each insulation container shall be marked with the type (pouring or pneumatic), the net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and installed design density to provide the levels of thermal performance shown. Manufacturer's installation~~



recommendations shall include precautions according to the 1993 *National Electrical Code* Section 410-66.

Products which may be used for pressure fill retrofit wall application shall be marked with the recommended wall density to prevent settling and separately marked with the tested thermal performance for such applications.

**(k) Polystyrene in board form.**

1. **Composition.** Insulation board shall be formed by the expansion of polystyrene resin beads or granules in a mold or the insulation board shall be formed by the expansion of polystyrene base resin in an extrusion process. The insulation shall be uniformly fused, homogeneous, and essentially unicellular. Insulation board shall be uniform in physical properties and reasonably free of voids or accumulations of unexpanded material, foreign inclusions, broken corners and broken edges.

2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option. All foam insulation materials using materials other than air or pentane as an expanding agent shall either separately condition samples at  $73.4 \pm 3.6^\circ\text{F}$  and a relative humidity of  $50 \pm 5$  percent, and at  $140^\circ\text{F}$  dry heat and test at 30-, 60- and 90-day intervals or shall test samples certified by an approved testing laboratory to have been aged while exposed to free air in a well ventilated room for at least two years at  $70 \pm 10^\circ\text{F}$ , provided, however, that until  $2\frac{1}{2}$  years after the adoption of these quality standards by the Commission, test samples may be aged for six months for certification of the material.

Notwithstanding any other provision of this article, this thermal performance standard shall not take effect until 250 days after adoption. If the certification statement submitted pursuant to Section 1555 of this article does not include test results for thermal performance, the manufacturer shall submit a new certification statement which includes such test results prior to 250 days after adoption. If the latest certification statement is based on the six-month aging test, a new statement, based upon the two-year aging test or the accelerated aging test shall be submitted by  $2\frac{1}{2}$  years after the adoption date.

3. Test

A. **Resistance to combustion.** The material shall be tested to meet the requirements of Sections 2602.1-2602.6 of the 1994 *Uniform Building Code*, with the additional provision that the surface-burning characteristics shall be determined according to [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	75
Smoke developed	450

B. This subsection shall not apply to any product recognized by the International Conference of Building Officials, as of the date of adoption of these regulations, as complying with Sections 2602.1-2602.6 of the 1994 *Uniform Building Code* based solely upon diversified testing. The manufacturer of any product which is recognized by the International Conference of Building Officials, subsequent to the date of approval of these regulations, as complying with Sections 2602.1-2602.6 of the 1994 *Uniform*

~~Building Code based solely upon diversified testing, may petition the Commission for an exemption of that product from the provisions of this subsection.~~

~~4. **Dimensional stability.** All foamed polystyrene insulation materials which are factory formed shall be tested for dimensional stability in accordance with Procedures E and G of [ASTM D 2126-75](#) with the following exceptions: (a) sample size shall be 12 inches by 12 inches  $\pm$  1 inch, and (b) samples shall be tested as manufactured with or without facers.~~

~~The average percent change in length or width shall not exceed  $\pm$  2 percent in 24 hours or  $\pm$  4 percent in seven days. The average percent change in thickness shall not exceed  $\pm$  10 percent in seven days. Samples shall be regarded as failing if: (1) delamination area of "faced" samples exceeds 25 percent or (2) warping or cupping exceeds  $\frac{1}{4}$  inch when checked by a straight edge across raised diagonal corners.~~

~~(l) **Polyurethane and polyisocyanurate in board form and field applied.**~~

~~1. **Composition.** The manufacture of the insulation shall be based mainly on the reaction of an organic polyisocyanate with a polyol resin.~~

~~Board shall be of uniform texture, reasonably free from accumulation of unexpanded material and foreign inclusions, and reasonably free of broken edges and corners. It shall be reasonably free from holes, voids, depressions and objectionable odor. Laminated composite boards shall be included in this quality standard. The faces of laminated boards shall adhere firmly throughout to the foam, and shall show no excessive amounts of slits, voids or depressions.~~

~~2. **Thermal performance.** Determination of the thermal performance shall be in accordance with [ANSI/ASTM C 177-76](#), [ANSI/ASTM C 236-66](#) or [ANSI/ASTM C 518-76](#) at the manufacturer's option. All foam insulation materials using materials other than air or pentane as an expanding agent shall either separately condition samples at  $73.4^{\circ} \pm 3.6^{\circ}\text{F}$  and a relative humidity of  $50 \pm 5$  percent, and at  $140^{\circ}\text{F}$  dry heat and test at 30-, 60- and 90-day intervals or shall test samples certified by an approved testing laboratory to have been aged while exposed to free air in a well ventilated room for at least two years at  $70^{\circ} \pm 10^{\circ}\text{F}$ , provided, however, that until  $2\frac{1}{2}$  years after the adoption of these quality standards by the Commission, test samples may be aged for six months for certification of the material.~~

~~Notwithstanding any other provision of this article, this thermal performance standard shall not take effect until 250 days after adoption. If the certification statement submitted pursuant to Section 1555 of these regulations does not include test results for thermal performance, the manufacturer shall submit a new certification statement which includes such test results prior to 250 days after adoption. If the latest certification statement is based on the six-month aging test, a new statement, based upon the two-year aging test or the accelerated aging test shall be submitted by  $2\frac{1}{2}$  years after the adoption date.~~

~~3. **Dimensional stability.** All foamed polyurethane and polyisocyanurate insulation materials which are factory formed shall be tested for dimensional stability in accordance with Procedures E and G of [ASTM D 2126-75](#) with the following exceptions: (a) sample size shall be 12 inches by 12 inches  $\pm$  1 inch and (b) samples shall be tested as manufactured with or without facers.~~

~~The average percent change in length or width shall not exceed  $\pm$  2 percent in 24 hours or  $\pm$  4 percent in seven days. The average percent change in thickness shall not exceed~~

± 10 percent in seven days. Samples shall be regarded as failing if: (1) delamination area of “faced” samples exceeds 25 percent or (2) warping or cupping exceeds <sup>1</sup>/<sub>4</sub> inch when checked by a straight edge across raised diagonal corners.

**4. Resistance to combustion.**

A. The material shall be tested to meet the requirements of Sections 2602.1-2602.6 of the 1994 *Uniform Building Code*, with the additional provision that the surface-burning characteristics shall be determined according to [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	75
Smoke developed	450

B. This subsection shall not apply to any product recognized by the International Conference of Building Officials, as of the date of adoption of this article, as complying with Sections 2602.1-2602.6 of the 1994 *Uniform Building Code* based solely upon diversified testing. The manufacturer of any product which is recognized by the International Conference of Building Officials, subsequent to the date of approval of these regulations, as complying with Sections 2602.1-2602.6 of the 1994 *Uniform Building Code* based solely upon diversified testing, may petition the Commission for an exemption of that product from the provisions of this subsection.

**5. Identification.** Foam containers shall state the conditions of proper storage.  
(m) **Urea formaldehyde foam field applied.**

1. **Limitation on sale.** Urea formaldehyde foam is unsafe for use as insulation. Sale within the State of California of urea formaldehyde foam insulation is prohibited.

2. **Exemption.** Notwithstanding any other provision of this article, a manufacturer of the primary components of urea formaldehyde foam insulation may apply for certification as provided in Section 1555 of this article. Such certification statement shall indicate compliance with the following standards:

A. **Composition.** The material shall consist of cellular plastic generated in a continuous stream by mixing the components which are a urea formaldehyde resin, air and a foaming agent. The material shall be suitable for filling closed cavities through small holes and suitable also for filling open cavities by trowelling during foaming prior to enclosure.

B. **Thermal performance.** The effective thermal performance, incorporating a derating value, shall be determined according to the method described in 42 Fed. Reg. pages 55143-55148.

C. **Resistance to combustion.** Surface-burning characteristics shall be determined according to the [ANSI/ASTM E 84-79](#) and shall not exceed the following values:

Flame spread	25
Smoke developed	450

Test specimens shall be aged for 45 days at 70°F ± 5°F and 35 to 40 percent relative humidity before testing.

D. **Free formaldehyde content of dry foam.** The free formaldehyde content of the dry foam shall be less than 0.01 percent formaldehyde by weight when tested as specified in paragraph (f) (8), published in 45 Fed. Reg. page 63801, except that the specimens

to be tested shall also be aged for 56 days at  $24 \pm 5^{\circ}\text{C}$  ( $75 \pm 10^{\circ}\text{F}$ ) and  $50 \pm 10$  percent relative humidity in an uncovered beaker.

E. ~~**Corrosiveness.**~~ The material shall be tested and shall meet the criteria for corrosiveness as specified in 45 Fed. Reg. pages 63786-63810.

F. ~~**Density.**~~ The material shall be tested and shall meet the criteria for density as specified in 45 Fed. Reg. pages 63786-63810.

G. ~~**Shrinkage.**~~ The material shall be tested and meet the criteria for shrinkage as specified in 45 Fed. Reg. pages 63786-63810, except that the material shall not shrink more than 2.0 percent in any direction.

H. ~~**Volume resistivity.**~~ The material shall be tested and meet the criteria for volume resistivity as specified in 45 Fed. Reg. pages 63786-63810.

I. ~~**Identification.**~~ Resin and foaming agent containers shall be marked with conditions of proper storage and the derated *R*-value and shrinkage of the prepared foam as certified by the manufacturer.

J. ~~**Safety information.**~~ Installers of urea formaldehyde foam insulation shall present the following safety notice to the purchasers of the foam prior to the signing of the contract for installation. The notice shall be printed in a minimum of 8-point type size. One copy of the notice signed by the purchaser shall be immediately given to the purchaser, one copy shall be retained by the installer and one copy shall be mailed by the installer to the Executive Director of the Energy Commission within 48 hours after installation of the insulation is completed.

Manufacturers shall make all sales of urea foam insulation components expressly subject to the application restrictions listed in the notice described below.

#### ~~**UREA FORMALDEHYDE FOAM INSULATION SAFETY NOTICE**~~

The Federal Panel on Formaldehyde has concluded that formaldehyde should be presumed to pose a carcinogenic (cancer) risk for humans. Formaldehyde gas may also cause eye, nose, and throat irritation, coughing, shortness of breath, skin irritation, nausea, headaches, and dizziness. People with respiratory problems or allergies may suffer more serious reactions, especially people allergic to formaldehyde. Women who are pregnant or planning to become pregnant should not be exposed to this product. The symptoms may appear immediately or not until months after installation. This product may release formaldehyde gas into your home or building over a long period of time. In some instances the formaldehyde gas cannot be controlled by ventilation or other means.

Application of this product is restricted to exterior sidewalls in both residential and commercial/industrial buildings. A 4-mil thickness plastic polyethylene vapor barrier, or equivalent plastic sheeting vapor barrier, shall be installed between the urea formaldehyde foam insulation and the interior space of the home or building in all applications.

If you have health concerns, call your doctor. Also, call the installer or manufacturer of the material.

**[STRIKE Image on Following Page]**

**(PLEASE PRINT OR WRITE LEGIBLY)**

PURCHASER NAME OR NAMES \_\_\_\_\_

PURCHASER ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ ZIP \_\_\_\_\_

PURCHASER PHONE NUMBER: Home (    ) \_\_\_\_\_ Work (    ) \_\_\_\_\_

**LOCATION OF INSTALLATION IF DIFFERENT FROM ABOVE**

LOCATION ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ ZIP \_\_\_\_\_

The Purchaser acknowledges he or she has read and understands this notice.

Signed X \_\_\_\_\_ Date \_\_\_\_\_

Signed X \_\_\_\_\_ Date \_\_\_\_\_

**THE FOLLOWING INFORMATION IS TO BE COMPLETED BY  
THE INSTALLING CONTRACTOR**

CONTRACTOR'S NAME \_\_\_\_\_

CONTRACTOR'S ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ ZIP \_\_\_\_\_

CONTRACTOR'S STATE LICENSE NUMBER \_\_\_\_\_

NAME OF MANUFACTURER \_\_\_\_\_

MANUFACTURER'S ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ ZIP \_\_\_\_\_

MANUFACTURER'S PHONE NUMBER (    ) \_\_\_\_\_

TEMPERATURE OF OUTSIDE AIR AT START OF INSTALLATION \_\_\_\_\_

	BATCH NUMBER	EXPIRATION DATE	TEMPERAT (START OF INSTA
RESIN	_____	_____	_____
FOAMING AGENT	_____	_____	_____

**STEPS THE INSTALLING CONTRACTOR MUST FOLLOW**

1. The installing contractor is responsible for mailing this completed notice to the following address within 48 hours after completion of installation. Mail one copy to:

Executive Director  
Energy Resources, Conservation and Development Comm  
1516 9th Street  
Sacramento, CA 95814.

2. Give one copy to the Purchaser.

~~3. Severability of provisions. If any provision of Section 1553 (m) (1) or (2), or the application thereof to any person or circumstances, is held invalid, the remaining provisions, or the application of such provisions to other persons or circumstances, shall not be affected thereby.~~

~~(n) Vermiculite in loose fill form.~~

~~1. Composition. Vermiculite loose fill insulation shall be produced by the expanding or exfoliating of natural vermiculate or by grading and heating.~~

~~2. Thermal performance. Determination of the thermal performance shall be in accordance with ANSI/ASTM C 177-76, ANSI/ASTM C 236-66 or ANSI/ASTM C 615-76 at the manufacturer's option.~~

~~3. Density. Density shall be determined according to installed design density. All tests except the ANSI/ASTM E 84-79 test shall be conducted at the installed design density.~~

~~4. Resistance to combustion. Resistance to combustion shall be determined by the use of the Attic Floor Radiant Panel Test, as described in the United States General Services Administration insulation standard HH-I-515D as amended October 11, 1979.~~

~~5. Identification. Containers of vermiculite shall be marked with the type (pouring or pneumatic), the net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and installed design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the California Electric Code Section 410-66.~~

~~Products which may be used for pressure fill retrofit wall application shall be marked with the recommended wall density to prevent settling and separately marked with the tested thermal performance for such applications.~~

#### **(b) BLANKET OR BATT**

This subdivision covers the standards for testing of the blanket and batt forms of materials including, but not limited to, cellulose, fiber glass, cotton, mineral fiber, polyester, silica aerogel, wool and ceramic fiber.

##### **1. Composition.**

Asbestos shall not be present as an ingredient or component in any insulation.

Mineral fiber (rock, slag, glass) shall be made and manufactured as defined in Section 6 of ASTM C 665 or Section 6 of ASTM C 553 or Section 6 of ASTM C 592.

Flexible Aerogel insulation shall be made and manufactured as defined in Section 6 of ASTM C 1728.

2. **Thermal performance.** Determination of thermal performance shall be in accordance with ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114 at the manufacturer's or tester's option.

3. **Thickness.**

(A) The thickness shall be determined according to ASTM C 167.

(B) For water heater insulation kits, the installed compressed thickness shall be determined as follows:

i. **Apparatus:**

(a) Using a depth gauge as described in ASTM C 167.

(b) Cylinders at least one foot in length, with the following diameters: 20 inches  $\pm$  2 inches and 1 inch  $\pm$  ¼ inch.

ii. **Procedure:** Water heater jacket material shall be wrapped around the 20 inch cylinder; nonpreformed pipe insulation shall be wrapped around the 1 inch cylinder. All cylinders shall be vertically placed so that their bases rest on the flat surface of the work table. The specimens shall be held in place by the manufacturer's recommended attachment method. The thickness measurements shall be made by penetrating the pin of the depth gauge downward through the specimen, perpendicular to the surface of the cylinder. If necessary to prevent compression of the specimen by the depth gauge pin, the specimen shall first be pierced. When the point of the pin touches the cylinder, the sliding disk shall be lowered to the point of contact with the top surface of the specimen. The gauge shall be withdrawn and the distance shall be measured from the point of the pin to the sliding disk within an accuracy of  $\pm$  1/16 inch (or 1 mm). The measurement procedure shall be repeated three times at random locations and the thickness results shall be averaged.

4. **Resistance to combustion.**

The blanket and batt insulation shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product.

5. **Corrosiveness.** Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for corrosiveness as specified in ASTM C 665, Sec. 7.7.

For cellulose and cotton batting, the material shall be tested and shall meet the criteria for corrosiveness as specified in ASTM C 739, Sec. 9.

For polyester batting, the material shall be tested and shall meet the criteria for corrosiveness as specified in ICC-ES AC187, Sec.3.3.5.

For polyester batting, the material shall be tested and shall meet the criteria for corrosiveness as specified in ICC-ES AC187, Sec.3.3.5.

For Flexible Aerogel insulation, the material shall be tested and shall meet the criteria for corrosiveness as specified in Section 7.5 of ASTM C 1728.

6. **Resistance to fungi.** Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for resistance to fungi as specified in ASTM C 665, Sec. 7.8.

For cellulose and cotton batting, the material shall be tested and shall meet the criteria for resistance to fungi as specified in ASTM C 739, Sec. 11.

For polyester batting, the material shall be tested and shall meet the criteria for resistance to fungi as specified in ICC-ES AC187, Sec.3.3.6.

For Flexible Aerogel insulation, the material shall be tested and shall meet the criteria for resistance to fungi as specified in Section 7.7 of ASTM C 1728.

7. **Odor emission.** Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for odor emission as specified in ASTM C 665, Sec. 7.6.

For cellulose and cotton batting, the material shall be tested and shall meet the criteria for odor emission as specified in ASTM C 739, Sec. 13.

For polyester batting, the material shall be tested and shall meet the criteria for odor emission as specified in ICC-ES AC187, Sec.3.3.4.

8. **Water vapor permeance.** Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for water vapor permeance as specified in ASTM C 665, Sec. 7.4.



9. **Water vapor sorption or Moisture vapor sorption.** Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for water vapor sorption as specified in ASTM C 665, Sec. 7.5.

For cellulose and cotton batting, the material shall be tested and shall meet the criteria for moisture vapor sorption as specified in ASTM C 739, Sec. 12.

For polyester batting, the material shall be tested and shall meet the criteria for moisture vapor sorption as specified in ICC-ES AC187, Sec.3.3.3.

For Flexible Aerogel insulation, the material shall be tested and shall meet the criteria for water vapor sorption as specified in Section 7.6 of ASTM C 1728.

10. **Resistance to vermin.** For wool batting, resistance to vermin for animal based materials such as wool shall be determined according to ISO 3998.

**(c) BLOCK OR BOARD**

This section covers the testing of the block and board forms of materials including, but not limited to, fiber glass, cellulose, mineral fiber, wool, ceramic fiber, cellular glass, mineral aggregate, polyisocyanurate, polystyrene, polyurethane, polyimide, calcium silicate, elastomeric (rubber), neoprene foam and phenolic foam.

1. **Composition.**

Asbestos shall not be present as an ingredient or component in any insulation.

Calcium silicate board shall be made and manufactured as defined in Section 5 of ASTM C 533 or Section 6 of ASTM C 656.

Cellular glass board shall be made and manufactured as defined in Section 6 of ASTM C 552.

Cellular polyolefin sheet shall be made and manufactured as defined in Section 5 of ASTM C 1427.

Elastomeric sheet shall be made and manufactured as defined in Section 5 of ASTM C 534.

Melamine foam board shall be made and manufactured as defined in Section 6 of ASTM C 1410.

Mineral aggregate board shall be made and manufactured as defined in Section 6 of ASTM C 728.

Mineral fiber board (rock, slag, glass) shall be made and manufactured as defined in Section 6 of ASTM C 612 or Section 6 of ASTM C 726. An insulation board shall be free from defects that would reduce its performance in the intended application.

Perlite block shall be made and manufactured as defined in ASTM C 610.

Phenolic board shall be made and manufactured as defined in Section 6 of ASTM C 1126.

Polyimide board shall be made and manufactured as defined in Section 5 of ASTM C 1482. The theoretical mole fraction of imide bonds must be greater than the theoretical mole fraction of amide bonds.

Unfaced polyisocyanurate foam plastic insulation shall be made and manufactured in accordance with ASTM C 591 and of uniform texture, free from accumulation of unexpanded material and foreign inclusions, broken edges and corners, holes, voids, depressions and objectionable odor.

Polyisocyanurate block or board foam plastic insulation shall be made and manufactured as defined in Section 6 of ASTM C 1289. The board shall be of uniform texture, free from accumulation of unexpanded material and foreign inclusions, broken edges and corners, holes, voids, depressions and objectionable odor. Laminated composite boards shall be included in this quality standard. The faces of laminated boards shall adhere firmly throughout to the polyisocyanurate board, and shall show no excessive amounts of slits, voids or depressions.

Expanded polystyrene (EPS) block and board and extruded polystyrene (XPS) block and board foam plastic insulation shall manufactured to comply with ASTM C 578. The blocks and boards shall be of uniform density and have no defects that will adversely affect its service qualities. EPS and XPS insulating material shall be free of foreign inclusions, broken corners and broken edges.

- 2. Thermal performance.** Determination of the thermal performance shall be based on a representative sample and shall be in accordance with ASTM C 177, or ASTM C 1363, or ASTM C 518, or ASTM C 1114 or in accordance with the thermal resistance measurement requirements of the applicable standard material specification, at the manufacturer's or tester's option.

Prior to R-value testing, all foam plastic insulating materials using materials other than air as an expanding agent shall be conditioned by one of the following methods at the manufacturer's or tester's option:

- (A) Condition samples at 73.4° ± 4°F and a relative humidity of 50 ± 5 percent for a period of 180 ± 5 days;
- (B) Condition samples at 140°F ± 2°F dry heat for a period of at least 90 days;  
or
- (C) Follow ASTM C 1303 or CAN/ULC S770 for unfaced or permeably faced boards when claiming LTTR.

3. **Resistance to combustion.**

- (A) All insulation boards other than foam plastic shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product
- (B) **Foam insulation block or boards:** Foam plastic block or board insulating material shall comply with the flammability requirements of Sections 2602.1-2602.9 of the CBC.

Insulating material which is recognized by an approved product evaluation agency as complying with Sections 2602.1-2602.9 of the CBC shall be deemed to comply with this subsection.

- 4. **Dimensional stability.** All foamed insulation materials which are factory formed foam plastic block or board insulating material shall be tested for dimensional stability with samples that are tested as manufactured with or without facers in accordance with the requirements listed in the applicable foam insulation material standard specification listed in section 12-13-1553 (c) 1.
- 5. **Water vapor permeance.** Water vapor permeance shall be determined as required in accordance with the requirements listed in the applicable foam insulation material standard specification listed in section 12-13-1553 (c) 1.
- 6. **Water absorption.** For foam plastic boards and blocks, the insulating material shall be tested and shall meet the criteria for water absorption in accordance with the requirements listed in the applicable foam insulation material standard specification listed in section 12-13-1553 (c) 1.

(d) **DUCTING**

This section covers the testing of air duct form of materials including, but not limited to, fiber glass, mineral fiber, silica aerogel, ceramic fiber and phenolic foam in the duct liner, duct wrap, duct board and duct systems forms.

All ducting insulation and duct lining in plenums shall comply with the CMC.

All preformed ducting and duct boards shall meet the standards set forth in UL 181.

1. **Composition**

Mineral fiber duct liner shall be made and manufactured as defined in Section 6 of ASTM C 1071.

Polymeric foam sheet duct liner shall be made and manufactured as defined in Section 5 of ASTM C 1534.

Mineral fiber duct wrap shall be made and manufactured as defined in Section 6 of ASTM C 1290.

Reflective duct insulation shall be made and manufactured as defined in ASTM C 1668.

2. **Thermal performance.** All duct insulation product R-values shall be based on insulation only and tested C-values at 75°F mean temperature at the installed thickness, in accordance with ASTM C 177 or ASTM C 335 or ASTM C 518 at the manufacturer's or tester's option. The R-values for air films, vapor barriers, or other duct components shall be excluded from this requirement.

3. **Thickness.** The installed thickness of duct insulation used to determine its R-value shall be determined as follows:

(A) For duct board, duct liner, and factory-made rigid ducts not normally subjected to compression, the nominal insulation thickness shall be used.

(B) For duct wrap, installed thickness shall be assumed to be 75 percent (25 percent compression) of nominal thickness.

(C) For cylindrical factory-made flexible air ducts, the installed thickness shall be determined by dividing the difference between the actual outside diameter (perimeter divided by 6.28) and the specified inside diameter by two.

4. **Resistance to combustion.** Surface burning characteristics shall be determined according to ASTM E 84 or UL 723 and installed as specified according to ASTM E 2231 and shall not exceed the following values:

Flame spread index .....	25
Smoke developed index.....	50

Surface-burning characteristics of insulation applied to the exterior surface of sheet-metal ducts located on the exterior of buildings shall be determined according to ASTM E 84 or UL 723 and installed as specified according to ASTM E 2231, and shall not exceed the following values:

Flame spread index.....	75
No smoke developed number required.	

5. **Water vapor permeance.** Water vapor permeance shall be determined using the Desiccant Method of ASTM E 96.

**(e) INSULATION SYSTEMS**

This section covers the testing of insulation systems including, but not limited to the entire assembly of individual components making up a wall, ceiling, roof, or floor; concrete blocks with polystyrene inserts; large scale metal frames with thermal breaks; air core concrete; and polystyrene aggregate concrete.

1. **Thermal performance.** Determination of the thermal performance shall be in accordance ASTM C 1363. In addition, the report shall list the thickness used for the test.
2. **Density.** Determination of density shall be in accordance with ASTM C 567, ASTM C 1386 or ASTM C 303.
3. **Specific heat capacity.** Determination of heat capacity shall be in accordance with ASTM E 1269 or ASTM E 2716.
4. **Air barrier leakage rate.** Air barrier leakage rate shall be determined in accordance with ASTM E 2357, ASTM E 2178, ASTM E 1680, ASTM E 283 or ASTM E 1677.
5. **Water vapor permeance.** Water vapor permeance shall be determined using the Desiccant Method of ASTM E 96.
6. **U-FACTOR.** Assembly U-factor shall be determined in accordance with the thermal performance testing and procedures specified in ASHRAE Handbook of Fundamentals.

## **(f) LOOSE FILL**

This section covers the testing of the loose fill form of materials including, but not limited to, fiber glass, cellulose, mineral fiber, wool, perlite, vermiculite, cotton and polyester fiber.

For loose-fill cellulose, the tests shall be done at the settled density determined under paragraph 8 of ASTM C 739.

For loose-fill mineral fiber the tests shall be done on samples that fully reflect the effect of settling on the product's R-value.

For loose-fill insulations, the initial installed thickness for the product shall be determined pursuant to ASTM C 1374, for R-values of 13, 19, 22, 30, 38, 49 and any other R-values provided on the product's label.

### **1. Composition.**

Loose-fill cellulose shall not include contaminated materials or extraneous foreign materials such as metals and glass which may reasonably be expected to be retained in the finished product. Chemicals may be introduced to improve flame resistance, processing and handling characteristics. The particles shall not be so fine as to create a combustible dust, and the added chemicals shall not create a health hazard. The materials used must be capable of adhesion to the additive chemicals.

Loose-fill cellulose shall be mechanically processed to produce an insulation suitable for pneumatic or poured application.

Loose-fill mineral fiber (rock, slag, glass) shall be mechanically processed to produce an insulation suitable for pneumatic or poured application.

Loose-fill polyester shall be mechanically processed to produce an insulation suitable for pneumatic application.

Loose-fill wool shall be mechanically processed to produce an insulation suitable for pneumatic application.

Loose-fill Perlite shall be made and manufactured as defined in Section 6 of in ASTM C 549.

Loose-fill Vermiculite shall be made and manufactured as defined in Section 6 of in ASTM C 516.

## 2. **Thermal Performance.**

Unless stated otherwise in this subsection, determination of the thermal performance shall be in accordance with ASTM C 687 with ASTM C 177, ASTM C 1363, ASTM C 518 or ASTM C 1114 at the manufacturer's or tester's option.

For loose-fill cellulose, determination of the thermal performance shall be in accordance with paragraph 15 of ASTM C 739.

For loose-fill mineral fiber, determination of the thermal performance shall be in accordance with paragraph 12.2 of ASTM C 764.

For perlite Loose-fill, determination of the thermal performance shall be in accordance with ASTM C 177, ASTM C 1363, ASTM C 518 or ASTM C 1114 at the manufacturer's or tester's option.

For loose-fill vermiculite, determination of the thermal performance shall be in accordance with ASTM C 177, ASTM C 1363, ASTM C 518 or ASTM C 1114 at the manufacturer's or tester's option.

## 3. **Density.**

For loose-fill cellulose, the tests must be done at the design density determined under paragraph 8 of ASTM C 739. All tests should be tested at densities per ASTM C 739.

For loose-fill mineral fiber, the design density shall be the settled density. All tests shall be conducted at the design density.

**Note:** The settled density is determined using long term aging studies in attics.

For loose-fill perlite and loose-fill vermiculite, design density shall be determined according to ASTM C 520. All tests except the ASTM E 84 or UL 723 tests shall be conducted at the design density.

For loose-fill polyester, design density shall be determined according to ICC-ES AC187, Sec.3.2.1

## 4. **Resistance to combustion.**

All loose-fill insulation shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product

5. **Resistance to fungi.**

Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for resistance to fungi as specified in paragraph 12.3 of ASTM C 1338.

For loose-fill cellulose, the material shall be tested and shall meet the criteria for resistance to fungi as specified in paragraph 11 of ASTM C 739.

For loose-fill mineral fiber, the material shall be tested and shall meet the criteria for resistance to fungi as specified paragraph 12.8 of ASTM C 764.

For loose-fill polyester, the material shall be tested and shall meet the criteria for resistance to fungi as specified in ICC-ES AC187, Sec.3.2.6.

6. **Corrosiveness.**

For loose-fill cellulose and loose-fill polyester, the material shall be tested and shall meet the criteria corrosiveness as specified in paragraph 9 of ASTM C 739.

For loose-fill mineral fiber, the material shall be tested for corrosiveness as specified ASTM C 1617.

For loose-fill polyester, the material shall be tested and shall meet the criteria for corrosiveness as specified in ICC-ES AC187, Sec.3.2.5.

7. **Odor emission.**

Unless stated otherwise in this subsection, the material shall be tested and shall meet the criteria for odor emission as specified in paragraph 7.1 of ASTM C 1304.

For loose-fill cellulose, the material shall be tested and shall meet the criteria for odor emission as specified in paragraph 13 of ASTM C 739.

For loose-fill mineral fiber, the material shall be tested and shall meet the criteria for odor emission as specified in paragraph 12.6 of ASTM C 764.

For loose-fill polyester, the material shall be tested and shall meet the criteria for odor emission as specified in ICC-ES AC187, Sec.3.2.4.

8. **Identification.**

(A) **Loose-fill cellulose.** Each insulation container shall be marked with: whether the loose-fill cellulose is a pouring or pneumatic type, its net



weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the 2013 California Electrical Codes Section 410.116 Clearance and Installation.

Insulation which may be used for pressure fill retrofit wall application shall be marked with the recommended wall density to prevent settling and separately marked with the tested thermal performance for such applications.

- (B) **Loose-fill mineral fiber.** Each insulation container shall be marked with: whether the loose-fill mineral fiber is a pouring or pneumatic type, its net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the 2013 California Electrical Codes Section 410.116 Clearance and Installation.

Products which may be used for pressure fill wall application shall be marked with the recommended wall density to prevent settling and shall be separately marked with the tested thermal performance for such applications.

- (C) **Loose-fill perlite.** Each insulation container shall be marked with: whether the loose-fill perlite is a pouring or pneumatic type, its net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the 2013 California Electrical Codes Section 410.116 Clearance and Installation.

Products which may be used for pressure fill wall application shall be marked with the recommended wall density to prevent settling and shall be separately marked with the tested thermal performance for such applications.

- (D) **Loose-fill vermiculite.** Each insulation container shall be marked with: whether the loose-fill vermiculite is a pouring or pneumatic type, its net weight and the manufacturer's recommendations for installation including minimum thickness, maximum coverage and design density to provide the levels of thermal performance shown. Manufacturer's installation recommendations shall include precautions according to the 2013 California Electrical Codes Section 410.116 Clearance and Installation.

Products which may be used for pressure fill wall application shall be marked with the recommended wall density to prevent settling and shall be separately marked with the tested thermal performance for such applications.

### **(g) RADIANT BARRIERS OR REFLECTIVE INSULATIONS**

This section covers the testing of products having performance related to low-emittance surface. These products include but are not limited to: reflective insulations, radiant barriers, interior radiation control coatings, low-emittance coatings and paint additives.

#### **1. Composition.**

Reflective insulation shall be made and manufactured as defined in Section 5 of ASTM C 1224.

Radiant barrier insulation shall be made and manufactured as defined in Section 5 of ASTM C 1313.

#### **2. Thermal performance.** The thermal emittance of radiant barriers shall be determined as indicated below. The thermal emittance and R-value for reflective insulation systems shall be obtained as indicated below:

##### **(A) Thermal emittance.**

The thermal emittance of all products in this classification shall be tested in accordance with ASTM C 1371 to obtain total hemispherical emittance. If limitations require testing by E 408, then the results shall be converted to hemispherical emittance using published correlations.

##### **(B) R-value.**

Reflective insulation systems with more than one sheet, and single sheet systems of metal foil or metalized film must be tested with ASTM C 1363 in a test panel constructed according to ASTM C 1224 and under the test conditions specified in ASTM C 1224. For framed assemblies, a 25% framing percentage shall be used. To get the R-value from the results of those tests, the manufacturer shall use the formula specified in ASTM C 1224.

#### **3. Size.** Layers of insulation composed of unsupported aluminum foil that is exposed shall have a minimum thickness of 0.0004 inch. Unsupported aluminum foil that is sandwiched in a multilayer sheet shall have a minimum thickness of 0.00035 inch. Aluminum foil bonded to kraft paper shall have a minimum thickness of 0.00025 inch.

4. **Resistance to combustion.**

The radiant barrier and reflective insulation shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product.

5. **Adhesive performance.**

(A) **Bleeding.**

The material shall be tested and shall meet the criteria for bleeding as specified in section 6.5.1 of ASTM C 1224 or section 7.2.6.1 of ASTM C 1313.

(B) **Pliability.**

The material shall be tested and shall meet the criteria for pliability as specified in section 6.5.2 of ASTM C 1224 or section 7.2.6.2 of ASTM C 1313.

6. **Fungi resistance.** The material shall be tested and shall meet the criteria for fungi resistance as specified in section 6.6 of ASTM C 1224 or section 7.2.7 of ASTM C 1313.

7. **Humidity Resistance.**

Reflective Insulation shall be tested and shall meet the criteria for corrosion and delamination as specified in section 6.4 of ASTM C 1224.

Radiant barriers shall be tested and shall meet the criteria for corrosivity as specified in section 7.2.4 of ASTM C 1313.

**(h) SPRAY APPLIED FIBROUS INSULATION**

This section covers the testing of the spray and field applied forms of materials including, but not limited to, fiber glass, cellulose and wool.

1. **General requirements.**

For self-supported spray-applied cellulose, the tests shall be performed on a sample with the density determined pursuant to ASTM C 1149.

For self-supported, spray-applied cellulose, and stabilized cellulose, the tests shall be done on samples that fully reflect the effect of settling on the product's R-value.

2. **Composition.**

Spray-applied cellulose shall be made and manufactured as defined in Section 4 of ASTM C 1149. The added chemicals shall not create a health hazard. The basic material shall be processed into a form suitable for installation by pneumatic conveying equipment and simultaneous mixing with water and/or adhesive at the spray nozzle.

Spray-applied mineral fiber shall be made and manufactured as defined in Section 4 of ASTM C 1014.

3. **Thermal performance.**

Stabilized spray-applied cellulose. Determination of the thermal performance shall be in accordance with Section 5.8 of ASTM C 1497, using ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114 at the manufacturer's or tester's option.

Self-Supported spray-applied insulation. Determination of the thermal performance shall be in accordance with Section 4.3 of ASTM C 1149, using ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114, at the manufacturer's or tester's option.

4. **Resistance to combustion.**

All spray-applied fibrous insulation shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product

5. **Corrosiveness.**

For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for corrosiveness as specified in Section 4.80 of ASTM C 1149.

For stabilized spray-applied cellulose, the material shall be tested and shall meet the criteria for corrosiveness as specified in Section 5.2 of ASTM C 1497.

For spray-applied mineral fiber, the material shall be tested and shall meet the criteria for corrosiveness as specified in ASTM C 1014, Sec 9.9.

6. **Bond strength.** For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for bond strength as specified in Section 4.5 of ASTM C 1149. This test procedure is not required of products that are installed in such a manner that physical restrictions imposed by the

construction elements preclude any possibility of subsequent delamination, erosion, or dusting and the product is identified only for such installations.

7. **Bond deflection.**

For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for bond deflection as specified in Section 4.12.1 of ASTM C 1149.

For spray-applied mineral fiber, the material shall be tested and shall meet the criteria for bond deflection as specified in Section 9.9 of ASTM C 1014.

These test procedures are not required of products that are installed in such a manner that physical restrictions imposed by the construction elements preclude any possibility of subsequent delamination, erosion, or dusting and the product is identified only for such installations.

8. **Air erosion.** For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for air erosion as specified in Section 4.12.2 of ASTM C 1149. This test procedure is not required of products which are installed in such a manner that physical restrictions imposed by the construction elements preclude any possibility of subsequent delamination, erosion, or dusting and the product is identified only for such installations.

9. **Odor emission.**

For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for odor emission as specified in Section 4.10 of ASTM C 1149.

For stabilized spray-applied cellulose, the material shall be tested and shall meet the criteria for odor emission as specified in Section 5.6 of ASTM C 1497.

For spray-applied mineral fiber, the material shall be tested and shall meet the criteria for odor emission as specified in Section 9.11 of ASTM C 1014.

For spray-applied mineral fiber, the material shall be tested and shall meet the criteria for odor emission as specified in Section 9.8 of ASTM C 1014.

10. **Fungi resistance.**

For self-supported spray-applied cellulose, the material shall be tested and shall meet the criteria for resistance to fungi as specified in Section 4.11 of ASTM C 1149.

For stabilized spray-applied cellulose, the material shall be tested and shall meet the criteria for resistance to fungi as specified in Section 5.4 of ASTM C 1497.

For spray-applied mineral fiber, the material shall be tested and shall meet the criteria for resistance to fungi as specified in Section 9.8 of ASTM C 1014.

11. **Water vapor permeance.** Water vapor permeance shall be determined using the Desiccant Method of ASTM E 96.

**(i) SPRAY OR FIELD APPLIED FOAM**

This section covers the testing of the spray and field applied forms of materials including, but not limited to, polyisocyanurate, polystyrene, polyurethane, polyimide, phenolic foam and urea formaldehyde foam.

The responsibility for use and specification for urea formaldehyde foam was retained by the CEC and is described in CCR Title 20, Chapter 4, Article 3, sections 1551- 1565.

1. **Composition**

Closed cell spray polyurethane foam shall be made and manufactured as defined in Section 6 of ASTM C 1029.

2. **Thermal performance.**

Determination of the thermal performance shall be in accordance with ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114, or in accordance with the thermal resistance measurement requirements of the applicable standard material specification at the manufacturer's or tester's option. All foam insulation materials using materials other than air as an expanding agent shall be conditioned prior to R-value testing by one of the following methods:

- (A) Condition samples at  $73.4^{\circ} \pm 2^{\circ}\text{F}$  and a relative humidity of  $50 \pm 5$  percent for a period of  $180 \pm 5$  days;
- (B) Condition samples at  $140^{\circ}\text{F} \pm 2^{\circ}\text{F}$  dry heat for a period of at least 90 days.
- (C) Follow ASTM C 1303 or CAN/ULC S770 when claiming LTTR.

3. **Resistance to combustion.**

Spray-applied plastic foams shall be tested and meet the criteria of Sections 2603.1-2603.6 of the CBC

Insulating material which is recognized by an approved product evaluation agency as complying with Sections 2602.1-2602.9 of the CBC shall be deemed to comply with this subsection.

4. **Identification.** Foam containers shall be marked or labeled with the conditions of proper storage.

#### **(j) STRUCTURAL PANELS AND SHEATHING**

This section covers the testing of the panel form of materials including, but not limited to, structurally insulated panels, insulated metal panels, insulated concrete forms and structural insulated sheathing.

##### **1. Thermal performance.**

For structural insulated panels (SIPS), structural insulated sheathing (SIS) and Insulated metal panels having the construction described above, determination of the thermal performance shall be in accordance with ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114, at the manufacturer's or tester's option.

If the panel is of a different construction than specified in Appendix 4 of Title 24, Part 6, the overall U-factor shall be determined using ASTM C 1363. The sample shall be assembled with screws and other fasteners used in practice or installation.

##### **2. Resistance to combustion.**

SIPS, SIS and Insulated metal panels shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product.

#### **(k) TUBULAR INSULATION**

This section covers the testing of the tubular (pipe) form of materials including, but not limited to, fiber glass, mineral fiber, ceramic fiber, polyimide, calcium silicate, elastomeric (rubber), melamine foam, molded expanded perlite, extruded polystyrene (fabricated from billets), and polyisocyanurate (fabricated from billets).

All pipe insulation and pipe coverings in plenums shall comply with the CMC.

## 1. **Composition.**

Calcium silicate pipe insulation shall be made and manufactured as defined in Section 5 of ASTM C 533. Asbestos shall not be used as an ingredient or component.

Cellular glass pipe shall be made and manufactured as defined in Section 6 of ASTM C 552 and fabricated according to ASTM C 1639.

Cellular polyolefin tubular form shall be made and manufactured as defined in Section 5 of ASTM C 1427.

Elastomeric tubular form shall be made and manufactured as defined in Section 5 of ASTM C 534/C 534M.

Melamine foam pipe insulation shall be made and manufactured as defined in ASTM C 1410.

Mineral fiber pipe (rock, slag, glass) shall be made and manufactured as defined in Section 5 of ASTM C 547 or Section 6 of ASTM C 592 or Section 6 of ASTM C 1393. Asbestos shall not be used as an ingredient or component.

Molded expanded perlite pipe insulation shall be made and manufactured as defined in ASTM C 610.

Phenolic pipe insulation shall be made and manufactured as defined in Section 6 of ASTM C 1126.

Polyimide board shall be made and manufactured as defined in Section 5 of ASTM C 1482 or Section 5 of ASTM C 1594. The theoretical mole fraction of imide bonds must be greater than the theoretical mole fraction of amide bonds.

Polyisocyanurate shall be made and manufactured as defined in Section 6 of ASTM C 591.

Polystyrene pipe insulation shall be made and manufactured as defined in Section 6 of ASTM C 578.

## 2. **Thermal performance.**

Insulation apparent thermal conductivity shall be determined in accordance with ASTM C 335, ASTM C 177, ASTM C 1363, ASTM C 518, or ASTM C 1114, at the manufacturer's or tester's option. Insulation apparent thermal conductivity shall be determined at the mean temperatures of 75°F for temperatures below 105°F, 100°F for



temperatures between 105°F and 201°F and 150 °F for temperatures between 201°F and 250°F. Apparent thermal conductivity shall be rounded to the nearest 1/100 Btu-inch per hour per square foot per °F.

3. **Resistance to combustion**

All tubular insulation shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product

4. **Size.** The thickness shall be determined according to ASTM C 302.

5. **Water vapor sorption.** Water vapor sorption of mineral fiber or open-cell insulation shall be determined according to ASTM C 1104/C 1104M. Water absorption of closed cell foam insulation products shall be determined according to ASTM C 272, Procedure A.

6. **Water vapor permeance.** Water vapor permeance shall be determined using the Desiccant Method of ASTM E 96.

**(I) VACUUM PANELS AND GAS-FILLED PANELS**

This section covers the testing of vacuum panel form of materials including, but not limited to, panels with an evacuated core.

1. **Composition.**

The vacuum panel shall meet all specifications described in ASTM C 1484.

Gas-filled panels are filled with low-thermal conductivity gas to achieve thermal resistance.

2. **Thermal performance.**

Determination of the thermal performance of vacuum panels shall be in accordance with ASTM C 1484, Sec. 11.4, using ASTM C 177 or ASTM C 518, at the manufacturer's or tester's option.

The thermal resistance of gas-filled panels shall be determined in accordance with ASTM C 518 or ASTM C 1363.

3. **Resistance to combustion.**

The vacuum panels and the gas-filled panels shall meet the CBC section 720 flammability resistance tests and criteria required for the end use of the product.

**Authority:** Sections 19034 and 19164, Business and Professions Code.

**Reference:** Sections 19018, 19019, 19020, 19021, 19022, 19034, 19164, and 19165, Business and Professions Code.

## APPROVAL OF TESTING LABORATORIES

### Sec. 12-13-1554.

~~(a) Except as provided in subsection (b), laboratories shall be approved using the procedures described in the Criteria for the Approval of Testing Laboratories, dated October 27, 1978. The Executive Director shall approve any laboratory that meets the standards described in the Criteria for the Approval of Testing Laboratories, dated October 27, 1978. A testing laboratory shall have the right to appeal to the full Commission any denial of approval by the Executive Director.~~

~~(b) Up to and including September 30, 1982, laboratories shall be approved either upon accreditation by the United States Department of Commerce National Voluntary Laboratory Accreditation Program or as stated in the preceding paragraph, at the manufacturer's option. After September 30, 1982, laboratories shall only be deemed approved by the Bureau upon accreditation by the United States Department of Commerce National Voluntary Laboratory Accreditation Program and its MRA signatories.~~

**Authority:** Section 25218(e), Public Resources Code 19034, Business and Professions Code.

**Reference:** Sections 25915(a) and 25921, Public Resources Code 19018, 19021 and 19165, Business and Professions Code.

Reference: Sections

## CERTIFICATION

### Sec. 12-13-1555.

~~(a) No insulating material shall be sold or installed in California on or after September 22, 1981, unless the manufacturer has certified that the material complies with the provisions of this article.~~

~~(b) The manufacturer shall submit a certification statement to the Executive Director Bureau for each type of insulating material. Such statement shall contain the following information:~~

- ~~1. Name of the manufacturer.~~
- ~~2. A description of the type of insulating material being certified in sufficient detail to permit its identification. The description may include information sheets, brochures, a sample label for the product or similar information.~~
- ~~3. Test results from an approved laboratory. Such tests shall have been conducted within two years of product's submittal for certification.~~
- ~~4. A description of the basis for ensuring that all the insulating material of the type being certified complies with the requirements of this article. Such description shall~~

include, but not be limited to a description of the frequency of testing of the material, the quality assurance program, and any third-party inspections or testing used by the manufacturer.

5. A declaration that the insulating material complies with the requirements of this article.

6. The wording of the certification seal, if such seal consists of a statement pursuant to Section 12-13-1557 (b) (2) of this article.

(c) Every certification statement shall be dated and signed by the manufacturer attesting to its truth and accuracy. Where the manufacturer is either a corporation or a business association, the certification statement shall be dated, signed and attested to by a ~~responsible official thereof~~ representative with authority to do so.

~~(d) Within 45 days after receipt of a certification statement, the Executive Director shall forward, to the manufacturer, an acknowledgment that the statement has been received and that it is complete and accurate on its face.~~

~~(e) Certification of the insulation material shall be deemed to occur upon forwarding of the acknowledgement by the Executive Director. If acknowledgment is not forwarded in a timely manner, certification shall be deemed to occur on the 45th day after receipt of the certification statement.~~

~~(f) The statement of test results required in the certification may be based upon tests conducted prior to the adoptive date of this article if: (1) the same test was conducted within two years of the date of adoption, (2) the laboratory at which the tests were conducted has been approved for those tests as of the date of the certification statement, and (3) the laboratory certifies that the test and product are the same as the test and product referred to in the statement of test results.~~

**Authority:** Sections 25218(e), Public Resources Code 19034 and 19164, Business and Professions Code.

**Reference:** Sections 25921 and 25921.1, Public Resources Code 19018, 19021, 19022, 19164 and 19165, Business and Professions Code.

## QUALITY ASSURANCE (Reserved)

### Sec. 12-13-1556

**Authority:** Section 25218 (e), Public Resources Code

**Reference:** Section 25921.1, Public Resources Code

## IDENTIFICATION

### Sec. 12-13-1557.

(a) Except as specified in subsection (b), Item 32, of this section, no insulation shall be sold or installed in California ~~on or after September 22, 1981~~, unless the insulating material, container, bundle or similar packaging material bears a visible ~~Commission~~ Bureau approved statement certifying that a representative sample of the insulation

material has been tested and approved by an approved laboratory and complies with the requirements of this article.

(b) The ~~Commission~~Bureau-approved statement shall consist of either:

1. A design or statement approved by the ~~Executive Director~~Bureau,  
or

2. An identification of the manufacturer and ~~any~~ statement that the material meets the quality standards of the State of California.

~~3.~~—A statement that the material meets the quality standards of the State of California included in the bill of lading shall ~~meet~~fulfill the requirements of this section only if either the product is being shipped in bulk, or the container or product is not otherwise labeled by the manufacturer and the product is being sold to its ultimate user.

(c) Any representation of thermal performance which appears on any label, literature, advertising or any other writing intended for the public shall be consistent with the certification testing results and derating required by this article.

(d) Any insulation with facings and membranes for which the flame spread index exceeds 25 when tested with facings and membranes exposed to the flame during the ~~ANSI/ASTM E 84-79~~ or UL 7223 tests must be clearly labeled with a statement that the product may be highly combustible if used in an exposed application. This subsection shall not apply to any product meeting the requirements of Sections 2602.1-2602.6 of the 1994 ~~Uniform Building Code~~CBC.

**Authority:** Section ~~25218(e)~~, ~~Public Resources Code~~ 19034, ~~Business and Professions Code~~.

**Reference:** Sections ~~25921~~, ~~Public Resources Code~~ 19164 and 19165, ~~Business and Professions Code~~.

## **GENERAL LABELING REQUIREMENTS**

### **Sec. 12-13-1557.10**

All insulation and radiant barriers tested and certified by the Bureau shall have a label or mark of the tested thermal performance or thermal emittance, as appropriate, on the installed insulation and packages of insulation and radiant barriers.

The label for all insulation and radiant barrier packages of insulation must contain, at a minimum, the following:

(1) The type of insulation.

(2) The license number assigned or approved by the Bureau.

(3) The product identification code as given to the Bureau for use in the Directory of Certified Insulation Materials.

(4) All of the disclosures required by Section 460.12 of Title 16 of the Code of Federal Regulations.

(5) Any information required by the CBC and CMC for a particular product.

(6) The tested thermal performance or thermal emittance, as appropriate.

**Authority cited:** Section 19034, Business and Professions Code.

**Reference:** Sections 19164 and 19165, Business and Professions Code.

## INSPECTIONS

### **Sec. 12-13-1558.**

~~After September 22, 1981, the Bureau~~ Commission may, upon the consent of the owner or lessee, or upon securing a search warrant, have access to and inspect, during normal working hours, to the premises of manufacturers, distributors and retailers of insulating material sold for installation within the state for the purpose of determining compliance with the standards promulgated pursuant to Chapter 10.5 of the ~~California Public Resources Code~~ Home Furnishings and Thermal Insulation Act and any regulations adopted thereto. Such access shall be for the purposes of obtaining representative samples of subject insulation and inspecting records and documents pertaining to tests by approved testing labs.

**Authority:** Sections 25218 (e), Public Resources Code 19004.1, 19031, 19034, 19164 and 19200, Business and Professions Code.

**Reference:** Sections 25926, Public Resources Code 19164 and 19200.5, Business and Professions Code.

## PERFORMANCE TESTS

### **Sec. 12-13-1559.**

The ~~Commission~~ Bureau may conduct, or may contract with others to conduct, independent performance tests of representative samples of insulation sold in the state to determine compliance with standards adopted pursuant to Chapter 10.5 of the ~~California Public Resources Code~~ the Home Furnishings and Thermal Insulation Act and any regulations adopted thereto. Such tests shall form the basis for instituting enforcement proceedings.

**Authority:** Sections 25218 (e), Public Resources Code 19034, 19164 and 19200, Business and Professions Code.

**Reference:** Sections 25926, Public Resources Code 19164, 19165, 19200.5 and 19213, Business and Professions Code.

## **COSTS OF INSPECTION AND TESTING (Reserved)**

### **Sec. 12-13-1560.**

The Bureau may require manufacturers, distributors, or retailers that are inspected and found not in compliance with this article to pay fees to cover the costs of inspections and testing necessary to investigate and enforce compliance. These fees shall be fixed to a minimum of \$200.00 and a maximum of \$500.00 per inspection.

**Authority:** Sections 19034, 19164, 19165 and 19213, Business and Professions Code,

**Reference:** Sections 19200.5, 19213, Business and Professions Code.

## **ENFORCEMENT (Reserved)**

### **Sec. 12-13-1561.**

(a) Failure to comply with any provisions of this chapter shall constitute grounds for discipline pursuant to Section 19210 of the Business and Professions Code.

(b) The Bureau chief or his or her designee may issue an order requiring the manufacturer to withhold from sale or destroy, statewide, any article or articles found to be in violation of this article.

**Authority:** Sections 19034, Business and Professions Code

**Reference:** Sections 19004.1, 19202, 19203, 19204, 19208, 19209, 19210 19212, and 19213 Business and Professions Code.

## **CITATIONS**

### **Sec. 12-13-1561.10**

The chief of the Bureau is authorized to determine when and against whom a citation will be issued and to issue citations containing orders of abatement, fines, or both, for violations of this chapter. The citations that contain fines shall not exceed two thousand five hundred dollars (\$2,500) for each violation. Each citation shall be in writing and shall describe with particularity the nature and facts of each violation, including a reference to the statute(s) or regulation(s) alleged to have been violated. The citation shall inform the cited person of the right to contest the citation, that hearing shall be requested by written notice to the Bureau within 30 days of the issuance of the citation. The citation shall be served upon the cited person personally or by certified mail.

**Authority:** Sections 125.9 and 19034, Business and Professions Code.

**Reference:** Sections 19208, 19209, 19210, 19212 and 19214, Business and Professions Code.

## CITATION FACTORS

### Sec. 12-13-1561.20.

In assessing an administrative fine or issuing an order of abatement, the Chief shall consider the following factors:

- (a) The nature and severity of the violation.
- (b) The good or bad faith exhibited by the cited person.
- (c) The history of previous violations of the same or similar nature.
- (d) Evidence that the violation was or was not willful.
- (e) The extent to which the cited person has cooperated with the Bureau's investigation.
- (f) The extent to which the cited person has mitigated or attempted to mitigate any damage or injury caused by the violation.
- (g) Any other factors as justice may require.

**Authority:** Sections 125.9 and 19034, Business and Professions Code.

**Reference:** Sections 19208, 19209, 19210 and 19212, Business and Professions Code.

## COMPLIANCE WITH CITATION / ORDER OF ABATEMENT

### Sec. 12-13-1561.30.

- (a) If a cited person who has been issued an order of abatement is unable to complete the correction within the time set forth in the citation because of conditions beyond his or her control after the exercise of reasonable diligence, the cited person may request an extension of time in which to complete the correction from the Bureau chief. Such a request shall be in writing and shall be made within the time set forth for abatement.
- (b) If a citation is not contested, or if the citation is contested and the cited person does not prevail, failure to abate the violation or to pay the assessed fine within the time allowed shall constitute a violation and a failure to comply with the citation or order of abatement.
- (c) Failure to timely comply with an order of abatement or pay an assessed fine may result in disciplinary action being taken by the Bureau or other appropriate judicial action being taken against the cited person.

**Authority:** Sections 125.9 and 19034, Business and Professions Code.

**Reference:** Sections 19208, 19209, 19210, 19212 and 19214, Business and Professions Code.

## CONTESTED CITATIONS AND REQUEST FOR A HEARING OR INFORMAL CITATION CONFERENCE

### Sec. 12-13-1561.40.

(a) If a cited person wishes to contest the citation, assessment of the administrative fine, or order of abatement, the cited person shall, within thirty (30) days after service of the citation, file in writing a request for an administrative hearing to the Bureau chief regarding the acts charged in the citation.

(b) In addition to or instead of requesting an administrative hearing, the cited person may, within 30 days after service of the citation, contest the citation by submitting a written request for an informal citation conference to the bureau chief or his/her designee.

(c) Upon receipt of a written request for an informal citation conference, the bureau chief or his/her designee shall, within 30 days, hold an informal citation conference with the cited person. The cited person may be accompanied and represented at the informal citation conference by an attorney or other authorized representative.

(d) If an informal citation conference is held, the request for an administrative hearing shall be deemed to be withdrawn and the bureau chief or his/her designee may affirm, modify or dismiss the citation, including any fine levied or order of abatement issued, at the conclusion of the informal citation conference. If affirmed or modified, the citation originally issued shall be considered withdrawn and an affirmed or modified citation, including reasons for the decision, shall be issued. The affirmed or modified citation shall be mailed to the cited person and his/her counsel, if any, within 10 days from the date of the informal citation conference.

(e) If a cited person wishes to contest an affirmed or modified citation, the cited person shall, within 30 days after service of the citation, contest the affirmed or modified citation by submitting a written request for an administrative hearing, to the Bureau chief or his or her designee. An informal citation conference shall not be held on affirmed or modified citations.

**Authority:** Sections 125.9, 19034, 19164 and 19214, Business and Professions Code.

**Reference:** Sections 19208, 19209, 19210 and 19214, Business and Professions Code.

## **RELEASE OF INFORMATION**

### ~~Sec. 12-13-1562.~~

~~Persons submitting information to the Commission who wish information to be kept confidential shall comply with the provisions of Sections 2501-2511 of the Public Resources Code.~~

~~**Authority:** Section 25218(e), Public Resources Code.~~

~~**Reference:** Sections 25223 and 25921.1, Public Resources Code.~~



## LIABILITY

### ~~Sec. 12-13-1563.~~

~~Nothing in this article shall be construed as imposing responsibility on manufacturers for misuse of properly labeled insulation.~~

~~Authority:~~ Section 25218(e), Public Resources Code.

~~Reference:~~ Sections 25926 and 25931, Public Resources Code.

## INSULATING EXISTING BUILDINGS

### ~~Sec. 12-13-1564.~~

~~(a) On or after March 25, 1982, if insulating material is installed in an existing building, in any of the applications specified in California Code of Regulations, Title 24, Part 6, Section 118, the installing contractor shall certify that the amount of insulation installed meets or exceeds the requirements of Part 6, Section 118 for that application. Such certification shall be made on completion of the installation by posting in a conspicuous location a certificate signed under penalty of perjury. The certificate shall state the manufacturer's name and material identification, the thermal resistance (R-value) of the newly installed insulation, the estimated R-value of the original insulation, the total R-value, and (in application of loose fill insulation) the minimum contractor installed weight per square foot. This installed weight per square foot shall conform with the manufacturer's installed design density per square foot at the manufacturer's labeled R-value.~~

~~(b) Water heater insulation kits. No water heater insulation kit shall be sold, on or after March 25, 1982, unless it has a thermal resistance of at least R-6 and is so identified. Each water heater insulation kit sold shall include instructions which are equivalent to the Department of Energy standard practice for the installation of insulation on gas-fired, oil-fired and electric resistance water heaters, 44 Fed. Reg. pages 64703-64705.~~

~~Authority:~~ Section 25922, Public Resources Code.

~~Reference:~~ Section 25922, Public Resources Code.

## INTERPRETATION

### ~~Sec. 12-13-1565.~~

~~The General Counsel of the Commission shall make a determination as to the application or interpretation of any provision of this article to any person requesting such a determination. Any such request shall be submitted in writing to the Commission. The Commission shall make written replies to such inquiries and shall widely publish interpretations that have broad application or interest.~~

~~Authority:~~ Section 25218 (e), Public Resources Code.

~~Reference:~~ Sections 25920 and 25922, Public Resources Code.