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NAVFAC IGS-07214 (APRIL 2003)  
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Preparing Activity: LANTNAVFACENGCOM Based on UFGS-07214N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

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SECTION 07214

BOARD AND BLOCK INSULATION

04/03

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NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

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NOTE: This guide specification covers requirements for board and block thermal insulation. It is intended for both retrofit of existing buildings and new construction.

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NOTE: Specify board-type insulations for masonry and concrete walls and under concrete floor slabs. Also specify board-type insulation where the type of construction favors their economical usage and their application would be less difficult than blanket or loose fill insulations.

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NOTE: The following information must be indicated on the drawings:

1. Locations where insulation will be used.
2. Thermal resistance value (R-Value) for each location.
3. Location of vapor retarder, if required.
4. Method of attachment of insulation board.
5. Location and size of attic ventilation openings where required.

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NOTE: Attic Ventilation

1. Provide net, unobstructed attic ventilation areas over insulated ceilings as recommended by ASHRAE Handbook of Fundamentals, Chapter 21, and as follows:
2. For attics with vapor retarder, provide 0.1 square meter one square foot of net ventilation area for each 30 square meters 300 square feet of attic floor area.
3. For attics without vapor retarder, provide 0.1 square meter one square foot of net ventilation area for each 15 square meters 150 square feet of attic floor area.
4. For insulation of cathedral ceilings, provide at least a 50 mm 2 inch gap between upper face of insulation and underside of roof sheathing. Provide ventilation openings at bottom and top of ventilated cavity; show on drawings.

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Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the technical proponents, including their organization designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

INTERNATIONAL STANDARDS ORGANIZATION (ISO)

ISO 844	(2001) Cellular Plastics - Compression Test of Rigid Materials
ISO 845	(1988) Cellular Plastics and Rubber - Determination of Apparent (Bulk) Density

ISO 1209-1	(1990) Cellular Plastics, Rigid - Flexural Tests - Part 1: Bending Test
ISO 1663	(1999) Cellular Plastics - Determination of Water Vapor Transmission Rate of Rigid Materials
ISO 2796	(1986) Cellular Plastics, Rigid - Test for Dimensional Stability
ISO 2896	(2001) Rigid Cellular Plastics - Determination of Water Absorption
ISO 4898	(1984) (Addenda 1 and 2; Amendment 4) Cellular Plastics - Specification for Rigid Cellular Materials Used in the Thermal Insulation of Buildings
ISO 7616	(1986) Cellular Plastics, Rigid - Determination of Compressive Creep Under Specified Load and Temperature Conditions First Edition
ISO 8145	(1994) Thermal Insulation - Mineral Wool Board for Over-Deck Insulation of Roofs - Specification
ISO 8301	(1991) Thermal Insulation - Determination of Steady-State Thermal Resistance and Related Properties - Heat Flow Meter Apparatus First Edition

#### LEGISLATIVE DECREES

DL 494	(1996) Implementation of Instruction 92/57/CEE Concerning the Minimum Safety and Health Requirements to be Accomplished in Temporary or Mobile Work Sites
DL 626	(1994) Application of Several European Union Directives Regarding for Improving the Safety and Health of Workers on the Work Site

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 31	(2001) Standard for the Installation of Oil-Burning Equipment
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#### 1.2 SUBMITTALS

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NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item is required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

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Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-03 Product Data

Block or board insulation

Vapor retarder

Pressure sensitive tape

Protection board or coating

Accessories

SD-08 Manufacturer's Instructions

Block or Board Insulation

Adhesive

Instructions

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Deliver materials to the site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.3.2 Storage

Inspect materials delivered to the site for damage; unload and store out of

weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

#### 1.4 SAFETY PRECAUTIONS

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**NOTE: Include the first paragraph below only for installations in which mineral fibers are released into the atmosphere, such as where mineral fiber boards are cut on the job site.**  
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##### 1.4.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, in accordance with DL 494 and DL 626.

##### 1.4.2 Other Safety Considerations

Consider safety concerns and measures as outlined in DL 494 and DL 626.

### PART 2 PRODUCTS

#### 2.1 BLOCK OR BOARD INSULATION

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**NOTE: Select type of insulation board based on job and application requirements regarding strength, vapor retardancy, and water absorption, and on manufacturer's recommendations.**  
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Provide only thermal insulating materials recommended by manufacturer for type of application indicated. Provide board or block thermal insulation as listed below, conforming to the following standards and the physical properties listed in [Table 1][ and ][Table 2]:

- [a. Rigid Cellular (RC), closed cell: ISO 4898]
  - [1. Molded Polystyrene (RC/PS-M), Category [I][ ]].
  - [2. Extruded Polystyrene (RC/PS-E) Category [I][ ]].
  - [3. Polyurethane, made with isocyanates (RC/PUR)Category [ ]].

Products manufactured by the following meet the requirements of this specification. Equivalent products by other manufacturers meeting the specifications are also acceptable.

Fibrotermica, S.r.l.  
Via A. Gasperi, 7  
42026 Canossa (RE)  
Tel: 0522/878 321

Fax: 0522/878 966

ISOTIF  
Stif, S.p.A.  
Via Brentelle, 11  
31037 Ramon di Loria (TV)  
Tel: 0423/48 5841  
Fax: 0423/45 6176

Owens Corning Polypan  
Polypan Nord, S.p.A.  
Strada Settimo, 399/11  
10156 Torino (TO)  
Tel: 011/273 4944  
Fax: 011/273 3791

Lafarge Gessi  
Via G. Winckelmann, 2  
20146 Milano (MI)  
Tel: 02/42 4151  
Fax: 02/42 41 5350

Poliespanso S.r.l.  
via Vespucci, 10  
46030 Valdoro (MN)  
Tel: 0376/37 0390  
Fax: 0376/37 2719

Termolan, S.r.l.  
Via Monte Santo, 46  
42021 Bibbiano (RE)  
Tel: 0522/88 2154  
Fax: 0522/88 1196

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**NOTE: Not all manufacturers make all products listed. Consult product literature prior to inclusion of manufacturer.**  
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- b. Cellular Glass. Products manufactured by the following meet the requirements of this specification. Equivalent products by other manufacturers meeting the specifications are also acceptable:

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**NOTE: The following may be only supplier of cellular glass products in Italy. Consult with project manager prior to using sole-source products.**  
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Foamglass [T2] [S3]  
Habitema S.p.A.  
Viale virgilio, 58N  
41100 Modena

Tel: 059/84 8797  
Fax: 059/84 8847

[c. Mineral Fiber Block and Board ISO 8145. Products manufactured by the following meet the requirements of this specification. Equivalent products by other manufacturers meeting the specifications are also acceptable:

Lana di Roccia S.p.A. (rock wool)  
Zona Industriale  
09016 Iglesias (CA)  
Tel: 0781/21345  
Fax: 0781/21327

Lafarge Gessi  
Via G. Winckelmann, 2  
20146 Milano (MI)  
Tel: 02/42 4151  
Fax: 02/42 41 5350

Knauf  
Via Postioma 59  
31050 Villorba (TV)  
Tel: 0422/6175  
Fax: 0422/60 8696

ISOVER  
Balzaretti Modiglianai, S.p.a.  
Via Romagnoli, 6  
20146 Milano  
Tel: 02/42 431  
Fax: 02/412 0325]

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**NOTE: Physical property requirements for rigid cellular, closed cell thermal insulating materials are organized into categories based on application:**

**Category I - Non-load-bearing applications (cavity walls, vented roofs, etc.)**

**Category II - Limited load-bearing applications (built-up roofs, floors where elevated temperatures may be encountered and resistance to compressive creep is required).**

**Category III - Load bearing applications (parking decks, cold storage floors requiring a higher level of compressive strength and compressive creep resistance).**

**These property categories are further divided into sub-categories (A, B and C) based on thermal conductivity. Refer to charts below.**

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Table 1 - Properties of RC/PS types M and E used for thermal insulation of building

Properties	Unit	Category (5.1) and subcat. (5.2)						Test Method
		I	II		III			
			A	B	A	B	C	
Density (min.) <sup>1</sup>	kg/m <sup>3</sup>	15	20	20	30	30	30	ISO 845
Compressive strength or compressive stress at 10% deformation (min.)	kPa	50	100	100	150	150	150	ISO 844
Thermal conductivity (max.)								
10 <sup>0</sup> C mean/28 days min.	mW/(m*k)	37	34	37	28	32	37	ISO 8301
or								
23 <sup>0</sup> C mean/28 days min.		39	36	39	29	34	39	ISO 8301
Dimensional change after 48 h at 70 <sup>0</sup> C (max.)	%	5	5	5	5	5	5	ISO 2796 as modified in 8.5.1
Compressive creep (max.) after 48 h at 80 <sup>0</sup> C under 20 kPa load	%	--	5	5	--	--	--	ISO 7616 as modified in 8.5.2
Compressive creep (max.) after 7 days at 70 <sup>0</sup> C under 40 kPa load	%	--	5	5	--	--	--	ISO 7616 as modified in 8.5.3
Water vapor permeability <sup>2)</sup>	ng/							
23 <sup>0</sup> C/0 to 50% r.h.	Pa*s*m	9,5 to 3,5	4,5 to 0,5		2,0 to 0,5		4,5 to 1,0	ISO 1663
Water absorption (max.) <sup>3</sup>	%(V/V)	6	4	4	2	2	2	ISO 2896 as modified in 8.5.3
Fusion quality (bending load at								

Table 1 - Properties of RC/PS types M and E used for thermal insulation of building break)

N	15	25	25	35	35	35	ISO 1209 as modified in 8.8
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- 1) Density is optional in a country that has established a system of quality identification.
- 2) A specific limiting value (maximum or minimum, depending on the application) may be selected by agreement between purchaser and supplier.
- 3) Values required only when direct contact with water is anticipated in the end-use application.

Table 2 - Properties of RC/PUR used for thermal insulation of buildings

Properties	Unit	Category (5.1) and subcat. (5.2)				Test Method
		II		III		
		A	B	A	B	
Density (min.) <sup>1</sup>	kg/m <sup>3</sup>	30	30	30	30	ISO 845
Compressive strength or compressive stress at 10% deformation or yield, whichever occurs first (min.)	kPa	100	100	150	150	ISO 844
Thermal conductivity (max.)						
10 <sup>0</sup> C mean/28 days min. min.	mW/(m*K)	22	27	22	27	ISO 8301 or an absolute method
or 23 <sup>0</sup> C mean/28 days min.		24	29	24	29	
Dimensional change after 48 h at 70 <sup>0</sup> C (max.)	%	5	5	5	5	ISO 2796 as modified in 8.5.1
Compressive creep (max.) after 48 h at 80 <sup>0</sup> C under 20 kPa load	%	5	5	--	--	ISO 7616 as modified in 8.5.2
Compressive creep (max.) after 7 days at 80 <sup>0</sup> C under 40 kPa load	%	--	--	5	5	ISO 7616 as modified in 8.5.3
Water vapor						

Table 2 - Properties of RC/PUR used for thermal insulation of buildings

permeability <sup>2)</sup>	ng/				
23 <sup>0</sup> C/0 to 50% r.h.	Pa*s*m	6,5 to 1,5		6,5 to 1,5	ISO 1663
38 <sup>0</sup> C/0 to 88,5% r.h.	"	9 to 1,5		12 to 1,5	"
Water absorption (max.) <sup>3)</sup>	%(V/V)	4	4	3	3
					ISO 2896 as modified in 8.7

- 1) Density is optional in a country that has established a system of quality identification.
- 2) A specific limiting value (maximum or minimum, depending on the application) may be selected by agreement between purchaser and supplier.
- 3) Values required only when direct contract with water is anticipated in the end-use application.

2.1.1 Thermal Resistance

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**NOTE:** Board and block thermal insulating materials have different thermal properties. Specify insulation to provide the R-Value required to meet the energy budget indicated in MIL-HDBK-1190, Facility Planning Design Guide. Indicate R-values on the project drawings. If not, specify in the appropriate blanks.

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**NOTE:** Where board insulation is installed in masonry cavity walls, the wall cavity must be sized to accommodate the insulation thickness required to provide the specified R-Value and a 25 mm one inch free air space.  
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[As indicated] [Ceiling [R-\_\_\_\_\_] Wall [R-\_\_\_\_\_] Floor [R-\_\_\_\_\_]].

2.1.2 Fire Protection Requirement

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**NOTE: Fire Safety Provisions**

1. Most vapor retarder materials and some thermal insulations are combustible. Do not leave such material exposed to accessible spaces, but cover with fire retardant finish.
2. See MIL-HDBK-1008, and local building code for

fire retardant classifications required, flame spread and smoke developed ratings and distance of insulation and vapor retarder from heat producing devices and other fire protection requirements, such as finish materials required in various occupancies.

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**NOTE:** Do not use cellular plastic insulation exposed to the interior. Separate the insulation from the interior by at least a 15 minute fire separation. Edit this paragraph and the paragraph entitled "Insulation on Vertical Surfaces" as required.

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**NOTE:** Consult product data for combustibility and reaction to fire. Insert fire resistance class and source of classification.

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Board and block insulation shall be covered or obtain a 15 minute fire resistive rating as certified or listed by a nationally recognized testing lab or agency (ie. REI, LPC, ULBS, etc.). All materials will be subject to review and approval by the cognizant EFD/EFA Fire Protection Engineer.

### 2.1.3 Other Material Properties

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**NOTE:** Include only those properties that are required for the particular application.

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Provide thermal insulating materials with the following properties:

- [a. Rigid cellular plastics: Compressive Resistance at Yield: Not less than [170] [\_\_\_\_\_] kilopascals (kPa) [10] [\_\_\_\_\_] pounds per square inch (psi) when measured according to ISO 844.]
- [b. Mineral fiber board: Compressive strength: Minimum load required to produce a reduction in thickness of 10 percent, kg/m2 lbf/sft: [120] [4900] [25] [1000] when tested according to ISO 8145.]
- [b. Flexural strength: Not less than [275] [\_\_\_\_\_] kPa [25] [\_\_\_\_\_] psi when measured according to ISO 1209-1.]
- [c. Water Vapor Permeance: Not more than [6.3 x 10<sup>-8</sup>] [\_\_\_\_\_] g/Pa.s.m2 [1.1] [\_\_\_\_\_] Perms or less when measured according to ISO 1663, desiccant method, in the thickness required to provide the specified thermal resistance, including facings, if any.]

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**NOTE:** Specify allowable moisture content for rigid

cellular plastic as absorption and for mineral fiber board as adsorption. Delete d. or e. below if only one material is allowed.

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[d. Water Absorption: Not more than [2] [\_\_\_\_\_] percent by total immersion, by volume, when measured according to ISO 2896.]

2.1.4 Premolded Concrete Masonry Insert

Install inserts in concrete masonry units at the masonry unit manufacturing plant. Provide insert with thickness not less than 32 mm 1 1/4 inches.

2.1.5 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum required recycled material contents are:

Polyisocyanurate/Polyurethane: 9 percent

2.1.6 Prohibited Materials

Do not provide materials containing more than one percent of asbestos.

2.2 VAPOR RETARDER AND DAMPPROOFING

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NOTE:

1. Determine the need for a water vapor retarder and its required permeance value based on a project and climate specific moisture analysis. For guidance see ASHRAE Handbook of Fundamentals, Chapter 20, "Thermal Insulations and Vapor Retarders;" ASTM C 755, "Selection of Vapor Retarders for Thermal Insulations;" and MIL-HDBK-1011/1, "Tropical Engineering" (for humid climates). The computer Program "MOIST" which is on CCB, is a user friendly tool based on hourly weather data that provides information on moisture content of materials and on the duration of high moisture content excursions. Traditionally, vapor retarders were considered materials having a permeance of  $5.72 \times 10^{-8}$  g/Pa.s.m<sup>2</sup> 1 perm (grain/h\*ft<sup>2</sup>\*in.Hg) or less.

However, that value may not be adequate for the particular construction or climate and in some instances a much lower value should be specified.

2. Vapor retarders, where required, can be provided as membranes or, alternatively, vapor retardant finishes labeled by manufacturer as having a water vapor permeance of no more than the required value can be used. Alternate materials include: Paints,

vinyl wall coverings, or foil-faced gypsum board. Specify these in Sections 09900, "Painting," Section 09955, "Vinyl-Coated Fabric Wall Covering," or Section 09250, "Gypsum Board," respectively and delete all paragraphs and references relating to vapor retarders from this section.

3. A vapor retarder is only effective if it prevents diffusion of water vapor as well as the passage of moisture laden air through openings and around material. Accordingly, proper installation to assure air tightness by sealing of joints, tears, and around utility penetrations is as important as proper selection of water vapor retarder materials.

4. Vapor retarders not only retard movement of water vapor into building envelope cavities, but also retard drying out of moisture that may have infiltrated the cavity. Accordingly, use vapor retarders only where their need is indicated by the moisture analysis.

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2.2.1 Vapor Retarder in Frame Walls and Roofs

[a. 0.15 mm 6 mil thick polyethylene sheeting and having a water vapor permeance of  $5.72 \times 10^{-8}$  g/Pa.s.m<sup>2</sup> 1 perm or less.]

[b. Membrane with the following properties:]

Water Vapor Permeance:  $5.72 \times 10^{-8}$  g/Pa.s.m<sup>2</sup>  
Tensile Strength: [15] [20] [35]

[2.2.2 Dampproofing for Masonry Cavity Walls

Bituminous material is specified in Section 07112, "Bituminous Dampproofing."

]2.2.3 Vapor Retarder under Floor Slab

a. Water vapor permeance:  $1.14 \times 10^{-8}$  g/Pa.s.m<sup>2</sup> 0.2 Perm or less.

2.3 PRESSURE SENSITIVE TAPE

As recommended by manufacturer of vapor retarder and having a water vapor permeance rating of  $5.72 \times 10^{-8}$  g/Pa.s.m<sup>2</sup> one perm or less.

2.4 PROTECTION BOARD OR COATING

As recommended by insulation manufacturer.

2.5 ACCESSORIES

2.5.1 Adhesive

As recommended by insulation manufacturer.

2.5.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

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Note: For retrofit projects, inspect facility to determine conditions which may adversely affect execution of work or create safety hazard. Identify relevant conditions on the drawings and, if required, develop additional specification sections for corrective actions. Conditions that warrant investigation:

- 1. Discolorations or mold growth indicating previous water leaks.
- 2. Heat producing devices, such as recessed lighting fixtures, chimneys, and flues.
- 3. Faulty electrical systems:
  - (a) Lights dimming or flickering
  - (b) Fuses blowing
  - (c) Circuit breakers tripping frequently
  - (d) Electrical sparks and "glowing" from receptacles
  - (e) Cover plates on switches and outlets warm to touch.

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Before installing insulation, ensure that all areas that will be in contact with the insulation are dry and free of projections which could cause voids, compressed insulation, or punctured vapor retarders. If installing perimeter or under slab insulation, check that the fill is flat, smooth, dry, and well tamped. If moisture or other conditions are found that do not allow the proper installation of the insulation, do not proceed but notify the Contracting Officer of such conditions.

3.2 PREPARATION

3.2.1 Blocking Around Heat Producing Devices

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NOTE: Indicate on the drawings blocking, stand-offs

and other clearances required around heat producing devices including light fixtures, appliances, furnaces, vents and flues. Indicate clearances required between these elements and insulation as well as other building components. Since NFPA documents are not referenced in the text of the specification, it is incumbent upon the designer to include the requirements on the drawings.

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Unless using insulation board with a Class 0 in addition to the requirements in Part 2, install non-combustible blocking around heat producing devices to provide the following clearances:

- a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: 75 mm 3 inches from outside face of fixtures and devices or as required by and, if insulation is to be placed above fixture or device, 600 mm 24 inches above fixture.
- b. Masonry chimneys or masonry enclosing a flue: 50 mm 2 inches from outside face of masonry. Masonry chimneys for medium and high heat operating appliances: Minimum clearances required by.
- c. Vents and vent connectors used for venting products of combustion, flues, and chimneys other than masonry chimneys: minimum clearances as required by.
- d. Gas Fired Appliances: Clearances as required in.
- e. Oil Fired Appliances: Clearances as required in NFPA 31.

Blocking is not required if chimneys or flues are certified by the Manufacturer for use in contact with insulating materials.

### 3.3 INSTALLATION

#### 3.3.1 Insulation Board

Install and handle insulation in accordance with the manufacturer's Installation Instructions. Keep material dry and free of extraneous materials. Observe safe work practices.

#### 3.3.2 Electrical Wiring

Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.

#### 3.3.3 Cold Climate Requirement

Place insulation to the outside of pipes.

#### 3.3.4 Continuity of Insulation

Butt tightly against adjoining boards, studs, rafters, joists, sill plates, headers and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, roof, and floor. Avoid creating any thermal bridges or voids.

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**NOTE: Foil sided board reflects heat. Indicate on drawings the side on which the foil is to be faced. Coordinate use with mechanical designer.**  
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### 3.4 INSTALLATION ON WALLS

#### 3.4.1 Installation using Furring Strips

Install insulation [between] [on] members as recommended by insulation manufacturer.

#### 3.4.2 Installation on Masonry Walls

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**NOTE: Use the first paragraph below for insulation on the outside or inside of masonry walls. Use the second paragraph for insulating individual masonry units within their hollow cores. Insulating the cores only can lead to thermal bridges and condensation at the web locations of the masonry units.**  
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[Apply board directly to masonry with adhesive or fasteners as recommended by the insulation manufacturer. Fit between obstructions without impaling board on ties or anchors. Apply in parallel courses with joints breaking midway over course below. Put ends in moderate contact with adjoining insulation without forcing. Cut and shape as required to fit around wall penetrations, projections or openings to accommodate conduit or other services. Seal around cut-outs with sealant. Install board in wall cavities so that it leaves at least a nominal 25 mm one inch free air space outside of the insulation to allow for cavity drainage.]

[Insert premolded or board insulation into masonry unit hollow cores as recommended by the insulation manufacturer.]

#### 3.4.3 Adhesive Attachment to Concrete and Masonry Walls

Apply adhesive to wall and completely cover wall with insulation.

[a. Full back bed method] [or]

[b. Spot method: Provide at least six spots having diameter of approximately 100 mm 4 inches, located at each corner and mid-points of each of the longer sides of each board.]

[c. As recommended by the insulation manufacturer].

d. Use only full back method for pieces of 0.1 square meter one square foot or less.

e. Butt all edges of insulation and seal edges with tape.

#### 3.4.4 Mechanical Attachment on Concrete and Masonry Walls

Cut insulation to cover walls. Apply adhesive to wall and set clip or other mechanical fastener in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners, bend split prongs flush with insulation. Butt all edges of insulation and seal with tape.

#### 3.4.5 Protection Board or Coating

Install protection board or coating in accordance with manufacturer's instructions. Install protection over all exterior exposed insulation board and down to 300 mm 1 foot below grade.

### 3.5 INSTALLATION ON UNDERSIDE OF CONCRETE FLOOR SLAB

#### 3.5.1 Mechanically Fastened Systems

Size insulation to cover underside of slab. Apply adhesive to slab and set fasteners in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners, bend split prongs flush with insulation. Butt all edges of insulation and seal with tape.

#### 3.5.2 Adhesively Bonded Systems

Apply adhesive to underside of the and completely cover wall with insulation.

[a. Full back bed method] [or]

[b. Spot method: Provide at least six spots having a diameter of approximately 100 mm 4 inches, located at each corner and mid-point of each of the longer sides.]

[c. As recommended by insulation manufacturer].

d. Use full back method for insulation pieces 0.1 square meter one square foot or less.

e. Butt all edges of insulation and seal with tape.

### 3.6 PERIMETER AND UNDER SLAB INSULATION

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**NOTE: Provide for and coordinate foundation draining as required by insulation manufacturer.**

**Provide R-Values and extent as indicated in the**

following Table EXTENT AND R-VALUE FOR PERIMETER AND UNDER-SLAB THERMAL INSULATION.

EXTENT AND R-VALUE FOR PERIMETER AND UNDER-SLAB THERMAL INSULATION

Weather Region by Heating Degree Days (Base 18 deg.C	Minimum Required R-Values For Perimeter Insulation per Position and Width											
	Unheated Slab						Heated Slab					
	Millimeters Vertical			Millimeters Horizontal			Millimeters Vertical			Millimeters Horizontal		
	600	900	1200	600	900	1200	600	900	1200	600	900	1200
Over 4150	NP *	NP *	1.06	NP *	NP *	2.64	NP *	NP *	1.41	NP *	NP *	2.99
3601 to 4150	1.41	1.06	.70	3.17	2.71	1.97	1.76	1.41	1.06	3.52	3.06	2.32
3046 to 3600	1.41	1.06	.70	3.17	2.71	1.97	1.76	1.41	1.06	3.52	3.06	2.32
2491 to 3045	1.41	1.06	.70	3.17	2.71	1.97	1.76	1.41	1.06	3.52	3.06	2.32
1941 to 2490	1.41	1.06	.70	3.17	2.71	1.97	1.76	1.41	1.06	3.52	3.06	2.32
1526 to 1940	1.34	1.02	.70	2.99	2.46	1.90	1.69	1.37	1.06	3.34	2.82	2.25
1111 to 1525	1.27	.99	.70	2.69	2.32	1.80	1.62	1.34	1.02	3.04	2.68	2.15
556 to 1110 **	1.13	.85	.70	2.18	1.87	1.51	1.48	1.20	1.06	2.53	2.22	1.87
0 to 555	0	0	0	0	0	0	0	0	0	0	0	0
0 to 555	0	0	0	0	0	0	0	0	0	0	0	0
556 to 1110 **	1.13	.85	.70	2.18	1.87	1.51	1.48	1.20	1.06	2.53	2.22	1.87

\* NP: Not Permitted

EXTENT AND R-VALUE FOR PERIMETER AND UNDER-SLAB THERMAL INSULATION

\*\* Perimeter Insulation is not required in weather regions 8 and 11 where there are less than 830 Heating Degree Days (18 degrees C).

EXTENT AND R-VALUE FOR PERIMETER AND UNDER-SLAB THERMAL INSULATION

Weather Region by Heating Degree Days (Base 65 deg.F)	Minimum Required R-Values For Perimeter Insulation per Position and Width											
	Unheated Slab						Heated Slab					
	Inches Vertical		Inches Horizontal				Inches Vertical		Inches Horizontal			
	24	36	48	24	36	48	24	36	48	24	36	48
Over 15000	NP *	NP *	6.0	NP *	NP *	15.0	NP *	NP *	8.0	NP *	NP *	17.0
13001 15000	8.0	6.0	4.0	18.0	15.4	11.2	10.0	8.0	6.0	20.0	17.4	13.2
11001 to 13000	8.0	6.0	4.0	18.0	15.4	11.2	10.0	8.0	6.0	20.0	17.4	13.2
9001 to 11000	8.0	6.0	4.0	18.0	15.4	11.2	10.0	8.0	6.0	20.0	17.4	13.2
7001 to 9000	8.0	6.0	4.0	18.0	15.4	11.2	10.0	8.0	6.0	20.0	17.4	13.2
5501 to 7000	7.6	5.8	4.0	17.0	14.0	10.8	9.6	7.8	6.0	19.0	16.0	12.8
4001 to 5500	7.2	5.6	4.0	15.3	13.2	10.2	9.2	7.6	6.0	17.3	15.2	12.2
2001 to 4000 **	6.4	4.8	4.0	12.4	10.6	8.6	8.4	6.8	6.0	14.4	12.6	10.6
0 to 2000	0	0	0	0	0	0	0	0	0	0	0	0
0 to 2000	0	0	0	0	0	0	0	0	0	0	0	0
2001 to 4000 **	6.4	4.8	4.0	12.4	10.6	8.6	8.4	6.8	6.0	14.4	12.6	10.6

**EXTENT AND R-VALUE FOR PERIMETER AND UNDER-SLAB THERMAL INSULATION**

\* NP: Not Permitted

\*\* Perimeter Insulation is not required in weather regions 8 and 11 where there are less than 3000 Heating Degree Days (65 degrees F).

\*\*\*\*\*

Install perimeter thermal insulation where heated spaces are adjacent to exterior walls or slab edges in slab-on-grade or floating-slab construction.

3.6.1 Manufacturer's Instructions

Install, attach, tape edges, provide vapor retarder and other requirements such as protection against vermin, insects, damage during construction as recommended in manufacturer's instructions.

3.6.2 Insulation on Vertical Surfaces

Install thermal insulation [as indicated.] [on exterior of foundation walls] [on grade beams] [partially] [below grade] [and] [on edges of slabs on grade.] Fasten insulation with [adhesive] [or] [mechanical fasteners].

3.6.3 Insulation Under Slab

Provide insulation horizontally under [entire] slab on grade [for a distance of [\_\_\_\_\_] mm feet from the edge of slab] [as indicated]. [Turn insulation up at slab edge, and extend full height of slab.] Install insulation on top of vapor retarder and turn retarder up over the outside edge of insulation to top of slab.

3.6.4 Protection of Insulation

Protect insulation on vertical surfaces from damage during construction and back filling by application of protection board or coating. Do not leave installed vertical insulation unprotected overnight. [Install protection over entire exposed exterior insulation board.] [Provide protection extending at least 300 mm one foot below grade.]

3.7 VAPOR RETARDER

Apply a continuous vapor retarder as indicated. Overlap all joints at least 150 mm 6 inches and seal with pressure sensitive tape. Seal at sill, header, windows, doors and utility penetrations. Repair punctures or tears with pressure sensitive tape.

3.8 ACCESS PANELS AND DOORS

Affix insulation to all access panels greater than 0.1 square meter one square foot and all access doors in insulated floors and ceilings. Use insulation with same R-Value as that for floor or ceiling.

-- End of Section --

