SECTION 072000

BOARD INSULATION

PART 1 GENERAL

1.1 DESCRIPTION

A. To be read with Division 1 – General Requirements, Conditions of Contract and all associated drawings.

B. Work of this section, as indicated on the drawings and specified herein, pertains to the fabricating, furnishing and installing of cellular glass insulation board for use as thermal barrier in walls, roofs and any other locations indicated in the documents.

1.2 RELATED SECTIONS

A. The Contractor shall be required to coordinate the work of other sections with the work of this section. Related work to be coordinated and used in conjunction with this specification includes but is not restricted to:

1. Section 04300: Concrete Masonry Units

1.3 REFERENCES

A. The minimum standards for products specified in this section shall be including as under but not limited to the following. Except as otherwise specified herein, perform work in accordance with specifications, codes and standards cited therein, and their latest applicable addenda and supplements. Where there is conflict between the reference standards the most stringent of the conditions/requirements shall be applicable.

B. American Society for Testing and Materials - ASTM:

1.	C165/240/522	-	compressive strength
2.	C177/518	-	thermal conductivity
3.	C240	-	absorption of moisture
4.	C303	-	density
5.	E84	-	flame spread and smoke development
6.	E96	-	water-vapor permeability
7.	E136	-	combustibility

C. European Norm, according EN13167 - EN:

1.	EN1602	-	density
2.	EN12667/12939	-	thermal conductivity
3.	EN13501-1	-	reaction to fire
4.	EN826	-	compressive strength
5.	EN1609/12087	-	water absorption
6.	EN12086	-	water vapor transmission

D. All applicable local codes, regulations etc. of Authorities having Jurisdiction.

Note: Contractor shall note that he shall keep copies of all of the referenced standards on the site and shall provide the Engineer copy of the requested referenced standards as and when requested.

1.4 **SUBMITTALS**

A. The following Submittals shall be submitted.

1. Product data and samples.
2. Method of installation
3. EPD Environment Product Declaration according ISO14025
4. Manufacturer's certificates meeting the specified requirements

1.5 **ENVIRONMENTAL REQUIREMENTS**

A. Do not install when temperature or weather conditions are detrimental to successful installation.
B. Do not allow building insulation to become wet or soiled.
C. Comply with other precautions and recommendations of the manufactures to protect insulation from deterioration.

1.6 **SEQUENCING**

A. Sequence Work to ensure materials are in place before beginning work of this section

1.7 **COORDINATION**

A. Coordinate Work with other sections for installation.

1.8 **WARRANTY**

A. Provide a warranty of 20 years for any defects in material and performance.

PART 2 PRODUCTS

2.1 **PRODUCTS SUPPLIERS AND MANUFACTURERS**

A. Pittsburgh Corning Europe N.V., Belgium
B. FOAMGLAS® Dubai, UAE
C. Approved Equal

2.2 **MATERIALS**

A. **Wall Insulation in cavity wall or behind cladding**. Thickness according to the drawings or spec. Cellular glass insulation board with following characteristics.

1. Density: 105kg/m^3 (ASTM C303, EN 1602)
2. Thermal conductivity at 10^o C: 0.038W/m K, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >400 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion) ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84, Euro class A1, EN13501
7. Ecology: Produced with recycling glass content >60% and low emission to full fill environment requirement and enable LEED credits.

B. **Flat roof insulation with flat or tapered material (TAPERED ROOF SYSTEM)** thickness according to the drawings or spec. Cellular glass insulation board with following characteristics.

1. Density: 115kg/m^{3,} ASTM C303, EN 1602
2. Thermal conductivity at 10° C: 0.041W/mK, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >600 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion), ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non-combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84. Euro class A1, EN13501
7. Ecology: Produced with minimum recycling glass content > 60% and low emission to full fill environment requirement and enable LEED credits.

C. **Flat roof insulation for trafficable areas with flat or tapered material (TAPERED ROOF SYSTEM)** thickness according to the drawings or spec. Cellular glass insulation board with following characteristics.

1. Density: 130kg/m^{3,} ASTM C303, EN 1602
2. Thermal conductivity at 10^{o} C: 0.045W/mK, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >900 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion), ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non-combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84. Euro class A1, EN13501
7. Ecology: Produced with minimum recycling glass content > 60% and low emission to full fill environment requirement and enable LEED credits.

D. **Floor insulation internal or external superstructure** thickness according to the drawings or spec. Rigid cellular glass insulation board with following characteristics.

1. Density: 115kg/m^{3,} ASTM C303, EN 1602
2. Thermal conductivity at 10^{o} C: 0.041W/mK, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >600 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion), ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non-combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84. Euro class A1, EN13501
7. Ecology: Produced with minimum recycling glass content > 60% and low emission to full fill environment requirement and enable LEED credits.

E. **Insulation for interior application on wall or ceiling** thickness according to the drawings or spec. Rigid cellular glass insulation board with following characteristics.

1. Density: 115kg/m^{3,} ASTM C303, EN 1602
2. Thermal conductivity at 10^{o} C: 0.041W/mK, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >600 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion), ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non-combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84. Euro class A1, EN13501
7. Ecology: Produced with minimum recycling glass content of 60% and low emission to full fill environment requirement and enable LEED credits.

F. **Insulation for exterior façade application with for thick bed render** directly applied on the insulation surface insulation thickness according to the drawings or spec. Rigid cellular glass insulation board with following characteristics.

1. Density: 115kg/$m^{3,}$ ASTM C303, EN 1602
2. Thermal conductivity at 10^{o} C: 0.041W/mK, ASTM C-518/C177, EN 12667/12939/10456
3. Compressive strength: >600 kPa, ASTM C165/C240/C552, EN 826
4. Water Absorption: 0.2% (only moisture retained is that adhering to surface cells after immersion), ASTM C240, EN1609/12087
5. Water vapor permeability shall be 0.0 (zero) per inch, ASTM E96
6. Reaction to fire: Non-combustible, ASTM E136, Flame spread 0 (zero) and smoke development 0 (zero), ASTM E84. Euro class A1, EN13501
7. Ecology: Produced with minimum recycling glass content > 60% and low emission to full fill environment requirement and enable LEED credits.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate, adjacent materials, etc. are ready to receive insulation.
B. Verify substrate is flat, free of honeycomb, fins, irregularities and materials or substances that may impede adhesive bond.

3.2 INSTALLATION

A. **Application of wall (façade) insulation behind cladding:**

Follow the supplier recommendation. Apply the cellular glass slabs with adhesive, which is spread onto the bedding face of the cellular glass slab using a notched trowel as well as on to the butt edges of the slab. The slabs are pressed to the substrate are laid staggered in parallel courses with sealed joints. The slabs are pressed down to the substrate and pushed diagonally into position. Additional mechanical fasteners applied according supplier recommendation.
Alternative the cellular glass board can be fixed mechanically only to the ground if noted in the drawings.

B. **Application of cavity wall insulation**

Follow the supplier recommendation. Apply the cellular glass board to the inner leaf with tightly butted und pressed joints. The boards are installed course-by-course, and spot fixed mechanically. Before installation of the first row, a level base should be provided to allow for accurate alignment of the boards. Sealing the joints with adhesive on request.

C. **Application of flat roof <u>on concrete</u> with flat or tapered insulation**:

Follow the supplier recommendation. Apply a primer coat of bitumen emulsion to concrete deck. Cellular glass insulation slabs are applied to the deck with hot bitumen poured from the can or cold adhesive. The slabs are laid in parallel courses with staggered and bitumen filled joints. The slabs are pressed down and pushed diagonally into position.
If not other specified apply a bituminous double layer waterproofing fully bonded to the surface of the cellular glass insulation.

D. **Application of flat roof <u>on metal deck</u> with flat or sloped or tapered insulation:**

Follow the supplier recommendation. Apply a primer coat of bitumen emulsion to the crowns of the cleaned and grease-free deck. Apply cellular glass insulation slabs to the deck with hot stable bitumen using the dipping method. The slabs are laid staggered in parallel courses with the long edge parallel to the troughs of the deck, joints butted and filled with bitumen. If not other specified apply a bituminous double layer waterproofing fully bonded to the surface of the cellular glass insulation.
If special noted in the drawings or spec the cellular glass board can be alternatively fixed mechanically or applied with cold adhesive.

E. **Application of sloped or curved roof insulation <u>on concrete</u> with covering layer:**

Follow the supplier recommendation. Apply a primer coat of bitumen emulsion to concrete deck. Cellular glass insulation slabs are applied to the deck with hot bitumen poured from the can or cold adhesive. The slabs are laid in parallel courses with staggered and bitumen filled joints. The slabs are pressed down and pushed diagonally into position.
Application of a mop-coat, use stable bitumen. Mark the laying grid on top of the coated insulation for the fixing plates. Fixing plates are pushed and bonded to the insulation by melting the bitumen coating underneath the plates using a gas torch. One layer of polymer bitumen roofing sheet is torch-applied to the insulation. If hot mopped bitumen is not permitted use the factory pre laminated material.

F. **Application of sloped or curved roof Insulation <u>on metal deck</u> with covering layer**:

Follow the supplier recommendation. Apply a primer coat of bitumen emulsion to the crowns of the cleaned and grease-free deck. Apply cellular glass insulation slabs to the deck with hot stable bitumen temperature using the dipping method or cold adhesive. The slabs are laid staggered in parallel courses with the long edge parallel to the troughs of the deck, joints butted and filled with bitumen.
Application of a mop-coat, use stable bitumen. Mark the laying grid for the fixing plates on top of the coated insulation. Fixing plates are pushed and bonded to the insulation by melting the bitumen coating underneath the plates using a gas torch. Polymer bitumen roofing sheet is torch-applied to the insulation. If hot mopped bitumen is not permitted use the factory pre laminated material.

G. **Application of floor Insulation**:

Follow the supplier recommendation. Apply a thin leveling course from stabilized sand or chippings, using a screed board. Cellular glass insulation boards are laid dry, with staggered and well-butted joints. Alternative the cellular glass board can be adhered with hot melt bitumen or with cold adhesive if requested on ground, if noted in the drawings.

H. **Application of interior wall and ceiling insulation**:

Follow the supplier recommendation. Apply the cellular glass slabs with adhesive, which is spread onto the bedding face of the cellular glass slab using a notched trowel as well as on to the butt edges of the slab. The slabs are pressed to the substrate are laid staggered in parallel courses with sealed joints. The slabs are pressed down to the substrate and pushed diagonally into position. Additional fixing should be used. 4 pc/m^2 on ceilings and 2 pc/m^2 on the wall.
For direct rendering or suspended ceiling follow the supplier recommendation.

I. **Application of exterior wall/façade insulation with thick bed render:**

Follow the supplier recommendation. Apply the cellular glass slabs with adhesive, which is spread onto the bedding face of the cellular glass slab using a notched

trowel as well as on to the butt edges of the slab. The slabs are pressed to the substrate are laid staggered in parallel courses with sealed joints. The slabs are pressed down to the substrate and pushed diagonally into position. Additional spot fixing 4 pc/m^2 on ceiling and 2 pc/m^2 on wall.
For direct rendering follow the supplier recommendation.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit work to be damaged prior to covering insulation.

END OF SECTION