



Green Label Product Building Materials: Thermal Insulation

(TGL-14-R1-11)

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Building Materials: Thermal Insulation

1 Background

Installation of thermal insulation in buildings can help in energy conservation and minimize heat transfer. However, manufacturing of thermal insulation resulted in significant environmental impacts. For instance, these impacts include the utilization of natural resources and energy to transform sand into glass wool; use of CFCs as a foaming agent; and the generation of solid waste after end-use.

In order to be awarded with the Green Label certification, the core materials used for production in glass wool insulation must come from glass cullet in order to conserve energy and reduce solid waste problems. For foam plastic insulation, CFCs must not be used during production in order to prevent further depletion of ozone layer in the stratosphere as well as promote recycling practices and conservation of oil reserves, which are the resources that provides energy in the production process.

2 Scope

Thermal insulation includes glass wool and foam plastic insulation for use in office, residential, commercial, and industrial buildings.

3 Definitions

Thermal insulation refers to a material or product that acts as a medium to reduce heat transfer between places of differing temperature.

Glass wool insulation refers to a product produced from melted glass into fiber through blast method, centrifugal method, rod method, or pot method, which can be either from one method or mixed methods. A binding agent is added to the fibers to form glass wool board, glass wool pipe, or other shapes. Finally, it is optional to add appropriate additives on the surface to finish the production.

Foam plastic insulation refers to a product containing mainly polymer of polystyrene, polyurethane foam, or polyethylene foam characterized by pipe or board shape structure. The closed-cell foam structure can prevent heat transfer and act as water vapor barrier.

Post-consumer waste refers to a type of waste produced by the end consumer or has already been used by the consumer.

Post-industrial waste refers to left over materials or by-products generated from production or processing in the factory before reaching consumers. This type of waste does not include wastes generated from the actual factory.

Total volatile organic compounds (TVOCs) refer to the sum of those VOCs volatile that elute between the retention times of n-hexane and n-hexadecane on a non-polar or equivalent capillary GC column. TVOC is estimated based on toluene response factor

4 General requirements

4.1 Glass wool insulation

- 4.1.1 The product shall be certified with Thai Industrial Standard TIS 486 for Glass Wool.
- 4.1.2 The product shall be certified with Thailand Industrial Standard, or passed the product quality specification test under the Thai Industrial Standard in Table 1, or be certified with standards equivalent to national standard or higher than Thailand Industrial Standards, or be certified with international standards/other acceptable national standards such as ASTM or JIS.

Table 1 List of related Thai Industrial Standards

No.	Standard No.	Name of standard
1	487	Standard for Glass wool boards
2	488	Standard for Glass wool pipe

- 4.1.3 Manufacturing, transportation, and post-industrial waste disposal shall comply with national laws and regulations such as the Factory Act under the Ministry of Industry and the Ministerial Notification on Safety, Health, and Environment in Working Conditions under the Ministry of Labour and Social Welfare.

4.2 Product environmental requirements

- 4.2.1 Use of glass cutlets retrieved from post-consumer waste and/or post industrial waste in at least 80% of total glass wool weight, not including waste generated from the factory.
- 4.2.2 Acceptable chemicals*
- 4.2.2.1 Formaldehyde of no more than 0.05 ppm at 168 hours (7 days)
- 4.2.2.2 Total volatile organic compounds (TVOCs) from C6-C12 of no more than 0.5 milligram per cubic meter at 168 hours (7 days)
- *Note: Requirement 4.2.2 will be enforced 2 years after formal announcement.
- 4.2.3 Thermal insulation product shall not have hazardous properties according to Hazardous Substance Act B.E. 2535, which are explosive, toxic, flammable, pathogenic, oxidizing and peroxide, radioactive, mutagenic and corrosive.
- 4.2.4 Packaging
- 4.2.4.1 Plastic packaging shall be symbolized to indicate the type of plastic according to TIS for recycled plastics under TIS 1310, ISO 1043, or ISO 11469.
- 4.2.4.2 Paper packaging
- Paper used for linerboard shall be Green Label certified paper or passed the product environmental requirements for paper used as linerboard.

- Paper used for corrugated medium shall be Green Label certified paper or passed the product environmental requirements for paper used as corrugated medium.
- 4.2.4.3 Ink, pigments, or additives used for printing the labels or on the packaging shall not contain heavy metals such as lead, mercury, cadmium, and chromium (+6) as well as its oxidized form. It is acceptable to have combined contamination of heavy metals per pigment on a dry basis of no more than 100 ppm.
- 4.2.5 Existence of product manuals or recommendations for appropriate handling and use of product as follows:
- 1) Product information
 - 2) Transportation and storage
 - 3) Product installation
 - 4) Safe and efficient handling
 - 5) Disposal

4.3 Verification method

- 4.3.1 The applicant shall declare the license issued for TIS 486.
- 4.3.2 The applicant shall declare the license issued for each type of product or test report for product quality specifications according to Thai Industrial Standards in Table 1 or test report according to test methods under international standards or other equivalent national standards.
- 4.3.3 The applicant shall declare evidence ensuring the manufacturing, transportation and waste disposal of the product comply with national laws and regulations such as the Factory Act under the Ministry of Industry and the Ministerial Notification on Safety, Health, and Environment in Working Conditions under the Ministry of Labour and Social Welfare.
- 4.3.4 The applicant shall declare the formula for glass wool insulation, amount of bought and sold glass cutlets as raw materials, and calculation methods for percentage of glass cutlets weight as compared to finished product. This document shall have company seal affixed and signed by authorized director of the manufacturing company according to product environmental requirement 4.2.1.
- 4.3.5 The applicant shall declare a test report of formaldehyde according to ASTM D 5116 test methods (Standard Guide for Small Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products. American Society for Testing and Materials, West Conshohocken) and amount of total volatile organic compounds according to the ASTM D 5116 or other equivalent methods according to product environmental requirement 4.2.2.
- 4.3.6 The applicant shall submit a declaration letter, signed by an authorized director, to certify that the product does not have hazardous properties according to Hazardous Substance Act B.E. 2535, which are explosive, toxic, flammable, pathogenic, oxidizing and peroxide, radioactive, mutagenic and corrosive as required by product environmental requirement 4.2.3.
- 4.3.7 The applicant shall declare evidence that the finished product conform to the product environmental requirement 4.2.4 with the following documents:
- For plastic packaging, the applicant shall submit a declaration letter, signed by an authorized director of the company with company seal affixed, to certify that

the plastic packaging is symbolized properly according to TIS 1310 for recycling plastic, ISO 1043 or ISO 11469.

- For paper used as linerboard, the paper shall be certified with Green Label for paper or passed the product environmental requirements for paper used as linerboard.
- For paper used in corrugated medium, the applicant shall declare Green Label certificate for paper used in corrugated medium, or declare a test report according to the product environmental requirements of the Thai Green Label
- A test report of heavy metals in pigments for printing the label or printings on the packaging according to standard test method of ISO 3856-1 or ASTM D 3335 for lead; ISO 3856-4 or ASTM D 3335 for cadmium; ISO 3856-5 for chromium (VI) and ISO 3856-7 or ASTM D 3624 for mercury; or other equivalent standards.

4.3.8 The applicant shall declare a manual or labels according to product environmental requirement 4.2.5 to the Green Label Program personnel.

5. Foam plastic insulation

5.1 General requirements

- 5.1.1 Polyethylene thermal insulation: product must be certified by TIS 1384 for polyethylene thermal insulation, or passed the product quality specification test according to TIS 1384, or passed other equivalent or higher standards.
- 5.1.2 Polyurethane thermal insulation: product must pass the quality assessment according to ASTM C591: Standard Specification for Unfaced Preformed Rigid Cellular Poly-isocyanurate Thermal Insulation, or passed other equivalent or higher standards.
- 5.1.3 Polystyrene thermal insulation: product must pass the quality assessment according to ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation, or passed other equivalent or higher standards.
- 5.1.4 Manufacturing, transportation, and post-industrial waste disposal shall comply with national laws and regulations such as the Factory Act under the Ministry of Industry and the Ministerial Notification on Safety, Health, and Environment in Working Conditions under the Ministry of Labor and Social Welfare.

5.2 Product environmental requirements

- 5.2.1 The percentage of post-consumer waste and/or post industrial waste shall be at least 80% by weight of the finished product. However, waste generated from the factory is not included.
- 5.2.2 Use of CFCs, HCFCs, and HFCs are prohibited in production process.
- 5.2.3 No presence of carcinogens in group 1 (carcinogenic to humans) and group 2A (probably carcinogenic to humans) as classified by the International Agency for Research on Cancer (IARC).
- 5.2.4 Mixture of toxic substances in the product is prohibited. The following are prohibited toxic substances:
- R45 (may cause cancer)
 - R46 (may cause heritable genetic damage)
 - R48 (serious damage to health by prolonged exposure)
 - R61 (may cause harm to the unborn child)
 - R63 (possible risk of harm to unborn child)
 - R68 (possible risk or irreversible effect)
 - polybrominated biphenyls (PBB)
 - polybrominated diphenyl ethers (PBDE)
 - polyurethane composed of halogenated organic compounds partially or completely according to RAL-UZ30a and hazardous substances list according to Annex I of Directive 67/548/EEC
- 5.2.5 Foaming agent or blowing agent for production shall have ODP value equaled to 0 and Global Warming Potential (GWP) value of no more than 140 kilograms CO₂ over 100 years.
- 5.2.6 Foam plastic insulation shall not have hazardous properties according to Hazardous Substance Act B.E. 2535, which are explosive, toxic, flammable, pathogenic, oxidizing and peroxide, radioactive, mutagenic and corrosive.
- 5.2.7 Plastic shall be symbolized by type on the product according to Thailand Industrial Standard TIS 1310 for recycling plastic or ISO 1043 or 11469.
- 5.2.8 Packaging
- 5.2.8.1 Plastic packaging shall be symbolized to indicate the type of plastic according to TIS for recycled plastics under TIS 1310, ISO 1043, or ISO 11469.
- 5.2.8.2 Paper packaging

- Paper used for linerboard shall be Green Label certified paper or passed the product environmental requirements for paper used as linerboard.
- Paper used for corrugated medium shall be Green Label certified paper or passed the product environmental requirements for paper used as corrugated medium.

5.2.8.3 Ink, pigments, or additives used for printing the labels or on the packaging shall not contain heavy metals such as lead, mercury, cadmium, and chromium (+6) as well as its oxidized form. It is acceptable to have combined contamination of heavy metals per pigment on a dry basis of no more than 100 ppm.

5.2.9 Existence of product manuals or recommendations for appropriate handling and use of product as follows:

- 1) Product information
- 2) Transportation and storage
- 3) Product installation
- 4) Safe and efficient handling
- 5) Disposal

6. Verification method

6.1 For polyethylene thermal insulation, the applicant shall declare the license issued by TISI, or a test report for product quality specifications according to TIS 1384, or other equivalent or higher standards or other international standards.

6.2 For polyurethane thermal insulation, the applicant shall declare evidence for passing the quality assessment according to ASTM C591: Standard Specification or Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation, or other equivalent or higher standards or other international standards.

6.3 For polystyrene thermal insulation, the applicant shall declare evidence for passing the quality assessment according to ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation, or other equivalent or higher standards or other international standards.

6.4 The applicant shall declare evidence ensuring the manufacturing, transportation and waste disposal of the product comply with national laws and regulations such as the Factory Act under the Ministry of Industry and the Ministerial Notification on Safety, Health, and Environment in Working Conditions under the Ministry of Labour and Social Welfare according to product environmental requirement 5.2.1.

6.5 The applicant shall declare the percentage of post-consumer/post-industrial foam plastic used in producing foam plastic insulation compared to the finished product including calculation methods according to product environmental requirement 5.2.1. This document shall have company seal affixed and signed by authorized director of the manufacturing company.

6.6 The applicant must submit the production formula as well as provide list of chemical substances used in replacement of CFCs, HCFs, and HFCs. This document must have the company stamp and signed by authorized person of the manufacturing company.

6.7 The applicant shall submit a declaration letter, signed by the authorized director of the company, to certify the non-use of prohibited carcinogens in group 1 (carcinogenic to humans) and group 2A (probably carcinogenic to humans) as classified by the International Agency for Research on Cancer (IARC) according to product environmental requirement 5.2.3.

6.8 The applicant shall submit a declaration letter, signed by the authorized director of the company, to certify the non-existent of toxic substances in the product according to product environmental requirement 5.2.4.

6.9 The applicant shall submit a declaration letter, signed the authorized director of the company, to certify that foaming agent or blowing agent has ODP value and GWP value according to product environmental requirement 5.2.5.

6.10 The applicant shall submit a declaration letter, signed by authorized director of the company, to certify that the applicable foam plastic insulation does not have hazardous properties according to Hazardous Substance Act B.E. 2535, which are explosive, toxic, flammable, pathogenic, oxidizing and peroxide, radioactive, mutagenic and corrosive as required by product environmental requirement 5.2.6.

6.11 The applicant shall provide a sample of foam plastic insulation together with a declaration letter, signed by the authorized director of the company, to certify the plastic is symbolized by type according to product environmental requirement 5.2.7.

6.12 The applicant shall declare evidence ensuring product environmental requirement 5.2.8 have been met with the following documents:

- For plastic packaging, the applicant shall submit a declaration letter, signed by an authorized director of the company with company seal affixed, to certify that the plastic packaging is symbolized properly according to TIS 1310 for recycling plastic, ISO 1043 or ISO 11469.
- For paper used as linerboard, the paper shall be certified with Green Label for paper or passed the product environmental requirements for paper used as linerboard.
- For paper used in corrugated medium, the applicant shall declare Green Label certificate for paper used in corrugated medium or declare a test report according to the product environmental requirements of the Thai Green Label.
- A test report of heavy metals in pigments for printing the label or printings on the packaging according to standard test method of ISO 3856-1 or ASTM D 3335 for lead; ISO 3856-4 or ASTM D 3335 for cadmium; ISO 3856-5 for chromium (VI) and ISO 3856-7 or ASTM D 3624 for mercury; or other equivalent standards.

6.13 The applicant shall declare a manual or labels according to product environmental requirement 5.2.9 to Green Label Program personnel.

- Remarks:** 1) Product testing shall be conducted in the following laboratories:
- 1.1) Laboratories operated by the government or under governmental control as defined by Clause 5 of the Industrial Standard Act B.E. 2511 **or**
 - 1.2) Laboratories certified by TIS 17025 General Requirements for the competence of laboratories to carry out tests and/or calibrations (ISO/IEC 17025).
- 2.) Test results shall have been issued no more than 1 year following the application date.