



iForm[®] - INSUGREEN[®]

GULF WALLS SYSTEM

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EXPANDED POLY STYRENE (EPS) INSULATION PANELS - i FORM
SPECIFICATION

GWALLS
GULF WALLS SYSTEM

Expanded polystyrene (EPS) foam is a closed-cell insulation manufactured by “expanding” a polystyrene polymer; the appearance is typically a white foam plastic insulation material.

INSUGREEN® the material comprises expandable beads of polystyrene pre-foamed and fused together in a steam-heated mould under pressure. This produces a block of material, which is then cut to and/or shape. After cutting to size, the material may be faced or laminated with other materials to suit its application. In the construction industry, INSUGREEN® EPS Panels is among the most versatile, energy efficient, and cost effective insulators available, delivering extremely high, stable R-values. Gwalls’ EPS insulation panel is a lightweight cellular plastic material suitable for a wide range of insulation applications. Insugreen® is versatile, light in weight, clean and easy to handle, it provides a cost-effective means of permanent insulation in floors, walls and roofs to meet, and exceed, the standards laid down in the Building Regulations.

PRODUCT COMPOSITION

Insugreen® insulation panels are manufactured of EPS material comprises expandable beads of polystyrene pre-foamed and fused together in a steam heated mould under required pressure. This produces a block of EPS Insulation material in 6 M x 1.2MX 1M size with different density, these blocks which is then cut to required size and shape.

RAW MATERIAL

Gwalls’ primary concern is Health and Safety we are sourcing our Raw Material from reputed manufacturers giving primary importance to quality and reliability. Insugreen® panels are made of Flame Retardant EPS beads which meets or overcome relevant building codes / standards.

TYPES OF INSUGREEN®

Insulation panels of Gwalls are majorly available in two different types which are Light & Heavy depends on application of the Products.

INSUGREEN-L

Insugreen® L are EPS insulation panels are light version for Low Density applications ranging Density 12 – 24 Kg/M³.

INSUGREEN IX (Density Range : 10 Series)

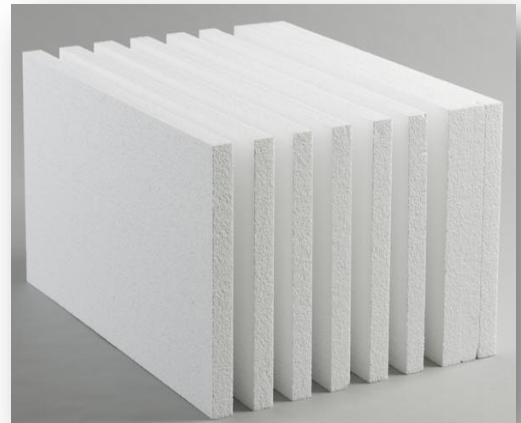
INSUGREEN IIX (Density Range : 20 Series)

INSUGREEN-H

Insugreen®H are EPS insulation panels are Heavy version for High Density applications ranging Density 25 – 40 Kg/M³.

INSUGREEN IIIX (Density Range : 20 Series)

INSUGREEN IVX (Density : 30 Series)



VERSATILE APPLICATIONS

Where energy efficiency and cost-effectiveness are primary design considerations, architects, constructors, and homeowners have made EPS the dominant thermal insulation. R-value of EPS is up to 5/in does not deteriorate over time. Applications include: Building construction (roof, wall, and foundation), Cavity wall and drywall base insulation, Exterior and interior foundation wall insulation, Roof applications (tapered panel and Holey-Board), Refrigeration Building and transportation applications, Perfect for walk-in coolers, tanks, vessels, Refrigerated rail and truck, Facility construction: pharmaceutical, petrochemical, liquid natural gas and other facilities

SIZE & SHAPE

Produced EPS Block is to be cut to size, thickness and in required Shape in accordance with applications and requirement.

Length : 0.5 - 6M

Width : Till - 1.2 M

Thickness : Till - 1.2 M

DIMENSIONAL STABILITY

EPS Panels of Gwalls are In accordance with BS EN 13163 DS(N)5 ± 0.5% under regular laboratory conditions

DIMENSIONAL TOLERANCES

Dimensions of Insugreen® panels are subject to tolerance in accordance with BS EN 13163. Tolerances on the cut dimensions of EPS panels are defined as follows:

- (A) Length: $\pm 3\text{mm}$ or $\pm 0.6\%$ whichever is greater
- (B) Width: $\pm 3\text{mm}$ or $\pm 0.6\%$ whichever is greater
- (C) Thickness: $\pm 2\text{mm}$
- (D) Squareness: $\pm 5\text{mm}$ per 1000mm

DENSITY

Insugreen® EPS Insulation panels are available in the density range of 15-40 kg/m³. Gwalls EPS panels are available as two major types insugreen – L® & Insugreen-H®, depends on the density.

PRODUCT STANDARD

Where relevant, Insugreen® products are manufactured to in accordance to meet the requirements of industrial Standard BS EN 13163 'Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) - specification'. Alternatively, Gwalls produces EPS insulation following ASTM Standard as well. ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

THERMAL PERFORMANCE

EPS Insulation Panels having high thermal performance comparing other insulations. Thermal Resistance, Thermal Conductance and Coefficient of Linear Expansion of EPS insulation materials are:

Thermal Resistance (R- Value)

The R-value of EPS remains constant and does not suffer from R-value loss. The closed cell structure of EPS contains air and not blowing agents therefore R- value is more stable and it may not which deplete over time. R- Value of EPS Sheet having 1Inch Thickness is Approx: **R - 4.5** or **0.80 K·m²/W**

Thermal conductivity (K- value)

Specifies the rate of heat transfer in any homogeneous material K-value of a number of common materials and demonstrates that EPS has a low thermal conductivity compared with several other Building Materials. Typical Thermal Conductivity (K-Value) of EPS is 0.032 (w/mk)

Coefficient of linear expansion

Insugreen® Panels are subject to a Linear Expansion: $0.6 \times 10^{-6}/^{\circ}\text{C}$. The material is sufficiently resilient and flexible that no allowance need to be made for thermal expansion in the method of installation.

EXPOSURE TO WATER AND WATER VAPOR

The mechanical properties of EPS are unaffected by moisture. Exposure to water or water vapor does not cause swelling however; a suitable damp-proof membrane or vapour control layer will be required in most forms of construction

FIRE PERFORMANCE

Insugreen® EPS insulation panels are made of Flame Retardant EPS material. Insugreen® panels does not burn itself however it will melt when it is subject to High Temperature Flash ignition temperature of normal EPS is about 490°C depending on the application and the exact circumstances of use. Decomposition may start at about 302°F (150°C).

Flame retardants used in the manufacturing of EPS provide an important margin of safety, all EPS products must be used in accordance with local Building Codes. Working Temperature Range of EPS is -150°C to +80°C. Insugreen® EPS is unaffected by the normal range of climatic temperature. Insugreen® panels are made of Flame Retardant EPS material having good resistance to flame it is a self extinguishing product. As per DIN 4102 Insugreen® EPS insulation panels are classified as Class: B1 Difficult to Ignite / Self Extinguishing. In accordance with ASTM E 84 Flame Spread and Smoke Developed are < 25 and < 450 respectively.

WEATHERING

Long-term exposure to sunlight causes yellowing and a slight embrittlement of the surface due to ultraviolet radiation this has little effect on mechanical properties. If stored out-doors, cover EPS with opaque polyethylene film, tarps, or similar material.

BIOLOGICAL PROPERTIES

Gwalls EPS will not decompose and will not support mold or mildew growth as it provides no nutrient value to plants, insects, vermin or microorganisms therefore; insugreen® Panels provides high Indoor Air Quality.

COMPATIBILITY WITH OTHER MATERIALS

EPS is soluble in aromatic, halogenated solvents, aliphatic hydrocarbons and their emulsions and ketones, esters, ethers therefore it should be protected from contact with hydrocarbons and strong solvents using a suitable membrane. EPS is unaffected by contact with solvent-free bitumen providing that, where necessary, the precautions set out above regarding temperature are observed. EPS should not be permitted to come into contact with PVC-sheathed electrical cables since this will lead to migration of plasticizer from the PVC resulting in embrittlement of the cable sheath. Cables should be protected by the use of a physical barrier, for example by being enclosed in a conduit or by safe air gap between EPS and PVC Sheathed Cables.

Property	Unit / Standard	Insugreen- L®					Insugreen- H®				
		Insugreen-L IX		Insugreen-L : IIX			Insugreen-H : IIIX		Insugreen-H : IVX		
Nominal Density	(kg/m ³)	15	18	20	22	24	28	32	35	38	40
Thermal Resistance per 1.0 in. thickness (R-Value) 24 +/- 1 ° C	(°K.m ² /W)	0.69	0.71	0.72	0.73	0.74	0.76	0.78	0.80	0.81	0.81
Thermal Conductivity (K-Value) 24 +/- 1 ° C	(W/KM)	0.038	0.038	0.036	0.036	0.035	0.034	0.034	0.033	0.032	0.032
Compressive Strength @ 10% deformation, min.	(kPa)	69	80	90	95	104	170	200	250	280	310
Flexural Strength min.	(kPa)	173	208	220	245	260	330	345	380	414	460
Water Vapor Permeance of 1.0 in. thickness	Max Perm/in	5	4.5	3.5	3.5	3	3	2.5	2.5	2.5	2.5
Water Absorption by total immersion	% by Vol Max	4	4	3	3	3	2	2	2	2	2
Dimensional Stability	Max %	2	2	2	2	2	2	2	2	2	2
Oxygen Index	min., volume %	24	24	24	24	24	24	24	24	24	24
Specific heat capacity	(kJ/kg.K)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Fire Property / Classification	DIN 4102	Class : B1 Difficult to Ignite / Self Extinguishing									
Flame Spread	ASTM E84	Class - A < 25									
Smoke Developed		Class - A < 450									

Note : Above values are average and are derived at our own facilities and/ or products, it is true and correct to the best of our knowledge and belief (above values are variable subject to ambient conditions from material to material and location to location)

HEALTH , SAFETY & ENVIRONMENT

Insugreen® Insulation panels are non-toxic and not-irritating to the eyes or skin. No medical treatment or action is required as a result of accidental ingestion. No special precautions are required during handling or cutting when carried out in well ventilated areas. Insugreen® panels are of 98% air the manufacturing process of EPS utilizes steam, it has no gases such as CFC, HCFC, HFC or HFA. Flame-retardant EPS contains additive material, around 0.5% of the flame-retardant (HBCD) which is entrapped in the polymer matrix of the EPS. EPS is fully recyclable and we at Gwalls operate an environmental program recycling all in-house manufacturing waste generated by Insugreen® production.

HANDLING AND STORAGE

Insugreen® EPS is easy to handle and install, being lightweight and easily cut to size. Gwalls' Insulation Board is supplied in polythene packs and should be stored off the ground. Avoid prolonged storage in direct sunlight as it may cause brittleness to the Panels. Life span of EPS insulation material is thought out the life of the building providing that, it is properly installed as instructed in the applicable building codes.