

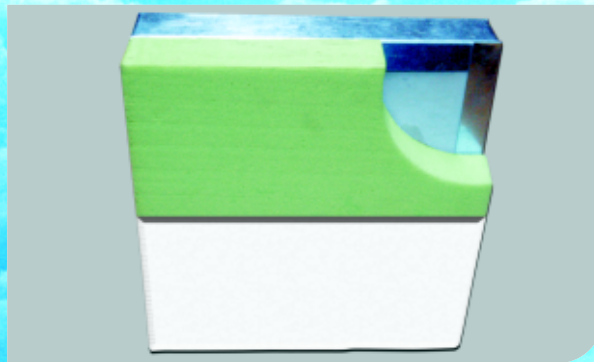
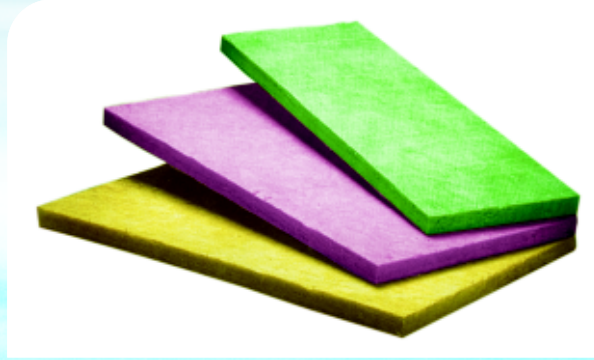
SUPERFOAM POLYURETHANE FOAM / ISOLOYD NILFLAME POLYISOCYANURATE FOAM SLABS

THERMALLY EFFICIENT CFC, HCFC FREE, ZERO ODP CLOSED CELL INSULATION SLABS  
FOR ROOF & WALL INSULATION

LLOYDFOAM CFC FREE SPRAYED POLYURETHANE FOAM FOR ROOF INSULATION

eco-friendly  
**insulations**  
by

Lloyd Insulations (India) Limited



# Thermal Insulation for Buildings

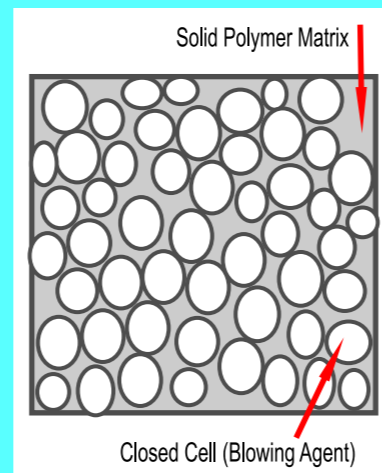
Our earth is enclosed in an envelope of air that insulates our planet to make it habitable. We are habituated with various insulation systems in our day to day life like clothing, glass, thermos flask and now building envelope. The use of thermal insulation in Residential, Commercial & Industrial buildings is for the purpose of providing comfort & save energy.

Taking lead from air being a good insulation material, enormous potential exists to develop high performance thermal insulation materials. Heat transfer takes place through Conduction, Convection & Radiation and the basic purpose of insulation is to reduce heat flow. The solid conduction and radiation components are related to the bulk density or weight of the insulation material. Air conduction acts independently and any material with reduced air component in its structure will result into a good insulation. This is where closed cell foam insulation development started.



**Energy savings is a prime factor and challenge to the building designers.**

Polyurethane & Polyisocyanurate foams are termed as high performance thermal insulating materials and systems for building envelopes. There are closed cell products manufactured out of a very fast chemical reaction between two chemicals in the presence of a blowing agent, resulting into a polymer matrix and a gas filled closed cell. The gaseous blowing agent fills up the closed cells surrounded by the polymer matrix. The thermal conductivity of the blowing agent is very low and reduces conduction component of heat loss. The small cell size practically eliminates convection, another source of energy transfer. Every cell will act as a barrier to energy transmission by radiative heat transfer. However foam materials thermal conductivity rises for sometime and reaches equilibrium stage. This is due to air entering into the blowing agent closed cells and diffusing them out, termed as aging. That is why in case of polyurethane & polyisocyanurate foam an aged 'K' value is generally considered (0.021 in place of 0.017 in case of slabs & pipe sections and 0.023 in case of Spray Foam) for design purpose.



The foam products are suitable between (-) 200°C to 150°C, moisture resistance, dimensionally stable, air tight and offers resistance to the transfer of heat through the building envelope.

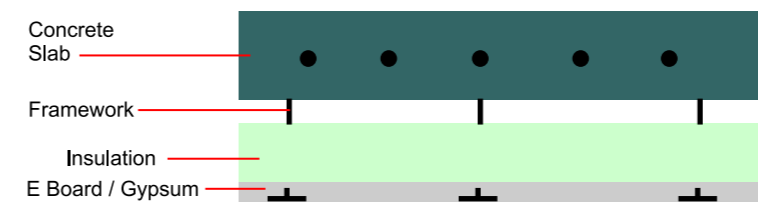
PUF & PIR foams functions in each temperature and do not get deformed or damaged by moisture due to condensation. The high compressive strength allows insulation to be fixed with thin metals to form pre-fab panels.

## Insulate Today, Save Tomorrow

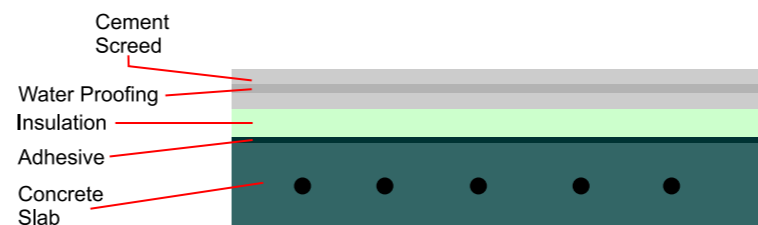
Saving Energy in buildings becomes more important everyday. Energy savings is a prime factor and challenge to the building designers. Energy lost through walls, roofs and windows is the largest composite source of energy wastage in most buildings. Energy loss in buildings means extra operating cost, loss of comfort and reduced productivity. Insulation product helps solving this typical problem of stopping energy waste and improving the comfort level inside a building at a reasonable cost. Rigid Polyurethane Foam and Polyisocyanurate Foam are some of the most confident thermal insulating products with very high thermal performance for buildings and for improving efficiency of the building envelope.

**It's Time For Action!**

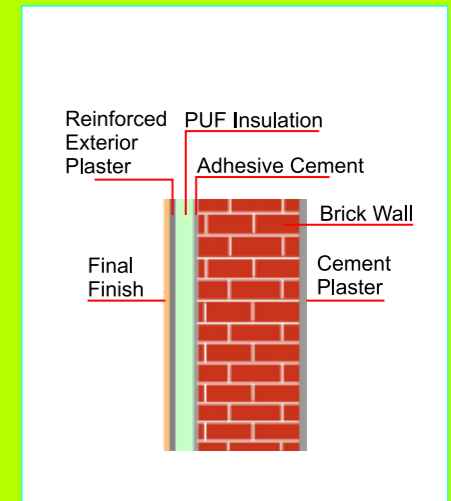
### Roof Underdeck Insulation



### Roof Overdeck Insulation



### Exterior Wall Insulation



## Superfoam Polyurethane Foam Slab

### Superfoam Polyurethane Foam Slab

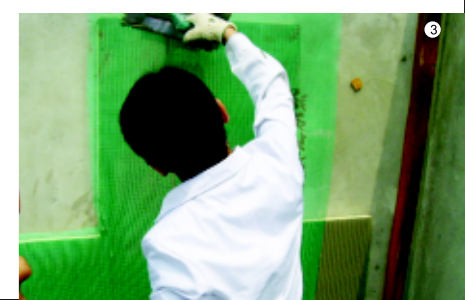
Superfoam CFC / HCFC free rigid Polyurethane Foam slab insulation conforms to IS:12436 and BS 5608. The slabs are made from mixing of polyol & Isocyanurate chemicals with blowing agent suitable for wide temperature range. It has low thermal conductivity, low smoke emission & low water vapour permeability making it ideal for building & industrial insulation. Superfoam in slab form is suitable for Roof Overdeck & Wall Insulation. Superfoam can be applied on roof as Overdeck Insulation, fixed with an adhesive and subsequently protected by plaster and application of water proofing membranes and tiling. Superfoam can be applied on to the walls with special adhesive and finally finished with special polymerized plaster applied with suitable reinforcement mesh directly over it. Superfoam can be used both on inner side and externally to building roofs & walls. Superfoam is now also available as 'ZERO ODP' slabs with cyclopentane blowing agent application during manufacture.



Roof Insulation - Overdeck



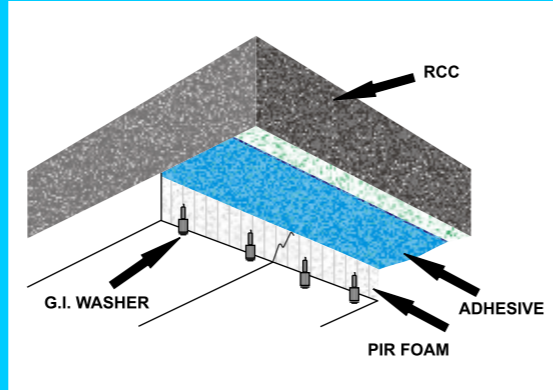
External Wall Insulation



## Isoloyd Nilflame Polyisocyanurate Slab

Isoloyd Nilflame CFC / HCFC free rigid Polyisocyanurate Foam slab insulation conforms to IS:12436 & ASTM C-591 suitable for wide temperature range. It has low thermal conductivity, low smoke emission & low water vapour permeability making it ideal for building & industrial insulation. Polyisocyanurate foam slab is suitable for Roof Underdeck & Wall Insulation.

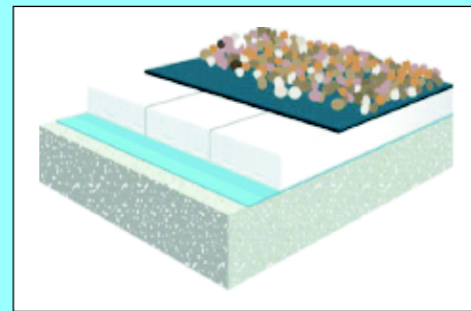
Isoloyd Nilflame as compared to SUPERFOAM has superior fire safety properties and very ideal for application as roof Underdeck Insulation, by directly fixing underneath the roof slab with adhesive and rawl plug – dash fasteners. It can be used as wall Insulation on inner side.



## Technical specifications

Properties	Polyisocyanurate Foam (PIR) Slab	Superfoam Polyurethane Foam (PUF) Slab
Density	32±2Kg/M <sup>3</sup> Higher densities available on request	36±2Kg/M <sup>3</sup> Higher densities available on request
Compression strength (in direction of rise)	172 KN/m <sup>2</sup> (1.75 kgf/cm <sup>2</sup> )	172 KN/m <sup>2</sup> (1.75 kgf/cm <sup>2</sup> )
Thermal Conductivity (K) at 10°C mean temp. (W/mK)	0.021	0.021
Temperature Limit	150°C to - 200°C	+110°C to - 180°C
Fire Resistance Properties Surface Spread of Flame (BS:476 Part-7, 1987)	Class- 1	-
Ignitability (BS : 476 Part-5, 1968)	Class 'P' (not easily ignitable)	Class 'P' (not easily ignitable)
Mean Extent of Burn (BS:4735, 1974)	Less than 25mm	Less than 125mm
Toxicity } Smoke } Oxygen } NES	1.0142 780.89 25	- - -
Availability	Slabs Size 1m x 0.5m	Slabs Size 1m x 0.5m
Green Rating Points	5	5

**Zero ODP Foam - Cyclo Pentane blown**  
on request



## R and U Values (for Roof/Wall)

PUF/PIR Thickness mm	R - value		U - value	
	m <sup>2</sup> °C/W	ft <sup>2</sup> Hr °F /Btu-in	W/m <sup>2</sup> °C	Btu in/ ft <sup>2</sup> Hr °F
30	1.43	8.11	0.700	0.123
50	2.38	13.52	0.420	0.074
65	3.10	17.58	0.323	0.057
75	3.57	20.28	0.280	0.049



## Lloydfoam

### Spray Applied Rigid, Closed Cell Polyurethane Foam For Roof Insulation

LLOYDFOAM, the spray applied CFC Free Rigid Polyurethane Foam is designed to combine highly efficient thermal insulation with great ease of application. It is ideal for insulation on roofs in buildings.

By nature, liquid applied foam polyurethane adheres strongly to almost any surface regardless of foam. As foam does not sag, buckle or mat in use, it retains its insulation value for the life of the insulation.

The SEAMLESS and MONOLITHIC nature of the sprayed foam provides a full proof method of sealing cracks and rendering any surface moisture resistance and draught proof. The closed cell foam has a low water vapour transmission properties and also inhibits ingress of moisture.

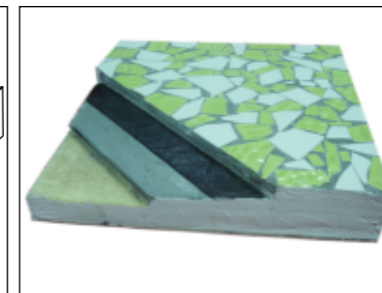
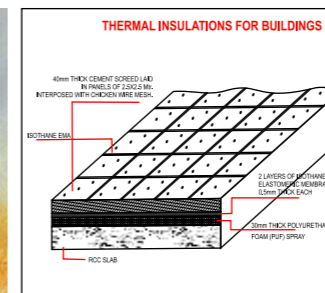
The excellent adhesion of the sprayed material makes mechanical fastening redundant. The low density of the material adds little weight to overall loading. The firm bonding to the substrate can also add significantly to reducing vibration of thin membrane roofs and the structural strength of a building itself. The process of applying rigid polyurethane foam by spray eliminates separate fixing procedures. LLOYDFOAM is sprayed with the help of two component GUSMER machines, which are capable of maintaining the mix ratio at ±2% accuracy and controlling the component temperatures at precisely the optimum range.



On roof work the insulation effect of the foam reduces thermal movement of the roof deck and helps prevent failure of the roof covering. Far from being confined to flat surface, spray applied LLOYDFOAM is deal for curved, corrugated and irregular surfaces.

Besides external use, spray foam can be applied internally as long as the building is suitable, having easy, convenient access for application and good ventilation. The foam can be sprayed on to the underside of roofs or suspended floors and on to the inner & outer surface of walls.

Although the foam forms a weather resistance membrane, a final water proof coating is required as an additional protection against U.V. radiation in exterior applications. In the same way as any other organic material, polyurethane foam can eventually be attacked by the ultra violet rays of the sun, hence a protective coating is necessary. Usually polyurethane based coatings like Isothane EMA – single component high solid content elastomeric liquid coatings which dries up to form homogenous membrane can be applied directly on top of Lloydfoam or else Bitumenous membranes or EPDM & TPO membranes can be applied on top of a plaster layer applied over Lloydfoam.



## Salient Features

- ★ Efficient Thermal Insulation
- ★ Seamless & Water resistant
- ★ Strong & Light Weight
- ★ Long Life with no sag
- ★ Excellent adhesion to any surface
- ★ Good dimensional stability
- ★ Ideal for irregularly shaped surfaces
- ★ Easy to handle and apply
- ★ Wide range of protective coatings
- ★ Exterior or Interior use
- ★ Faster application rate

## Technical Specifications

Density	42±2 kg/m <sup>3</sup>
Compressive Strength	300 Kpa
Tensile Strength	280 Kpa
Shear Strength	210 Kpa
Closed Cell Content	92% vol.
Thermal Conductivity	0.023 W/mK at 10°C mean temp.
Water Absorption (7days)	0.2 kg/m <sup>3</sup>
Water Vapour Transmission	2.9 ng/pasm
Temperature Limit	100°C (max.)
Extent of Burn	125 mm

Consult us for recommendation on thickness of insulation & application to suit your end use condition.

Lloydfoam conform to IS : 13205. Lloydfoam is in use in the country since mid 80s with a proven track record.

## R and U Values (For Roof/Wall)

Lloydfoam Thickness mm	R - value		U - value	
	m <sup>2</sup> °C/W	ft <sup>2</sup> Hr °F /Btu-in	W/m <sup>2</sup> °C	Btu-in/ft <sup>2</sup> Hr°F
30	1.30	7.41	0.767	0.135
50	2.17	12.34	0.460	0.081
65	2.83	16.05	0.354	0.062
75	3.26	18.52	0.307	0.054



Roof Gardening over sprayed PUF Roof



## Lloyd Insulations (India) Limited

(An ISO 9001, ISO 14001 & OHSAS 18001 Certified Organisation)

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 Think Environment Protection  
 Think Lloyd Insulations