



Building Solutions



STYROFOAM™

Blue

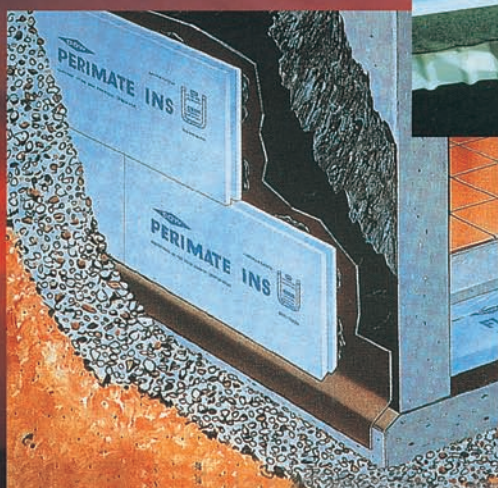
Extruded

Polystyrene

Foam



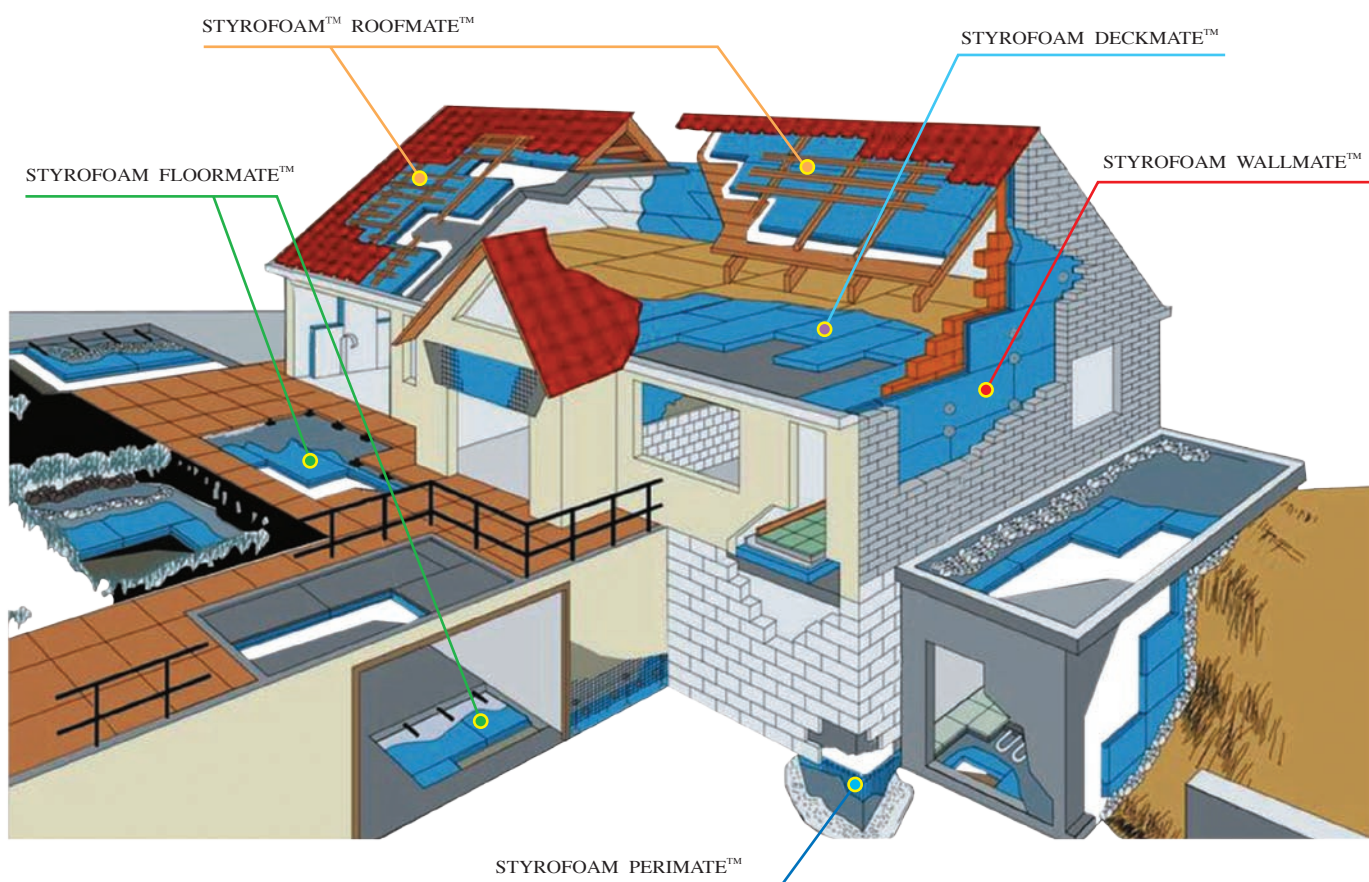
**Product
Properties
and
Applications
Guide**



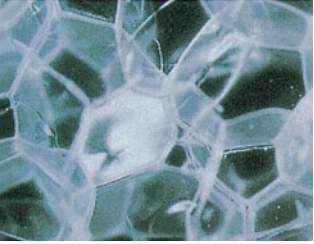
About Dow

Dow (NYSE: Dow) combines the power of science and technology with the “Human Element” to passionately innovate what is essential to human progress. The Company connects chemistry and innovation with the principles of sustainability to help address many of the world’s most challenging problems such as the need for clean water, renewable energy generation and conservation, and increasing agricultural productivity. Dow’s diversified industry-leading portfolio of specialty chemical, advanced materials, agrosiences and plastics businesses deliver a broad range of

technology-based products and solutions to customers in approximately 160 countries and in high growth sectors such as electronics, water, energy, coatings and agriculture. In 2010, Dow had annual sales of \$53.7 billion and employed approximately 50,000 people worldwide. The Company’s more than 5,000 products are manufactured at 188 sites in 35 countries across the globe. References to “Dow” or the “Company” mean The Dow Chemical Company and its consolidated subsidiaries unless otherwise expressly noted. More information about Dow can be found at www.dow.com.



Blue Insulation - STYROFOAM Brand Extruded Polystyrene Foam



STYROFOAM™ is the trade-name of a range of blue **extruded polystyrene foam** insulation boards originally developed and marketed by The Dow Chemical Company in the early 1940's.

Manufactured through a continuous extrusion process, STYROFOAM products possess a rigid **closed cell structure** (as shown above at 25X magnification) with unique properties such as low thermal conductivity, high resistance to water penetration and high compressive strength. It is lightweight and easily bonded.

STYROFOAM products are **CFC Free**, they do not contain fully halogenated chlorofluorocarbons (CFCs) regulated by the United Nations Environment Program (UNEP) in the Montreal Protocol.

STYROFOAM products are produced at 24 Dow manufacturing locations in North America, Europe, Middle East, and Japan.

The products are branded for easy identification:

- STYROFOAM™ ROOFMATE™ brand insulation for roofs
- STYROFOAM™ DECKMATE™ brand insulation for use in single ply roof structures
- STYROFOAM™ WALLMATE™ brand insulation for walls
- STYROFOAM™ FLOORMATE™ brand insulation for floors
- STYROFOAM™ PERIMATE™ brand insulation for foundations and basement walls
- STYROFOAM™ insulation for building laminates, refrigerated transport and cold storage

This guide provides an introduction to each product to help you identify the right STYROFOAM product for each application. Technical data is available from the insert, or you can contact your Dow representative for further information.

Applications

STYROFOAM extruded polystyrene was invented by Dow more than 50 years ago and was first used as a flotation material in life-rafts and life-boats as its fully closed cell structure made it highly resistant to water absorption. By the early 1950's, the combination of excellent mechanical strength, high insulation value and extremely low water absorption properties led to STYROFOAM being regarded as the perfect thermal insulation material. It is

the ideal structural core for a wide range of building composites such as roofing, walls, and floors.

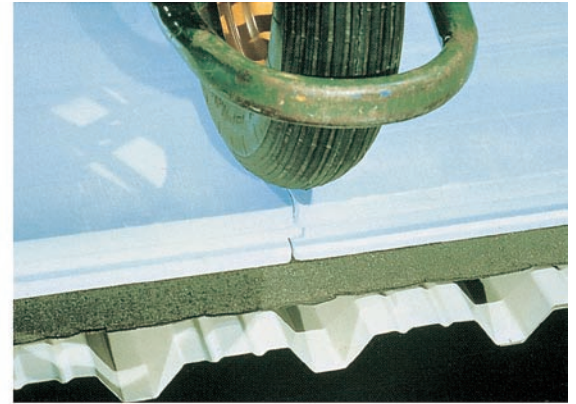
Today, STYROFOAM products are being used extensively throughout the world in both residential and commercial buildings, civil construction projects, cold stores, laminated panels, refrigerated trucks and containers.

ROOFING

The long term thermal resistance of an insulation material is essential for both building owners and designers. With its excellent moisture resistance and thermal performance retention properties, STYROFOAM ROOFMATE is the ideal insulation material for Upside-Down roofing, while STYROFOAM DECKMATE is the perfect choice for single-ply roofing.



Ballasted Upside-Down roofing



STYROFOAM DECKMATE over metal roof-deck

WALLS

STYROFOAM WALLMATE extruded polystyrene boards considerably reduce energy loss through external walls of new and existing buildings. They keep their structural and thermal integrity even when buried, and are extremely resistant to the rigors of site conditions. Whereas STYROFOAM IB, STYROFOAM LB and other brands of STYROFOAM Plane products, provides a good substrate for any finishing jobs such as plastering, dry lining and rendering.



Plastering



Fixing of insulation boards



FLOORS

The excellent mechanical strength of STYROFOAM FLOORMATE extruded polystyrene foam makes it an ideal heavy-load-bearing insulation material for any kind of floors in warehouses, parking areas, as well as residential and commercial buildings.

Rack warehouse floor



Car parking on roof

COLD STORES AND PANELS

STYROFOAM is the ideal insulation for high-load-bearing floors such as those found in cold stores, long term high creep resistance ensure long term performance to the floor. With its close tolerance, dimensional stability, dust-free surface allows for perfect bonding to a variety of sheet materials in high quality sandwich panels used in the cold storage industry.



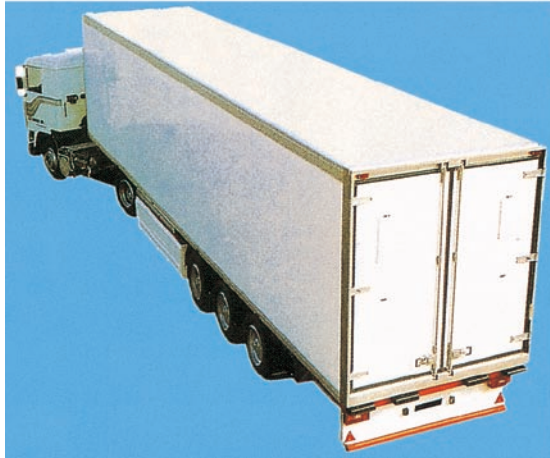
Load-bearing floor

Sandwich panel and floor



REFRIGERATED TRANSPORT

The core material of refrigerated trucks and container panels has to withstand severe dynamic loads and stresses which may eventually lead to fatigue and panel failure. STYROFOAM RTM brand extruded polystyrene foam has been specially designed to resist such forces and in tests has been shown to perform extremely well under dynamic load cycling.



Refrigerated truck

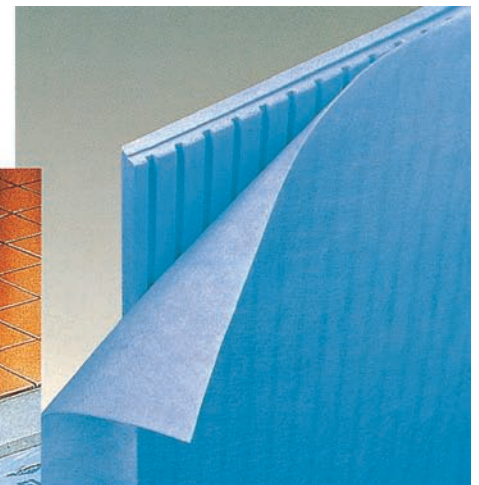
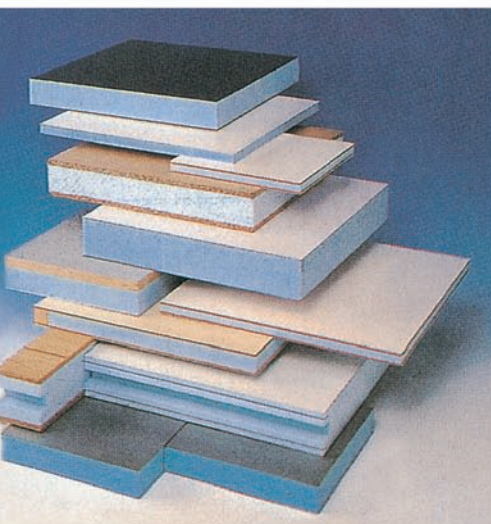


Refrigerated container

LAMINATES/ FABRICATION

For fabricators and laminate manufacturers who demand ease of fabrication as well as thermal and mechanical performance, Dow's broad line of STYROFOAM extruded polystyrene boardstock is designed to meet a wide variety of such needs. STYROFOAM PERIMATE is an excellent example of a combined drainage, insulation and protection board.

Laminates



STYROFOAM PERIMATE
drainage board

Fire Performance, Site Handling & Storage, and Environment

FIRE

STYROFOAM extruded polystyrene products contain a flame retardant additive to inhibit accidental ignition from a small fire source. However STYROFOAM products are combustible and, if exposed to an intense fire, may burn rapidly. In most countries, fire classifications are based on small scale tests and may not reflect the reaction of the material under actual fire conditions.

STYROFOAM extruded polystyrene products will melt when brought into direct contact with high temperature heat sources. The maximum recommended continuous operating temperature is 75°C.

HANDLING AND STORAGE

STYROFOAM extruded polystyrene products should be stored on a clean, flat surface in an area free from flammable or volatile materials. When large quantities of the boards are stored indoors it is recommended that the building be ventilated to allow a minimum of two air changes per hour.

To avoid surface degradation, the boards should be protected from direct sunlight when stored for long periods in the open. Light colored plastic sheeting is a suitable protective cover, but dark or transparent materials should be avoided as they may cause excessively high temperatures to develop underneath.

Solvent attacks may occur if the blue extruded polystyrene products are used in direct contact with materials containing volatile components.

Care should be taken to protect the boards from flames or other ignition sources during storage, installation, and in-use.

ENVIRONMENT

Dow has taken a leadership role in defining and implementing solutions for environmental concerns. STYROFOAM brand products are manufactured with HCFC and other advanced blowing agents which have an ozone depletion potential much lower than standard CFC blowing agents or ozone depletion free. For details of environment and ozone depletion, please refer to detail product specification and material safety data sheet. STYROFOAM brand products can be re-used, even after having been installed for decades.



Applications and Properties for STYROFOAM™ Products

CONSTRUCTION APPLICATIONS			DECKMATE CM	ROOFMATE SL	FLOORMATE 200	FLOORMATE 350	FLOORMATE 500	FLOORMATE 700	STYROFOAM WALLMATE	STYROFOAM LB
ROOFS	Warm Flat Roof	Insulation beneath light coloured SPRM	●		●	●				
	Lightweight Inverted Roof	Gravel covered		●	●	●				
		Paved		●	●	●				
		Roof Garden		●	●	●				
		Roof top car park		●		●	●			
Cold Roof	“Lost formwork”				●				●	
WALLS	External Insulation	Render and/or cladding system							●	●
		Cold bridge insulation							●	●
	Internal Insulation	STYROFOAM plasterboard laminate							●	●
FLOORS	Above Concrete Slab	Covered with screed			●	●				
		Covered with chipboard/timber			●	●				
	Below Concrete Slab	Below ground bearing slab			●	●	●	●		
		Industrial floors				●	●	●		
	Soffit Insulation	“Lost formwork”								
UNDER-GROUND	Basement Walls	Insulation against tanking			●					
		Drainage and insulation			●					
		Foundations			●					

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Building Solutions

Applications and Properties for STYROFOAM™ Products

FABRICATION APPLICATIONS			STYROFOAM RTM	STYROFOAM HD300	STYROFOAM LB	STYROFOAM LT	STYROFOAM SP
REFRIGERATED TRANSPORT	Truck	Walls	●				
		Floor	●	●			
		Roofs	●				
		Doors	●				
COLDSTORAGE	Coldstore	Floors					●
		Highly Loaded Floors		●			
		Panels			●	●	
COMPOSITE PANELS	Building Panels	Curtain Walling			●		
		Infill			●		
		General Laminates			●		

PROPERTIES	STANDARD	UNIT	STYROFOAM RTM	STYROFOAM HD300	STYROFOAM LB	STYROFOAM LT	STYROFOAM SP
Density (minimum)	BS4370: Method 2	kg/m ³	40	45	30	28	34
Thermal conductivity (90 days, 10 °C)	BS4370: Method 7	W/mK	0.025	0.025	0.027	0.024 ⁽¹⁾	0.027
Compressive strength at 10% deflection	BS4370: Method 3	kN/m ²	400	700	300	250	350
Compressive modulus	BS4370: Method 3	kN/m ²	16-25,000	25-33,000	12-20,000	12-15,000	10-22,000
Tensile strength	DIN 53292	kN/m ²	700	1000	500	450	—
Tensile modulus	DIN 53292	kN/m ²	16-25,000	25-33,000	12-20,000	12-15,000	—
Shear strength	ASTM C- 273	kN/m ²	400	500	250	250	—
Shear modulus	ASTM C- 273	kN/m ²	10,000	14,000	8,000	8,000	—
Design compressive stress which gives 2% compression after 20 years.	PREN 1606	kN/m ²	—	250	—	—	120
Water vapour resistivity	BS4370: Method 8	μ - value	100-160	100-160	100-160	80-160	100-160
Water absorption by immersion (28 days, full boards)	DIN 53434	% - vol.	0.5	0.5	0.5	0.5	0.5
Capillarity	—	—	nil	nil	nil	nil	nil
Coefficient of linear thermal expansion	BS4370: Method 13	mm/mK	0.07	0.07	0.07	0.07	0.07
Temperature limits	—	°C	-50/+75	-50/+75	-50/+75	-50/+75	-50/+75
Fire classification	BS3837: Part 1 1986	—	A	A	A	A	A
Size: Length	—	mm	2500	2500	2500	2500/6000	2500
Width	—	mm	600,1200	600	600,1200	605	600
Thickness ⁽²⁾	—	mm	(2)	(2)	(2)	(2)	(2)
Tolerances thickness	—	mm	+/-0.5	+/-0.5	+/-0.5	+/-0.5	+/-3.0
Width (600mm board)	—	mm	+3/-0	+3/-0	+3/-0	+3/-0	+3/-0
Width (1200mm board)	—	mm	—	—	—	+5/-0	+5/-0
Length (600mm board)	—	mm	+10/-0 (2500)	+10/-0	—	+10/-0	+10/-0
Length (1200mm board)	—	mm	+15/-0 (6000)	—	—	+15/-0	+15/-0
Edge profile	—	—	butt	butt	butt	butt	butt
Surface	—	—	planed with or without grooves	planed with or without grooves	planed	planed	skin

⁽¹⁾ STYROFOAM LT is tested at 30 days and 10°C for thermal conductivity

⁽²⁾ Special dimensions are available on request

⁽³⁾ Above properties are general product property description , for detail of specific product properties , please refer to relevant product Sales Specification

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For further information, call:

Pacific: +800 7776 7776† (toll-free)

+800 7779 7779 (fax)

<http://www.dowbuilding.cn>

www.dow.com

†except Indonesia and Vietnam

Shanghai

Tel: ☎(8621) 3851 1000

Fax: ☎(8621) 5895 1818

Beijing

Tel: ☎(8610) 8527 9199

Fax: ☎(8610) 8527 9299

Guangzhou

Tel: ☎(8620) 3813 0600

Fax: ☎(8620) 3839 6551

Taipei

Tel: ☎(886) 2 2776 6073

Fax: (886) 2 2776 2525

Sydney

Tel: ☎(61) 2 9776 3215

Fax: (61) 2 9776 3196

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