

# Foamex Styroboard

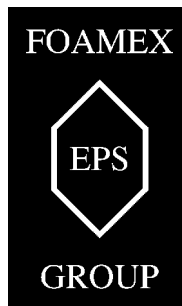
C.F.C. FREE

## Expanded polystyrene



PS

Expanded Polystyrene is designated by plastic resin identification 6.



**Manufactured by FOAMEX GROUP**

### **Victoria**

Foamex Victoria Pty Ltd  
31-33 Gatwick Road  
Bayswater North Vic 3153  
Phone: (03) 9720 4200  
Fax: (03) 9729 5050  
Email: [Sales@foamex.com.au](mailto:Sales@foamex.com.au)  
Web: [www.foamex.com.au](http://www.foamex.com.au)

### **South Australia**

Foamex South Australia Pty. Ltd.  
8-10 Waldaree Street  
Gepps Cross, SA 5094  
Phone: (08) 8349 9919  
Fax: (08) 8349 9910  
Email [Fomexsa@foamex.com.au](mailto:Fomexsa@foamex.com.au)

### **Brisbane**

Polyfoam Brisbane Pty. Ltd.  
43 Proprietary Street  
Tingalpa, QLD 4173  
Phone: (07) 3390 8955  
Fax: 07) 3390 8956  
Email: [qldsales@polyfoam.com.au](mailto:qldsales@polyfoam.com.au)

## What is Foamex Styroboard EPS?

Foamex Styroboard is the brand name for the Expanded Polystyrene (EPS) produced in block or sheet by Foamex Group. The material has been modified by the addition of flame retardant additives.

Foamex Styroboard is a closed cell light weight cellular plastics material produced from polystyrene.

Polystyrene literally translated is ‘polymerised styrene’. That is, the single styrene molecules are chemically joined together to form a large molecule which is called the polymer. Styrene is produced from benzene and ethylene, and polymerisation is accomplished in the presence of catalysts, usually organic peroxides. The expanded form is produced as small beads containing a blowing agent.

### The Manufacturing Process

#### Pre – Expansion

The small expandable beads are subjected to steam, which causes the thermoplastic polystyrene to soften. Increasing vapour pressure caused by the blowing agent causes the beads to expand up to 40 times their original volume. It is this prefoam stage which determines the final density of the expanded polystyrene block.

#### Ageing

After pre-expansion the prefoam is transferred via a fluidised bed to large hoppers for ageing. This process is designed to allow for the replacement of expanding agent by air in the cells of the bead. Ageing also allows for stabilisation and cooling of the prefoam.

#### Moulding

Once conditioned by ageing, the prefoam is blown into a mould where further steaming causes the expanded beads to fuse into a block.

#### Drying

To provide dimensionally stable, dry blocks it is necessary to pass them through a temperature controlled oven. This process also ensures that any residual blowing agent has been removed, as well as being the step that converts EPS into Foamex Styroboard.

#### Finishing

For most customers the manufacturing process is not complete until the Foamex Styroboard blocks have been cut into various shapes. This process is mainly carried out using a hot wire cutting machine, which gives a fine finish to the product and enables very fine cutting tolerances to be achieved.

### Australian Standard

Australian Standard 1366, Part 3 – 1992 Physical Properties of Rigid Cellular Polystyrene – sets out minimum properties for six classes (see table 1) and methods of determination and compliance. Flexibility in production allows Foamex Styroboard to be produced to this standard or to other requirements that specialised applications may demand.

### Quality Control

To ensure compliance with customer requirements Foamex monitors all stages of the manufacturing process, and tests various key physical properties such as density, cross breaking and compressive strength.

### Acoustic Properties

Because Foamex Styroboard has a closed cell structure it offers only a limited absorption of airborne sound. Structure borne sound, transmitted through such structures as walls, may be effectively isolated by the use of floating floor systems. For this type of insulation, Foamex Styroboard with the required dynamic stiffness can be obtained by compressing the sheets by 50 to 60 percent and then allowing them to recover to 80 or 90 percent of their original thickness.

Table 1 Physical Properties of EPS, according to AS 1366, Part 3 - 1992

Physical Property	Unit	Class						Test Method
		L	SL	S	M	H	VH	
Compressive stress at 10% deformation, min	kPa	50	70	85	105	135	165	AS2498.3
Cross – breaking strength ; min.	kPa	95	135	165	200	260	320	AS2498.4
Rate of water vapour transmission ; max – measured parallel to rise at 23°C	µg/ m <sup>2</sup> s	<b>710</b>	630	580	520	460	400	AS2498.5
Dimensional stability of length ; max : - at 70°C, dry conditions ; 7 days	Per cent	1.0	1.0	1.0	1.0	1.0	1.0	AS2498.6
Thermal resistance(min) at a mean temperature of 25° C (50mm sample)	m <sup>2</sup> K/W	1	1.13	1.17	1.20	1.25	1.28	AS2464.5 or AS2464.6
Flame propagation characteristics :								AS2122.1
- median flame duration ; max	s	2.0	2.0	2.0	2.0	2.0	2.0	
- eighth value ; max	s	3.0	3.0	3.0	3.0	3.0	3.0	
- median volume retained ;	Per cent	15	18	22	30	40	50	
- eighth value ; min.	Per cent	12	15	19	27	37	47	

## Thermal Properties

Foamex Styroboard EPS gains its exceptional insulating properties from the stabilised air trapped within its cellular structure.

As Australian Standard 1366 Part 3 is a minimum conformance standard, the thermal resistance quoted will be achieved, as a minimum, in 97.5% of cases in a statistical sample, when tested at a mean sample temperature of 25°C.

For design purposes the average thermal resistance is a better guide than the minimum thermal resistance (refer table3).

## Moisture Resistance

Of all the materials used for insulation applications, Foamex Styroboard EPS is one of the most resistant to the adverse affects of moisture. Even when force saturated to moisture content ten times its dry weight, EPS has been found to maintain 80% of its R value.

## Floataion Properties

The density of Foamex Styroboard is low compared to water, with a normal density range of 11 to 32 kg/m<sup>3</sup> compared to water at 1000kg/m<sup>3</sup>. The water buoyancy per cubic metre of Foamex Styroboard is determined by subtracting its kg/m<sup>3</sup> density from 1000. the result is the weight in kilograms which a cubic metre of Foamex Styroboard can support when fully submerged in water.

## Temperature Cycling

Foamex Styroboard EPS is able to withstand the effects of temperature cycling, thereby providing long term performance in low temperature applications.

Core specimens of EPS removed from freezer walls in place for twenty years have demonstrated no deterioration in the structural integrity of physical properties.

The K value of Foamex Styroboard EPS decreases at lower average mean temperatures, hence it's popularity and success in sub-zero applications.

## CFC Free

Foamex Styroboard EPS does not contain any Fluorocarbons or modified Fluorocarbons or Ozone Depleting Substances, nor are any used in its manufacture.

Foamex Styroboard EPS does not contain any Volatile Compounds (VOC's). Pentane which is a Volatile Organic Compound is used in its manufacture but is lost from the product during manufacture and post manufacture curing.

Product		
Styroboard EPS All Classes	Ozone depleting substances content	Ozone depleting substances used in manufacture
	0	0
	VOC Content	VOC used in manufacture
Styroboard EPS All Classes	0	< 0.8 g/l

## Toxicity

Extensive research programs have been conducted overseas (i) to determine if thermal decomposition products of EPS present a toxicity hazard. The test results have revealed that these decomposition products are less harmful than those of burning wood.

Gases released during combustion are predominantly carbon monoxide and, to a lesser extent, carbon dioxide. A CSIRO report (ii) comments that the toxicity of the gases associated with the burning of EPS is no greater than that associated with timber.

## Combustibility

As with all other organic material, EPS insulation products must be considered combustible and to constitute a fire hazard if improperly used or installed.

EPS products should not be exposed to open flames or other ignition sources.

The material contains a flame retardant additive to inhibit accidental ignition from small fire sources, Table 2 shows test results for Foamex Styroboard and other common building materials to provide a good guide as to how these products compare.

- (i) *H.Hofmann & H. Oettel "Comparative Toxicity of Thermal Decomposition Products"*
- (ii) *P.R. Nicholl & K.G. Martin "Toxicity Considerations of Combustion Products from Cellular Plastics."*

Table 2

### Comparative testing of some materials to AS1530, Part 3 – Early Fire Hazard Test

Material	Ignitability Index (0-20)	Spread of Flame Index (0-10)	Heat evolved Index (0-10)	Smoke developed Index (0-10)
EPS	12	0	3	5
Australian Softboard	16	9	7	3
Oregon Bluegum	13	6	5	3
	11	0	3	2

### Source: EBS Notes on the Science of Building NSB66

The information contained in this brochure is presented as a guide to the users of EPS, and while to the best of Foamex's knowledge it is correct and reliable, no responsibility can be taken by the company for the applications in which Foamex Styroboard EPS may be selected or the way in which it is used.

**Table 3 Thermal Conductivity Design Values – W/mK**

(a) Determine mean temperature of insulation in °C

*The simplest way to determine the mean temperature is to add the insulation warm side temperature to the insulation cold side temperature and divide by two.*

(b) Select the Class of EPS from AS1366.3

(c) Look up relevant K value in the table for the mean temperature

Class-Temperature	L	SL	S	M	H	VH
0	.0389	.0370	.0360	.0349	.0337	.0321
1	.0391	.0372	.0361	.0350	.0338	.0322
2	.0393	.0374	.0363	.0351	.0339	.0323
3	.0394	.0375	.0364	.0353	.0341	.0325
4	.0396	.0377	.0366	.0354	.0342	.0326
5	.0397	.0378	.0367	.0356	.0343	.0327
6	.0399	.0380	.0369	.0357	.0344	.0328
7	.0401	.0382	.0370	.0358	.0346	.0330
8	.0402	.0383	.0372	.0360	.0347	.0331
9	.0404	.0385	.0373	.0361	.0348	.0332
10	.0406	.0386	.0375	.0362	.0349	.0333
11	.0407	.0388	.0376	.0364	.0351	.0335
12	.0409	.0389	.0378	.0365	.0352	.0336
13	.0410	.0391	.0379	.0367	.0353	.0337
14	.0412	.0393	.0381	.0368	.0354	.0338
15	.0414	.0394	.0382	.0369	.0356	.0340
16	.0415	.0396	.0384	.0371	.0357	.0341
17	.0417	.0397	.0385	.0372	.0358	.0342
18	.0419	.0399	.0387	.0373	.0359	.0343
19	.0420	.0401	.0388	.0375	.0361	.0345
20	.0422	.0402	.0390	.0376	.0362	.0346
21	.0423	.0404	.0391	.0378	.0363	.0347
22	.0425	.0405	.0393	.0379	.0364	.0348
23	.0427	.0407	.0394	.0380	.0366	.0350
24	.0428	.0408	.0396	.0382	.0367	.0351
25	.0430	.0410	.0397	.0383	.0368	.0352
26	.0432	.0412	.0399	.0384	.0369	.0353
27	.0433	.0413	.0400	.0386	.0371	.0355
28	.0435	.0415	.0402	.0387	.0372	.0356
29	.0437	.0416	.0403	.0388	.0373	.0357
30	.0438	.0418	.0405	.0390	.0374	.0358
31	.0440	.0419	.0406	.0391	.0376	.0360
32	.0441	.0421	.0408	.0393	.0377	.0361
33	.0443	.0423	.0409	.0394	.0378	.0362
34	.0445	.0424	.0411	.0395	.0379	.0363
35	.0446	.0426	.0412	.0397	.0381	.0365
36	.0448	.0427	.0414	.0398	.0382	.0366
37	.0450	.0429	.0415	.0399	.0383	.0367
38	.0451	.0431	.0416	.0401	.0384	.0368
39	.0453	.0432	.0418	.0402	.0386	.0370
40	.0454	.0434	.0420	.0404	.0387	.0371
41	.0456	.0435	.0421	.0405	.0388	.0372
42	.0458	.0437	.0423	.0406	.0389	.0373
43	.0459	.0438	.0424	.0408	.0391	.0375
44	.0461	.0440	.0426	.0409	.0392	.0376
45	.0463	.0442	.0427	.0410	.0393	.0377
46	.0464	.0443	.0429	.0412	.0394	.0378
47	.0466	.0445	.0430	.0413	.0396	.0380
48	.0467	.0446	.0432	.0415	.0397	.0381
49	.0469	.0448	.0433	.0416	.0398	.0382
50	.0471	.0450	.0435	.0417	.0399	.0383
51	.0472	.0451	.0436	.0419	.0401	.0385
52	.0474	.0453	.0438	.0420	.0402	.0386
53	.0476	.0454	.0439	.0421	.0403	.0387
54	.0477	.0456	.0441	.0423	.0404	.0388
55	.0479	.0457	.0442	.0424	.0406	.0390
56	.0481	.0459	.0444	.0425	.0407	.0391
57	.0482	.0461	.0445	.0427	.0408	.0392
58	.0484	.0462	.0447	.0428	.0409	.0393
59	.0485	.0464	.0448	.0430	.0411	.0395
60	.0487	.0465	.0450	.0431	.0412	.0396