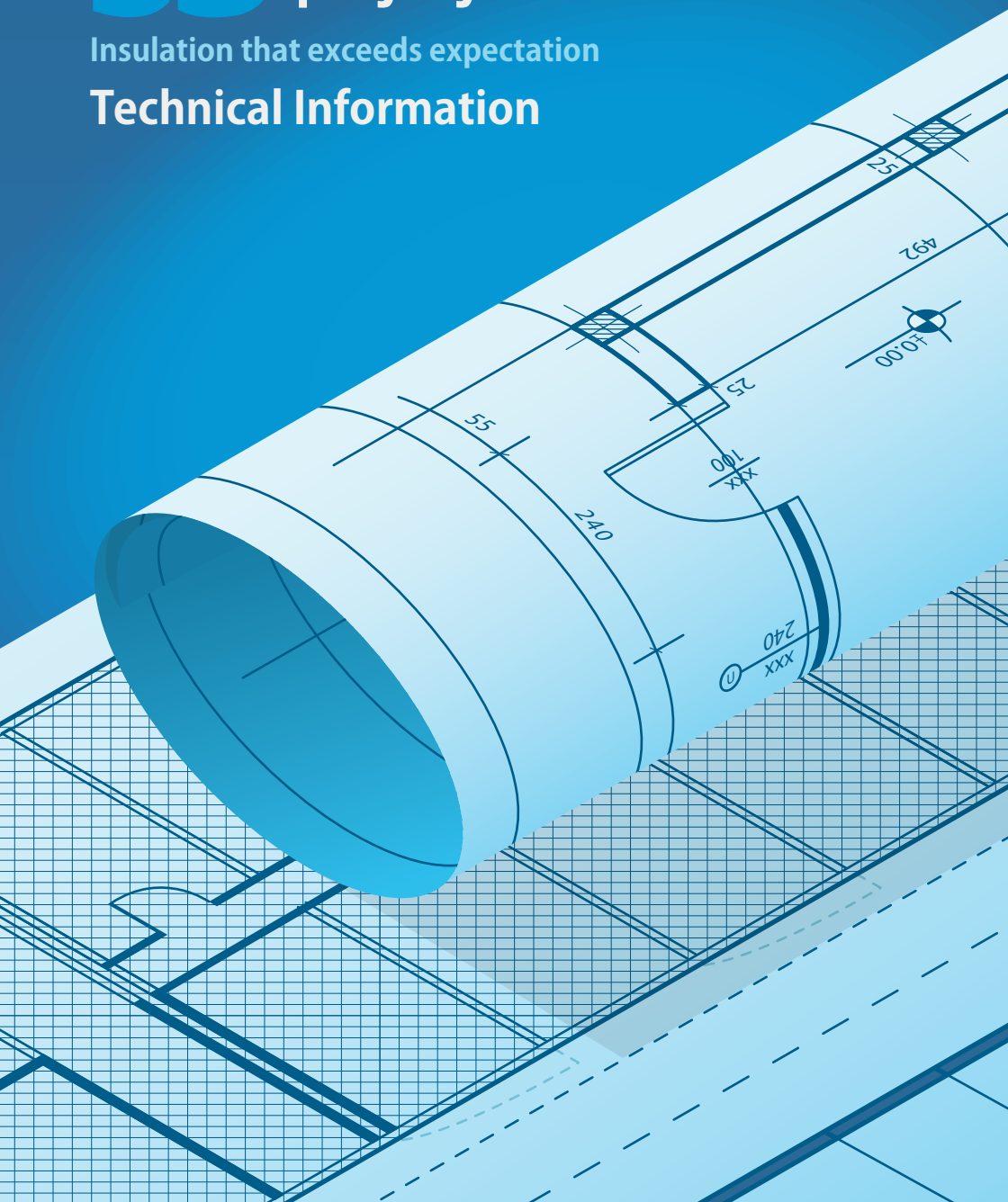
expanded polystyrene

Insulation that exceeds expectation

Technical Information



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Glossary of Terms

Thermal Conductivity [k-values]: Units = W/mk

This is a measure of the rate at which heat is conducted through a particular material under specified conditions. In lists of these figures, a range of different values will be seen for similar materials due to the variations created by moisture levels and air levels within the material.

Thermal Resistivity [r-values]: Units = mK/W

This is merely the reciprocal of thermal conductivity and so may be calculated easily: r = 1/k.

An R-value will take into account the thickness of the material, thus allowing for more accurate comparisons between materials carrying out the same job. Steel, wood and concrete may all be used for the frame of the building, however each has a radically different thickness and R-value. To allow for a more accurate comparison in the insulation properties of each material, an R-value should be calculated.

Thermal Resistance [R-value]: Units = m2K/W

This is a measure of the opposition to heat transfer offered by a particular component in a building element. R-values are created by dividing the thickness of the material [metres] by the k-value for a particular material: R = d/k or R = dxr

Thermal resistance provides a specific result for a material of known thickness and can therefore allow for almost any material on sites' insulation properties to be examined.

Thermal Transmittance [U-values]: Units = W/m2K

This is a measure of the overall rate of heat transfer by all mechanisms under standard conditions through a particular section of construction. This measure takes into account the thickness of each material involved and is calculated from R-values of each material as well as constant accounting for surface transmittance [Rsi and Rso, inner and outer surfaces respectively] and also for a small standard value assigned, which in reality may vary
slightly.

Thermal Bridging

This is the portion of a structure whose higher thermal conductivity lowers the overall thermal insulation of the structure. The bridge creates an area where heat loss is far greater in one area than it is for the general building structure thus creating a number of problems. These areas with poorer insulation will lower the average U-value for the building. This will also create cold spots on the walls inside the building where condensation will form more rapidly, resulting in damp patches and in the long term, possible rotting of the building structure.

Floor U-values

Calculating floor U-value is done using tables and involves the comparison between the perimeter and the floor area. The calculations are complex as they have to take into account both downward and lateral movement of heat.

Advantages of EPS Board

Thermal Insulation

EPS is a lightweight, closed cell material with excellent stable thermal insulation properties based on entrapped air.

Moisture Resistance

EPS is non-hygroscopic and therefore moisture resistant, and retains its thermal properties.

Compatibility

EPS is compatible with cement, concrete, brick, masonary, mortars, plaster and bitumen based damp proof membranes. It must not be used in contact with membranes based on coal tar pitches or other building material containing solvents.

Ease of Installation

EPS products are light in weight and easy to handle, store and install. No specialised equipment or specialised trades are required.

Environmental Safety

EPS is not affected by bacteria, mold or fungi and will not provide nutrient value for insects or vermin. It is non-toxic, non-irritant and odourless. It does not contain CFCs [chloroflurocarbons] which affect the ozone layer.

Durability

EPS is rot proof and durable and will remain effective as an insulant.

Physical Properties

Physical properties of each grade of EPS are shown in the specification data sheet at the back of this brochure. Test methods are as required by EN 13163.

Combustibility

The reaction to fire classification of EPS as supplied to the market is Euroclass F. Flame retardant modified boards will achieve Euroclass E. However the classification of construction works incorporating EPS [end use application] will be considerably better. For example when used in a masonry wall or protected by plasterboard, a Euroclass B can be expected.

Our Accreditations

Global Warming Potential & Climate Change

Background

Global Warming Potential (GWP) is a means of measuring the strength of different greenhouse gases in the atmosphere and can be used to define the impact greenhouse gases will have on global warming over different periods of time. As an example, carbon dioxide (CO2) has a GWP of 1 over 100 years. All other greenhouse gases (HFC, CH4) are measured relative to CO2; their global warming effect after 100 years relative to the simultaneous emission of the same mass of CO2.

BREEAM

BREEAM states that "one credit is awarded where the specification of insulating materials avoids the use of ozone depleting substances and substances with a global warming potential (GWP) of five or more in either manufacture or composition".
In this instances BREEAM is referring to the GWP of the blowing agent/s used within manufacture, "many blowing agents have significant global warming potentials".

BREEAM Pollution Credit 1-1: Insulant ODP and GWP

Expanded polystyrene normally uses pentane as the blowing agent. The release of pentane into the atmosphere causes neither ozone depletion or global warming, and pentane therefore has an Ozone Depletion Potential (ODP) of zero and a GWP less than 5.

The use of pentane blown expanded polystyrene therefore achieves this BREEAM credit.

Environmental Profiles

BRE's Environmental Profiles are a way of displaying the results of a Life Cycle Analysis (LCA). LCA's measure all the impacts associated with the manufacture of a product, including manufacture and transport of raw materials, use of fuels and production of wastes.

BRE Environmental Profile report the amount of climate change caused in the manufacture of one tonne of a product, or in the construction of a m2 of construction element. This will include the climate change or global warming caused by the release of any blowing agent with a GWP, as well as emissions of CO2 from the use of fuels. The climate change impact in Environmental Profiles are not the same as GWP of the product.

EPS Fire Characteristics

Characteristics of:	EPS E Grade Temperature [°C]	EPS F Grade Temperature [°C]
Softening, shrinking, melting	from 100	from 100
Ignition temperature with pilot flame	370	350
Self ignition temperature	500	450

Composition

Expanded polystyrene containing residual amounts of pentane (blowing agent) E grade material also contains a brominated flame retardant.

Component name	CAS No.	Hazard	Risk Phrase
Pentane	#109-66-0	#Highly Flammable	#11

CAS number for polymer component - 900/3-53-6 (polystyrene)

Toxicity of smoke fumes from EPS

Characteristics of:	Emitted fractions (v/v) in ppm at different temperatures			
EPS [standard grade]				
Smoke gases in a fire	300°C	400°C	500°C	600°C
Carbon monoxide	50*	200*	400*	1,000**
Monostyrene	200	300	500	50
Other aromatic compounds	fractions	10	30	10
Hydrogen bromide	0	0	0	0
EPS-SE [FR grade]				
Carbon monoxide	10*	50*	500*	1,000*
Monostyrene	50	100	500	50
Other aromatic compounds	fractions	20	20	10
Hydrogen bromide	10	15	13	11

End-use conditions. * Smouldering/glowing ** as a flame-not detected

Thermal Resistance for Flooring / Sheet

Grade	EPS 70	EPS 100	EPS 120	EPS 150	EPS 200	Lambdatherm 70 / 90	
Thermal value W/mK	0.038	0.036	0.036	0.035	0.034	0.032 / 0.030	
Thickness [mm]							
25	0.65	0.65	0.65	0.70	0.70	0.75	0.80
30	0.75	0.80	0.80	0.85	0.85	0.90	1.00
35	0.90	0.95	0.95	1.00	1.00	1.05	1.15
40	1.05	1.10	1.10	1.10	1.15	1.25	1.30
45	1.15	1.25	1.25	1.25	1.30	1.40	1.50
50	1.30	1.35	1.35	1.40	1.45	1.55	1.65
55	1.40	1.50	1.50	1.55	1.60	1.70	1.80
60	1.55	1.65	1.65	1.70	1.75	1.85	2.00
65	1.70	1.80	1.80	1.85	1.90	2.00	2.15
70	1.80	1.90	1.90	2.00	2.05	2.15	2.30
75	1.95	2.05	2.05	2.10	2.20	2.30	2.50
80	2.10	2.20	2.20	2.25	2.35	2.50	2.65
85	2.20	2.35	2.35	2.40	2.50	2.65	2.80
90	2.35	2.50	2.50	2.55	2.60	2.80	3.00
95	2.50	2.60	2.60	2.70	2.75	2.95	3.15
100	2.60	2.75	2.75	2.85	2.90	3.10	3.30
105	2.75	2.90	2.90	3.00	3.05	3.25	3.50
110	2.85	3.05	3.05	3.10	3.20	3.40	3.65
115	3.00	3.15	3.15	3.25	3.35	3.55	3.80
120	3.15	3.30	3.30	3.40	3.50	3.75	4.00
125	3.25	3.45	3.45	3.55	3.65	3.90	4.15
130	3.40	3.60	3.60	3.70	3.80	4.05	4.30
135	3.55	3.75	3.75	3.85	3.95	4.20	4.50
140	3.65	3.85	3.85	4.00	4.10	4.35	4.65
145	3.80	4.00	4.00	4.10	4.25	4.50	4.80
150	3.90	4.15	4.15	4.25	4.40	4.65	5.00
155	4.05	4.30	4.30	4.40	4.55	4.80	5.15
160	4.20	4.40	4.40	4.55	4.70	5.00	5.30
165	4.30	4.55	4.55	4.70	4.85	5.15	5.50

Flooring Pack Quantity & Meterage

Length [mm]	Width [mm]	Thickness [mm]	Qty per pack	Per pack [m^3]	Per pack [m^2]
2400	1200	20	15	0.8639	43.200
2400	1200	25	12	0.8639	34.560
2400	1200	30	10	0.8639	28.800
2400	1200	40	8	0.9215	23.040
2400	1200	50	6	0.8639	17.280
2400	1200	60	5	0.8639	14.400
2400	1200	70	4	0.8063	11.520
2400	1200	75	4	0.8639	11.520
2400	1200	80	4	0.9215	11.520
2400	1200	90	3	0.7775	8.640
2400	1200	95	3	0.8207	8.640
2400	1200	100	3	0.8639	8.640
2400	1200	105	3	0.9071	8.640
2400	1200	110	2	0.6335	5.760
2400	1200	120	2	0.6911	5.760
2400	1200	125	2	0.7199	5.760
2400	1200	140	2	0.8063	5.760
2400	1200	150	2	0.8639	5.760
2400	1200	200	2	1.1519	5.760
2400	1200	250	2	1.4398	5.760
2400	1200	300	2	1.7278	5.760

Indicative U-Values

Floor insulation below 65mm screed, 100mm slab. Soil: clay

EPS 70 @ 0.038 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	30	60	75	85	90	95	100	105	105
0.22	25	50	80	95	105	110	115	120	125	125
0.18	25	85	115	130	140	150	155	160	160	165
0.15	40	120	150	170	180	190	195	195	200	205
0.10	140	230	265	285	295	305	310	315	315	320

EPS150 @ 0.035 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	30	55	70	80	85	90	95	95	100
0.22	25	45	75	85	95	105	110	110	115	115
0.18	25	75	105	120	130	135	140	145	150	150
0.15	35	110	140	155	165	175	180	180	185	185
0.10	125	210	245	265	275	280	285	290	290	295

EPS100 @ 0.036 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	30	55	70	80	85	90	95	100	100
0.22	25	45	75	90	100	105	110	115	120	120
0.18	25	80	110	125	135	140	145	150	150	155
0.15	35	115	140	160	170	180	185	185	190	190
0.10	130	215	255	270	280	290	295	300	300	305

Lambdatherm 90 @ 0.030 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	25	50	60	65	75	75	80	85	85
0.22	25	40	65	75	85	90	95	95	100	100
0.18	25	65	90	105	110	120	120	125	125	130
0.15	30	95	120	135	145	150	155	155	160	160
0.10	110	180	210	225	235	240	245	250	250	255

Indicative U-Values

Floor insulation below ground supported 100mm concrete slab. Soil: clay

EPS 70 @ 0.038 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	35	65	80	85	95	100	105	105	110
0.22	25	50	80	95	105	115	120	125	125	130
0.18	25	85	115	130	145	150	155	160	165	165
0.15	40	125	150	170	185	190	195	200	205	205
0.10	140	230	270	290	300	305	315	315	320	320

EPS150 @ 0.035 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	30	60	70	80	85	90	95	100	100
0.22	25	45	75	90	100	105	110	115	115	120
0.18	25	80	105	120	130	140	145	150	150	155
0.15	40	115	140	160	170	175	180	185	185	190
0.10	130	215	250	265	275	285	290	290	295	295

EPS100 @ 0.036 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	30	60	75	80	90	95	100	100	105
0.22	25	50	80	90	100	110	115	115	120	125
0.18	25	80	110	125	135	145	150	150	155	155
0.15	40	115	145	165	175	180	185	190	195	195
0.10	135	220	255	275	285	290	295	300	305	305

Lambdatherm 90 @ 0.030 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.25	25	25	50	60	70	75	80	80	85	85
0.22	25	40	65	75	85	90	95	100	100	105
0.18	25	70	90	105	115	120	125	125	130	130
0.15	35	100	120	135	145	150	155	160	160	165
0.10	110	185	215	230	235	245	245	250	255	255

Indicative U-Values

Suspended floor T beam insulation. 158mm beam, 75mm concrete. Soil: unknown
Warm Beam & Warm Beam Plus

Thickness using Warm Beam @ 0.036 /mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.20	183	183	183	188	193	198	198	198	203	203
0.18	183	183	198	203	208	213	218	218	218	223
0.15	183	213	228	238	243	248	253	253	253	258
0.13	203	248	263	273	278	283	283	288	288	288
0.11	248	293	308	318	323	328	328	333	333	333

Thickness using Warm Beam Plus @ 0.030 W/mK

P/A Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
U-Value										
0.20	183	183	183	183	183	183	183	188	188	188
0.18	183	183	183	188	193	198	198	198	203	203
0.15	183	198	208	218	223	223	228	228	228	233
0.13	188	223	238	243	248	253	253	253	258	258
0.11	223	258	273	278	283	288	288	293	293	293

Identification Table

New Identification / colour coding of products manufactured to BSEN 13163		
EPS 70	2 x brown stripes	
EPS 70 E	2 x brown stripes & 1 red stripe	
EPS 100	1 black stripe	
EPS 100 E	1 black stripe & 1 red stripe	
EPS 120	2 x green stripes	
EPS 120 E	2 x green stripes & 1 red stripe	
EPS 150	1 yellow stripe	
EPS 150 E	1 yellow stripe & 1 red stripe	
EPS 200	2 x black stripes	
EPS 200 E	2 x black stripes & 1 red stripe	
EPS 250	1 violet stripe	
EPS 250 E	1 violet stripe & 1 red stripe	
EPS 300	2 x violet stripes	
EPS 300 E	2 x violet stripes & 1 red stripe	

Specification Data

Property	Conditions	Grades					Lambdatherm	
		EPS200	EPS150	EPS120	EPS100	EPS70	90	70
Strength								
Compressive strength kPa Min	at 10% compressive strength	200	150	120	100	70	90	70
Cross breaking strength kPa Min		250	200	170	150	115	150	115
Safe working load kPa	at 1% nominal compression	90	70	45	45	21	45	21
Heat								
Thermal conductivity [k] value W/mk Max	10°C mean	0.034	0.035	0.036	0.036	0.038	0.030	0.032
Water (tabulated values)								
Vapour diffusion resistance factor μ1		40-100	30-70	30-70	30-70	20-40	30-70	20-40
Vapour permeability δ mg [pa.h.m]		0.007 to 0.018	0.010 to 0.024	0.010 to 0.024	0.010 to 0.024	0.018 to 0.036	0.010 to 0.024	0.018 to 0.036

Specification Data

Property	Conditions	Grades		
		EPS250	EPS300	EPS350
Strength				
Compressive strength kPa Min	at 10% compressive strength	250	300	350
Cross breaking strength kPa Min		350	450	525
Safe working load kPa	at 1% nominal compression	100	120	140
Heat				
Thermal conductivity [k] value W/mk Max	10°C mean	0.033	0.033	0.0325
Water (tabulated values)				
Vapour diffusion resistance factor μ1		40-100	40-100	40-100
Vapour permeability δ mg [pa.h.m]		0.007 to 0.018	0.007 to 0.018	0.007 to 0.018

FIND US

At S and B EPS Ltd we take real pride in finding solutions to problems, so whatever your expanded polystyrene needs, you can call on us to deliver

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