POLYPHEN™

FIRE RESISTANT FOAM INSULATION www.polyphen.com

- POLYPHEN®: A novel fire resistant FM Global Class 1 accredited insulation foam.

Polyphen®

At last, the long awaited solution to the world-wide problem of fire risks associated with foam core sandwich panels.

Polyphen®:

Is a new revolutionary rigid Polystyrene/ Phenolic composite foam.

- Exhibits excellent fire resistance properties.
- Can be manufactured extremely cost effectively.
- Has excellent Thermal Insulation performance.
- Is manufactured using standard plant and equipment.
- Can be manufactured on a continuous line.
- Possesses excellent mechanical properties.
- Can be manufactured to have significant sound absorbing properties.

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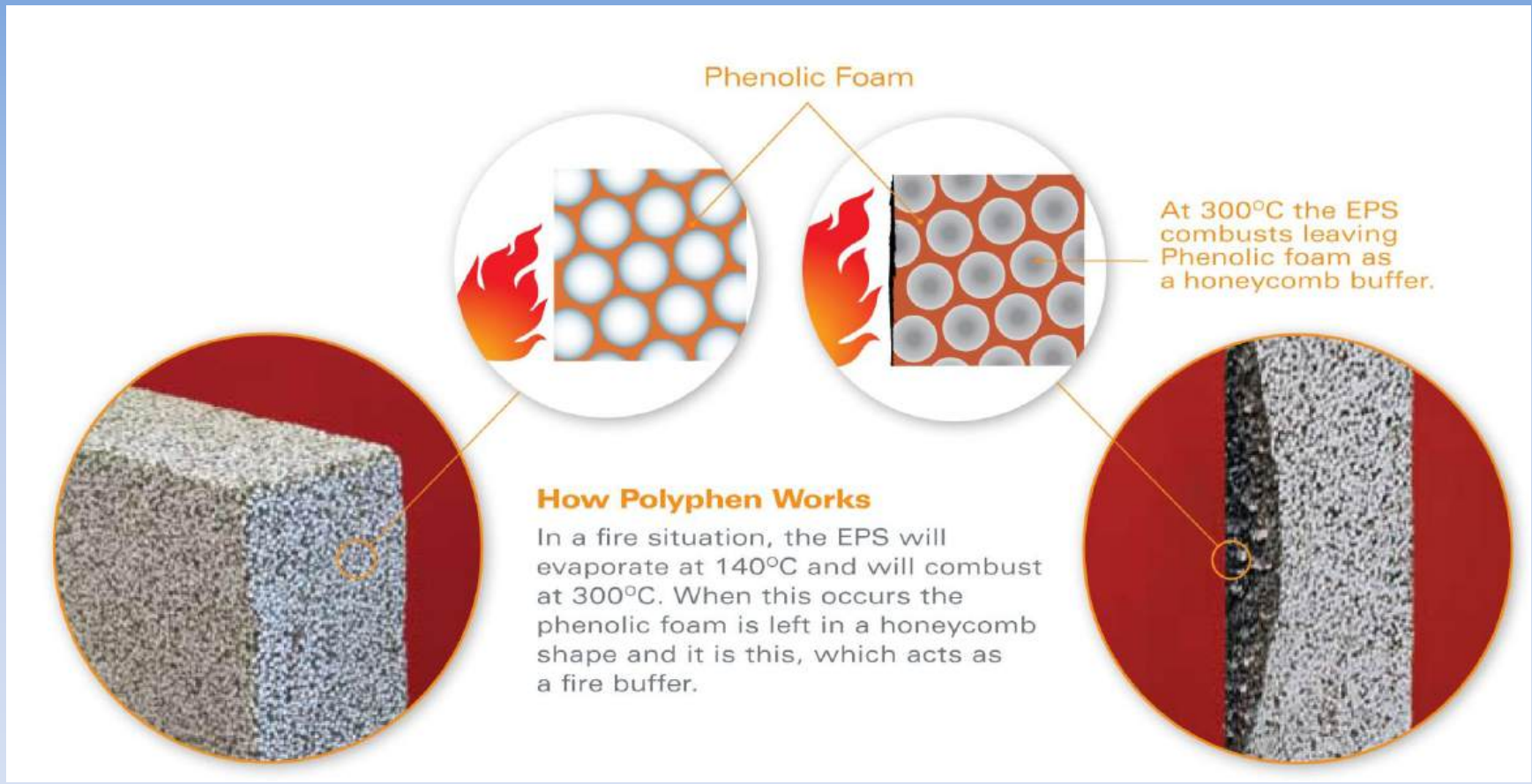
Polyphen®

- Polyphen® is suitable for:
- Cold stores and Warehouses (steel clad panels);
- External Cladding for high rise apartments / Office blocks;
- Rendered Factory and housing insulation as well as hygienic building structures;
- Pipe and vessel insulation;
- Residential Applications, e.g. light weight wall cladding with rendered finish, and profile mouldings.

How Polyphen® works



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Fire Tests

- Fire rating to AS1530.4 (ASTM E 119, ISO834, BS476pt20-24)
- ISO 9705 Room Corner Test
- Factory Mutual UBC 26-3 Test Room Test)
- FM Global Class 1 Accreditation

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Polyphen® FM Global 4880 Fire Test

Figure 4. Polyphen™ steel clad sandwich panels showing tongue and groove joint

Figure 6. Test in progress at 6 minutes.

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Polyphen® FM Global 4880 Fire Test cont…

Figure 9. Damage to corner specimens with skins and bolting in place.

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Polyphen® FM Global 4880 Fire Test cont…

Figure 11. With skin removed charring of foam in region of direct flame contact

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Technical Information - Properties

- Physical properties of Polyphen® vary with the density of the foam
- The following test results were obtained for a nominal 50kg/m3 (3lbs/cu ft) foam

Property	metric	imperial
Density	48-50kg/m3	3lbs/cuft
Compressive Strength (AS 2498.3)	126kPa	18psi
Cross Breaking Strength (AS 2498.4)	248kPa	35psi
Shear Strength (ASTM C273)	104kPa	14.8psi
Tensile Strength (ASTM D1623)	238kPa	33.8psi
Thermal Conductivity		
at 25 degress	0.0368 W/m degrees C	.25 Btu in/ft^{2}h degrees F
Dimensional Stability (AS 2498.6)		
70 degrees C, 95% RH, 20 hours	Less than 0.5%	
-10 degrees C, 20 hours	Less than 0.5%	

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Technical Information – Properties cont…

Acoustics

- Polyphen® has good sound absorbing properties, competing with polyurethane and acoustic foams at lower cost while providing higher fire resistance. e.g. a 32 kg/m3 density
- Polyphen® foam was found to have a Noise Reduction Coefficient NRC=0.45 (250-2000 Hz, 30mm thickness). This means it can be used for acoustic applications e.g. ceiling tiles, wall linings and office partitions, to reduce disturbing echoes. Areas of potential use include restaurants, factories, call centres etc…

Biological Resistance

- Mould - does not promote mould growth.
- Vermin -offers no food value to insects or rodents.

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Fire Resistance

The following test results were obtained:

Physical Property	Units	PolyPhen®	Test Method
Flame propagation characteristics;			
• median flame duration, max.	SD	0	
• eight value, max.	SD	0	AS 2122.1
• median volume retained.	percent	96.4	
• eight value, min.	percent	96.2	
Fire Propagation and Smoke Release			
• Spread of Flame Index SFI		0	AS/NZS 1530
• Smoke Developed Index		3	Part 3
Surface Burning Characteristics			
• Flame Spread Index		20	ASTM E84-05
• Smoke Developed Index		5	
Fire Rating - 200mm thick PolyPhen® sandwich panel with 0.6mm steel both sides (tested by Warrington Fire Research *[BS476 Part24, ISO834, ASTM E119])*		2 hour	AS1530.4
ISO 9705 Room Corner Test - (Building Code of Australia)		Group 1 (no flashover)	ISO 9705
Requirements for "fire-resisting materials" as defined in the Marine code MSC.90(71):			
• HRR not to exceed 100kW:		<50 kW	
• Max HRR 500kW over any 30 second period		<100kW	
• Av. smoke production rate not to exceed 1 .4m^2/s		<1.0m^2/s	MSC.90(71)
• Max smoke production rate not to exceed 8.3m^2M/s		<2.0m^2/s	
• No flame spread on walls below 0.5m above floor		pass	
• No flaming drops or debris falling on the floor		pass	
Factory Mutual Room Corner Test FM Approvals Standard 4880 (1994) - (for sandwich panels up to 250 mm thick, 0.6 mm steel both sides with tongue-and-groove joints).		Class 1 Fire Rated to max. 30ft(9.1m)High	FM Approvals Standard 4880 (1994)
European Single Burning Item Test			DIN EN 13823 : 2002-06

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Manufacturing Processes

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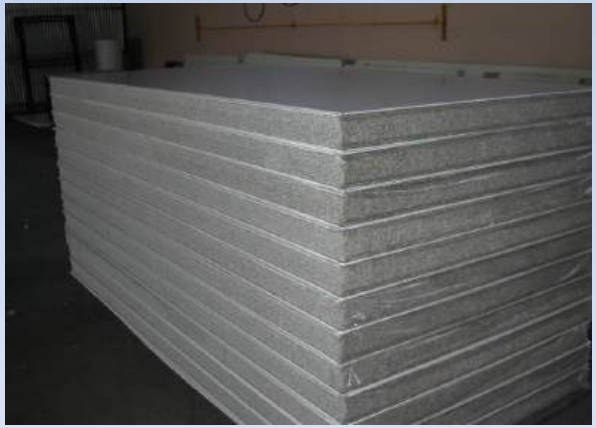
Technical information
Production Process - Panels

- Blocks of Polyphen® foam are cut to +/- .5mm on an abrasive wire cutting machine, e.g. *www.wintechint.com.au*

- Converts to steel clad panels cost-effectively, on existing continuous conveyor lines, e.g. www.panelmachines.com that produce widely used EPS/steel panels



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Laminating Video

Click here:

http://www.youtube.com/watch?v=VprSMVsNRQ4

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Continuous Line

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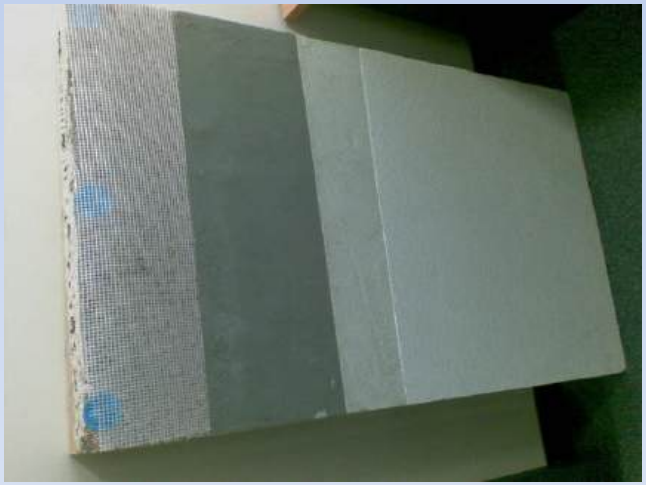
Rendered Polyphen® Images



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Rendered Wall

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