Phenolic Foam Technical Specification

UNITECH enterprise
Building Solutions

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Phenolic

Phenolic Foam (PF) is a closed cell rigid plastic foam comprising of phenolic resin and other additives. The phenolic foam has been recognized the best insulation material for the excellent fire resistance performance, low smoke emission, high temperature resistance, stability, superior thermal performance, extremely sound insulating property & structural strength performance. Therefore it has been named the Third Generation insulation material.

Characteristics of Phenolic Foam

Less smoke emission and harmfulness	Low smoke emission under high temperature, good integrity performance in toxic gas test of international standard
Thermal insulation	Good temperature convection deterrent, excellent energy saver material
Fireproof	High Oxygen percent requirement. No dropping, no melting under high temperature but carbonized.
Chemical resistance	Extreme anti-corrosion for acidity and alkalescency.
Durability	Available working temperature scale -180℃ to 180℃.Stable physical feature
Environmental performance	Both HCFC and CFC free

The test report from National Research center of Testing Techniques for Building Materials
Center Number: 200933148

No.	Test Items			Test Method	Standard	Result	The Single Item Judges
1	**Combustion Performance**	B	FIGRA. W/s	GB/T20284-2006	≤ 120	0	Comply
			THR600s. MJ		≤ 7.5	0.06	Comply
			LFS. m		< Sample Edges	Comply	Comply
			FS in 60s	GB/T8626-2007	≤ 150	5	Comply
		s2	SMOGRA	GB/T8626-2007	≤ 180	109	Comply
			TSP600 s.m²		≤ 180	69	Comply
		d0	Dripping	GB/T20284-2006	No drips in 600s	Comply	Comply
			The filter paper burning condition	GB/T8626-2007	NOT	Comply	Comply
		t1	Smoke toxic	GB/T20284-2006	ZA3	ZA2	Comply
2	**Heating Conductivity**			GB/T13475-2008	---	0.74 W/(M²k)	
3	**Sound insulation block**			GB/T50121-2005	---	30 dB	

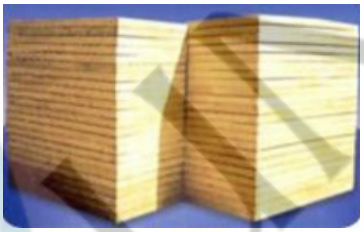
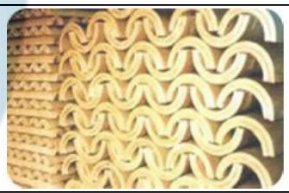
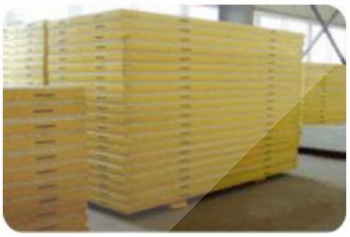
Test Conclusion :

The test result in line with GB8624-2006, its grade is B, the additional classifications comply to s2, d0, t1. According to GB8624-2006, the combustion performance of the submitted sample is grade B-s2, d0, t1.
The submitted sample is PF composite laminated pane. Its thickness is 35mm. Its thermal conductivity consulted from heating transfer conductivity is 0.0258.

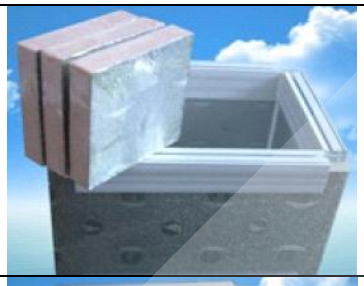
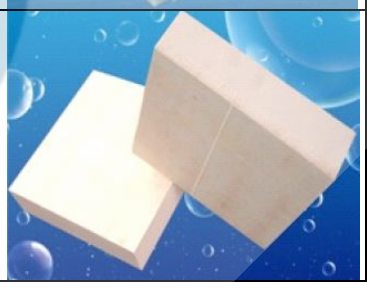
Performance Comparison Table of Phenolic Foam (PF), Polyurethane Rigid Foam (PUF), PolyVinyl Chloride (PVC), Polystyrene (PS).

Item/ Name	PF	PU	PVC	PS
Max. Working Temp. (°C)	**180°C**	120°C	120°C	60°C
Limitation	**210°C Color change**	100°C Shrink	140°C Intenerate	30°C Shrink
Thermal Conductivity (w/mk)	**0.016~0.036**	0.022~0.036	0.029~0.035	0.033~0.045
Loss of Weight (%)	**37**	100	95	94
Ageing Testing	**Best**	Bad	Good	Bad
Chemical resistance	**Best**	Good	Best	Bad
Water Absorption (kg/m³)	**0.02**	0.03	0.03	0.2
Pressure Resistance (kpa)	**216**	127	33	107
Burning Period (sec)	**---**	≤ 30	≤ 30	≤ 30
Flame Height (mm)	**15**	≤ 100	≤ 250	≤ 250
Oxygen Index	**42 Difficult to Burn**	25 Easy to Burn	25~27 Easy to Burn	18~21 Easy to Burn
Melt Condition	**NO**	Drip with Flame	Yes	Drip with Flame
Smoke Density (Dm)	**9**	51	68	66
Toxic	**NO**	YES	YES	YES

Specifications of Products

Product Name		Appearance Density (kg/m³)	Length (mm)	Width (mm)	Thickness (mm)
PF Thermal Insulation Board		55 ± 5	Unlimited	1200	≤ 1000
PF Fireproof Board		120	Unlimited	1200	10
PF Thermal Insulation Cover		55 ± 5			
PF Thermal Insulation Board		40 ± 5	Unlimited	1200	≤ 300

Panels for Air Ducts:

Product Name		Description	Dimension
Double Sided Aluminum Foil PF Panel **HS Code 392119900**		with **Phenolic foam** as core material ,with aluminum foil on both sides	Upto 3900×1200×20 mm 3900×1200×25 mm 3900×1200×30 mm
Single Sided Color Steel PF Panel **HS Code 392119900**		with **Phenolic foam** as core material ,with aluminum foil on one side, with color steel on other side.	Upto 3900×1200×20 mm 3900×1200×25 mm 3900×1200×30 mm
Single Sided GI Panel **HS Code 392119900**		with **Phenolic foam** as core material ,with aluminum foil on one side, with color steel on other side.	Upto 3900×1200×20 mm 3900×1200×25 mm 3900×1200×30 mm
Single Sided GI Panel **HS Code 392119900**		with **Phenolic foam** as core material ,with aluminum foil on one side, with color steel on other side.	Upto 3900×1200×20 mm 3900×1200×25 mm 3900×1200×30 mm
Double Sided Color Steel PF Panel **HS Code 392119900**		With **Phenolic foam** as core material, with color steel on both sides	Upto 3900×1200×20 mm 3900×1200×25 mm 3900×1200×30 mm
Phenolic Foam Sound & Wall Insulation Boards **HS Code 392119900**		with **Phenolic foam** as core material ,with non-woven fabrics or Kraft paper on both sides	Any length x upto 1200 mm in breath x thickness upto 1000 mm

Note:

Packing: Carton: Plastic bag and carton, 10pcs per pack

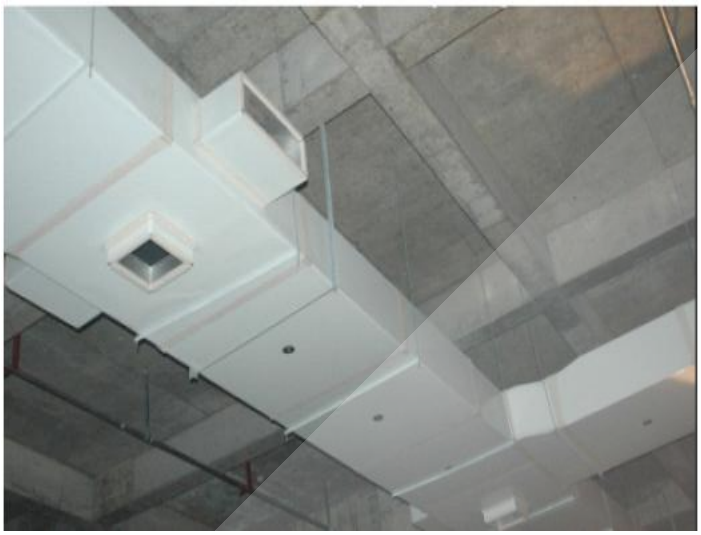
20"Container load 600㎡, 40"Container load 2000㎡, 40HQ Container load 2800㎡ panels,(size:1200 x 3900 x 20 mm)

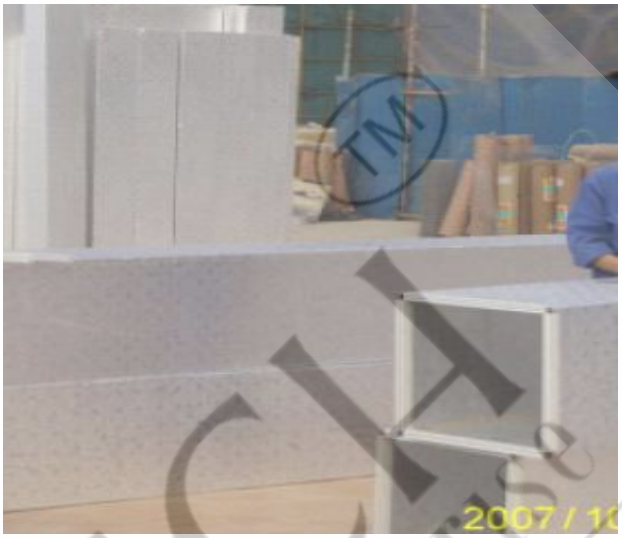
Performance Comparisons of Phenolic Print Painted Steel Sandwich Panel, Rock Wool Print Painted Sandwich Panel and Polyurethane Print Painted sandwich Panel

Feature	Phenolic Print Painted Steel Sandwich Panel	Polyurethane Print Painted Steel Sandwich Panel	Rock Wool Print Painted Steel Sandwich Panel
Fire Proof Effect	One Hour	Non	One Hour
Produce Smoke when Burning	Non-Toxicity	Produce Highly Toxic Gases	Non-Toxicity
Sound Insulation	Reduce 30~60 dB	Reduce 20~40 dB	Reduce 20~45 dB
Thermal Conductivity (HTC)	0.020~0.035	0.020~0.035	0.054~0.06
Smoke Density	Very Low (14.3 Dm)	Very High (above 500 Dm)	Low
Water Absorbing capacity	0.02 kg/m³	0.03 kg/m³	1.2 kg/m³
Content test		Poisonous	
Resistance against Chemical Solvent	Perfect	Bad	Good
Save Energy & Heat Preservation	Perfect	Perfect	Bad
Harm to the People	Non	Contain substance which can cause Cancer	The batts, makes the respiratory tract easy to cause cancer
Quality	Stable, will not foam for the second item	Effected by the temperature, easy to become deformed and will foam for the second time	
Construction	Production & one-body formed, Easy Installation	Production & one-body formed, Easy Installation	
Recycling	Rejected production can be dealed by burning; it can be mixed with soil to improve the soil & also can be used to produce light	Recycling will cause environmental protection problem, it can't be dealt with burying & burning	Recycling will cause environmental protection problem, it can't be dealt with by burying or burning
Reusing Times	More than 5 times	More than 5 times	1-2 times
Working Temperature	-180 °C to 180 °C	Below 70 °C	Below 1000 °C

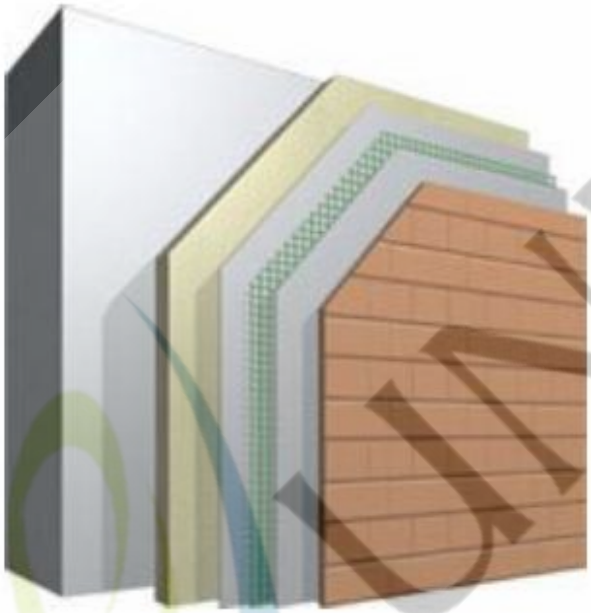
Applications:

- ✓ Air duct in HVAC application
- ✓ The insulation layer of external insulation system
- ✓ The Padding material of fireproof door
- ✓ The core material of refrigerator truck and chill store
- ✓ The fireproof materials for internal walls, ceilings, seats, boards of the transportations facilities
- ✓ The Fireproof and damp & sound insulating material for underground projects
- ✓ The roll packing material for container and petroleum, chemical product, gas, heating and water pipe





Air Duct



External Wall Sketch

External Wall Heat Insulating Project

External Wall Insulating Decorative Panel

External Thermal Insulating Decorative Project

Fireproof Door

Refrigerated Truck

Refrigerated Storeroom

Train & Carriage

Plane & Cabin

Yacht & Ship Cabin

Petroleum & Gas Pipeline

Steam Pipeline

Columniform Container

Tank

Phenolic Foam Insulation Benefits

By Catalina Bixler-Harris, eHow Contributor
updated: September 24, 2010

1. Approved by the U.S. Environmental Protection Agency for its 5 percent recycled material content, phenolic insulation foam offers advantages that include multipurpose applications on land and sea. Whether protecting oil and gas pipes from corrosion or optimizing heating and cooling in buildings and homes, phenolic insulation foam maintains superior performance.

Versatility

2. Suitable for a broad range of uses, phenolic insulation foam cuts into any desired shape and size including half sections, foil-faced laminate duct board, flange and valve box covers. Phenolic foam works with roofing, plasterboard dry lining systems and floor insulation as well. Factory-engineered composite panels of the foam joined with double-sided steel facings create insulation applications for food processing factories, cold storage and hospitals.

Environmental

3.

Using phenolic foam provides significant CO2 reduction.
According to the European Phenolic Foam Association (EPFA), compared to other insulation materials, using phenolic foam provides significant CO2 (carbon) reduction. The EPFA further reports using phenolic insulation affords the ability to play a considerable role in meeting the United Nations 2004 Kyoto Protocol, targeting 37 industrialized countries to reduce greenhouse gases by 2012.

Fire Reaction

4.

Phenolic insulation has low flame and smoke reaction to fire.
Properly applied phenolic insulation foam, according to the EPFA, meets or exceeds international building insulation and fire regulations. Phenolic foam insulation makes exceptional fire doors and panels because of both its low flame and smoke reaction to fire. With factory engineered composite panels, the EPFA reports phenolic foam achieves two hours of insulation integrity when furnace tested.

Moisture Resistant

5. 

Low water vapor seepage makes phenolic low in water absorption.
Phenolic insulation foam systems ensure limited water enters through any puncture in the material vapor barrier because of the non-wicking properties of the insulation. Non-wicking ensures no moisture build up occurs to compromise the system by limiting water accumulation to the puncture area only. Low water vapor seepage makes this insulation foam low in water absorption.

Structural Strength

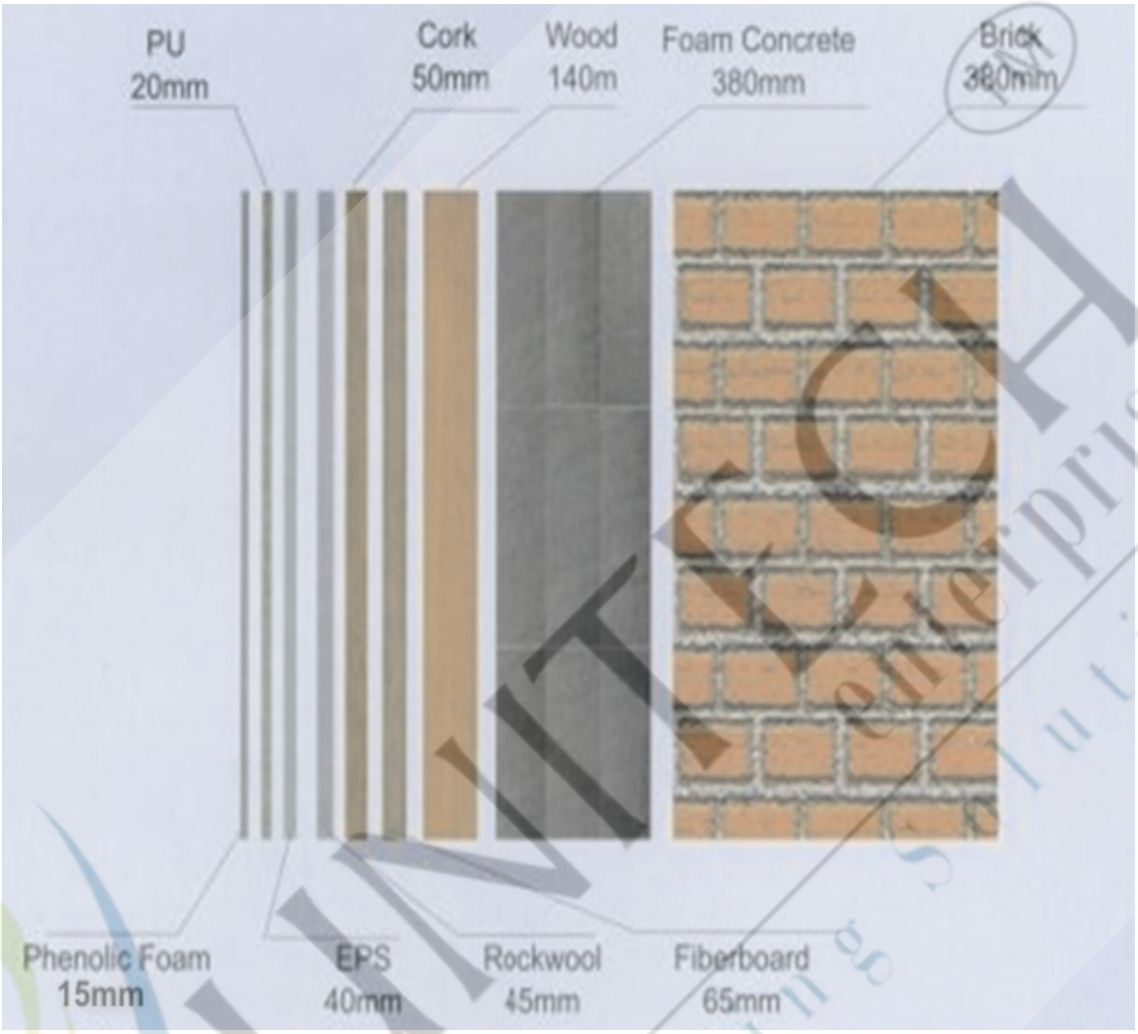
6. Though lightweight, higher density Phenolic insulation foam offers structural strength to steel faced composites of walk-on ceilings. Both pipe and duct supports made from phenolic brand insulation remain structurally stable whether above or under water.

Thermal

7. Phenolic foams gives an array of advantages in thermal performance. With correct applications, Phenolic foam supplies up to 50 percent more thermal efficiency than other common insulation products resulting in reduced long-term energy costs. Presenting higher thermal efficiency with reduced thickness over other insulation materials, Phenolic foams save valuable space.

Read more: Phenolic Foam Insulation Benefits | eHow.co.uk
http://www.ehow.co.uk/list_7230295_phenolic-foam-insulation-benefits.html#ixzz12daFFYaR

Thickness Comparison of Different Insulation Materials for the same Insulation Performance:



Recommended Insulation Thickness for Phenolic Foam:

Insulation Thickness (mm) / Lowest Avg. Temp. in Winter (°C)	Highest Average Temperature in Summer (°C)				
	20°C	**30°C**	**40°C**	**50°C**	**60°C**
20°C	10	15	20	30	40
10°C	20	20	20	30	40
0°C	30	30	30	40	40
-10°C	40	40	40	50	50
-20°C	50	50	50	55	55
-30°C	60	60	60	60	60
-40°C	80	80	80	80	80
-50°C	100	100	100	100	100
-60°C	120	120	120	120	120