PHENOLIC FOAM
PRODUCT RANGE

HVAC Ducts

Pipe Insulation

Insulation Board

Blocks

WOLF INTERNATIONAL

WOLF International (WI) in association with various factories around the world brings quality products for its customers in Middle East, South Asia and Africa region. We appreciate you interest in 'WI' product range and look forward to serve you with wide product portfolio.

WOLF International (WI) now proudly introduces latest product range of

1. Pre Insulated HAC duct work – **PHENOLIC FOAM**.
2. PU & PIR Air Duct System.
3. Insulation Board – **PHENOLIC FOAM**.
4. Pipe Insulation - **PHENLIC FOAM**.
5. **PHENOLIC FOAM BLOCK**.

With a factory sprawling over area of 33333㎡, specializing in researching and developing ventilation system in central air conditioning, pipe insulation and building insulation products. It is supported by advanced equipment and three laboratories. ISO9001 quality management certified production facility pays great attention to its development, cooperating with many universities and professional institutions.

The factory now operates two production plants with 24 hours running capacity.

1. Ducting Panel Production Plant – Annual capacity over 4m Sq. mtr.
2. Resin compounding plant – Annual capacity – 8m kg Resin.

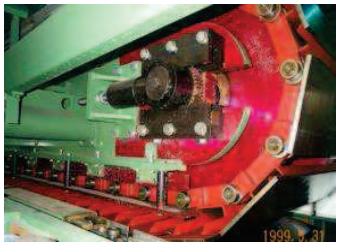
In addition to this substantial production capacity, **WOLF International (WI)** will maintain ready stocks in the region through its own warehouses and wide distributor network in the region, to supply material to its valued customers at short notice.

Ducting Panel Production Plant: It consist of production line for Sandwich Panel, a professional machine for manufacturing Sandwich Panels, with the core material as phenolic foam or polyurethane, with both layers is embossed aluminum foil or colored steel. The thickness of sandwich panel is 20-200mm, the width 1200mm and the length according to customers' request. The sandwich panels are used as the air ducts in Central air conditioning. The machine can used to make other insulation panel as long as the surface material is changed. The working principle of the machine is to as below: mix the raw materials with a certain ratio in a container and then pour the mixture on the interlayer of the sandwich panel. The raw material has the chemical reaction of foaming and solidifying. In the end the automatic tracking cutting machine cuts the panels into a certain length. The production line comprises of following components which can be individually adjusted.

The Aluminum foil embossing machine
The Raw Material Distributor /Charging Unit
The Aluminium Foil/Colored Steel Pre-heating,
The Material-baffling Mechanism
The automatic tracking cutting machine.
The roller supports & brackets.

The Reaction Injection Machine is used to calculate the computation and mix of raw materials pro rata.

The Back-and-forth Injection Machine
is used to apply the mixture on the lower aluminum foil or the colored steel



The Heated Air Circulation Device
To meet the expected requirement of foaming technology, the production line is equipped with a heated air circulation device.

The Automatic Tracking Cutting Machine
The panels are cut into different lengths by this machine.

Main Technical Parameter of the Production line.

Specification of Sandwich Panel	Width*Thickness (mm)	1200×（20～200）
The Production Speed	m/min	arbitrary
The Embossing Speed	m/min	≤20
The Mixing Speed	round/min	4500
The Moving of Injection Head	times/min	≤80
The Max temp of the heated air circulation device	℃	70
The Laminating Length of the Conveyor	M	18.82
The Max start-up Speed of the Conveyor	mm	300
Total Power	KVA	85～125
The Specification of the Production Line	mm	40950×5620×3700
The Specification of the Embossing Machine	mm	
Weight	T	≈34

CNC Foam Cutting Machine Technical Specification:

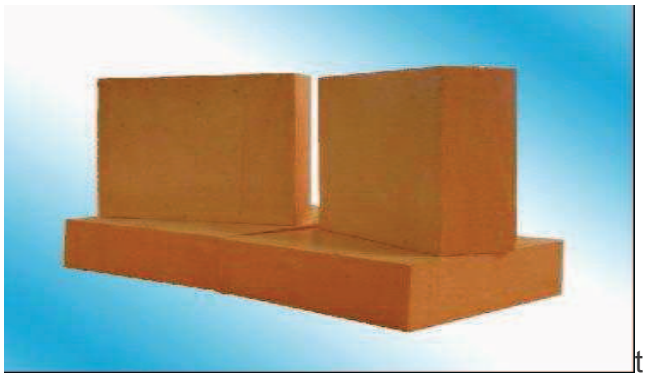
The numerical controlled cutting machine is a programmable CNC cutting machine which cuts sponge blocks, PU Blocks, and Phenolic foam blocks of different density. This machine produces high precision cuts for regular shape blocks as well as for irregular shapes. The operator is able to draw the graphics desired by using the digital control which then operates the mechanical function to cut the foam blocks. The machine is controlled by a computer with Windows XP operating system and CAXA drawing software. It is easy to operate, because the computer has a Graphic Operating Interface and 2D designing system. The designing system can convert Vector Graphics like DWG and DXF into executable programs, which saves a lot of time into programming. The G-format processing procedures of international standards facilitate the converting of the program. The machine has the function of remote control. The main control unit which is imported from Japan and has the function of remote control (optional) avoids the contamination of the equipment.

NON-COMBUSTIBLE PHENOLIC FOAM

Phenolic Foam is a highly efficient energy saving insulation material which is **fire resistant**. WI® Phenolic products have passed the E84/BS fire tests according to ASTM standards with proven results of 10 flames spread and 0 smoke develop which complies with most of the North American and European building inspection standards. This allows for our product to be used, exposed and crawl space of any project. The thin wall, high in R-Value and cost effective

WI® closed cell patent rigid Phenolic foams are constructed of Phenolic resin, fire retardant, flame retardant, foaming and curing agents. Our patent product assures Closed-celled toughening phenolic foam plastic and production techniques (Application No: 200310113965.3) The aluminium foil-phenolic foam sandwich composite panels and production technique (Application No: 02108279.0)

Unique Advantage of WII® closed-cell Phenolic foams – Light weight, cost savings, compared to the other insulation materials currently in the market.



The Phenolic products suitable for most projects such as: building construction, cold storage warehouses, accumulator tanks, natural gas projects, steamships, trains, and all other insulation projects that require space saving. It can be adjusted specific Density based on application.

The comparison between Phenolic foam and other insulation materials:

ITEMS	PHENOLIC FOAM	POLY ETHYLENE	POLY URETHANE	POLY STYRENE	GLASS WOOL	ROCK WOOL
DENSITY（kg/m3)	25-300	22-30	25-100	30	24-28	40-60
THERMAL CONDUCTIVITY (w/m k）	0.016-0.035	0.029-0.035	0.023-0.026	0.033-0.04	0.03-0.042	0.033-0.042
0xygen Index	46	>32	>32	<30	NA	Na

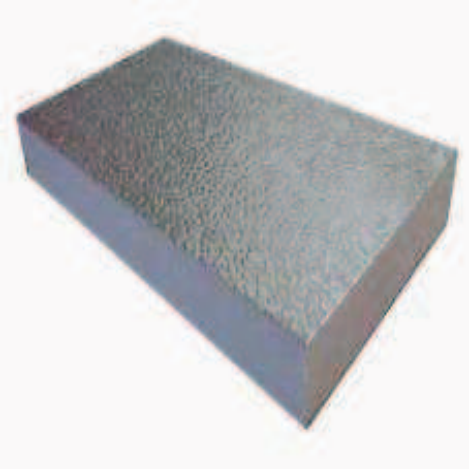
From the above form, we can see that the thermal conductivity of phenolic foam is very low which proves phenolic foam as the best insulation material. The density of Phenolic foam can be produced much higher and the thermal conductivity much lower than the other type of insulation. Mechanical properties of Phenolic foam can be easily adjusted to different densities due to good flexibility.

WI Phenolic Foam Pre-insulated Duct Panel Compounded with Aluminum Foil is of high strength, which takes phenolic foam as the core material with reinforcing the aluminum foil on both sides. It's a kind of noncombustible material which gives off no smoke and no poisonous gas when exposing to fire. Its bending strength reaches over 1Mpa and the thermal conductivity index 0.020w/mk. The phenolic foam can be fabricated into all kinds of rectangular (bended) ducts by cutting and adhesive connecting, and then can be assembled into the air ducts of different specifications by using the fire-proof flange and adhesive. It's widely used for the ventilation systems of central air conditioning units in hotels, apartments, hospitals, office buildings and other deluxe buildings.

The Feature of WI Phenolic Foam Air Duct System:

Lower heat conductivity, higher thermal efficiency, light weight, Foamed with CFC free materials, environment. Protective. Hermetic seal ensures little air leakage With aluminum foil reinforced on sides, its corrosion protective, hygiene, and has a beautiful appearance. Foamed with closed-cell structure, its water- proof and sound -insulated.

Easy making, rapid installing and convenient maintenance save cost. No protruding flange on the connections, it can save a Lot of building space.



Suitable for Internal Application

20mm thickness, Density 45-60 kg/m3, Vapor barrier Al foil of 80 micron internally as well as externally embossed.

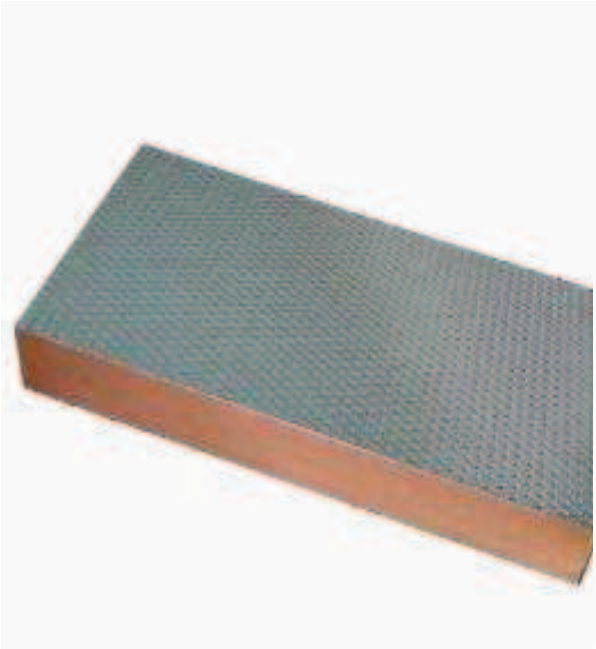
WI Phenolic Foam Pre-insulated Duct Panel with GI or Steel Sheet

WI Phenolic Pre-insulated Duct Panels comprise rigid Phenolic insulation foam faced on internal side with a protective 80 micron aluminum foil and external side with Galvanized Iron or Painted Steel Sheet. They are completely CFC and HCFC free, high intension, fire proof, especially suited for use in HVAC ductwork system. We also supply all kinds of tools and accessories needed for ductwork fabrication and installation. The phenolic foam duct panel can be fabricated into all kinds of rectangular (bended) ducts by cutting and adhesive connecting, and then can be assembled into the air ducts of different specifications by using the fire-proof flange and adhesive. It's widely used for the ventilation systems of central air conditioning units in hotels, apartments, hospitals, offices etc.

Suitable for External Application

20-30 mm thickness, Density 60-70 kg/m3, Vapor barrier Al foil of 80 micron internally embossed, Al sheet/ Galvanized sheet / Pre-painted steel sheet of 200micron on external surface either smooth or embossed

Aluminum Foil/ 'WI' Phenolic Foam / GI



Aluminum Foil / 'WI' Phenolic Foam / Painted Steel Sheet

Technical Data : PHENOLIC FOAM AIR DUCT

Item	Unit	Specification
Density	kg/m3	50-60
Thermal Conductivity	w/m.k	0.02
Compressing Strength	Mpa	0.25
Bending Strength	Mpa	1.0
Combustibility Property	BS476 Part 6& 7	Class 0
	ASTM E84	Class A
Water Absorption	%	1.9
Max Smoke Density	%	2
Dimension Change	%	0.3
Working Temperature	℃	-250 - +150
Standard Size	mm	3900*1200*20
Maximum Allowable Wind Velocity	m/s	≤12
Continuous Running Maximum Temperature	℃	≤120

Fabrication Process of Air Duct

1.Toolbox Show - consists of Double 45°jack plane, Left 45°jack plane, Right 45°jack plane, 90°Jack plane, 45°Side jack plane, Knife, Tape mea sure, Adjustable tape marker, Marking pencil, Anti-rebound hammer, Spare blades for Jack plane. The construction of a duct is accomplished by following a standardized procedure. The process is the same regardless of the shape of the duct element: tracing, cutting, gluing, folding, taping, flanging reinforcement and sealing.

1st Step-tracing - Put Ducting Panel onto the Working Table, scribe a line as opposed to marking a line by utilizing the pencil supplied in the toolbox, Aluminium Ruler or similar rod is required to press the panel for cutting.

2nd Step-cutting - This operation involves cutting 45°mitre cuts along each edge of the duct. The V grooves made by the 45°Jack Plane enable the phenol ic insulation panel to be folded into shape.

3rd Step-gluing - Glue is applied evenly to mitered surfaces utilizing a Hair Brush, and should cover all exposed phenolic material. The glue requires approximately 10 to 20 minutes to cure during which time the solvents evaporate.

4th Step-folding - Following the curing phase, the sides are folded at right angles to each other (90°) and the duct shape is formed.

5th Step-taping - The tape-marker is used to scribe a line on the phenolic insulation panel which serves as reference during application of the tape. The spatula is brushed firmly along the surface of the tape during application to ensure maximum adhesion and to expel any air trapped underneath.

6th Step-flanging - Apply glue at the end of duct section and on the flange joint, lay the steel angle bracket on the corner of duct section to reinforce the duct, then install the Flange Joint.

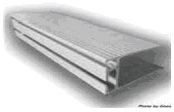
7th Step-sealing - Following assembly of the duct section, all internal joints must be sealed with silicone. It is recommended that after the silicone bead has been applied, a radiused tool (or alternatively a wet finger) is gently run along the entire length of the bead to further spread the sealant along the sides of the duct wall. Proper application is crucial in order to achieve "clean air" performance and minimize leakage.

Fabrication Process of Elbow - The process is similar as described above. Bending Machine is used for bending the strips. Please note the distance of each groove should be more than 5 cm and the groove can not be too deep in the strips.

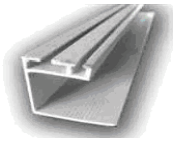
Support and Hanging - There are a wide range of materials and methods can be used for fixing the ductwork to building structure. Here we take fixing to concrete for example. First, drill a hole in the concrete, install the suspender with expansion anchor, and then install saddle and support. Connect the duct sections by inserting H Bayonet into the Flange Joint. Apply silicon sealant in the corner, and then install the Covering Board.

WI - ACCESSORIES

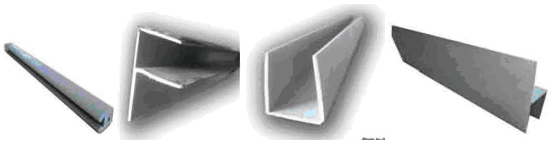
PVC Invisible Flange



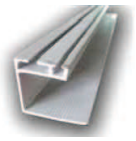
PVC Tee Connector Flange



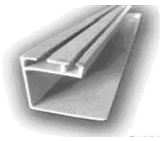
PVC H Bayonet / Sections F – U - Chair



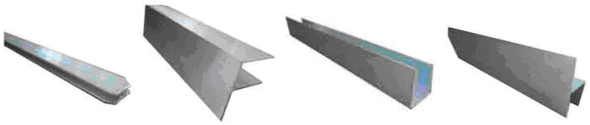
AL Invisible Flange



AL Tee Connector Flange



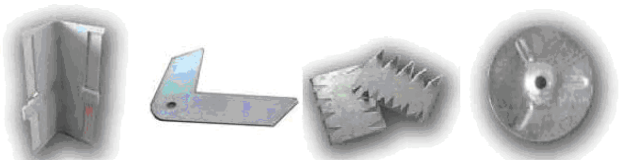
Aluminimum H Bayonet / Sections F – U - Chair



Silicon Sealant

AL Reinforcement Section Bar

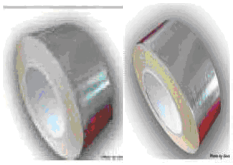
PVC Covering Board /G.I. Angle Bracket G.I.CRAB (TIGER) / G.I. Shaped Disc



Glue

AL Adhesive Tape. / FSK Al Adhesive Tape

Glue AL Tape Adhesive tape Reinforced with Fiber Glass Scrim

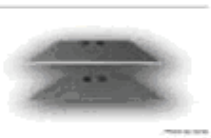


WI - FABRICATION TOOLS

Tool Box

Jack Plan Cutter

Jack Plane Spare Blade

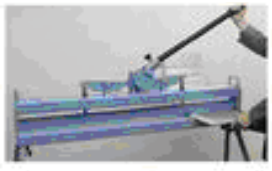


Wooden Square

Aluminium Compass

Aluminium Ruler 1.2m / 4m

Manual Bending Machine



Electrical Cutting Machine

Phenolic Foam Pipe Sections are fire resistant pipe sections made of non-flammable, superior and rigid insulation material. Pipe sections can be used for heat and temperature insulation in any industry. Phenolic Foam Pipe Sections are cost effective and better than conventional insulation materials because of various distinct properties like **Low K Value**, highest fire rating standards with **100% fire retardance**, **Correction & Chemical Resistance** and tested as per BS standards.

Advantages over conventional insulation materials:

1. It is non – burning. **2.** Toxicity of Smoke is nil **3.** Flame Spread is very low. **4.** During Continuous fire, turns dark brown, shows surface cracks but never burn /loose shape.

Advantages of Phenolic Foam Pipe Section:

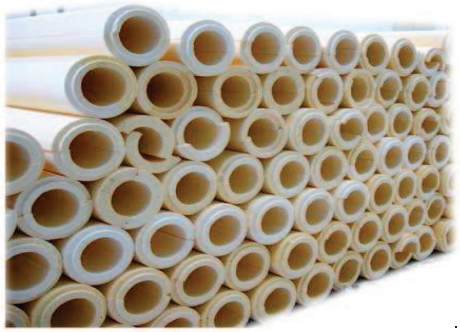
1. Easy Installation **2.**Clean and seamless appearance **3**. Space and energy savings. **4.** Light weight for handling. **5**. Comparing to fiberglass, there is absolutely no skin irritations

Applications of Phenolic Foam Pipe Section:

1. Hot and cold water pipelines (including underground lines) 2. Ethanol plants **3**. Petroleum and chemical transportation pipelines. **4.** Food processing plants. **5**. For any pipes that require insulation

Specification of Phenolic foam insulation Pipe:

Phenolic foam insulation pipe is compose of insulation layer and aluminium foil or reinforced aluminium. The insulation layer of the pipe insulation is made of phenolic foam.



Technical Data of Phenolic Foam Insulated Pipe Sect

Item	Standard	Specification
Standard Length		
Density	BS 4370	40 – 50 kg/m3
Thermal Conductivity	BS 4730	0.02 W/m.K
Compressive Strength	ASTM D1621-00	137.78 psi
Tensile Strength	ASTM 1623 -00	61.4 psi
Fire Test Classifications	Bs 476 PART 6 AND PART 7	Class O
Water Absorption	ASTM C 209-98	0.25%
Dimension Stability	ASTM 2126-99	0.3%
Working Temperatures		-250 TO 150 Deg C
Form Acid and Alkali		PH=7 Neutral
CFC & HCFCtest	Headspace GC/MS	Not Detected

Technical Data of High Density Phenolic Foam Insulated Pipe Support

Item	Unit	Specification			
Density	kg/m3	80	120	160	200
Thermal Conductivity	W/m.K	0.031	0.033	0.035	0.038
Compressing Strength (parallel to rise, perpendicular to rise)	KPa	600	1350	2300	2600
		400	950	1650	2200

Technical Data : Recommended Thickness for Hot & Cold Insulation

DN (mm)	OD (mm)	Insulated Temperature(^{O}C)															
		130	80	50	10	0	-10	-20	-30	-40	-50	-60	-80	-100	-120	-160	-190
15	22	45	25	20	20	25	30	35	40	45	50	60	65	70	75	80	85
20	27	45	30	25	25	30	35	40	45	45	55	60	70	75	80	85	90
25	33.4	50	30	25	25	30	35	40	45	50	60	65	75	80	85	90	95
32	42.2	50	30	25	25	30	35	40	45	50	60	70	75	80	85	90	100
40	48.3	55	35	25	25	35	35	45	50	55	65	70	80	85	90	95	100
50	60.3	55	35	25	25	35	40	45	50	55	65	75	80	90	95	100	110
65	73	60	35	30	30	35	40	50	55	60	70	80	85	95	100	105	115
80	89	60	35	30	30	35	40	50	55	60	70	80	90	100	105	110	120
100	114.3	65	40	30	30	40	45	50	55	65	75	85	95	105	110	115	125
125	141.3	65	40	30	30	40	45	55	60	65	80	90	100	110	115	120	130
150	168.3	70	40	30	30	40	45	55	60	70	80	90	100	120	120	125	135
200	219	70	40	30	30	40	45	60	65	70	85	95	110	120	125	135	145
250	273	75	45	30	30	45	50	60	65	75	90	100	110	125	130	140	150
300	323.8	75	45	35	30	45	50	60	65	75	90	105	115	130	135	145	155
350	356	75	45	35	35	45	50	60	70	75	90	105	120	130	140	145	160
400	406	80	50	35	35	45	50	60	70	80	95	110	120	130	140	150	160
450	457	85	60	40	35	45	50	60	70	85	100	115	125	135	145	155	170
Equipment Insulation		100	70	50	35	45	55	65	75	90	105	125	140	155	170	180	200

Technical Data: Properties Comparison between Typical Insulation Materials.

Insulation Material	CFC/ HCFC Free	LOW Flame / Low Smoke	Closed Cell	Low Thermal Conductivity
PHENOLIC FOAM	Y	Y	Y	Y
Fiber Glass	Y	Y	N	N
Mineral Wool	Y	Y	N	N
Cellular Glass	Y	Y	Y	N
Polystyrene	Y	N	Y	N
Expanded Rubber	Y	N	Y	N
Polyurethane (PU)	Y	N	Y	Y

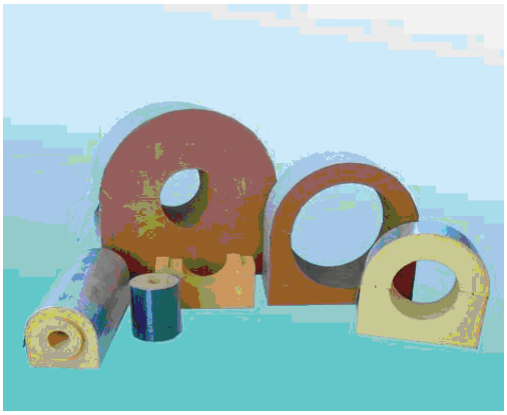
Phenolic Foam Insulation Pipe Support is a new type thermal insulation material cut from phenolic foam block. It has excellent heat preservation effect and trimmed appearance and is convenient to make. It is widely used in the thermal insulation of cold and heat water pipes, petroleum and chemical engineering ducts. It is one of the best substitutes (replaced) product for rubber-foam, fiberglass and polyurethane foam.

Advantages over conventional insulation materials:

1. CFC & HCFC free material, environmentally safe & compliant with international protocols – Zero ODP.
2. It is non – burning. Low Flame spread, & Low smoke emissions – BS 476 Class 0, During Continuous fire, it turns dark brown and shows surface cracks but does not either burn or loose shape.
3. Closed cell material resists moisture ingress.

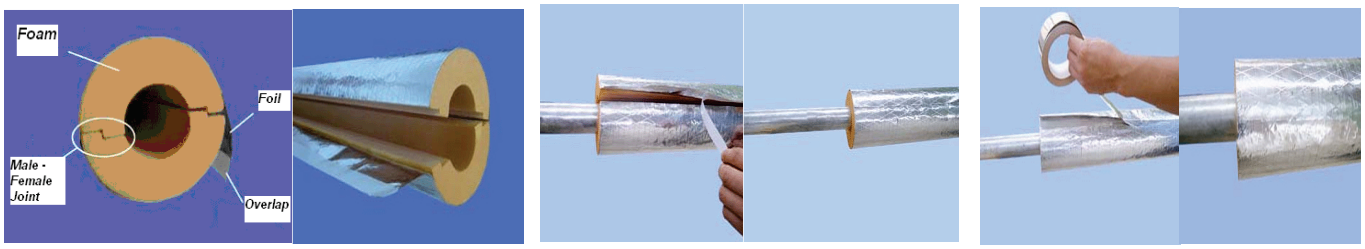
Advantages of Phenolic Foam Pipe Support:

1. Easy Installation
2. Clean and seamless appearance
3. Space and energy savings
4. Light weight for handling
5. Comparing to fiberglass, does not irritate Skin



All pipe section is protected on the outside with Aluminum foil Vapor barrier. The rigid Phenolic foam block can be cut into pipe section and pipe support in any diameter and thickness to suit different cold & hot insulation purpose

Application of 'WI' Phenolic foam insulation pipe: Consist of following.



Double-sided adhesive seal in the form

Outer Protective layer made of aluminum foil has a strong adaptation to the environment characteristics, high temperature, low temperature, easy deformation, temperature and other characteristics of reflected sunlight. **'WI' Phenolic foam**, **Male female heat pipe design** is an important institution, "Z"-shaped structure is not only effective in isolated thermal conductivity, but also in the actual construction process, the buffer size to play the role. **Sealing tape composition**. 'WI' Phenolic foam insulation pipe biggest feature: Quick execution at site.

PHENOLIC BOARD INSULATION

WI Phenolic Foam Insulation Board comprises rigid phenolic insulation foam faced on both / single side with a protective aluminium foil, fiber reinforced aluminium foil, glass tissue or nonwovens have lot of advantages.

Advantages: Quick installation and rapid & easy construction

Light weight with different density (40 to 200 kg/m3)

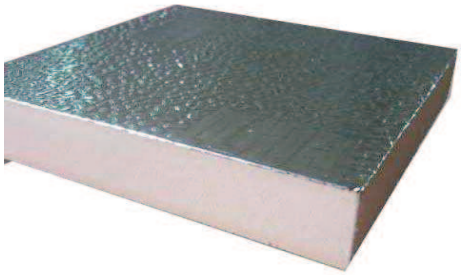
Fire-resistant with BS476 Class O & ASTM E-84 Class A & UL94-VO test reports.

Excellent insulation with thermal conductivity 0.024W/m. K.

CFC / HCFC free and environment friendly

Applications: Exterior buildings. Agriculture/ residential / commercial buildings, Fire wall for office and/or other interiors Cold Storage, Roof, Wall and Floor Insulation

Dimensions: Length: 600 - 4000mm Width: 600 -1200mm Thickness: 20-100mm



Phenolic foam-building insulation is an excellent choice.

Phenolic heat preservation material the most outstanding advantage is besides excellent heat preservation effect outside have fire prevention function, therefore phenolic heat preservation material is better suited to a strict requirements under the environmental conditions of use high-performance materials, has a good development prospect.

1, construction areas, such as steel structure workshop, large industrial workshop, mobile home, the cold storage, the clean workshop, buildings and layer, temporary housing, stadium, supermarkets need to fire prevention insulation requirements of the buildings;

2, replacing the polyurethane, polystyrene, rock wool used in steel sandwich board thermal insulation layer, have other materials cannot achieve fire insulation requirements;

3, can be used to construct fire belt, achieve A level not burning the national construction industry fire safety standards;

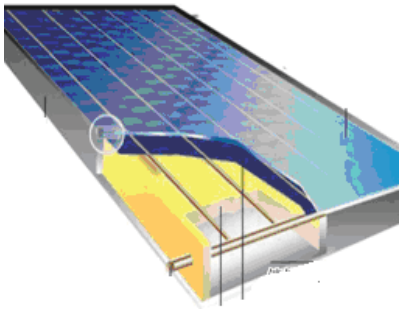
4, replacing the polyurethane, glass cotton used in solar industry flat collector to heat preservation, the wall the performance is far higher than other common materials;

5, and other refrigeration equipment, instrumentation, and fire prevention, because of the heat preservation heat preservation performance phenolic with polyurethane, and be able to fire prevention (as flammable), has been gradually polyurethane alternative polyurethane used in all kinds of fields, become a kind of fire prevention + insulation double efficacy of high quality materials;

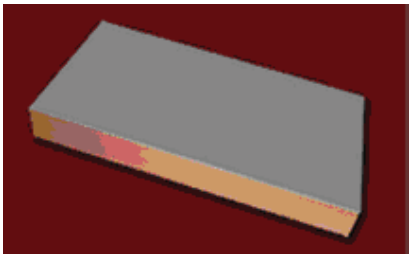
6, used in making the central air conditioning composite duct, at present this kind of product is high, the most mature products at home and abroad, most project has applications.

Steel structure workshop metal roofing heat preservation

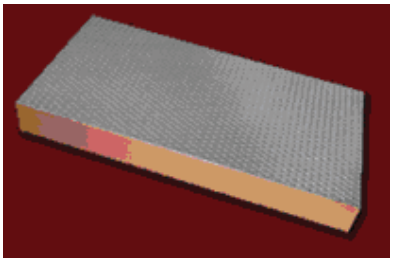
Solar energy collector to heat preservation plate



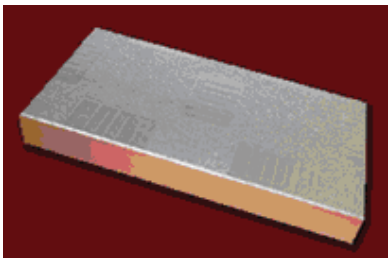
Single caging composite phenolic foam plank



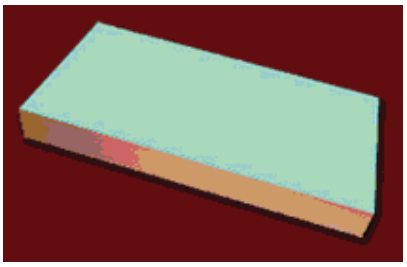
Single composite phenolic foam plank galvanized



Double-sided aluminum foil phenolic composites sheet



Single aluminum composite phenolic foam plank



Because polystyrene foam and polyurethane foam are flammable, high temperature resistant, not in some developed countries (by fire department restrict the use of fire prevention, demanding place, government departments have expressly can only use phenolic foam and sandwich board. Therefore, phenolic heat preservation material is better suited to a strict requirements under the environmental conditions of use high-performance materials, has a good development prospect. As steel structure workshop, large industrial workshop, mobile home, the cold storage, the clean workshop, buildings and layer, temporary housing, stadium, supermarkets and other need to fire the requirements of the heat preservation buildings.

1, replacing the polyurethane, polystyrene, rock wool used in steel sandwich board thermal insulation layer, have other materials cant achieve fire insulation requirements;

2, some industrial workshop roof, me tope heat insulation heat preservation, achieve the effect of warm in winter and cool in summer;

3, can be used to construct fire belt, achieve A level not burning the national construction industry fire safety standards;

4, used in making the central air conditioning composite duct, at present this kind of product is high, the most mature products at home and abroad, most project has applications.

PHENOLIC BOARD INSULATION

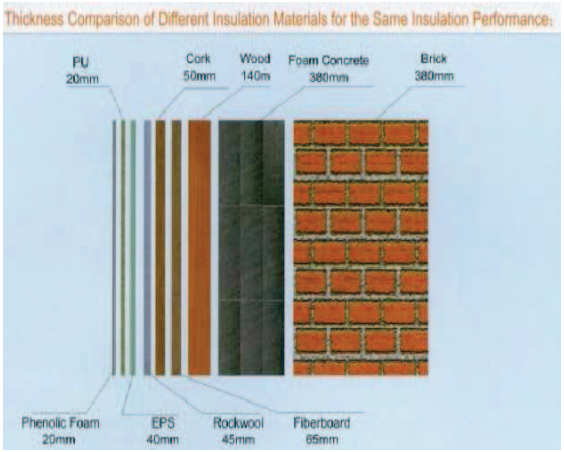
Phenolic Alde Hyde colored steel sandwich board--the fire prevention + insulation double efficient performance. At present, most of the steel sandwich board manufacturers use of core board for polyurethane, polystyrene, rock wool, etc. Polyurethane itself not fire, burning a lot of smoke produced to contain, harm to human health. And polystyrene but not fire prevention, with long will shrink after external thermal insulation performance is also very poor. Rock wool although can fire prevention, but the heat preservation performance is poor. Polyurethane, polystyrene market is poor, service life generally in 10 years or so and phenolic insulation board life can be as high as 30 years. Xiamen high, based on research and development production has phenolic insulation board 10 years history, phenolic foam is as steel sandwich board replace board core best materials.

Workshop roof, metope heat insulation heat preservation

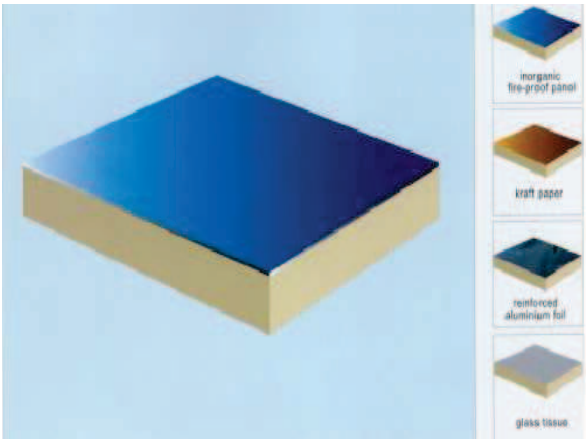
For the buildings for, in the summer, outdoor heat energy mainly through the wall and roof radiation enter indoor, and winter is most heat through the wall and roof penetration lost. Therefore, the walls and the heat insulation to block a heat transfer is very necessary.

Phenolic heat insulation board set fire, heat preservation double efficacy, resistant to 150 ℃ high temperature, the coefficient of thermal conductivity in 0.023, and use life is as high as 30 years, can make up for polyurethane, polystyrene, rock wool cant fire, heat preservation material such as poor efficiency, short life defects. At the same time, phenolic board is qualitative light, construction is convenient, is the ultimate roof insulating heat preservation material.

Comparison Between Insulation types



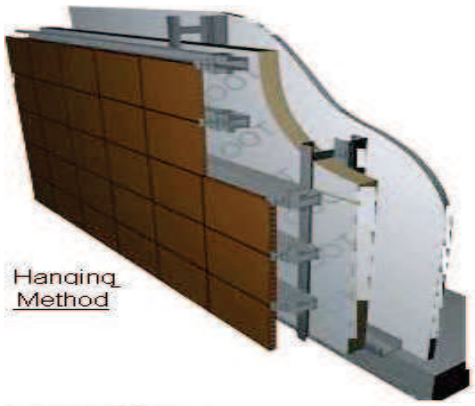
Different options of Vapor barrier surface

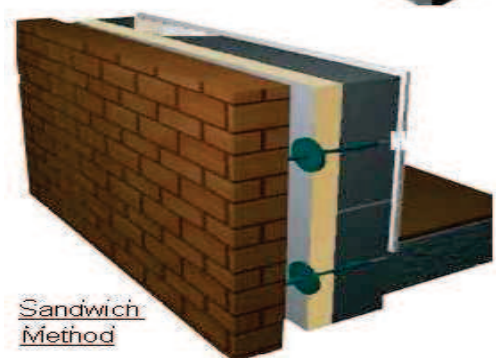


Item	Unit	Specificatio
Thickness of WI Phenolic Foam Core Material	mm	10-80
Fire proof Class		Non Conbustible
Oxygen Index	%	42
Vapor barrier Permeability Index	Ng/Pamg	2.3
Thermal Conductivity	w/m.K	0.023
Water Absorption	% (v/v)	2

Diifferent Application of WI Phenolic Insulation Boards

Wall Insulation Types

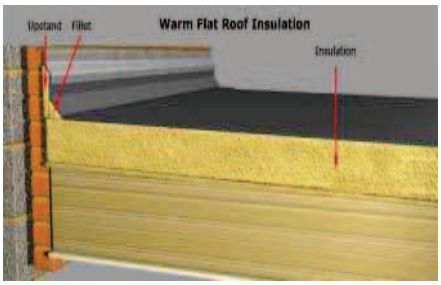




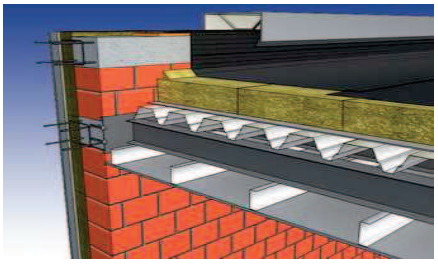
Roof Insulation

Steel Structure

Flat Roof



Building Roof



PHENOLIC FOAM BLOCK

Phenolic Foam is a highly efficient energy saving insulation material, with low thermal conductivity and high fire resistance. WI is equipped with professional workshop for production of phenolic resin. Phenolic Foam Blocks is made from phenolic resin, blowing agent, and chemical additives, after mixing, heating and curing. Comparing with other insulating materials, it performs excellent features both in thermal insulating properties and fire resistance. WI phenolic foam meets almost all the characteristics of all the standard material but has an edge over them with its fire resistance. Hence it can be universally applied in the field of construction, chemical industry and automobile sector.

By using Rigid Foam CNC cutting machine, WI can cut Phenolic Foam blocks can be cut into Pipe section, pipe supports and Insulation Boards of any size.

Phenolic Foam Block Dimension

2200mm X 1200mm X 850 mm

2000mm X 1200mm X 650 mm

Density: For general purpose, the foam density goes from 40 to 120 kg/m^3

Block is available as standard in Yellow colors. And green or grey as option.

ADVANTAGES OF THE 'WI' PHENOLIC FOAM BLOCK

NON – COMBUSTIBILITY

'WI' Phenolic foam has passed Third party testing from 'Warrington fire' (global safety) – Test Certificates Available on Request. In addition WI can provide all the internal testing certificates conducted on general product as well as specific batches.

THERMAL CONDUCTIVITY

Lamda ValueOF 'WI' is very low and ranges from 0.018-0.032 W/m.K.

WORKING TEMPERATURES

The working Temperatures of the 'WI' foam covers the range of -250 to 150 ^{O}C

MECHANICAL PROPERTY

Compressive strength is 0.12-0.35mpa,
Elongation strength is 0.12-0.26mpa
Tensile strength0.30-0.35mpa

NO TOXICITY

The foam is not using Freon as blow agent, releasing no toxic gases when burning. So harmless to environment to humans.

WATER PROOFING

Due to its closed structure the 'WI' foam is waterproof. Hence does not affect its insulating characteristics during working life.

CHEMICAL PROOFING

The 'WI' foam shows excellent chemical proofing property when it comes in contact with acid.

ECONOMIC PROPERTY

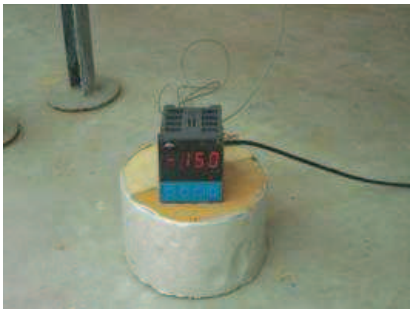
Besides low price and long life fewer amounts is required for whole systems because of the low conductivity co-efficient. Therefore its reasonable to use the 'WI' foam from economic point of view.

The experiment of phenolic foam insulation performance at -150℃

Phenolic insulation pipe has good performance in cold, hot water pipes and petroleum pipes. It is of great advantage in low temperature and cryogenic field. The experiment of phenolic foam insulation performance at -153℃ is as follows:
The equipment of experiment: Dewar thermos bottle (-196℃liquid nitrogen inside), phenolic insulation pipe (28 insulation layer 40mm), buffer tank, thermometer.

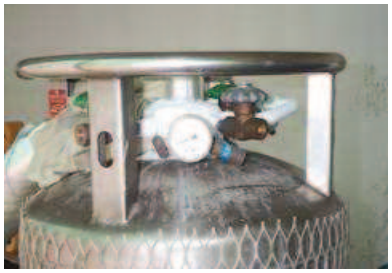
Experiment process:
1. Connect the equipment of experiment
Connect Dewar thermos bottle (-196℃ liquid nitrogen inside) to "S" shape phenolic insulation pipe, the length of insulation pipe is 30 meter. Then connect the thermometer to the phenolic insulation pipe to inspect the temperature of inner insulation pipe. Connect the end of insulation pipe to buffer tank.

2. Open the Dewar thermos bottle (-196℃ liquid nitrogen inside) and buffer tank, then you can see the white mist emitted from one side of buffer tank, start to measure the temperature. Close the Dewar thermos bottle (-196°C liquid nitrogen inside) and buffer tank at the same time when the thermometer shows -150℃, the 30meter insulation pipe then has filled up with liquid nitrogen at this point.



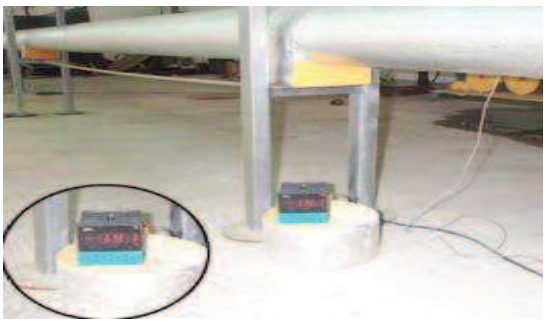
Thermometer shows -150℃

Dewar thermos bottle (-196℃ liquid nitrogen inside)



The connected experiment equipment

Liquid nitrogen through the insulation pipe



3. Maintain 12hour. 12 hours later, observe the thermometer to show -141°C the dimension of insulation pipe is 28 thickness of insulation pipe is 40mm.

Conclusion: Phenolic insulation pipe has good insulation performance in supper low temperatures and cryogenic liquid containers, which without distortion and contraction has remained in perfect condition.

FIRE TESTING CERTIFICATION FROM

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Regional Sales & After Sales Sevice Contact :

WOLF INTERNATIONAL

Regional Office: Middle East, South Asia, Africa

E mail: info@wolfmep.com / wolfinternational@gmail.com

Associated factory

XGA Material Co.LTD

Local factory

Diplomat Industries, Emirates Industrial CIty, UAE

WI/PF/DSS/01-13