Marine Exhaust Insulation

Firwin Corp., 1685 Flint Road, North York, ON M3J 2W8 Canada
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INSULATION CONSIDERATIONS

"Heat can be both a blessing and a problem for us all."

Excessive heat and cold are good reasons to insulate for safety and comfort.

In the marine and engine world heat problems are a condition to be identified and controlled.

Preventative Maintenance

Preventative maintenance is preferable to emergency downtime for repairs. The challenge is to identify problems well before they become critical. By being reactive problems can be dealt with as cost effective scheduled maintenance.

Often when equipment is not operating correctly, excessive heat is generated. Non- contact infrared "Laser pointer" Thermometers can be used as a diagnostic tool to identify such potential problems. By sweeping the "Light pointer " over electric panels, bearings, brakes and engines one can often identify where "hot spots" are present, and after investigation find perhaps an unknown problem developing.

The correct diagnostic instruments go a long way to resolving problems. This valuable function for a non-contact Thermometer makes it a valuable addition to your tool bag!

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Exhaust and Steam Line Insulation

Heat loss from engine exhausts, piping, silencers etc., together with steam piping systems can be considerably reduced by insulating [see chart A].

Chart A **HEAT LOSS** in Watts /sq.meter

Temperature º C	316	371	427	482
0mm Insulation	6232	8411	10980	13972
25mm Insulation	593	757	946	1160
50mm Insulation	322	407	508	624

As you can see [Chart B] heat loss can be contained to acceptable outer surface temperatures by insulation.

Chart B Outer Surface Temperature Comparison

Engine Room at Various Temperatures	316	371	427	482
No Insulation	316	371	427	482
25mm Insulation	73	84	95	107
50mm Insulation	54	60	67	75

Due to the narrow confines of Engine rooms, galleys and gangways on board, in the interests of safety and good working environments insulation is critical for personnel protection, reduction of ambient heat load, protection of heat sensitive sensors and equipment, fire prevention, and maximizing the effectiveness of exhaust catalytic purifiers/filters.

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Insulation Materials

Since the outlawing of Asbestos, which was broad-spectrum temperature insulation, alternative insulation materials had to be found. Fiberglass, Mineral Wool, CalSil and Ceramic Insulation have been adopted as substitutes. All these materials are considered non-combustible by the various Insurance Authorities and Coast Guard, although some of them have not been certified as hull board grade.

Fiberglass, Mineral wool and Calsil materials are rated up to 625°C [depending on binders, chemical colorants etc] and the Ceramic Insulation up to 1200°C [dependant on quality]. Fiberglass, Mineral Wool, and Ceramic Insulation are available in various forms, depending on the product, such as flexible blanket, board and preformed pipe and elbow sections. Being fibrous they stand up well to high vibration conditions without breaking down. Calcium Silicate is a good insulator, comparative to glass fiber, available in pipe and elbow preforms but because of its rigid form, is not a good insulation in high vibration environments, as it tends to break up.

Each type of insulation should be used where their best characteristics are used to full advantage. There are price differences between the different types of insulation, and often a decision made on price alone could lead to a short-term solution that has to be remedied well before the normal expected life span of the material.

As these insulation materials do not have a wear resistant finish they, have to be covered with a protective outer skin. This could be galvanized or aluminum cladding, painted lagging, PVC, coated fiberglass or other suitable non-combustible material. The choice depends on whether permanent or removable insulation is required and considerations such as sea-air and other chemical environments.

Cross-section of removable insulation blanket, showing protective outer skin

Insulation Categories

There are basically two groups of Insulation applications

"A". Permanent
"B". Removable.

Similar Insulation material can be used for both applications; however the Outer "cladding" or skin will differ.

A. Permanent is ideal for long pipe runs but not for any application where ease of removal for maintenance and / or inspection is essential. Permanent insulation is routinely installed by an outside contractor and is messy to remove [not replaceable] – it can usually only be replaced by a contractor. Initial installation cost is usually less than removable blankets. However replacement insulation obviously doubles the cost. This type of insulation is cut and fitted on site.

B. Removable/Reusable Insulation is modular – made up in convenient size panels or sections, and can be easily be installed or removed by your own crew – only sufficient blankets have to be removed to enable a particular maintenance or inspection job to be done.

After service/maintenance the blanket can be replaced without special tools. Although slightly more expensive than permanent insulation it becomes more and more economical every time you remove and replace a module. These blankets are ideal for engine manifolds, turbochargers, flexes, expansion joints, valves of all types, flanges, and sight glasses and also any equipment that has to be repaired/serviced in remote areas where insulation contractors are not readily available. Measurements are taken on site, the blankets usually made off site in a factory, and the ship's crew can do installation. In order to be able to replace blankets that are damaged or require to be replaced the manufacturer usually keeps complete records of each blanket on hand.

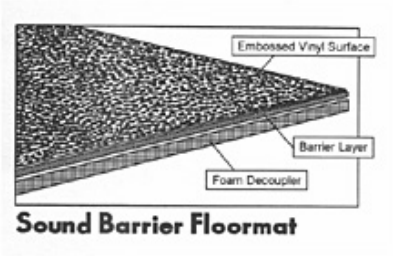
Other Insulation / Protection Systems

Steam Spray Shields

During the Second World War due to the high accident rate from steam burns due to burst flange gaskets, steam spray guards were introduced in combination with Removable insulation covers to protect against accidental burns as sailors walked by.

Sound Attenuation

The fibrous nature of some of the insulation materials used for heat insulation is also a sound absorber, with a Noise Reduction Coefficient rating of .75 for 1" inch. This characteristic can be improved upon by using dense membranes in composite layers. It is important to specify composites that fall within the fire safety standards required.



Sound Barrier Floormat

About Firwin Corp:
Founded in 1982, Firwin Corp is a manufacturer of removable insulation blankets. The company's focus is to provide insulation solutions to industries using diesel-powered engines and equipment. Industries that Firwin services include power generation, off-road equipment, gen-set, mining, forestry, marine, and the military. The company provides removable insulation blankets for both OEM and end-user applications.

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