

TECHNICAL SPECIFICATION FOR THE THERMAL INSULATION FOR
EXHAUST GAS PIPES OF MAIN ENGINE , AUX. ENGINE, EMERG.GEN.
Oil fired boiler And INCNERATOR for VESSEL NO. 11136-41

I. CONDITIONS OF AGREEMENT:

- A) Contractor should employ has own workmen and bring necessary tools for quantum of insulation work.
- B) The contractor shall complete the insulation work on the vessel within schedule period after award of firm order from Shipyard, to the satisfaction of Shipyard officers, Surveyors and Ship Owners.
- C) Shipyard reserves the right of adding or deleting any item from the specification of certain items. Additions and modifications shall be carried only after the receipt of official advice from Hindustan Shipyard authorities.
- D) The insulation material to be used shall be in the contractor scope and they must be superfine mineral / rock wool, glass wool, polyethylene mattresses, fiberglass cloth & FN* sheet or equivalent sheet of density as specified in enclosed specification sheets. All insulation materials should be fire resistant and relevant class certificate shall be furnished before starting of work.

*FN Sheets are anti splashing tapes approved by SOLAS to cover, valves, flanges etc. of Oil system. The details may be obtained from <http://www.fntape.co.uk>

- E) Calculations are to be supplied by the contracted in support of designed thickness of insulation for Main Engine, Auxiliary Engines of Exhaust gas pipes and other hot pipes. The temperature of 55 °C is required on outside of exhaust gap pipes, when the ambient temperature is 45 °C. It is the responsibility of the contractor to ensure the outside temperature over insulation does not exceed 55 °C. If found temperature more than above contractor has to redo the whole job to ensure 55 deg. C .temperature at their cost.
- F) Binding material like steel bands, wires, wire mesh, aluminium foils fasteners etc. as required shall be provided by the vendor.

II. HSL SCOPE OF SUPPLY

- A) Shipyard will supply necessary scaffolding electricity for completion of work.

III. DESCRIPTION OF WORK

- A) All the pipes, valves, compensators, silencers and other equipments etc. coming on the ship require insulation for the systems are to be insulated as specified Drg. No. enclosed here with.
- B) All the pipes and equipments to be insulated are to be cleaned thoroughly with wire brush to remove rust or any foreign matter prior to insulation.
- C) All insulated surface are to be covered suitably to give neat finish
- D) Particular attention is to be given for the following points while carrying out the work.

Following points are to be considered while doing thermal insulation :

1. The insulation should be firm on the surface and regular in shape.
2. When ever end of connection is to be tapered down, 0.4mm thick glass cloth covering is to be carried out over the tapered portion to the minimum possible extent without impairing efficiency.
3. Muff insulation should be arranged that it could be removed and replaced easily as shown in the enclosed Drg.No.
4. There should not be any cracks and burnt spots on the insulation during the service period.
5. The insulation should be properly secured to withstand minor impacts and ship vibration. The molded insulation should be secured to the pipe with galvanized steel band or wire.
6. Wherever insulation is damaged (during the course of work) it should be properly repaired at their cost.
7. Wherever the thickness is reduced due to restricted places the insulation is to be finished in such a way that it does not either fall down due to vibration or burnt away due to reduced thickness of insulation material. Use one or more layers of glass cloth with out impairing efficiency.
8. All flanged surfaces should be finished to stand severest vibrations in service conditions.
9. Wherever glass fibre cloth is to be used for covering the all pipes joints.
10. Over rock / mineral wool insulation material, th 20 gauge galvanized wire knitting / Aluminium foil shall be arranged or as specified in enclosed specification..
11. Exhaust gas pipes to be insulated to be height of 2.5m above the casing top.

12. Asbestos is not to be used and asbestos free insulated material to be used for all pipe lines in E.R. and Accommodation places.
13. The exposed parts on the following pipe lines, where human body frequently touches shall be insulated with fiberglass cloth regardless of internal temperature.
 - (a) Boiler Blow-off lines
 - (b) Escape piping after steam safety valve
 - (c) Feed water lines
 - (d) Fresh water lines
 - (e) Steam escape pipe, open drain pipe, condensate water drain pipe and boiler feed water pipes .

IV. GUARANTEE

The contractor shall guarantee the performance of the insulation as stipulated in Specification and also against all defects of workmanship for a period of one year from the date delivery of the vessel to the owners. Any defects occurring during Guarantee period should be rectified either by the contractor himself or the owner at the cost of contractor.

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DETAILED SCOPE OF WORK FOR THE INSULATION OF PIPES AND OTHER EQUIPMENTS SHALL BE CARRIED OUT AS PER THE ATTACHED DRAWING / DOCUMENTS CONSIDERING THE FOLLOWING ALSO.

A. INSULATION OF EXHAUST GAS PIPING

The Main engines, Generator engines, Silencers and all Compensators (expansion bellows) etc.

1. PIPING INSULATION (AS PER DRG.)

The surface is to be lagged with rock wool or mineral wool, reinforced with galvanized wire / Aluminum foil and covered with galvanized steel sheet of thick 0.8mm. The insulation of pipes shall be as follows.

<u>Systems:</u>	<u>Insulation thickness</u>	<u>Material</u>
M.E.Exhaust gas pipe	100 mm (min.)	M.G.B.(Density of 80-150 Kg/cu.M)
DG sets Exhaust gas pipes	100 mm (min.)	M.G.B. (Density of 80-150Kg/cu.M)
Emergency Generator engine	100mm(min)	M.G.B.(Density of 80-150Kg/cu.M)
Boiler up takes pipes	100 mm (min.)	M.G.B. (Density of 80-150 Kg/cu.M)
Incinerator pipes	100mm (min.)	M.G.B. (Density of 80-150 Kg/cu.M)

Note : M.G.B. means (1) mineral glass blanket or (2) rockwool. Both are rigid self stand type.

The insulation thickness indicated above is the minimum values. However, as per calculations if insulation thickness is to be increased, same to be provided. Any discrepancy should be clearly specified before insulation of pipes.

2. The following pipes are to be insulated with 100 mm thick Mineral Rock wool and covered with Glass cloth as per enclosed specification. The main engine exh. Temp. is 460 degree c approx. and A.E. exh. Gas temp is 350 degree c.

SI. NO		DESCRIPTION OF MATERIAL	Sizes	QTY./NOS
1	ME	MS NW 1100 Pipe	1118 OD x 8 thk.	28 Mtrs.
2	AEs (3 Nos.)	MS NW 200 Pipe	219 OD x 8 thk	2 Mtrs..
		MS NW 250 Pipe	273 OD x 8 thk	16mtrs
		MS NW 350 Pipe	377 OD x 8 thk	70 mtrs
3	Silencer (ME)	.	2.3 mts dia x 7 mts ht	1 No.
4	Silencers (AE)		0.75 mts dia x 2.1 mts ht.	3 Nos.
5	Incinerator	MS NW 300 Pipe	325 OD x 8 thk	3 Mtrs.
		MS NW 350 Pipe	377 OD x 8 thk.	28 Mtrs.
		MS NW 400 Pipe	426 OD x 8 thk.	5 Mtrs.
6	Oil fired Boiler	MS NW 350 Pipe	377 OD x 8 thk.	18 Mtrs.
7	E.DG set	MS NW 100 Pipe	114 OD x 8 thk.	15 Mtrs.
8	ME Expn.		NW 1100	3 Nos.

	Bellows			
9	AE Expn. Bellows		NW 350	3 Nos.
10	Flanges (ME)		NW 1100	8 Joints
11	Flanges (AE)		NW 200	2 Joints.
			NW 250	6 Joints
			NW 350	19 Joints
12	Flanges (Incinerator		NW 300	2 Joints
			NW 350	9 Joints
			NW 400	2 Joints

3. Duct insulation shall be carried out as per the attached drawing for 6 Sq.m.
4. Cascade tank
5. Incinerator
6. The vendor has to quote for the cost for qty. Of insulation material at clause 1.separately .
7. The exh. Gas layout drawings are already available with SBO dept both as hard and soft copy pl.
The list of Piping systems are enclosed at Annexure-1.

Annexure-1

List of systems(To be insulated)

The details of pipe dia and lengths ,no of flanges, valves, compensators are to be worked out from drgs indicated

S.No.	System	Drawing No.
1	Exhaust gas System: i. Main Engine Exhaust System ii. AE Exhaust system iii. Incenerator & Boiler Exhaust systems	77500 B
2	HFO System: i. Transfer ii. Purification and iii. Service	72100 B 72400 B 72201 B
3	FO System: i. Service system for boiler incinerator and emergency generator	77101 A
4	Steam and condensate System	77201 A
5	L.O System: i. Purification ii. Transfer & Service Systems	72600 A 72503 A
6	Auxiliary boiler feed water	26000 B
7	Accommodation hot water and cold water	

All the above piping system includes Valves, Flanges, Expansion bellows, Clamps etc., as per above indicated drawings

Prepared by

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