Annexure – 3: Technical Specification: Insulation Material

LOT 1	Light Resin Bonded Mattresses
LOT 2	Ceramic Fibre Blanket Insulation
LOT 3	Preformed Fibrous Pipe sections for thermal insulation

1. Description

- The Insulation material to be used in India one solar project is one of the important commodity with respect to reducing thermal losses and thus increasing the overall efficiency of the plant.
- The Insulation material to be used on static cast iron cavity receivers is of major importance as it is primary actor in enhancing the efficiency of the receiver with respect to its thermal storage property. Since the Receiver stores thermal energy for night operation of the plant, it becomes very imperative to avoid thermal losses from the receiver throughout 24 hours, thus increasing the overall thermal storage efficiency of the Receiver. It has been observed and documented that in presence of proper insulation to the Receiver there are about more than 70% reduction in overnight losses.
- The insulation material is also required over the steam pipe lines in the solar block and power block. This shall help in minimizing the heat loss from the steam while moving from solar block to the turbine and thus shall help improve the overall efficiency of the plant.

2. Technical Specification

<u>LOT 1: Light Resin Bonded Mattresses</u>

- Light Resin Bonded Mattresses, machine laid and machine stitched with one side G.I. Wire netting of 3/4" X 24G in size 1640mm X 1220mm and packed in HDPE Bags.
- Product specification: As per IS :8183: 1994 and ASTM C 592
- Packing and marking: Packed in HDPE bags with marking indicating the specifications like thickness and density, batch number and standard BIS mark.
- Testing of the properties for Sr. No.02 to Sr. No.12 as per IS 3144:1990 (Table 1)
- Testing of Sr. No. 01: Thermal conductivity as per IS 3346:1980 (Table 1)
- Test certificates from manufacturer's end shall be provided conforming to the properties as given in Table 1.

- The thickness, density and sizing shall be as per the Table No: 02 (bill of materials)
- Inspection, sampling and testing from independent third party Inspection lab will be done before dispatch.

Material Specification (*Light Resin Bonded Mattresses*): Table 01

S.No.	PROPERTY	VALUE	SPECIFICATION
01	THERMAL CONDUCTIVITY(W/Mk) AT NORMAL TEMPERATURE	0.043	IS : 8183, IS : 3346
02	MAXIMUM SERVICE TEMPERATURE	750˚ C	IS : 8183 : 1994
03	SHOT CONTENTS (WEIGHT %)	<15	IS : 8183 : 1994
04	RIGIDITY	FLEXIBLE	IS : 8183 : 1994
05	CORROSIVENESS	NONE CORROSIVE	IS : 8183 : 1994
06	WATER VAPOR SORPTION (WEIGHT %)	<1	IS : 8183 : 1994
07	PH	8 - 9	IS : 8183 : 1994
08	COMBUSTIBILITY	NON COMBUSTIBLE	IS : 8183 : 19 94
09	NOISE REDUCTION COEFFICIENT	0.09	IS : 8225 : 1987
10	MOISTURE CONTENT & ABSORPTION	2% BY WEIGHT EACH	IS : 8183 : 1994
11	CHLORIDE CONTENT (WEIGHT %)	MAX 0.01	IS : 8183 : 1994
12	SULPHER CONTENT (WEIGHT %)	MAX 0.60	IS ; 8183 : 1994

Bill of Quantity (*Light Resin Bonded Mattresses*) : Table 02

S.No.	Material Description	Density Kg/m3	Thickness mm	Quantity in SQMTRS
1	Light Resin Bonded Mattresses;	100	50	4250
2	Light Resin Bonded Mattresses;	100	75	2600
3	Light Resin Bonded Mattresses a) 3.5 meters long for 1630 SQM b) 3.7metres long for 1070 SQM	100	100	2700

Proposition by Supplier	Light Resin Bonded Mattresses
Agreed to supply as per the specification given in the table 1 and 2 above (Yes/ No)	
Remark/ Deviation, if any	

LOT 2: Ceramic Fibre Blanket Insulation

- The material shall be soft inorganic refractory fibres needled mat made by melting alumina and silica followed by fabrication either by blowing the melt or by drawing the melt over a set of spinning wheels. Zirconia (ZrO,) shall be added alongwith alumina and silica to improve the properties.
- The product grade shall be Type I; 128 kg/m3; with bulk density as per IS15402 : 2003;
- Testing of the properties for Sr. No.02 to Sr. No.12 as per IS 14656 (Table 01)
- Testing of Sr. No. 01 : Thermal conductivity as per IS 3346:1980 (Table 01)
- Test certificates from manufacturer's end shall be provided conforming to the properties as given in Table 01.
- Inspection, sampling and testing from independent third party Inspection lab may also be done from the Purchaser before dispatch.
- Packing and Marking: The material shall be packed in waterproof polythene bags which shall be further encased in card board cartons.
- Marking shall include name of material, manufacturer name, density of material, length, width and thickness of material and batch number.

Material Specification *(Ceramic Fibre Blanket insulation)* : Table 01

S. No.	Properties	Value	Specification
01	Thermal Conductivity W/mK, Maximum Temperature: 200 300 400 500	0.076 0.081 0.122 0.150	IS 15402 : 2003
02	Shot content when sieved through 210 micron sieve	Not more than 30%	IS 15402 : 2003
03	Fibre Diameter	2.0 to 4.0 microns	IS 15402 : 2003
04	Tensile strength in longitudinal direction	40 k Pa	IS 15402 : 2003
05	Linear Shrinkage, percent, maximum	3.5% maximum	IS 15402 : 2003
06	Chemical composition	As per Table 4	IS 15402 : 2003
07	Thickness of Blanket Rolls	25 mm	Tolerance as per IS 15402 : 2003
08	Width of the Blanket Rolls	1220 mm	Tolerance as per IS 15402 : 2003
09	Length of the Blanket Rolls	7620 mm	Tolerance as per IS 15402 : 2003

Bill of Quantity *(Ceramic Fibre Blanket insulation)*: Table 02

S.No.	Material Description	Density Kg/m3	Thickness mm	Quantity in SQMTRS
1	Ceramic Fibre Blanket Insulation	128	25	2600

Proposition by Supplier	**Ceramic Fibre Blanket Insulation**
Agreed to supply as per the specification given in the table 1 and 2 above (Yes/ No)	
Remark/ Deviation, if any	

LOT 3: Preformed Fibrous Pipe sections for thermal insulation

- The material shall be mineral wool into fibrous form and bonded with suitable binder in form of sections. The sections shall be supplied as hollow cylindrical split lengthwise on one or both sides of cylindrical axis with lengths of min.1000mm and without facing.
- Product specification: As per IS:9842 : 1994 and ASTM C 547
- Packing and marking: Packed in ply cardboard boxes with marking indicating the specifications like thickness and density, batch number and standard BIS mark.
- Material properties as per Table No.:01 given below:
- Testing of the properties for Sr. No. 02 to Sr. No.12 as per IS 3144: 1990
- Testing of Sr. No. 01 : Thermal conductivity as per IS 3346:1980
- Test certificates from manufacturer's end shall be provided conforming to the properties as given in Table 1.
- The thickness, density and sizing shall be as per the Table No: 02 (bill of materials)
- Inspection, sampling and testing from independent third party Inspection lab may also be done from the Purchaser before dispatch.

Material Specification *(Preformed Fibrous Pipe sections)*: Table 01

S. No.	PROPERTY	VALUE	SPECIFICATION
01	THERMAL CONDUCTIVITY(W/Mk) AT NORMAL TEMPERATURE	0.043	IS : 9842 : 1994, IS : 3346 : 1980

02	MAXIMUM SERVICE TEMPERATURE	650˚ C	IS : 9842 : 1994
03	SHOT CONTENTS (WEIGHT %) THROUGH 250 MICRON SIEVE	<15	IS : 9842 : 1994
04	RECOVERY AFTER COMPRESSION	>90% OF THIKNESS	IS : 9842 : 1994
05	CORROSIVENESS	NONE CORROSIVE	IS : 9842 : 1994
06	WATER VAPOR SORPTION (WEIGHT %)	<2	IS : 9842 : 1994
07	PH	8 - 9	IS : 9842 : 1994
08	COMBUSTIBILITY	NON COMBUSTIBLE	IS : 9842 : 1994
09	MOISTURE CONTENT & ABSORPTION	< 2% BY WEIGHT EACH	IS : 9842 : 1994
10	SULPHER CONTENT (WEIGHT %)	MAX 0.60	IS : 9842 : 1994

Bill of Quantity *(Preformed Fibrous Pipe sections)*: Table 02

Sr. No.	Material Description	NB of pipe mm	Density Kg/m3	Thickness mm	Quantity in RMTRS
1	Preformed Fibrous PSI	25	144	40	2100
2	Preformed Fibrous PSI	25	144	60	2300
3	Preformed Fibrous PSI	25	144	75	6600
4	Preformed Fibrous PSI	25	144	120	2200
5	Preformed Fibrous PSI	50	144	40	1000
6	Preformed Fibrous PSI	50	144	120	2100
7	Preformed Fibrous PSI	80	144	100	350
8	Preformed Fibrous PSI	100	144	100	650

Proposition by Supplier	**<u>Preformed Fibrous Pipe sections for thermal insulation</u>**
Agreed to supply as per the specification given in the table 1 and 2 above (Yes/ No)	
Remark/ Deviation, if any	

Declaration by the supplier:

1. *I/ we hereby declare that we have attached the sample test certificate as per the requirement given in the table above.*

2. *All the applicable Test certificates for the supplied material will be provided at the time of delivery of material.*

3. *I/ We hereby confirm that all the specification given above has been properly understood and agree to supply the material conforming to the required standard / specification.*

(Signature of Bidder)

Seal/ Stamp and Date: