

**NTPC
3X660MW NORTH KARANPURA STPP**

**TECHNICAL SPECIFICATION
FOR
CERAMIC FIBRE BLANKETS**

SPECIFICATION NO: PE-TS-405-169-M039 (REV-00)



**BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA**

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	TITLE: TECHNICAL SPECIFICATION CERAMIC FIBRE BLANKETS 3X660MW NORTH KARANPURA STPP	SPECIFICATION NO. PE-TS-405-169-M039
		REV. NO.: 0
		DATE: 13.10.2017
		SHEET 1 OF 1

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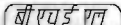
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- SPECIFIC TECHNICAL REQUIREMENT

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- DATA SHEET- A
- QUALITY PLAN
- COMPLIANCE SHEET


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1.00.00 GENERAL

This specification covers the requirements of manufacture, physical & chemical properties, inspection & testing and packing for supply of Ceramic Fibre blankets suitable for service temperatures upto 1260 deg C. In case of contradiction between Section-I and Data Sheet-A of Section-II, Data Sheet-A of Section-II will prevail.

2.00.00 CODES AND STANDARDS

2.01.00 INDIAN STANDARD

2.01.01 The manufacture, physical & chemical properties, inspection and testing of the Ceramic Fibre Blankets shall conform to the latest editions of the following appropriate standards.

IS:15402 Specification for Ceramic Fiber blanket Insulation.

IS:14656 Methods of test for Ceramic Fiber Products.

IS:3346 Methods for the determination of thermal conductivity of thermal insulation materials (two slab, guarded hot plate method).

2.02.00 INTERNATIONAL STANDARD

2.02.01 For procurement as per ASTM: C 892-10 (Standard specification for Ceramic Fibre blanket Insulation), requirement of ASTM shall be applicable in place of mentioned IS codes.

2.03.00 In case of any conflict between the standards and technical specification, the latter shall prevail and in case of any further conflict in the matter, the interpretation of the Purchaser's Engineer shall be final and binding.

3.00.00 MATERIAL COMPOSITION

3.01.00 Zirconia or non-zirconia based material with a classification temperature of 1260 degree C (Type-I)

3.02.00 The Ceramic Fibre blankets shall be made from soft inorganic refractory fibres made by melting alumina and silica followed by fibrillation 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 in case of Type-II materials.

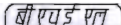
3.03.00 The blankets shall be needled type with the same fibers.

4.00.00 DIMENSIONS AND DIMENSIONAL TOLERANCES

4.01.00 The blankets shall be supplied in rolls and width of the blankets shall be 610mm or 1220mm. Length of the blanket shall be as per IS. Nominal thickness shall be 25mm & 50mm.

4.02.00 The method of measuring the dimensions i.e. length, width and thickness & Tolerances shall be as prescribed in IS:14656.


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5.00.00 BULK DENSITY AND TOLERANCES ON DENSITY

- 5.01.00 The bulk density of the Ceramic Fibre blankets shall be 128 kg/m³. Tolerances on bulk density when tested as per method prescribed in IS: 14656 shall be as per IS 15402.
- 5.02.00 The bulk density shall be calculated by dividing the actual weight of the blanket in kilograms by the volume in cubic meters arrived at as the product of the average actual length, average actual width and nominal / specified thickness (subject to the condition that the thickness is maintained within the specified tolerance limits).

6.00.00 MATERIAL PROPERTIES & TESTING

- 6.01.00 Material properties of ceramic fibre blankets shall be as per IS 15402 when testing is carried out as per the methods prescribed in IS 14656 for the following:

1. SHOT CONTENT
2. THERMAL SHRINKAGE
3. TENSILE STRENGTH
4. FIBRE DIAMETER
5. CHLORIDE CONTENT

6.02.00 THERMAL CONDUCTIVITY

The thermal conductivity (K-value) of the Ceramic Fibre blankets shall not exceed the values given in IS:15402 when determined in accordance with the method prescribed in IS:3346.

The thermal conductivity (K-value) test will be carried out for minimum three mean temperatures i.e. 400 °C, 500 °C & 550 °C on samples identified and sealed by customer / BHEL Inspector once in twelve (12) months. The tests will be carried out from govt. approved labs or test houses recognized by reputed customers.

6.03.00 COMPRESSIBILITY AND RESILIENCE:

- 6.08.01 The objects of this test are firstly to ensure that the blankets applied at greater than nominal thickness shall be sufficiently compressible to be fitted as its nominal thickness and secondly that the mattress shall be sufficiently resilient to recover its nominal thickness after being subjected to compression.
- 6.08.02 The material shall be tested as per the method prescribed in IS: 14656
- When tested in accordance with the method, the recovery, after compression of 75% of the original thickness, shall not be less than 90% of the original thickness.

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7.00.00 PACKING AND MARKING

7.01.00 Stack of Ceramic Fibre blankets shall be packed in Polythene lined HDPE bags and sealed / properly stitched to prevent moisture absorption during transit and storage.

In case of export orders stack of Ceramic Fibre blankets shall be packed in 0.2 mm thick Polythene all around and further shall be packed in HDPE Bags and sealed / properly stitched to prevent moisture absorption during transit and storage. For moisture absorption minimum four (4) packets of silica gel (25 grams each) shall be placed inside Polythene at different positions in each package. Silica gel shall be of indicating type conforming to IS:3401-1992 packed in cotton bags and shall not come into direct contact with the material inside the package.

7.02.00 Each bag of Ceramic Fibre blankets shall be serial numbered.

7.03.00 Following details shall be legibly and indelibly marked on the packages:

- a) Project Name
- b) Purchase Order No.
- c) Sl. No. of package
- d) Size of Ceramic Fibre blankets (Thickness x Length x Width)
- e) Density of Ceramic Fibre blankets
- f) Weight of the package
- h) No. of Ceramic Fibre blankets in the package
- i) A caution note "Always store under covered shed and on raised platforms"

8.00.00 INSPECTION AND TESTING

8.01.00 Ceramic Fibre blankets to be supplied under this specification shall be of tested quality and workmanship. Inspection and testing of thermal insulation materials shall be as per this specification / quality plan enclosed. Manufacturer shall conduct all tests and stage inspections as per the approved quality plan to ensure that the material conforms to the requirements of this specification and of applicable standards. All shop tests shall be conducted in the presence of BHEL's / BHEL's customer's representative, on the samples identified by him / them.

8.02.00 The Quality Plan enclosed with this specification specifies minimum quality control requirement. During contract stage vendor shall furnish this Quality Plan duly signed & stamped for BHEL approval. Quality plan shall be approved by BHEL and customer. Inspection and testing shall be carried out as per Quality Plan by BHEL/ BHEL representative and customer (as applicable). In case inspection is by both BHEL and their customer, then the inspection can be carried out jointly or separately, which will be informed later. In case of the foreign bidder, inspection shall be carried out by reputed third party.

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8.03.00 The charges for third party inspection (Lloyds, TUV or equivalent) for foreign bidders shall be included in the base price of the item by the bidder. This third party agency shall be approved by BHEL. Bidder to inform the same in the offer and mention the same in Quality Plan.

Note: There may be minor changes in quality plan depending on customer/consultant comments which will have to be accommodated by vendor at no extra cost.

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**DATA SHEET-A
BILL OF MATERIAL (BOM)**

S.No	MATERIAL	SPECIFICATION	DENSITY	THICKNESS	UNIT OF MEASUREMENT	QUANTITY
1.	CERAMIC FIBRE BLANKETS	PE-TS-405-169-M039	128 Kg/Cub.M	25mm	Sq.M.	11550
2.	CERAMIC FIBRE BLANKETS	PE-TS-405-169-M039	128 Kg/Cub.M	50mm	Sq.M.	10800


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NTPC		MANUFACTURER'S NAME AS PER APPROVED VENDOR LIST		STANDARD MANUFACTURING QUALITY PLAN				PROJECT : 3X660MW NORTH KARANPURA STPP						
				Item: CERAMIC FIBRE BLANKETS		QP No. PE-QP-405-169-M002		PACKAGE : THERMAL INSULATION						
				Date : 13.10.2017		CONTRACT NO. : 405								
						CONTRACTOR : BHEL, PEM, NOIDA								
S.NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORM OF RECORD		AGENCY **			REMARKS	
								D*	M	C	N			
1.	Ceramic Fibre Blankets (Finished Product)	Chemical composition (Raw material)	MA	Chemical	1 / Lot	Vendor standard	Vendor standard	Test Certificate	P	V		V	Ref. Note "A"	
		Bulk density	MA	Lab. test	Sampling as per IS:15402	IS:14656 & Spec.	IS:15402 & Tech. Spec.	Test Certificate	P	W		W	Ref. Note "B"	
		Shot Content	MA	-do-	-do-	-do-	-do-	-do-	-do-	P	W		W	
		Dimensions	MA	-do-	-do-	-do-	-do-	Tech. Spec.	-do-	P	W		W	
		Thermal Conductivity	MA	-do-	-do-	-do-	IS:3346 & Spec	IS:15402 & Tech. Spec.	-do-	P	V		V	
		Tensile Strength	MA	-do-	-do-	-do-	IS:14656 & Spec	-do-	-do-	P	W		W	
		Fibre Diameter	MA	-do-	-do-	-do-	-do-	-do-	-do-	P	W		V	
		Linear Shrinkage	MA	-do-	-do-	-do-	-do-	-do-	-do-	P	W		W	
		Compressibility & Resiliency	MA	-do-	-do-	-do-	-do-	-do-	-do-	P	W		W	
		Chloride content	MA	-do-	-do-	-do-	-do-	-do-	-do-	P	W		W	
		Appearance	MA	Visual	-do-	-do-	--	Shall be free from Voids, Cracks	Inspection Report	P	W		W	
2.	Packing and marking	Packing type and identification marking	MA	Visual	Random	Tech. Spec.	Tech. Spec.	(Soft copy of photographs)	P	W	-	Photographs of packed material to be verified by BHEL before issuing MDCC.		

NOTES: A) 'K' Value test will be carried out on samples identified and sealed by customer / BHEL Inspector once in twelve (12) months irrespective of NTPC ongoing projects. The tests will be carried out at govt. approved labs or test houses recognized by reputed customers.

B) These type tests shall be done once in three months. (BHEL witness once in 03 months and NTPC witness once in 06 months).

	LEGEND: * RECORDS, IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ** M: MANUFACTURER / SUB-CONTRACTOR, C: CONTRACTOR/TPI, N: NTPC INDICATE "P" PERFORM, "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE "CHP" - NTPC SHALL IDENTIFY IN COL. "N".	FOR NTPC USE	DOC. NO.
CONTRACTOR SIGNATURE		REVIEWED BY	NAME & SIGN. OF APPROVING AUTHORITY & SEAL

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	COMPLIANCE SHEET CERAMIC FIBRE BLANKETS 3X660MW NORTH KARANPURA STPP	SPECIFICATION NO: PE-TS-405-100-M039
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I hereby comply/not comply (*) to all the requirements of this technical specification in totality.

* In case the bidder does not comply to the technical specification, the deviations shall be explicitly listed in the technical deviation sheet of GCC. Deviations listed in technical deviation sheet shall only be considered.

Name of Bidder / Authorized Representative :-

Designation :-

Signature :-

Company Seal :-

Date :-

PARTICULARS OF BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

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Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
PROJECT ENGINEERING MANAGEMENT

ANNEXURE-I

THERMAL INSULATION- CERMIC FIBRE PACKAGE

Price Variation Clause:

Ex-works prices shall be variable as per PVC formula given below:

$$\text{Current Price} = \text{Order Price} * (0.15 + 0.45 * M1/M0 + 0.15 * F1/F0 + 0.25 * L1/L0)$$

Where

M0 = INDICES AS PER RBI BULLETIN TABLE 21 SL NO.: 1.3.13.2 (REFRACTORY PRODUCTS) FOR MONTH OF ORDERING.

M1 = INDICES AS PER RBI BULLETIN TABLE 21 SL NO.: 1.3.13.2 (REFRACTORY PRODUCTS) FOR 1 MONTH PRIOR TO DESPATCH.

F0 = INDICES AS PER RBI BULLETIN TABLE 21 SL NO.: 1.2 (FUEL & POWER) FOR MONTH OF ORDERING.

F1 = INDICES AS PER RBI BULLETIN TABLE 21 SL NO.: 1.2 (FUEL & POWER) FOR 1 MONTH PRIOR TO DESPATCH

L0 = INDICES AS PER RBI BULLETIN TABLE 19 (CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS) FOR MONTH OF ORDERING.

L1 = INDICES AS PER RBI BULLETIN TABLE 19 (CONSUMER PRICE INDEX FOR INDUSTRIAL WORKERS) FOR 1 MONTH PRIOR TO DESPATCH

Total PVC shall be limited to $\pm 10\%$ of Ex-Works Value.

Note: RBI Indices considered for refractory, Fuel & Power are as per base year 2011-12 and for Industrial worker as per base year 2001 of RBI Bulletin. The above PV Clause is subject to change based on latest RBI Bulletin.

All other terms shall be as per BHEL GCC Rev-06 / NIT / project SCC.

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