

**PRE-QUALIFICATION REQUIREMENTS**

Following are the pre-qualification requirements (PQR) for the vendors who are not registered with BHEL-Hardiwar for supply of Turbine cleading/ Acoustic enclosure. Offer of registered vendors (i.e. registered for supply of Turbine cleading/Acoustic enclosure) shall be processed according to their registration status with BHEL at the time of opening of price-bid.

Sl No	Pre-Qualification Requirements	Vendor's confirmation Indicating page no. where documents are placed
1.	Vendor should have designed, manufactured, supplied and erected at least 2 (Two numbers) acoustic enclosures for 100 MW or above rating Steam / Gas Turbine of Thermal Power Plants. For this, following supporting documents to be submitted : A. Copy of Purchase order of the executed Project. B. Project completion certificate from customer.	
2.	Vendor to furnish their complete reference / experience list of supplied Acoustic Enclosures with noise reduction.	
3.	Vendor to furnish the list of activities being outsourced. Party to furnish the details of outsourced Vendor.	
4.	Party to confirm that they meet each and every clause of BHEL specification and drawing as per enclosed Annexure-AA for Unchahar Stg-IV project (Material Code W90312101139) and Annexure-AB for Neyveli-1&2 projects (Material Code W90312101040).	
5.	BHEL reserves the right to verify information submitted by vendor. In case the information is found false/ incorrect, the offer shall be rejected.	
6.	<b>For Indigenous suppliers</b> , inspection by BHEL nominated inspection agency M/s TUV as per BHEL SQP QA/BE/QP/310_Neveli for Neyveli-1&2 projects and as per BHEL SQP QA/BE/QP/310_UNCH dated 14.02.2015 for Unchahar Stg-IV project (Copy of QP's enclosed). Vendor to provide endorse copy of the same.	
7.	<b>For foreign suppliers</b> , Inspection will be done by third party inspection agency (TUV/LRS/BVQ) as per as per BHEL SQP QA/BE/QP/310_Neveli for Neyveli-1&2 projects and as per BHEL SQP QA/BE/QP/310_UNCH dated 14.02.2015 for Unchahar Stg-IV project (Copy of QP's enclosed). Vendor to provide endorse copy of the same.	

**Notes:**

1. BHEL would consider the offers and open the price bids of only those bidders, who fulfill the Pre-Qualification requirements (PQRs).

**Material code:- W90312101139 (Project: Unchahar Stg-IV)**

Following documents to be submitted for BHEL review /approval:-

1. OGA drawings of acoustic enclosure with part list and total weight.
2. GA drawing of control panel with schematic and total power requirement.
3. Base frame details, supporting frame details and acoustic panel details.
4. Calculation for ventilation requirement and number and capacity of ventilation fans.
5. Data sheet of motor of fans.
6. Plan for the lighting installation inside the acoustic enclosure.
7. Assembly plan and quality plan.

**Important notes to be confirmed by vendor in their offer:-**

1. Mechanical as well as fabrication design of acoustic enclosure is sole responsibility of the acoustic enclosure vendor.
2. Base/Support structure, doors and approach platform, ladders, acoustic panels, fasteners, fixtures, gaskets, seals, equipment for lighting, ventilation system(exhaust silencer, tubular type exhaust fans, air intake manifolds etc.) control panel and all the electrical wiring from acoustic enclosure up to control panel shall fall within the scope of vendor.
3. Design of acoustic enclosure is sole responsibility of vendor. Approval drawings, calculations, quality plan etc. by BHEL shall in no way absolve vendor from either design responsibility and performance demonstration.
4. Roof panels should preferably be designed in such a way that panels on top of bearing pedestals (without necessitating removal of other panels) for dismantling of pedestal covers. No supporting member shall be located in this area.
5. Location of doors shown in the drawing is indicative only. Location of doors, sizes & their numbers shall be suiting to actual site requirement.
6. Approach platform from the operating floor to the bearing pedestals and turbine valve casings shall be provided by vendor suiting to actual site requirements.
7. Approach platforms and ladders with side railings shall be provided by vendor for all doors to reach TG deck. Width of platforms and ladders shall be 300 mm more than the width of respective door.
8. Dimensions given in the drawing are clear inside dimensions of the acoustic enclosure.
9. Approval of drawings and quality plan authorizes vendor to start manufacturing activity, but does not absolve the vendor from design/performance responsibility.
10. Vendor should visit the respective sites to discuss with BHEL representatives/ customer to finalize the layout, locations and sizes and number of doors, approach platforms, ladders and general erection suiting to actual site requirements before start of fabrication of enclosure.

**Material code:- W90312101040 (Project: Neyveli-1&2)**

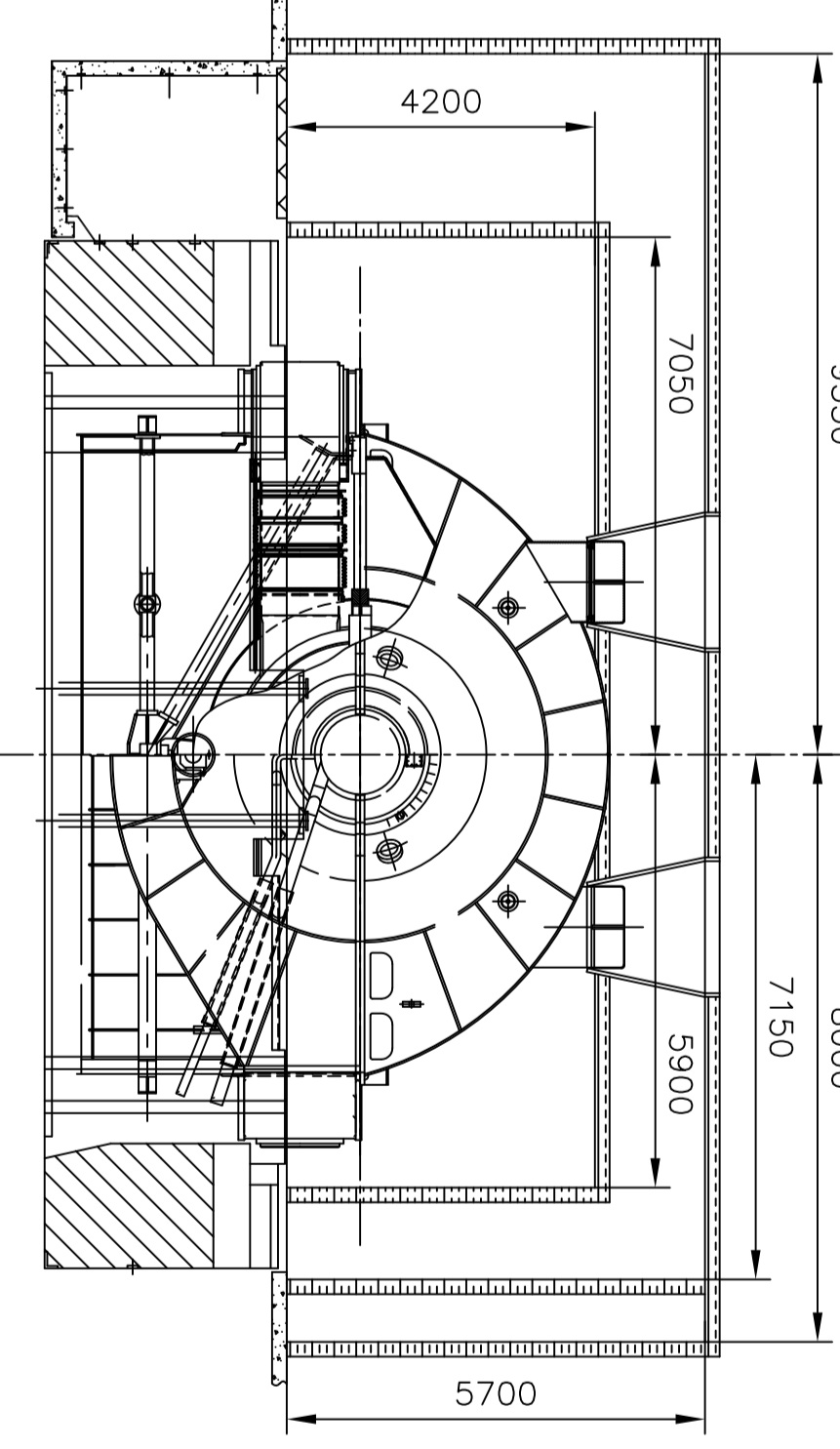
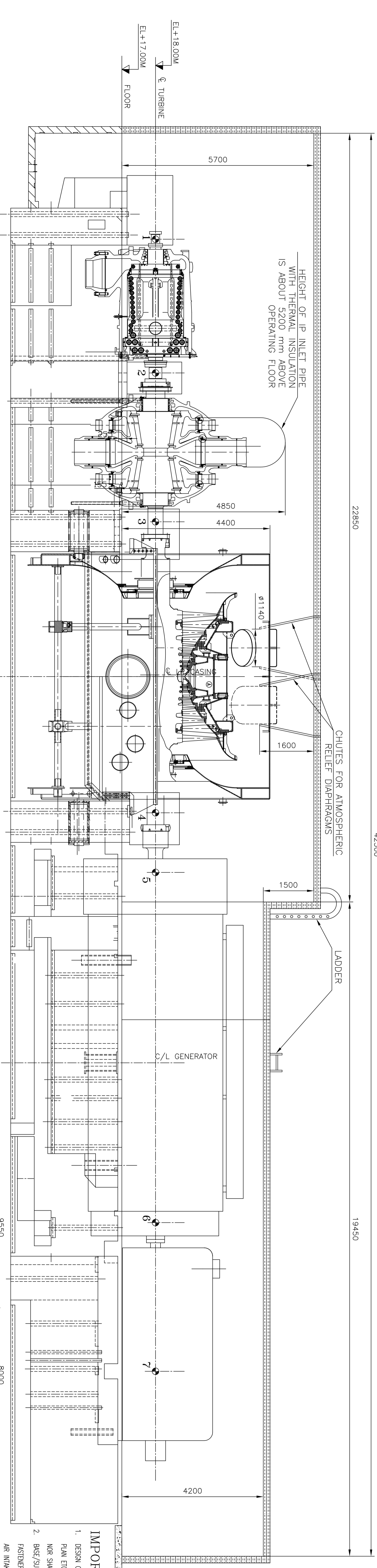
Following documents to be submitted for BHEL review /approval:-

1. OGA drawings of acoustic enclosure with part list and total weight.
2. GA drawing of control panel with schematic and total power requirement.
3. Base frame details, supporting frame details and acoustic panel details.
4. Calculation for ventilation requirement and number and capacity of ventilation fans.
5. Data sheet of motor of fans.
6. Plan for the lighting installation inside the acoustic enclosure.
7. Assembly plan and quality plan.

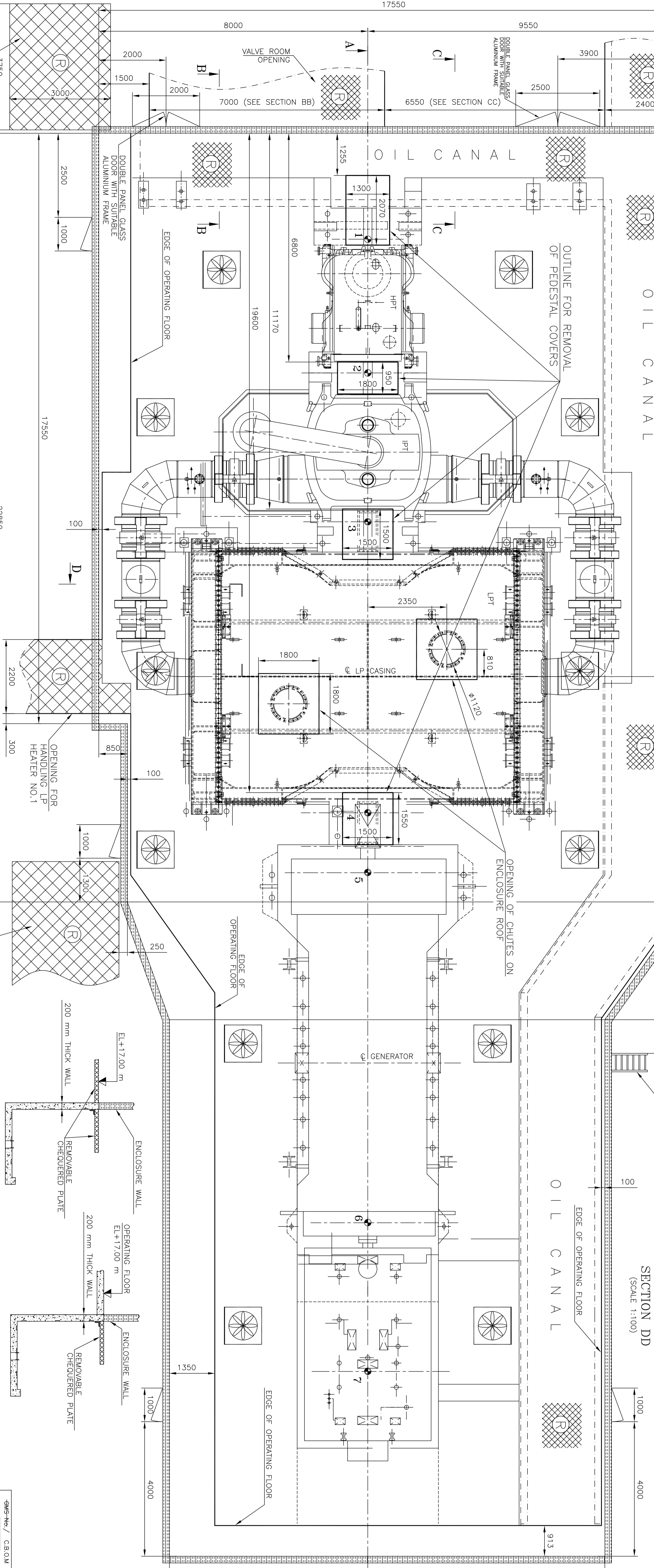
**Important notes to be confirmed by vendor in their offer:-**

1. Mechanical as well as fabrication design of acoustic enclosure is sole responsibility of the acoustic enclosure vendor.
2. Base/Support structure, doors and approach platform, ladders, acoustic panels, fasteners, fixtures, gaskets, seals, equipment for lighting, ventilation system(exhaust silencer, tubular type exhaust fans, air intake manifolds etc.) control panel and all the electrical wiring from acoustic enclosure up to control panel shall fall within the scope of vendor.
3. Design of acoustic enclosure is sole responsibility of vendor. Approval drawings, calculations, quality plan etc. by BHEL shall in no way absolve vendor from either design responsibility and performance demonstration.
4. Roof panels should preferably be designed in such a way that panels on top of bearing pedestals (without necessitating removal of other panels) for dismantling of pedestal covers. No supporting member shall be located in this area.
5. Location of doors shown in the drawing is indicative only. Location of doors, sizes & their numbers shall be suiting to actual site requirement.
6. Approach platform from the operating floor to the bearing pedestals and turbine valve casings shall be provided by vendor suiting to actual site requirements.
7. Approach platforms and ladders with side railings shall be provided by vendor for all doors to reach TG deck. Width of platforms and ladders shall be 300 mm more than the width of respective door.
8. Dimensions given in the drawing are clear inside dimensions of the acoustic enclosure.
9. Approval of drawings and quality plan authorizes vendor to start manufacturing activity, but does not absolve the vendor from design/performance responsibility.
10. Vendor should visit the respective sites to discuss with BHEL representatives/ customer to finalize the layout, locations and sizes and number of doors, approach platforms, ladders and general erection suiting to actual site requirements before start of fabrication of enclosure.
11. Outlets of atmospheric relief diaphragm shall be bought outside the acoustic enclosure (ceiling) through suitable chutes/vertical shafts. Opening of chutes /vertical shafts shall be covered with grills having opening 100X100 mm approximately.
12. No support column should be located on the TG deck.

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



- IMPORTANT:-**
- DESIGN OF ACOUSTIC ENCLOSURE IS SOLE RESPONSIBILITY OF THE VENDOR. APPROVAL OF DRAWINGS, CALCULATIONS, QUALITY PLAN ETC. BY BHEL SHALL IN NO WAY ABSOLVE VENDOR FROM EITHER DESIGN RESPONSIBILITY OR PERFORMANCE DEMONSTRATION NOR SHALL CONSTRUCT TO ALLOW ANY ALTERATION IN THE SCOPE OF SUPPLY WITH RESPECT TO DESIGN/PACKAGE ORDER.
  - BASE/SUPPORT STRUCTURE, DOORS & APPROACH PLATFORMS (REFER GAUSE-413 OF ST53010), LADDERS, ACOUSTIC PANELS, FASTENERS, GASKETS, SEALS, EQUIPMENT FOR LIFTING, VENTILATION SYSTEM (EXHAUST SILENCERS, TURBULENCE EXHAUST PANS, AIR INLET MANIFOLDS ETC.), CONTROL PANEL AND ALL THE ELECTRICAL WIRING FROM ACOUSTIC ENCLOSURE UP TO CONTROL PANEL SHALL FALL WITHIN THE SCOPE OF THE VENDOR.
  - SCOPE OF SUPPLY GIVEN IN THE DRAWING / SPECIFICATION IS FINAL AND CANNOT BE ALTERED BY THE VENDOR WITHOUT EXPRESS APPROVAL OF BHEL. APPROVAL OF DRAWING & QUALITY PLAN AUTHORIZES VENDOR TO START MANUFACTURING ACTIVITY.
  - NO SUPPORT COLUMN SHOULD BE LOCATED ON THE TOP DECK.
  - LOCATIONS OF THE DOORS SHOWN IN THE DRAWING ARE INDICATIVE ONLY. LOCATIONS OF DOORS, SIZES & NUMBERS SHALL BE SIGNED TO ACTUAL SITE REQUIREMENTS.
  - APPROACH PLATFORM FROM THE OPERATING FLOOR TO THE BEARING BESSINGS AND TURBINE WAKE CASINGS SHALL BE PROVIDED BY THE VENDOR. SILING TO ACTUAL SITE REQUIREMENTS. APPROACH PLATFORMS AND LADDERS WITH SILE RAILINGS SHALL BE PROVIDED BY THE VENDOR FOR ALL DOORS TO REACH TO EACH TO-CHECK WIDTH OF PLATFORMS AND LADDERS SHALL BE 300MM MORE THAN THE WIDTH OF RESPECTIVE DOOR.
  - SPACE OF PAINT SHALL BE 217 (SEA GREEN) CONFORMING TO IS 5 UNLESS OTHERWISE SPECIFIED IN ENQUIRY/PURCHASE ORDER.
  - VENDOR SHOULD VISIT THE SITE TO DISCUSS WITH BHEL REPRESENTATIVES/CUSTOMERS TO FINALISE THE LAYOUT, LOCATIONS & SIZES & NUMBER OF DOORS, APPROACH PLATFORMS, LADDERS AND GENERAL ERECTION SILING TO ACTUAL SITE REQUIREMENTS BEFORE START OF FABRICATION OF ENCLOSURE.
  - VENDOR MAY ONE A CALL TO BHEL FOR A JOINT VISIT TO SITE, IF REQUIRED.



- TECHNICAL REQUIREMENTS :-**
- DIMENSIONS GIVEN IN THE DRAWING ARE CLEAR INSIDE DIMENSIONS OF THE ACOUSTIC ENCLOSURE.
  - FOR ALL OTHER REQUIREMENTS REFER ST53010.
  - GENERAL LINE OF BESSINGS ARE MARKED AS 2.1.7.
  - OPENINGS COVERED WITH REMOVABLE CHECKERED PLATES ARE SHOWN AS 2.2.7.
  - LOCATIONS FOR THE EXHAUST SILENCER AND INLET MANIFOLDS SHOWN IN THE Dwg. ARE INDICATIVE. THE EXACT NUMBER AND LOCATIONS TO BE DECIDED BY VENDOR. APPROVAL OF BHEL TO BE OBTAINED.
- NOTE :-**  
WHENEVER IN DOUBT, THE VENDOR MUST SEEK CLARIFICATION FROM BHEL.

INVENTORY No.	SIGN & DATE	REF. DRAWING No.
16		
15		
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REV	DATE	ALTERED	BY	CHECKED
01				

GRADE OF UNITOL. DIM	GRADE OF PRODUCT
M/GS - AA0230208 m	STEAM TURBINE
WINDING-GLASS 'B' OF AA0231104	
DWG. CUTTING-TRAC 3 OF AA0231101	

DATE	ALTERED	SD/-	SCALE
			1:50

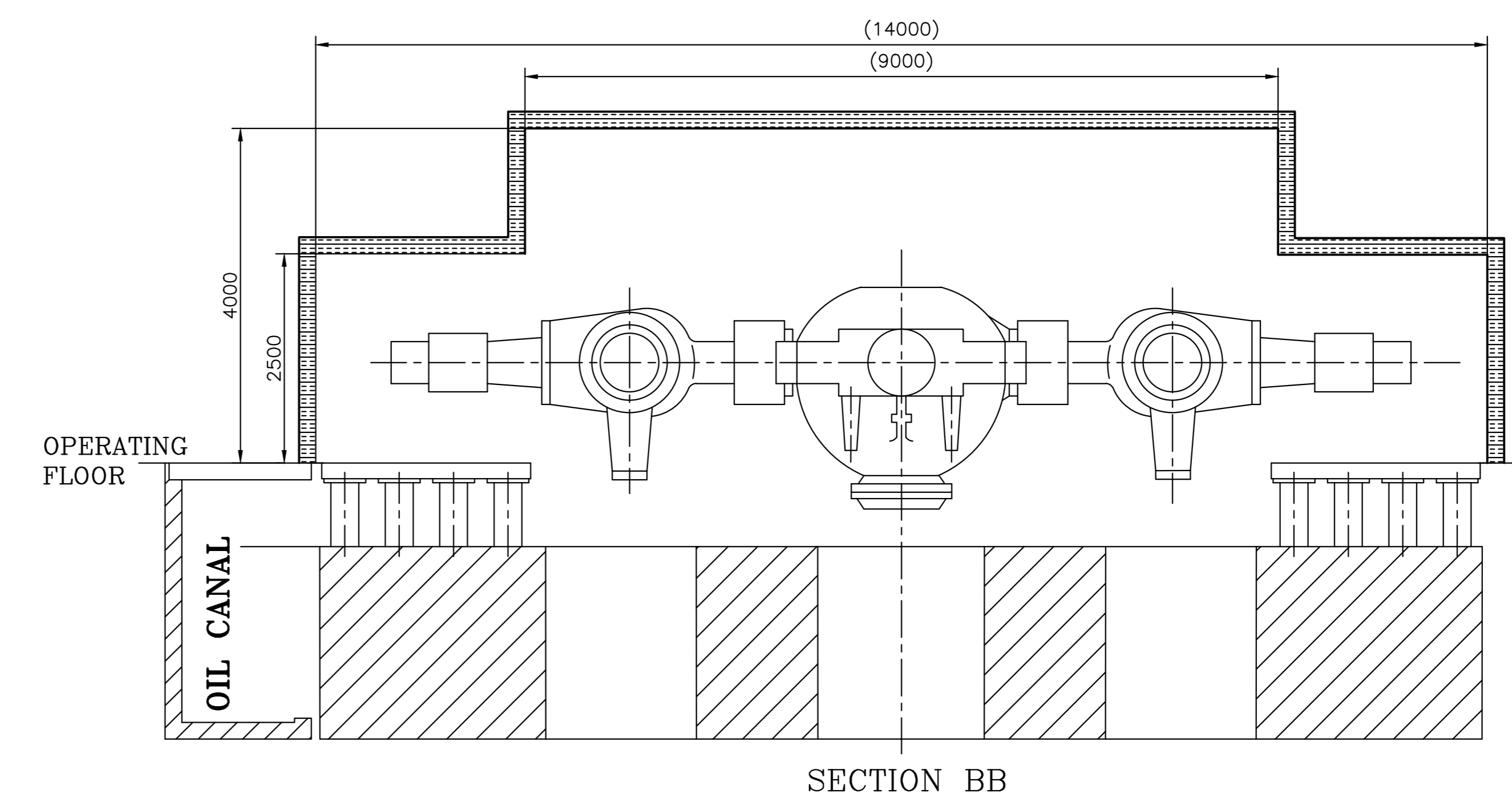
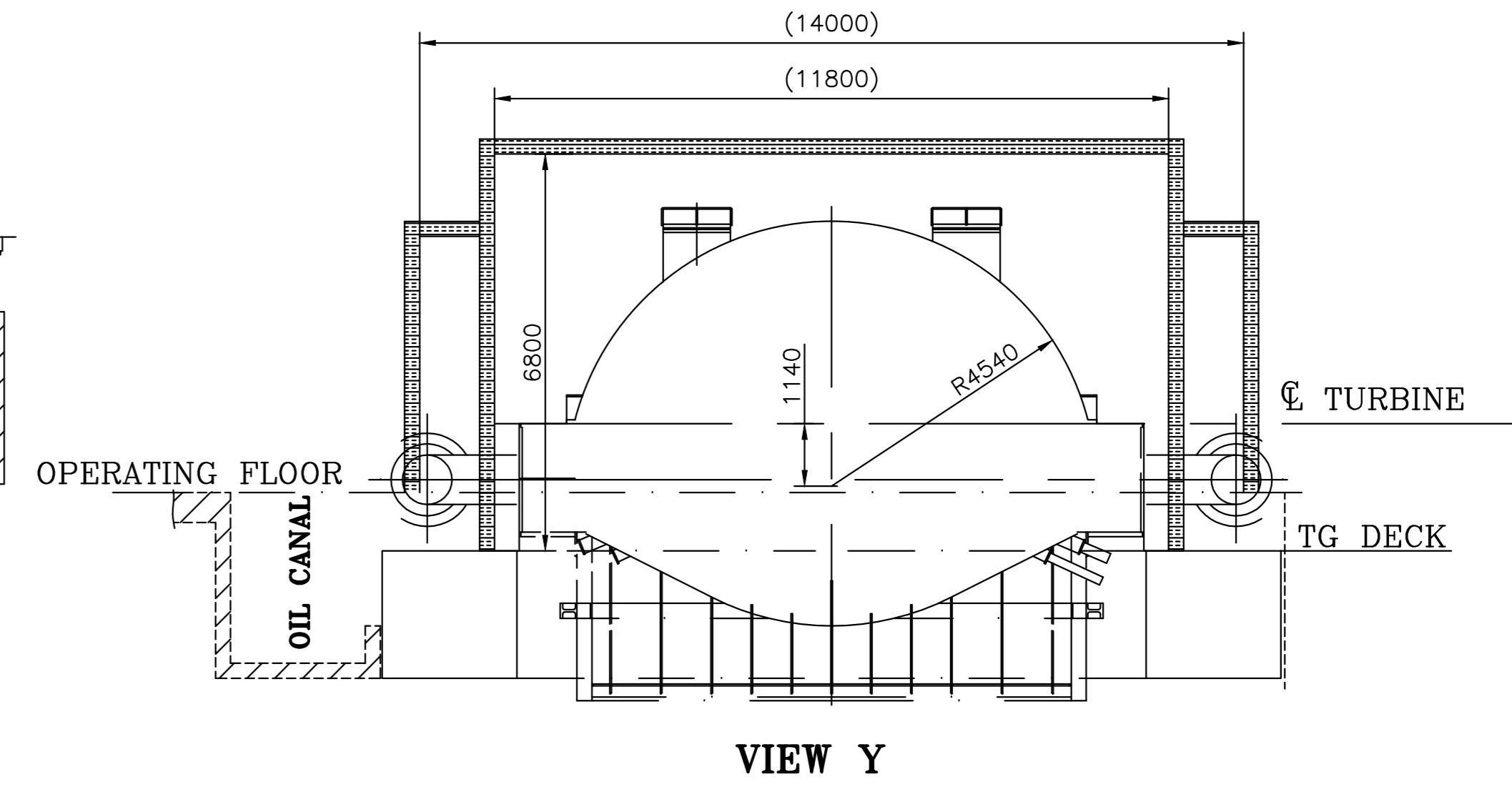
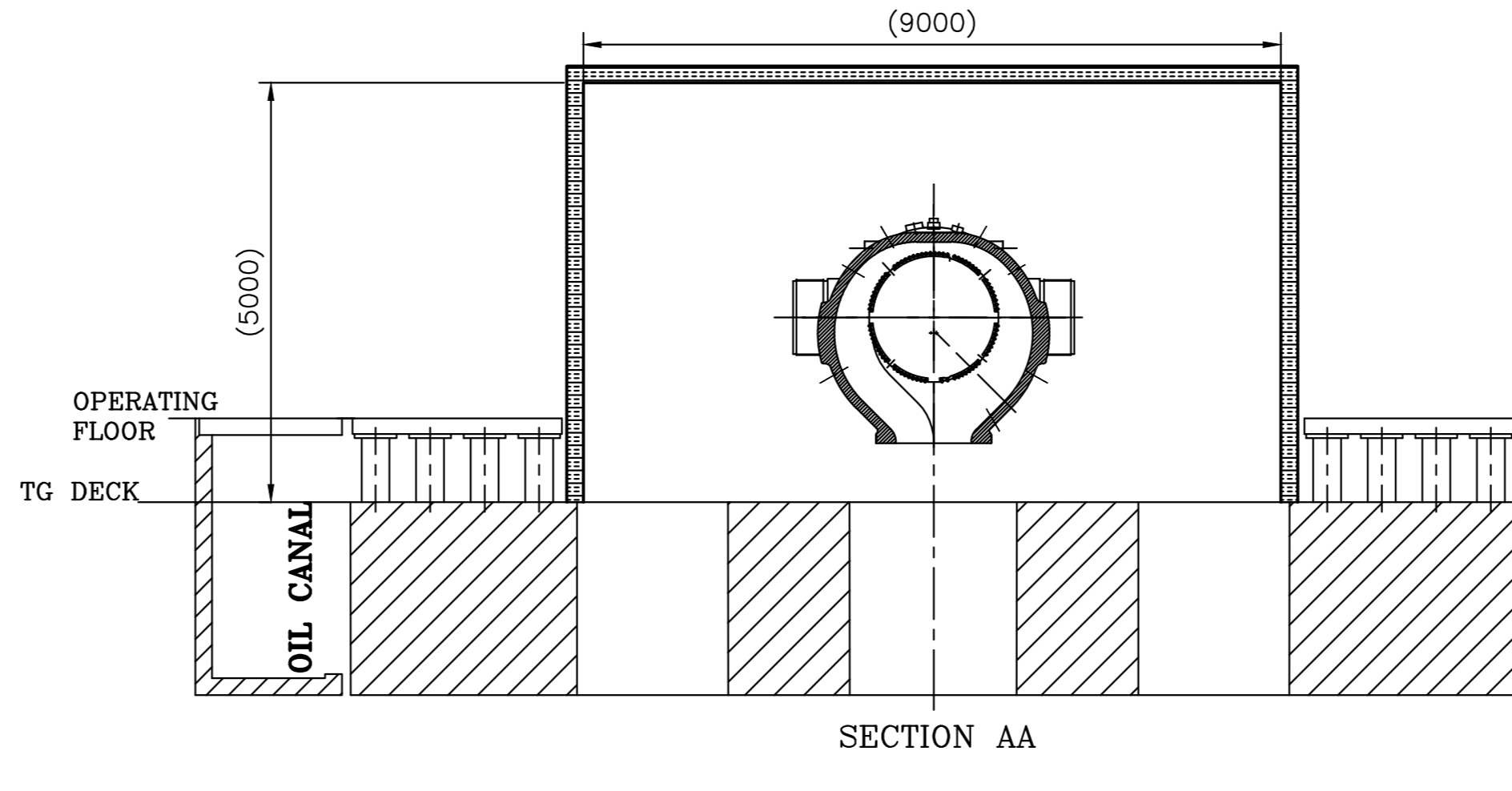
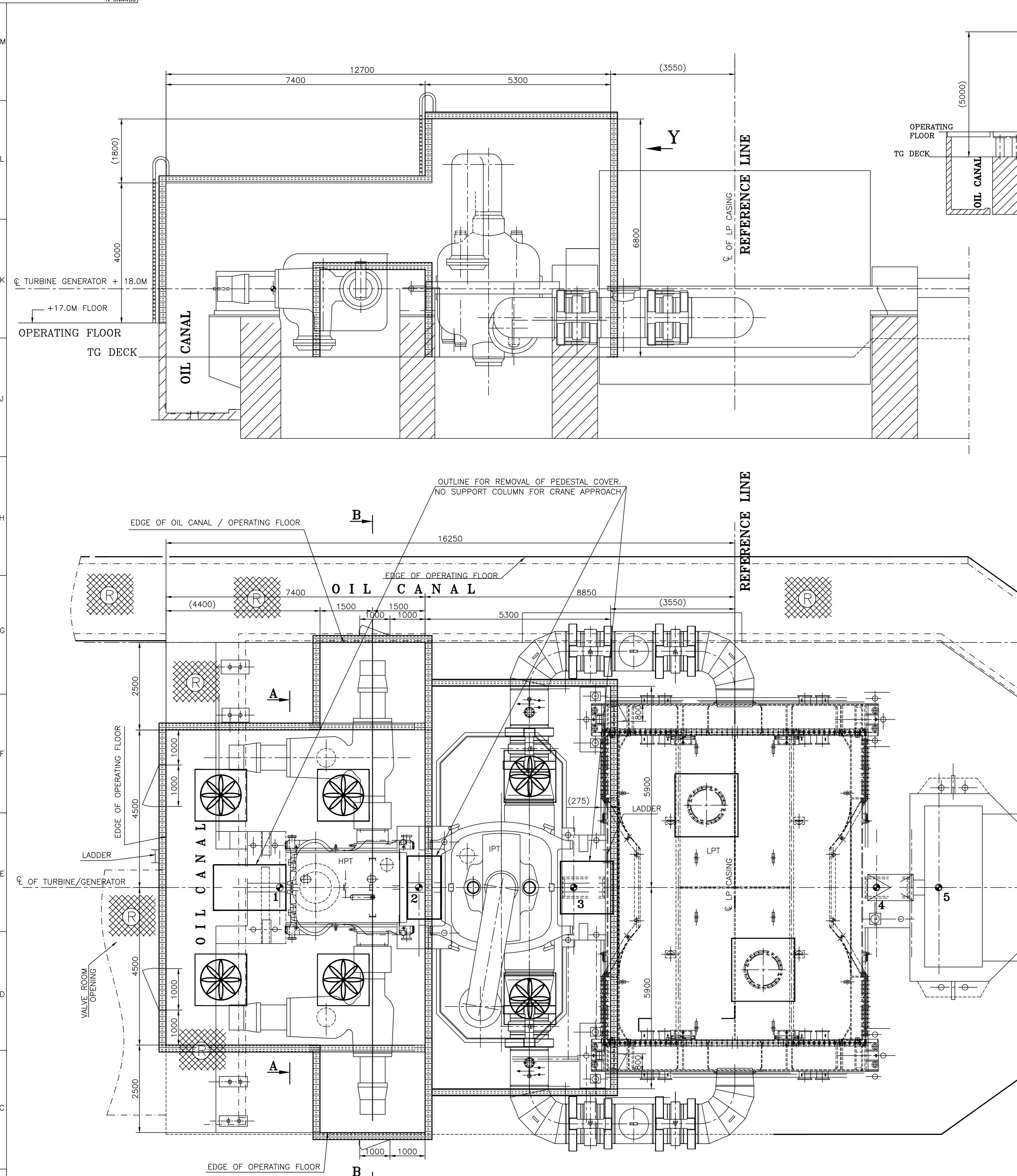
  

CONTENTS UNDER THE DRAWING	DRAWING NO.
ENCLOSURE & WAKE (4850)	0-12101-10541

IS. REF. GA. NO. SE-07-0393	NO. OF SHEETS
1	1

0-12101-41549



**PAINTING SCHEME/INSTRUCTIONS :-**

01. THE ACOUSTIC ENCLOSURE SHALL BE PAINTED WITH FULL GLOSS POLYURETHANE PAINT AS FOLLOWS :-
  - (a) PRIOR TO APPLICATION OF PAINT, SURFACES TO BE PAINTED SHALL BE CLEANED/PREPARED FOR PAINTING AS PER IS:8629-PART 2.
  - (b) TWO COATS OF EPOXY BASED ZINC RICH PRIMER PAINT (IS:14589) SHALL BE APPLIED (DRY FILM THICKNESS- 35+35 μm)
  - (c) ONE COAT OF HIGH BUILD INTERMEDIATE EPOXY PAINT [BHEL SPECIFICATION AA56112 OR EQUIVALENT EPI LUX 4 HB EPOXY COATING (BERGER PAINTS) OR EPI LAC HB EPOXY PAINT (JENSEN & NICHOLSON PAINTS)] SHALL BE APPLIED THEREAFTER (DRY FILM THICKNESS-70 μm)
  - (d) TWO FINISHING COATS OF FULL GLOSS POLYURETHANE FINISHING PAINT (IS:13213) SHALL BE APPLIED (DRY FILM THICKNESS- 30+30 μm). THE SHADE OF THE PAINT SHALL BE "SEA GREEN"(SHADE NO. 217 AS PER IS:5) UNLESS OTHERWISE SPECIFIED IN THE ENQUIRY/ PURCHASE ORDER.
  - (e) THE TOTAL THICKNESS OF PAINT SHALL NOT BE LESS THAN 200 μm.
02. THE PRIMER PAINT, INTERMEDIATE EPOXY PAINT AND FINISHING PAINT SHOULD BE OF SAME MAKE. IF PAINT IS DAMAGED/SCRATCHED DURING SHIPMENT, ONE COAT OF "FULL GLOSS POLYURETHANE FINISHING PAINT" (IS:13213) SHALL BE APPLIED AT SITE (DRY FILM THICKNESS-30 μm).

**TECHNICAL AND GENERAL REQUIREMENTS :-**

01. IMPORTANT: SCOPE OF SUPPLY GIVEN IN THIS DRAWING IS FINAL, AND CANNOT BE ALTERED BY VENDOR WITHOUT EXPRESS APPROVAL OF BHEL. APPROVAL OF DRAWINGS AND QUALITY PLAN AUTHORIZES VENDOR TO START MANUFACTURING ACTIVITY, BUT DOES NOT ABSOLVE THE VENDOR FROM DESIGN/PERFORMANCE RESPONSIBILITY. BHEL SHALL HAVE RIGHT TO PASS ON APPROVED DRAWINGS/QUALITY PLAN TO BHEL'S CUSTOMERS/AUTHORIZED INSPECTION AGENCY.
02. THE SCOPE OF WORK SHALL COVER DESIGN, MANUFACTURE/ FABRICATION, SUPPLY AND ERECTION AT SITE OF ACOUSTIC ENCLOSURE (TURBINE CLEADING) INCLUDING SUITABLE VENTILATION SYSTEM TO REDUCE AVERAGE NOISE LEVEL TO BE LESS THAN 90 dB(A) MEASURED AT 1m DISTANCE FROM THE NEAREST SURFACE OF ACOUSTIC ENCLOSURE AND AT 1.5m HEIGHT. THE VENDOR SHALL DEMONSTRATE ACHIEVEMENT OF REDUCTION IN NOISE LEVEL TO THE SATISFACTION OF BHEL/BHEL'S CUSTOMERS.
03. THE SUPPORTING STRUCTURE SHALL BE SUFFICIENTLY STRONG TO WITHSTAND LOAD OF PANELS, AND TO RETAIN SHAPE AND SIZE UNDER ALL OPERATING CONDITIONS AND UNDER THE WEIGHT OF PERSONNEL WORKING ON THE ROOF OF ACOUSTIC ENCLOSURE FOR ASSEMBLY ETC. THE VENDOR SHALL SUBMIT ALL MANUFACTURING DRAWINGS AND DESIGN CALCULATIONS FOR APPROVAL BY BHEL, BEFORE TAKING UP MANUFACTURING.
04. THE WALLS AND ROOF OF ACOUSTIC ENCLOSURE SHALL BE FABRICATED OUT OF ACOUSTIC PANELS WITH SUITABLE STIFFENERS WITHIN SPECIFIED LIMITS, HAVING-
  - \* OUTER FACING SHEET OF MINIMUM 1 mm THICKNESS PRE-COATED SHEET AS PER IS:14246.
  - \* INNER PERFORATED SHEET OF MINIMUM 1 mm THICKNESS PRE-COATED SHEET AS PER IS:14246 WITH >30% OPEN SPACE. OPENING IN PERFORATED SHEETS SHALL BE 3 TO 5 mm DIAMETER.
  - \* SANDWICHED ABSORBING MINERAL WOOL (CONFORMING TO IS: 8183) IN BETWEEN OUTSIDE AND INSIDE FACING SHEETS HAVING A MINIMUM DENSITY OF 64 Kg/m3.
  - \* A GLASS FABRIC LAYER BETWEEN MINERAL WOOL AND INSIDE PERFORATED SHEET.
  - \* PROPER ADHESIVE SEALING ARRANGEMENT IN BETWEEN THE PANELS.
05. THE ACOUSTIC MATERIAL SHALL BE ADEQUATELY SUPPORTED AND BE ABLE TO WITHSTAND VIBRATION DURING TURBINE OPERATION. THE ACOUSTIC PANEL SHALL BE ATTACHED TO THE SUPPORTING FRAME STRUCTURE BY MEANS OF SUITABLE FASTENERS PREFERABLY COUNTERSUNK TYPE. ACOUSTIC PANELS SHOULD HAVE LARGE SURFACE AREA AND SHOULD BE OF UNIFORM WIDTH & HEIGHT AS FAR AS POSSIBLE. ALL ACOUSTIC PANELS ARE ARRANGED OUTSIDE THE SUPPORTING FRAME STRUCTURE. THE GAP BETWEEN TWO ACOUSTIC PANELS SHOULD NOT BE MORE THAN 1.5 mm. FITTING DESIGN SHOULD BE SUITABLE FOR REPEATED ASSEMBLY & DISASSEMBLY.
06. VENTILATION SYSTEM OF ACOUSTIC ENCLOSURE SHOULD BE DESIGNED FOR ~325KW HEAT REMOVAL. VENTILATION SYSTEM SHOULD HAVE SUFFICIENT CAPACITY TO MAINTAIN INSIDE TEMPERATURE COMFORTABLE (MAX.40-45°C) FOR PERSONNEL WORKING INSIDE. NUMBER AND LOCATION OF FANS SHOWN IN THE DRAWING ARE INDICATIVE ONLY. SIZING/NUMBER OF FANS ARE TO BE WORKED OUT BY SUPPLIER. VENTILATION SYSTEM SHOULD INCORPORATE SUITABLE NOISE REDUCTION MEASURES (EXHAUST SILENCERS AND SUFFICIENT NUMBER OF AIR INTAKE MANIFOLDS - TO CONTAIN NOISE LEVEL WITHIN SPECIFIED LIMITS).
07. DESIGN OF ACOUSTIC ENCLOSURE SHALL BE SUITABLE FOR EASY DISMANTLING OF PANELS AND STRUCTURAL MEMBERS. LIFTING ARRANGEMENT (LIFTING LUGS/HOOKS/EYE BOLTS) SHALL BE PROVIDED ON EACH MEMBER FOR EASE OF HANDLING. THE TOP MEMBERS INCLUDING STRUCTURAL MEMBERS SHALL BE DISMANTLABLE WITHOUT NECESSITATING REMOVAL OF SIDE MEMBERS. SIDE WALLS SHOULD RETAIN ORIGINAL SHAPE AND SHOULD NOT DEFLECT OR BEND WHEN TOP PANELS/MEMBERS ARE REMOVED. INDIVIDUAL PARTS OF THE ENCLOSURE SHALL BE MARKED PERMANENTLY AND VISIBLY FOR EASE OF ASSEMBLY/DISMANTLING.
08. ALL PIPES COMING OUT OF ACOUSTIC ENCLOSURE SHALL BE PROPERLY SEALED AGAINST VIBRATIONS.
09. SUITABLE DAMPING MATERIALS ARE TO BE USED TO INSULATE ACOUSTIC ENCLOSURE FROM VIBRATIONS OF TG SET/TG DECK.
10. DOORS ALONG WITH THEIR SEALS SHALL BE FITTED NEATLY INTO THE DOOR FRAMES. DOORS SHALL BE PROVIDED WITH NON-PROTRUDING LOCKING ARRANGEMENT AND DOOR CATCHERS FOR LOCKING AND SECURING. THE DOORS IN OPEN POSITION RESPECTIVELY. VIEWING WINDOWS CONSISTING OF NON TINTED TOUGHENED FLOAT SAFETY GLASS (TF) CONFORMING TO IS 2553 (PART-1) OF NOMINAL THICKNESS OF 6 MM OR ABOVE, SIZE 600X600 MM SHALL BE PROVIDED IN ALL DOORS.
11. DIMENSIONS GIVEN IN THE DRAWING ARE CLEAR INSIDE DIMENSIONS OF THE ACOUSTIC ENCLOSURE.
12. LIGHTS SHALL BE PROVIDED INSIDE THE ACOUSTIC ENCLOSURE TO PROVIDE SUFFICIENT ILLUMINATION (MINIMUM 300 LUX) FOR INSTRUMENT READING AND MINOR REPAIRS. PROVISION OF EMERGENCY LIGHTS SUITABLE FOR 220V DC SUPPLY SHOULD ALSO BE MADE TO PROVIDE MINIMUM 70 LUX ILLUMINATION. PROVISION FOR AUTO-CHANGEOVER OF EMERGENCY LIGHTING SYSTEM FROM 'AC' TO 'DC' IN CASE OF POWER FAILURE SHALL BE PROVIDED.
13. ALL THE CONTROLS OF VENTILATION SYSTEM, LIGHTING AND EMERGENCY LIGHTING SHALL BE PROVIDED OUTSIDE ACOUSTIC ENCLOSURE (AT INDICATED LOCATION) IN A DUST & VERMIN PROOF, CUBICLE PATTERN, FLOOR MOUNTED CONTROL PANEL. CONTROL PANEL SHALL BE MADE OUT OF MINIMUM 16 GAUGE CRCA SHEET (IS:513) AND SHOULD BE FULLY ENCLOSED AND GASKETTED. CONTROL PANEL SHOULD HAVE FOLLOWING PROVISIONS:
  - (a) REQUIRED NOS. OF TPN FSU COMPLETE WITH HRC FUSES AND SINGLE PHASE PREVENTOR AND CONTROL FUSES
  - (b) REQUIRED NOS. OF FAN CONTROL CIRCUIT WITH NECESSARY SWITCH, CONTACTOR, OVERLOAD RELAY & PB SWITCHES WITH INDICATING LAMP.
  - (c) PROVISION FOR GROUP STARTING OF FAN MOTORS, INDICATION SHOWING STATUS OF INDIVIDUAL CIRCUITS.
  - (d) SEPARATE MCB TO CONTROL OUTSIDE LIGHT POINTS.
  - (e) THE PANEL SHALL BE COMPLETE WITH ALL INTERNAL WIRING, CONNECTION AND TERMINATION PROVISION FOR INCOMING AND OUTGOING CABLES INCLUDING PROPER EARTHING AND OTHER SAFETY REQUIREMENTS/PROVISIONS.
14. TWO NOS. BHEL NAME PLATES (SUPPLIED BY BHEL) SHALL BE FIXED AS UNDER:
  - (a) ON THE FRONT PEDESTAL SIDE AT LONGITUDINAL CENTER LINE OF TG SET, AND
  - (b) ON THE SIDE FACING CONTROL ROOM AT THE CENTER OF SIDE WALL, AT SUITABLE HEIGHT.
15. ACOUSTIC ENCLOSURE SHALL BE MANUFACTURED, ERECTED AND PAINTED WITH GOOD WORKMANSHIP TO GIVE IT GOOD AESTHETIC LOOK (SEE PAINTING SCHEME/ INSTRUCTIONS). SPECIAL ATTENTION SHALL BE GIVEN TO JOINTS OF SIDE COVER PANEL. COMPLETE FIT-UP GAPS SHALL BE CHECKED DURING TRIAL ASSEMBLY AT VENDOR'S WORKS.
16. IT SHOULD BE ENSURED BY THE VENDOR THAT NO STRUCTURAL MEMBER COMES OVER THE PEDESTALS ON THE ROOF (APPROX. 2mX2m AREA) IN VIEW OF FREQUENT MAINTENANCE REQUIRED IN THIS AREA.
17. ACOUSTIC ENCLOSURE IS TO BE DESIGNED/MANUFACTURED BY THE VENDOR KEEPING IN VIEW THE ACTUAL SITE CONDITIONS, IN ORDER TO AVOID REWORK/ RECTIFICATION AT SITE. IF VENDOR DESIRES TO CHANGE THE OVERALL DIMENSIONS OF THE ACOUSTIC ENCLOSURE BASED ON SITE CONDITIONS, PRIOR EXPRESS APPROVAL OF BHEL SHALL BE OBTAINED.
18. BASE FRAME AND ITS FOUNDATION BOLTS / ANCHORING BOLTS ETC. FOR SECURING ACOUSTIC ENCLOSURE ON OPERATING FLOOR/TURBINE GENERATOR DECK ARE IN THE SCOPE OF SUPPLY. BASE FRAME MAY CONSIST OF FABRICATED STRUCTURE FOR CHANNEL, ANGLE OR HOLLOW RECTANGULAR SECTION OF MATERIAL CONFORMING TO IS:2002 GRADE 'B'. BASE FRAME SHALL BE SECURED TO OPERATING FLOOR/TG DECK AND SUITABLE ISOLATING DAMPING MATERIALS SHALL BE PROVIDED BETWEEN OPERATING FLOOR/TG DECK AND BASE FRAME.

**IMPORTANT :-**

1. DESIGN OF ACOUSTIC ENCLOSURE IS SOLE RESPONSIBILITY OF THE VENDOR. APPROVAL OF DRAWINGS, CALCULATIONS, QUALITY PLAN ETC. BY BHEL SHALL IN NO WAY ABSOLVE VENDOR FROM EITHER DESIGN RESPONSIBILITY OR PERFORMANCE DEMONSTRATION NOR SHALL CONSTRUCT TO ALLOW ANY ALTERNATION IN THE SCOPE OF SUPPLY WITH RESPECT TO ENQUIRY/PURCHASE ORDER.
2. BASE/SUPPORT STRUCTURE, DOORS, APPROACH PLATFORMS (SEE POINT NO. 4), LADDERS, ACOUSTIC PANELS, FASTENERS, GASKETS, SEALS, EQUIPMENT FOR LIGHTING, VENTILATION SYSTEM (EXHAUST SILENCERS, TUBULAR TYPE EXHAUST FANS, AIR INTAKE MANIFOLDS ETC.), CONTROL PANEL AND ALL THE ELECTRICAL WIRING FROM ACOUSTIC ENCLOSURE UP TO CONTROL PANEL SHALL FALL WITHIN THE SCOPE OF THE VENDOR.
3. LOCATIONS OF DOORS SHOWN IN THE DRAWING ARE INDICATIVE ONLY. LOCATIONS OF DOORS, SIZES & NUMBERS SHALL BE SUITING TO ACTUAL SITE REQUIREMENTS.
4. APPROACH PLATFORM FROM THE OPERATING FLOOR TO THE BEARING PEDESTALS AND TURBINE VALVE CASINGS SHALL BE PROVIDED BY THE VENDOR SUITING TO ACTUAL SITE REQUIREMENTS. APPROACH PLATFORMS AND LADDERS WITH SIDE RAILINGS SHALL BE PROVIDED BY THE VENDOR FOR ALL DOORS TO EACH TG-DECK. WIDTH OF PLATFORMS AND LADDERS SHALL BE 300MM MORE THAN THE WIDTH OF RESPECTIVE DOOR.
5. VENDOR SHOULD VISIT THE SITE TO DISCUSS WITH BHEL REPRESENTATIVES/CUSTOMERS TO FINALISE THE LAYOUT, LOCATIONS & SIZES & NUMBER OF DOORS, APPROACH PLATFORMS, LADDERS AND GENERAL ERECTION SUITING TO ACTUAL SITE REQUIREMENTS BEFORE START OF FABRICATION OF ENCLOSURE.
6. VENDOR MAY GIVE A CALL TO BHEL FOR A JOINT VISIT TO SITE, IF REQUIRED.

**NOTE :-**

WHENEVER IN DOUBT, THE VENDOR MUST SEEK CLARIFICATION FROM BHEL.

**DOCUMENTS FOR APPROVAL :-**

01. OGA DRAWINGS OF ACOUSTIC ENCLOSURE WITH PART LIST AND TOTAL WEIGHT.
02. GA DRAWING OF CONTROL PANEL WITH SCHEMATIC AND TOTAL POWER REQUIREMENT.
03. BASE FRAME DETAILS, SUPPORTING FRAME DETAILS, & ACOUSTIC PANEL DETAILS.
04. CALCULATION FOR VENTILATION REQUIREMENT AND NUMBER & CAPACITY OF VENTILATION FANS.
05. DATA SHEET OF MOTORS OF FANS.
06. PLAN FOR THE LIGHTING INSTALLATION INSIDE THE ACOUSTIC ENCLOSURE.
07. ASSEMBLY PLAN & QUALITY PLAN.

REV	DATE	ALTERED	CHECKED	DATE	ALTERED	CHECKED	DATE	STATUS	DATE	TYPE OF PRODUCT	NAME OF CUSTOMER/PROJECT																				
01	26.06.14							AS PER C/A NO. STE-14-F0198.		STEAM TURBINE	BHARAT HEAVY ELECTRICALS LTD RANIPUR, HARDWAR																				
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GRADE OF UNTOL. DIM	M/CG-- AA0230208 m	WELDING-CLASS 'B' OF AA0621104	GAS CUTTING-TABLE 3 OF AA0621101																												
DRN	NAME	SIGN	DATE																												
CHD	D.K.RAY	SD/-	04.04.08																												
APPD	A.SHAH	SD/-	14.04.08																												
<table border="1"> <tr> <td>DEPT</td> <td>STE</td> <td>SCALE</td> <td>WEIGHT (KG)</td> <td>REF. TO ASSY. DRG.</td> <td>ITEM NO.</td> <td>NO. OF ITEMS</td> </tr> <tr> <td>4011</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										DEPT	STE	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS	4011							<table border="1"> <tr> <td>CARD CODE</td> <td>DRAWING NO.</td> <td>NO. OF SHEETS</td> </tr> <tr> <td></td> <td>0-12101-41549</td> <td>22/23</td> </tr> </table>		CARD CODE	DRAWING NO.	NO. OF SHEETS		0-12101-41549	22/23
DEPT	STE	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS																									
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CARD CODE	DRAWING NO.	NO. OF SHEETS																													
	0-12101-41549	22/23																													

सामग्री सूची संख्या को  
 SUPERSEDES  
 INVENTORY NO.  
 अधिकांशित करते हैं

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**स्वत्वाधिकार एवं गोपनीय**  
 इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि अल्पमौ के हित में हासिलकारक हो न किया जाए ।

हस्ताक्षर एवं दिनांक  
 SIGN & DATE  
 12/11/08  
  
 सामग्री सूची संख्या  
 INVENTORY NO.  
 P-6319

## TECHNICAL SPECIFICATION FOR ACOUSTIC ENCLOSURE (85 dB)

**1.0 SCOPE :**

This specification covers the broad guidelines on design, fabrication, supply & erection of Acoustic Enclosure for Steam Turbine or Steam Turbine Generator set (including exciter) at site to reduce average noise level, measured at 1 m distance from the nearest surface of acoustic enclosure and at 1.2 m height, to be less than 85 dB(A). An insertion loss of 20 dB minimum in noise level at 1.2 m height must be obtained with acoustic enclosure.

Acoustic Enclosure must satisfy all the requirements of ISO/FDIS 15667.

The scope of work covers design, engineering, manufacturing, supply and erection of Acoustic Enclosure at site for Steam Turbine or Steam Turbine Generator set (including exciter) as per this specification and drawing referred in the enquiry. **Base/support structure, doors & approach platforms (refer clause – 4.13), ladders, acoustic panels, fasteners, fixtures, gaskets, seals, equipment for lighting, ventilation system (exhaust silencers, tubular type exhaust fans, air intake manifolds etc.), control panel and all the electrical wiring from acoustic enclosure up to control panel shall fall within the scope of the vendor.**







The vendor shall demonstrate achievement of reduction in noise level by measurement as per ISO 11546-2.



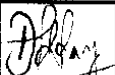
**2.0 IMPORTANT :**




**Design of Acoustic Enclosure is sole responsibility of vendor. Approval of drawings, calculations, quality plan etc. by BHEL shall in no way absolve vendor from either design responsibility and performance demonstration.**


**3.0 PURPOSE :**

The function of Acoustic Enclosure is to provide an overall covering to reduce the noise level resulting from TG set operation. It also provides an aesthetic look and protects TG set from ingress of dust, dirt etc.

				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
MEMBER-PSC	RPS Sisodia		अनुवादक TRANSLATED BY	-	-
QAX	S. KCHAUHAN		निर्माणकर्ता WORKED BY	AKASH SHUKLA	 23.09.08
TSX	A.K.Chaturvedi		जांचकर्ता CHECKED BY	D.K. RAY	 23.09.08
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	ASHOK SHAH	 25.9.08
स्वीकृति APPROVED : AGM (STE/GTE) A. K. SAXENA				Gr. No. 8.20	
REV. 03			निर्माण PREPARED : STE	जारी ISSUED : TSX	दिनांक DATE : 23.07.05
06.04.11					

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक</b>  <b>PRODUCT STANDARD</b>	<b>ST 35010</b>  पृष्ठ 11 का 2  Page 2 of 11	
सामग्री सूची संख्या को अधिकृतित करना है	SUPERSEDES INVENTORY NO.	<p><b>4.0 DESIGN :</b></p> <p>Broad guidelines on the design of acoustic enclosure are specified here. <b>However, mechanical as well as fabrication design of acoustic enclosure is sole responsibility of the Acoustic Enclosure vendor.</b></p> <p>Acoustic enclosure should be designed to meet the following requirements –</p> <p><b>4.1</b> ISO/FDIS 15667.</p> <p><b>4.2</b> Reduction in the noise level of TG set to less than 85 dB(A). The expected noise level due to TG set operation at 3000 rpm without Acoustic Enclosure is 105 dB(A) maximum, i.e. insertion loss of 20 dB minimum in noise level must be obtained.</p> <p><b>4.3</b> The base and supporting structure shall be sufficiently strong to withstand load of panels, and it must retain shape and size under all operating conditions and under the weight of personnel working on acoustic enclosure for assembly/dis-assembly etc.</p> <p><b>4.4</b> <b><i>NO support column should be located on the TG-Deck.</i></b></p> <p><b>4.5</b> The top members including structural members shall be dismantlable without necessitating removal of side members for taking out HP Turbine, Pedestal Covers, Rotors, IP Casing &amp; LP Casing Top halves etc. for repairs/maintenance purposes. Sidewalls should retain original shape and should not deflect or bend when roof panels/members are removed.</p> <p><b>4.6</b> <b>Roof panels should preferably be designed in such a way that panels on top of Bearing Pedestals (location and size shown in drawing) shall be removable independently (without necessitating removal of other panels) for dismantling of Pedestal Covers. No supporting member shall be located in this area.</b></p> <p><b>4.7</b> Suitable induced ventilation system shall be provided to reduce heat build up and remove moisture, oil vapor or gases from inside and to allow comfortable environment for repair/inspection inside the enclosure. At least 20% ventilation capacity shall be located above Turbo generator and Exciter.</p> <p>Ventilation system shall be designed for removal of following heat load –</p> <ul style="list-style-type: none"> <li>• 500 MW TG set : 325 kW</li> <li>• 250 MW TG set : 250 kW</li> <li>• 210 MW TG set : 200 kW</li> <li>• CCP (125-175 MW) TG set : 150 kW</li> <li>• CCP (175-275 MW) TG set : 250 kW</li> </ul>		
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<b>स्वत्वाधिकार एवं गोपनीय</b> इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इस्का प्रयोग एवं आरक्षण रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।				
दिनांक एवं हस्ताक्षर SIGN & DATE	12/11/08			
सामग्री सूची संख्या INVENTORY NO.	REV. 03	निर्माणकर्ता WORKED BY	AKASH S	 23.09.2008
P-6319		जांचकर्ता CHECKED BY	D.K. RAY	 23.09.2008

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक</b>  <b>PRODUCT STANDARD</b>	<b>ST 35010</b>  पृष्ठ 11 का 3  Page 3 of 11		
सामग्री सूची संख्या को अधिकतम करता है SUPERSEDES INVENTORY NO.	<p>4.8 Sufficient illumination inside the enclosure shall be ensured for ease of inspection/repair (see Clause 5.6).</p> <p>4.9 -----</p> <p>4.10 Perfect joint matching with well-defined corner without any sharp edge shall be ensured. Waviness, depression etc. on any panel is not acceptable.</p> <p><b>4.11 Pipes coming out of the enclosure shall be properly sealed against vibration and noise.</b></p> <p>4.12 Suitable elastic mounts/damping material may be used to isolate acoustic enclosure from structure borne vibrations.</p> <p>4.13 Doors along with their seals shall be fitted neatly into the doorframes. Doors shall be provided with non-protruding locking arrangement and door catchers for locking and securing the doors in open position respectively.</p> <p><b><i>Locations of doors shown in the drawing are indicative only. Location of doors, sizes &amp; their numbers shall be suiting to actual site requirements.</i></b></p> <p><b><i>Approach platform from the operating floor to the bearing pedestals and turbine valve casings shall be provided by the vendor suiting to actual site requirements.</i></b></p> <p><b><i>Approach platforms and ladders with side railings shall be provided by the vendor for all doors to reach TG deck. Width of platforms and ladders shall be 300 mm more than the width of respective door.</i></b></p>				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<p>4.14 Acoustic enclosure shall be manufactured, erected and painted with good workmanship to give it excellent aesthetic look (see Painting Scheme/Instructions). Special attention shall be given to joints of side cover panel. Complete fit-up gaps shall be checked during trial assembly at vendor's works.</p> <p>4.15 Complete side panel of exciter side shall be fully dismantlable type without requiring dismantling of adjoining side panels or roof panels.</p> <p>4.16 Acoustic enclosure is to be designed/manufactured by the vendor keeping in view the actual site conditions, in order to avoid rework/rectification at site. If vendor desires to change the overall dimensions of the acoustic enclosure based on site conditions, prior express approval of BHEL shall be obtained (refer clause – 10).</p>				
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।					
हस्ताक्षर एवं दिनांक SIGN & DATE 18/12/09					
सामग्री सूची संख्या INVENTORY NO. P-6319	REV.03		निर्माणकर्ता WORKED BY RITESH K		16.12.2009
			जांचकर्ता CHECKED BY D.K. RAY		16.12.2009

रिवाज एवं दिनांक SIGN & DATE		<b>उत्पाद मानक</b>		<b>ST 35010</b>	
		<b>PRODUCT STANDARD</b>		पृष्ठ 11 का 4 Page 4 of 11	
सामग्री सूची संख्या को INVENTORY NO.	<p><b>4.17 Outlets of Atmospheric Relief Diaphragm shall be brought outside the acoustic enclosure (ceiling) through suitable chutes/vertical shafts. Opening of chutes/ vertical shafts shall be covered with grills having opening 100x100 mm approximately.</b></p> <p><b>4.18 All the controls of ventilation system, lighting and emergency lighting shall be provided on a single control panel.</b></p> <p><b>4.19 One permanent ladder to reach the roof of the acoustic enclosure shall be provided. One permanent ladder to reach one level of the roof from another level of roof of the acoustic enclosure shall be provided.</b></p> <p><b>4.20 Individual parts of the acoustic enclosure shall be marked permanently and visibly for ease of assembly/dismantling.</b></p> <p><b>4.21 Two nos. BHEL name plates (supplied by BHEL) shall be fixed at :</b></p> <ul style="list-style-type: none"> <li>• on the front pedestal side at longitudinal center line of TG set and</li> <li>• on the side facing control room at the center of sidewall, at suitable height.</li> </ul> <p><b>5.0 CONSTRUCTIONAL DETAILS :</b></p> <p>The acoustic enclosure is designed to be fixed on the concrete/operating floor. The Acoustic Enclosure basically consists of :</p> <ul style="list-style-type: none"> <li>• Base frame, supports and fasteners etc. for base frame.</li> <li>• Supporting structure</li> <li>• Acoustic panels</li> <li>• Ventilation System</li> <li>• Lighting</li> <li>• Control Panel</li> </ul> <p>All cables and fitting used within the system shall be FRLS (fire resistant low smoke) type. The sound absorbing material used should not impose any health hazard and shall be chemically inert particularly with oil.</p> <p><b>5.1 Base Frame :</b></p> <p>Base frame consisting of channel, angle or rectangular hollow sections shall be fixed on the turbine operating floor. All along the length it shall be isolated from the floor by appropriate elastic mounts/vibration damping material. The material of Base Frame shall conform to IS:2062; Grade B.</p>				
सामग्री सूची संख्या INVENTORY NO.	REV.03		निर्माणकर्ता WORKED BY	RITESH K	16.12.2009
P-6319			जांचकर्ता CHECKED BY	D.K. RAY	16.12.2009

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स्वाधिकार एवं गोपनीय

इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक  
SIGN & DATE

18/12/09

सामग्री सूची संख्या को  
अधिकारित करता है  
SUPERSEDES  
INVENTORY NO.

A bridge structure shall be made to clear the pipeline and support panels, wherever any pipe is coming out.

All the supports and fasteners for securing the base frame to floor are in the scope of acoustic enclosure vendor.

**5.2 Supporting Frame :**

Infrastructure for supporting acoustic panels, doors etc. will be called Supporting Frame and members shall be designed to facilitate dismantling of the pedestal covers. These parts should be accessible from top and no member of the supporting frame should be located directly above Bearing Pedestal Covers.

It must be possible to assemble the acoustic enclosure during initial stage of erection to form a self-supporting framework without need for elaborate erection aids. The material of Supporting Frame should conform to IS:2062; Grade B.

**5.3 Acoustic Panels :**

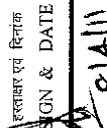
The walls and roof of acoustic enclosure shall be fabricated out of acoustic panels with suitable stiffeners of minimum 75 mm thickness having -


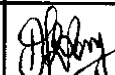
- Outer facing sheet of min. 1 mm thickness pre-coated sheet as per IS 14246.
- Inner perforated sheet of min. 1 mm thickness pre-coated sheet as per IS 14246 with > 30% open space. Opening in perforated sheets shall be 3 to 5 mm diameter.
- Sandwiched absorbing mineral wool (conforming to IS:8183) in between outside and inside facing sheets having a minimum density of 64 kg/m<sup>2</sup>.
- A glass fabric layer between mineral wool and inside perforated sheet.
- Proper adhesive sealing arrangement in-between the panels.




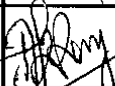
The acoustic material shall be adequately supported and be able to withstand vibration during turbine operation.

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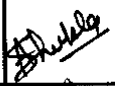

**स्वत्वाधिकार एवं गोपनीय**  
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दिनांक एवं हस्ताक्षर  
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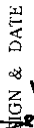
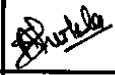

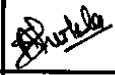

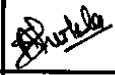

सामग्री सूची संख्या INVENTORY NO.	REV.03  Change in clause 5.3.	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>SUPERSEDES</b> </div>	निर्माणकर्ता WORKED BY	<b>AKASH S</b>		06.04.2011
P-6319			जांचकर्ता CHECKED BY	<b>D.K. RAY</b>		06.04.2011


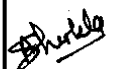

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सामग्री सूची संख्या को अधिकारित करता है SUPERSEDES INVENTORY NO.	<p>The acoustic panels shall be attached to the supporting frame structure by means of suitable fasteners preferably countersunk type. Acoustic panels should have large surface area and should be of uniform width and height as far as possible. All acoustic panels are arranged outside the supporting frame structure. The gap between two acoustic panels should not be more than 1.5 mm. Fitting design should be suitable for repeated assembly and disassembly.</p> <p><b>5.4 Windows and Glass Doors :</b></p> <p>Doors of ~900x2100 mm size shall be provided (refer clause – 4.13). Viewing windows consisting of non-tinted toughened float safety glass (TF) conforming to IS:2553 (Part-1) of nominal thickness 6 mm or above, size 600x600 mm shall be provided in all the doors.</p> <p>Doors in front of governing panels shall be of non-tinted toughened float safety glass (TF) conforming to IS:2553 (Part-1) of nominal thickness 12 mm or above in a suitable metallic frame.</p> <p><b>5.5 Ventilation System :</b></p> <p>Acoustic enclosure shall be designed with required number of exhaust silencers equipped with heavy-duty operation fans to take care of the air intake and exhaust. The fans shall be fire/explosion proof conforming to IS:13346/IEC60079-0. The expected heat load is given in Clause 4.6. The fans shall be of axial tubular type of reputed make e.g. Nadi, Alstom or equivalent.</p> <p>Ventilation system should incorporate suitable noise reduction measures (exhaust silencers - to contain noise level within specified limits) and sufficient number of air intake manifolds. The air intake manifolds should be located inside the acoustic enclosure.</p> <p><b>5.6 Lighting :</b></p> <p>Lights shall be installed inside the acoustic enclosure to provide sufficient illumination (300 LUX) for instrument reading and minor repairs. Provision of emergency lights suitable for 220 V DC supply should also be made to provide minimum 70 LUX illumination. Light fitting enclosures shall be suitable for IP55 protection class.</p> <p><b>5.7 Wiring :</b></p> <p>All wiring for lighting and ventilation system shall be done using galvanized iron conduits with receptacles, junction box etc.</p>			
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दिनांक एवं हस्ताक्षर SIGN & DATE 	18/12/09			
सामग्री सूची संख्या INVENTORY NO. P-6319	REV.03		निर्माणकर्ता WORKED BY <b>RITESH K</b> 	16.12.2009
			जांचकर्ता CHECKED BY <b>D.K. RAY</b> 	16.12.2009

दिनांक एवं हस्ताक्षर SIGN & DATE		<b>उत्पाद मानक</b>  <b>PRODUCT STANDARD</b>		<b>ST 35010</b>	
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सामग्री सूची संख्या को अधिकारिता प्रदान है SUPERSIDES INVENTORY NO.	<b>5.8 Control Panel :</b>  The control panel will be Floor mounted, cubical pattern, dust & vermin proof, totally enclosed and gasketed made out of 16 gauge CRCA sheet having the following provisions : <ul style="list-style-type: none"> <li>• Required nos. of FSU complete with HRC fuses</li> <li>• Single phase preventor and control fuses</li> <li>• Required nos. of fan control circuit with necessary switch, contactor, overload relay &amp; PB switches with indicating lamp.</li> <li>• Provision for group starting of fan motors, indication showing status of individual circuits.</li> <li>• Provision for auto-change over of emergency lighting system from AC to DC source in case of power failure.</li> <li>• Separate MCB to control outside light points</li> <li>• The panel shall be complete with all internal wiring, connection and termination provision for incoming and outgoing cables including proper earthing provision &amp; other safety requirements.</li> </ul>				
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	स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	<b>6.1 A-weighted overall sound pressure levels or octave-band data at specified positions, such as</b> <ul style="list-style-type: none"> <li>• at 1 m distance from the acoustic enclosure,</li> <li>• averaged over an enveloping surface,</li> <li>• at a work station,</li> <li>• inside the enclosure,</li> <li>• at a specified reference point in the neighbourhood</li> </ul>			
दिनांक एवं हस्ताक्षर SIGN & DATE	<b>6.2 A-weighted overall sound pressure levels and octave-band data of sound Emission from the acoustic enclosure and enclosed noise source.</b>  Octave-band data of the sound emission from the acoustic enclosure or the sound source to be enclosed are preferred.				
सामग्री सूची संख्या INVENTORY NO.	REV.03		निर्माणकर्ता WORKED BY	RITESH K	16.12.2009
P-6319			जांचकर्ता CHECKED BY	D.K. RAY	16.12.2009

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शीर्षकी सूची संख्या को अधिकारित करता है SUPERSEDES INVENTORY NO.	<b>7.0 REFERENCE TO STANDARDS :</b>  Latest revisions of the following codes shall be used for the design of acoustic enclosure :  ISO/FDIS 15667 : Acoustics – Guidelines for noise control by enclosures and cabins; and VDI guidelines for the design of intake & exhaust system.				
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<b>8.0 INSPECTION AND QUALITY PLAN :</b>  The vendor shall submit Quality Plan separately for inspection to be carried out during procurement and shop working/fabrication, prior to receipt of items at site, and for inspection to be carried out at site during receipt at site, storage, pre-erection, erection and post-erection activities.  All material procured shall be identified and co-related to vendor's material certificates. These material certificates would be reviewed and checked for conformance to relevant specifications by BHEL. Dimensional measurement and visual inspection shall be carried out on materials by BHEL to check for defects/damages.  Painting thickness shall be checked as per specification/drawing.  Vendor will carry out all tests/inspection required to ensure that all materials procured conforms to the requirement of this specification. The inspection check list/quality plan shall be reviewed by BHEL and shall be approved subsequently. BHEL may identify customer hold points, to be witnessed by BHEL/customer's representative on inspection check list/quality plan. Vendor shall give inspection call well in advance (15 days) to enable BHEL to depute their inspector for the same.				
<b>स्वत्वाधिकार एवं गोपनीय</b> इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	<b>9.0 PAINTING &amp; CONSERVATION :</b>  The acoustic enclosure will be painted with full/half gloss polyurethane paint. Alternatively, powder coating or panels fabricated from pre-powder coated sheets are also acceptable.  <b>Shade of paint shall be 217 (Sea Green) conforming to IS:5 unless otherwise specified in enquiry/purchase order.</b>				
दिनांक एवं हस्ताक्षर SIGN & DATE 12/11/08					
शीर्षकी सूची संख्या INVENTORY NO. P-6319	REV. 03.		निर्माणकर्ता WORKED BY <b>AKASH S</b>		23.09.2008
			जांचकर्ता CHECKED BY <b>D.K. RAY</b>		23.09.2008

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सामग्री सूची संख्या को संश्लेषित करें। SUPERSEDES INVENTORY NO.	<p><b>9.1 Full/Half Gloss Polyurethane Paint :</b></p> <p>a. Prior to application of paint, surfaces to be painted shall be cleaned/prepared for painting as per IS:8629 - part 2.</p> <p>b. Two coats of epoxy based zinc rich primer paint (IS:14589) shall be applied (dry film thickness - 35 + 35 µm)</p> <p>c. One coat of high build intermediate epoxy paint [BHEL specification AA56112, equivalent Epilux 4 HB Epoxy Coating (Berger Paints) or Epilac HB Epoxy Paint (Jenson &amp; Nicholson paints)] shall be applied thereafter (dry film thickness - 70 µm).</p> <p>d. Two finishing coats of full gloss polyurethane finishing paint (IS:13213) shall be applied (dry film thickness - 30 + 30 µm). The shade of the paint shall be intimated after placement of order.</p> <p>e. The total thickness of paint shall not be less than 200 µm.</p> <p>f. If paint is damaged/scratched during shipment, one coat of "full gloss polyurethane finishing paint" (IS:13213) shall be applied at site (dry film thickness - 30 µm).</p> <p>The primer paint, intermediate epoxy paint and finishing paint should be of same make.</p>				
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<p><b>9.2 Powder Coating :</b></p> <p>Powder Coating process shall be preceded by phosphating as per IS:3618 – Class B (Medium Weight). Powder coating process shall be as per IS:13871 to achieve coating thickness 70 µm.</p> <p>Panels fabricated out of pre-coated sheets as above are acceptable provided no damage to coating is ensured in fabrication process.</p> <p><b>10.0 PRE-APPROVAL DOCUMENTS :</b></p> <p><b><i>Dimensions given in the drawing are clear inside dimensions of the acoustic enclosure.</i></b></p> <p>The vendor shall prepare the pre-approval documents based on this specification and the drawing furnished separately. Pre-approval documents consist of :</p>				
<b>स्वत्वधिकार एवं गोपनीय</b> इस दस्तावेज में कोई सूचना भारत के ही इलेक्ट्रिकल्स की संपत्ति है इसका प्रचार एवं आरक्षण रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।					
दिनांक SIGN & DATE 12/11/08					
सामग्री सूची संख्या INVENTORY NO. P-6319	REV.03		निर्माणकर्ता WORKED BY AKASH S		23.09.2008
			जांचकर्ता CHECKED BY D.K. RAY		23.09.2008

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शायदी सूची संख्या को अधिकारित करता है  SUPERSEDES INVENTORY NO.	a. GA drawing of Acoustic Enclosure with part list and total weight. b. GA drawing of control panel with control schematic and total power requirement. c. Base frame details. d. Supporting frame details. e. Acoustic panel details. f. Ventilation Calculations. g. Assembly plan h. Plan for the lighting installation inside the acoustic enclosure. i. Quality Plan  These pre-approval documents are required in triplicate.  <b>Approval of drawings and quality plan authorizes vendor to start manufacturing activity, but does not absolve the vendor from design/performance responsibility.</b> BHEL shall have right to pass on approved drawings/quality plan to BHEL'S customers/authorized inspection agency.  <b>Vendor should visit the respective sites to discuss with BHEL representatives /customers to finalise the layout, locations &amp; sizes &amp; number of doors, approach platforms, ladders and general erection suiting to actual site requirements before start of fabrication of enclosure.</b>  <b>Vendor may give a call to BHEL for a joint visit to sites, if required.</b>										
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<b>स्वत्वाधिकार एवं गोपनीय</b> इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में होना चाहिए ही न किया जाए।											
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शायदी सूची संख्या INVENTORY NO. P-6319	REV. 03		<table border="1"> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>AKASH S</td> <td></td> <td>23.09.2008</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>D.K. RAY</td> <td></td> <td>23.09.2008</td> </tr> </table>	निर्माणकर्ता WORKED BY	AKASH S		23.09.2008	जांचकर्ता CHECKED BY	D.K. RAY		23.09.2008
निर्माणकर्ता WORKED BY	AKASH S		23.09.2008								
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शपथी सूची संख्या को SUPERSEDES INVENTORY NO.	<p><b>11.0 FINAL DOCUMENTS :</b></p> <p><b>11.1</b> 22 copies (20 for customer and 2 for STE, BHEL, Haridwar) of Operation and Maintenance manuals consisting of installation &amp; assembly/disassembly instructions/ procedure, GA drawing of Acoustic Enclosure with part list, GA drawing of control panel with control schematic, Assembly plan, plan for the lighting installation inside the acoustic enclosure shall be supplied by the vendor.</p> <p><b>11.2</b> 5 copies of following certificates to QAX, BHEL, Haridwar :</p> <p>a. Material test certificates of sheet and mineral wool.</p> <p>b. Dimensional report</p> <p>c. Visual and painting report</p> <p><b>11.3</b> 5 copies of performance test report to QAX, BHEL, Haridwar.</p> <p><b>12.0 PACKING AND CONSERVATION :</b></p> <p>All the items shall be conserved and packed to avoid damage during shipment and handling.</p> <p>If paint is damaged/scratched during shipment, one coat of "full gloss polyurethane finishing paint" (IS:13213) shall be applied at site (dry film thickness - 30 µm).</p> <p><b>13.0 CROSS-REFERRED STANDARDS :</b></p> <ul style="list-style-type: none"> <li>• ISO/FDIS 15667</li> <li>• ISO 11546-2</li> <li>• IEC60079-0</li> <li>• IS:5</li> <li>• IS:2062</li> <li>• IS:513</li> <li>• IS:227</li> <li>• IS:8183</li> <li>• IS:3618</li> <li>• IS:13213</li> <li>• IS:8629</li> <li>• IS:14589</li> <li>• IS: 2553 (Part-1)</li> <li>• IS:13871</li> <li>• IS:13346</li> <li>• AA56112</li> </ul>				
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