

PURCHASE SPECIFICATIONS

FOR

ACOUSTIC ENCLOSURE FOR OIL RIG POWER PACK WITH CAT 3512B ENGINE

FOR

OIL RIG APPLICATIONS



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PREPARED BY

CHECKED BY

APPROVED BY

PRAVEEN SHAH
Sr. ENGINEER (D) CEE

RAKESH VISHNOI
DGM (D) OFE

D. SARMA
AGM (D) CEE

ISSUED BY

**OIL FIELD ENGINEERING DIVISION
BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL**

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1. INTRODUCTION:

Cap on type acoustic enclosure (referred as "**Enclosure**" hereafter) is required for BHEL make Oil Rig Power Pack comprising of M/s Caterpillar Make 3512B engine & BHEL make alternator OA 7002/7001 or equivalent alternator of other make. The enclosure shall be designed for providing minimum 25 dB(A) insertion loss. The measurement of insertion loss shall be carried out at different points at 0.5 m from the acoustic enclosure, and then averaged (refer Para 2.2 of CPCB norm mentioned below). The base frame of enclosure shall be installed on BHEL master skid by welding & other parts will be installed on base frame by fastening hardware.

The enclosure shall be designed to meet & exceed CPCB (Central Pollution Control Board/ Ministry of Environment & Forest/ Government of India) norm attached here as **Annx: 1**:-

"ENVIRONMENTAL STANDARD- GENERATOR SETS- DIESEL GENERATOR SETS -

NOISE LIMIT FOR GENERATOR SETS RUN WITH DIESEL-

PARA-2: NOISE LIMIT FOR DG SET NOT COVERED BY PARAGRAPH 1- CL. 2.2.*

Supplier shall also get performance of enclosure certified for minimum 25 dB(A) insertion loss through type test at ultimate customer site as covered in this specification, by " one of the authorized agency, as per para 3.6 of above norm: *AUTHORISED AGENCIES FOR CERTIFICATION*" or " One of the recognized laboratory/ institute and their analyst recognized by MOEF (Ministry of Environment & Forest/ Government of India) vide notification SO 1174 (E) dated 18/07/2007 and subsequent amendment to this notification as published in Gazette of India".

The agency engaged for type testing shall be hereafter referred to as "**Testing agency**".

For testing of acoustic enclosure with noise limit the procedure followed shall be as per CPCB norm, attached here as **Annx: 2** :-

"ENVIRONMENTAL STANDARD- GENERATOR SET- SYSTEM & PROCEDURE - SYSTEM & PROCEDURE FOR COMPLIANCE WITH NOISE LIMITS FOR DIESEL GENERATOR SETS (UPTO 1000 KVA), EFFECTIVE FROM 15 JANUARY 2008 - PART III-

TEST EQUIPMENT & PROCEDURE".

Details of material & services in supplier's scope are furnished in para-2. Sound emission data for specified engine and other technical parameter as required shall have to be arranged by the bidder from M/s Caterpillar or any authentic source. BHEL does not take any responsibility for providing these parameters. Party shall specifically confirm in their techno- commercial bid that they have required engine's technical parameters available with them for taking up the project.

*Para 1 stands for small DG sets of upto1000 KVA rating

2. SCOPE OF SUPPLY:

2.1 MATERIAL :

1. Cap on acoustic enclosure (Enclosure) with 25 dB (A) minimum insertion loss for installation over BHEL master skid by welding of base frame & fastening of panel.
2. Roof Mounted Detachable muffler stands with muffler wrapping arrangement & Support for exhaust stack.
3. Loose items such as touch up paint & primer required for rectification of job for good aesthetics, Silicon sealant & other loose items as per technical specification (clause 19.43).

2.2 SERVICES AT BHEL BHOPAL FOR FIRST ACOUSTIC ENCLOSURE:

The supplier shall get first enclosure, to be supplied against this enquiry & subsequent PO, assembled with BHEL master skid in BHEL premises. The scope of service for supplier for installation of first enclosure shall be as under:

1. Mobilisation of their team for assembly as per this specification.
2. Welding/ Assembly of supplier's base frame of acoustic enclosure on BHEL master skid.
3. Bolting of acoustic panels including roof above base frame.
4. Supervision of installation of Exhaust stacks assembly measuring approximately 7.7 m above ground level on acoustic enclosure.
5. Assembly time for acoustic enclosure by the supplier shall not be more than 2 (two) weeks. During assembly of first acoustic enclosure assembly shall be closely monitored by BHEL. In case any mismatch of component or difficulty during assembly shall be brought into notice of supplier. The supplier shall promptly supply rectified components and complete the assembly of acoustic enclosure, within three week of information regarding rectification if required by BHEL.
6. Touching and painting of job for proper aesthetics prior to dispatch from BHEL.
7. On completion of installation by supplier, the supplier shall issue a certificate. This will be countersigned by BHEL. The same shall be submitted by supplier for release of payment against installation.

2.3 SERVICES AT BHEL BHOPAL FOR SUBSEQUENT ACOUSTIC ENCLOSURE:

1. Second set onwards shall be supplied with components duly modified ,in manufacturer's plant itself, with modification if any required as per point 5 above, based on experienced gained assembly of first set. Such modification shall not have any cost repercussion to BHEL.

2. Welding of base frame and assembly of acoustic enclosure as covered in point 2- 6 above.
3. On completion of installation by supplier, the supplier shall issue a certificate. This will be countersigned by BHEL. The same shall be submitted by supplier for release of payment against installation.

Tool set & special tools as required for installation for activities covered in clause 2.2 & 2.3 shall be arranged by supplier on returnable basis. The following items are not in the scope of supplier (and are in BHEL scope):

1. Well glass fittings (Light Fittings).
2. Cable & PVC Conduit for well glass fitting however hollow metallic tube/ conduit required for wire routing/ laying of cable conduit shall be provided by supplier in acoustic enclosure.
3. Arrangement of crane, welding set, welding machine, water & electricity for general purpose shall be in BHEL scope. However material handling shall be done by supplier.

2.4 SERVICES AT SITE FOR PRFORMACE TESTING OF ACOUSTIC ENCLOSURE:

The supplier shall get enclosures, to be supplied type tested at site against this enquiry & subsequent PO, at ultimate customer's site for insertion loss & temperature rise. The scope of service for supplier for & certification of enclosure shall be as under:

1. Co-ordination and engaging testing agency as per this specification, for testing and certification of meeting insertion loss of minimum 25 dB(A) as per CPCB norm for acoustic level.
2. Inspection of customer's site before testing for familiarization & fulfilling prerequisite prior to tests, measurement of acoustic level of DG set, with BHEL Bhopal engineers, prior to calling the testing agency.
3. Temperature rise test to prove meeting cl. 2.2 of Annx. II (Max 7⁰ C rise). Clarified that this tests shall be done by supplier's & BHEL engineers and involvement of testing agency is not necessary for the same. Results shall be duly submitted to BHEL.
4. Engaging testing agency and facilitating testing of DG set sound level by testing agency for measurement & recording of insertion loss.
5. Co-ordination with testing agency for testing at site. Facilitating test of DG Set with acoustic enclosure by the testing agency and demonstration to testing agency as required. (Refer clause 14: Methodology of Project Execution).
6. Co-ordination with testing agency for getting performance of acoustic enclosure certified for minimum 25 dB (A) insertion loss by testing agency.
7. Rectification of acoustic enclosure components as required to achieving minimum 25 dB (A) insertion loss and maximum allowable temperature rise. Any such rectification shall be carried out by the supplier at site, without any extra cost to BHEL. Such

- rectification if required shall have to be completed within three weeks of its identification.
8. Scope of supplier towards services required for testing of performance of Acoustic enclosure shall deemed to have been completed on issue of certificate by testing agency regarding meeting desired performance level of minimum 25 dB (A) insertion loss, obtaining satisfactory result for temperature rise test as per point No. 3 above and completion of all modification required to achieve the same in all the acoustic enclosures covered under this PO.
 9. Testing equipment/s for internal test prior to calling testing agency shall be in supplier's scope and the same shall be brought in site on returnable basis, without any cost repercussion to BHEL. Calibration certificate of instrument shall be furnished by supplier. Testing agency shall bring their own testing equipment on returnable basis without any cost repercussion to BHEL.
 10. Regarding performance testing BHEL scope shall be limited to Installation assembly & alignment of engine, alternator & radiator; providing load during performance test; fuel, lube oil , lube, coolant required for engine operation shall be arranged by BHEL. In case maximum/ specified load is not available test shall be conducted at available load at site. If any special tool/ facility/ incidental support is required by testing agency the same shall be in the scope of supplier.

NOTE:

- (i) Notwithstanding anything mentioned either in this specification or any future drawing approval or MOM or inspection or correspondence by BHEL, ensuring safety, ergonomic, adequate safe working space for operation & maintenance, maintaining good aesthetic and use of sound engineering practices, compliance with CPCB and other applicable norms and proper integration of various assemblies, irrespective of whether the same is explicitly mentioned in specification or not is sole responsibility of supplier, and shall have to taken care by supplier only, during all stage including design, drawing, submission & approval, manufacturing, packing, transportation, installation, testing & commissioning. BHEL can not be held responsible if these aspects are violated by virtue of any approval, MOM, correspondence or approval by BHEL.
- (ii) M/s ONGC is the ultimate customer for the items covered in this specification, and therefore referred to in this specification, wherever necessary. Site (Wherever mentioned) shall be considered as ONGC Rajamundry.

3. DELIVERY:

Delivery of material as per our enquiry. Ex- works delivery date shall be considered for LD purpose. Two week period for drawing submission and approval and eight week's period for supply is considered.

Two weeks period is considered for assembly of acoustic enclosure at BHEL Bhopal from the date of BHEL call and three weeks period is considered for type testing at customer site.

It is envisaged that second lot shall be delivered after incorporation of necessary modifications, if any, based on experience gained during testing of first lot. However supplier may choose to carry out these modifications at BHEL. All material, manpower and services for such modification shall be in supplier's scope.

4. **OFFER & PRICES:**

Offer shall be given in two bid system.

1. - **Techno Commercial Bid.**
2. - **Price Bid.**

BHEL standard purchase procedure shall be applicable for tendering system.

1. **Techno Commercial Bid:**

The techno commercial bid shall contain all details but with price columns of the price bid format blanked out. However a tick (√) mark shall be provided against each item of price bid format to indicate that there is a quote against this item in the price bid.

2. **PRICE BID:**

Price bid should be submitted in a separate sealed envelope shall contain price duly filled in for item as mentioned below 4.2(a), (b), (c) & (d). Prices as per 4.2(a), (b) & (c) shall be considered for bid evaluation. Price as per clause 4.2(d) is for reference only.

Separate prices should be quoted against following head:-

- (a) Unit price of enclosure & and price for quantity as per enquiry: The unit price of enclosure shall include all accessories and loose items supplied/ per unit of enclosure including silicon sealant, muffler support, stack support, hardware required, paint for final finish / touching, radiator & exhaust cap etc.
- (b) Unit price (lump sum) & price for total quantity, as per enquiry: For installation of acoustic enclosure at BHEL Bhopal as per cl. 2.2 & 2.3.
- (c) Lump sum charges for testing, type approval & certification by testing agency for one set as per para 2.4 – one unit only.
- (d) Supplier to separately indicate per day charges of service engineer for reference for any future requirement beyond warranty. This will not be considered for evaluation of bid.

Note:

- (1) No separate charges are payable for any co-ordination activity by supplier for co-ordination with testing agency. All payment (Including their testing fees, documentation charges if any and expenses towards air/ train fare, travelling, lodging, daily expenses, incidental expenses & any other expenses) to testing agency shall be made by supplier & shall be considered in their offer under head 4.2 (c) above.

- (2) No separate charges shall be payable for supplier's visit to BHEL Bhopal / site for any other purpose. In case the testing agency/ies are required to be called for more than once charges and expenditure towards the same shall be borne by supplier only.
- (3) No separate packing, handling or forwarding charges shall be payable.
- (4) Due to compatibility reasons all items covered in this PI shall be sourced from one source.

5. TERMS OF PAYMENT:

1. BHEL standard condition for payment is on receipt and acceptance of material and 90 days after dispatch. Any deviation from above shall attract applicable loading/s for purpose of comparison of bids. Lowest bidder (L1) shall be decided on the basis of total (including landed cost) cost to BHEL and with applicable loading.
2. Release of Payment:
 - A. For material: 90% payment as above (clause 5.1). Along with material supplier shall submit TC and certificate that acoustic enclosure is designed for insertion loss of minimum 25 dB(A) for DG Set with CAT 3512B Engine & BHEL make alternator OA 7002/7001 or equivalent alternator of other make.
 - B. For services: 100% payment for activities completed as under:
 - (i) Installation Charges: Duly countersigned installation report by BHEL as per clause 2.2 (7) & 2.3(3).
 - (ii) Type Test and Certification charges : against duly countersigned signed Test report by Testing agency as per clause 2.4 (6) and temperature rise test as per clause 2.4(3) for one Set
 - C. Remaining 10% for material: After successful type test for one set as above and testing for randomly selected sets (if so desired by BHEL) for any set/s and on submission of PBG as per clause 16.
 - D. No advance payment shall be made.

6. SUBMISSION OF DRAWINGS WITH OFFER:

As required in clause 7A (i), along-with offer the supplier shall submit OGA drawing of enclosure with CG & weight, muffler exhaust extension piping with all supporting structure. Supplier shall also submit indicative drawings of assembled DG set comprising of Diesel Engine, Alternators & Radiator. With CG & weight. Drawing should also show the position of:

1. Baffles
2. Louvers
3. Doors.
4. Glass Windows
5. Exhaust Cut out & exhaust mounting arrangement.
6. Radiator Water filling hole cutout
7. Muffler, Exhaust Pipe/s & Exhaust stand location
8. DG Set with radiator & Exhaust piping till muffler

9. Muffler & it's mounting stand
10. Exhaust mounting support

7. DOCUMENT, MAUNUALS, DRAWING & SCHEDULE OF SUBMISSION:

(A) To be submitted with offer:-

SL. NO.	TYPE OF DOCUMENT	QTY.	TIME SCHEDULE	REMARKS
(A) Along with bid				
1.	OGA drawing of Acoustic Enclosure, with location of engine, alternator & muffler with proposed exhaust arrangement, refer clause 6.	02*	Along with bid	
2.	Reference of Acoustic Enclosure supplied for OIL Rig Main Power Packs (=>1215 KVA DG set)– min 03 numbers in last 5 (Five) years (Refer Cl. 23 (A))	02*	Along with bid	
3.	Technical write up & literature	01*	Along with bid	
4.	Filled up matrix of BEC as per clause-8	02	Along with bid	
5.	Technical details as per annexure-4	02*	Along with bid	
6.	Methodology of getting approval stamping and project execution	01	Along with bid	
7.	Consent from testing agency for conducting testing at customer premises for insertion loss and furnish approval for performance duly stamped with reference of BHEL drawing.	01	Along with bid	
8.	Declaration that the supplier shall co-ordinate with testing agency and demonstrate performance to testing agency for approval	01	Along with bid	
9.	Preparedness required from BHEL side supplier has to take care and inform clearly that what facility, material, tools etc. they will need from BHEL sides, BHEL shall scrutinize this and reply to supplier as per feasibility. Anything not covered here shall be in supplier's scope.	01	Along with bid	
10	Declaration that Supplier has all Technical parameters of the engine & accessories for project execution	01	Along with bid	
11	CNC Facility details as per cl. 23(ii)	01	Along with bid	

SL. NO.	TYPE OF DOCUMENT	QTY.	TIME SCHEDULE	REMARKS
(B) Within 1 weeks from LOI				
1.	Detailed OGA drawing of Acoustic Enclosure, with location of engine, alternator & muffler with proposed exhaust arrangement.	02*	Within1 week from LOI/ PO whichever is early	For approval
2.	Assembly Drawings	02*	Within1 week from LOI/ PO whichever is early	For approval
3.	Thickness & material used for enclosure & other items	02*	Within1 week from LOI/ PO whichever is early	For approval
4.	Technical data sheet showing sound level at different location.	02*	Within1 week from LOI/ PO whichever is early	For approval
5.	QA plan & test procedure	02*	Within 2 week from LOI/ PO whichever is early	For approval
6.	Manufacturing schedule.	02	Within 2 week from LOI/ PO whichever is early	For approval
7.	BOM for one set of material	02*	Within1 week from LOI/ PO whichever is early	For approval
8.	Exploded View of acoustic Enclosure	02*	Within1 week from LOI/ PO whichever is early	For approval
9.	Type Test Procedure	02*	Within1 week from LOI/ PO whichever is early	For approval
(C) ALONG-WITH SUPPLY				
1	TC and certificate that acoustic enclosure is designed for insertion loss of minimum 25 dB(A) for DG Set with CAT 3512B Engine & BHEL make alternator OA 7002/7001 or	02*	Final documents along with consignment	As part of final documentation .

SL. NO.	TYPE OF DOCUMENT	QTY.	TIME SCHEDULE	REMARKS
	equivalent alternator of other make			
2.	Detailed drawing of enclosure and all other components	02*	Final documents along with consignment	As part of final documentation .
3.	Technical manual/ Write Up	02*	Final documents along with consignment	As part of final documentation .
4.	Parts list with catalogue nos.	02*	Final documents along with consignment	As part of final documentation
5.	Exploded View of acoustic Enclosure	02*	Final documents along with consignment	As part of final documentation
(D) AFTER PERFORMANCE TESTING & INSTALLATION				
1.	Signed Installation report for acoustic enclosure. This will be duly countersigned by BHEL.	01	After installation	
2.	For One DG set-Test Report confirming min 25 dB(A) insertion loss duly countersigned by testing agency with reference to BHEL drawings for Power pack (Oil Rig DG set)	01	After successful testing of the first set by testing agency	To be submitted to BHEL
3.	Temperature rise test Report for one DG Set.	01	After successful temperature rise test.	To be submitted to BHEL
4.	As built drawings	02*	After successful testing.	If changes have been done during testing

For documents with (*) sign above, soft copy in PDF / AutoCad is also to be submitted. Documents as per 7 (A) above shall be submitted along-with bid. Technical documents, as covered in 7(B), 7(C) & 7(D), thereafter shall be directly dispatched to:-

AGM (CEE)
Block III, Western annexe
Gr. Floor
BHEL Bhopal
Piplani, Bhopal (MP)
India 462022.

NOTE:

1. Drawing shall be in A4 to A1 size and shall be signed by competent authority. Standard drawing practice shall be used. All drawing shall bear BHEL PO Number. All revisions should be duly recorded and numbered and dated chronologically, maintaining original drawing number. All parts shall have unique P/N (Part Number). All fabricated part shall have unique P/N as well as drawing number. Bill of material shall contain P/N for all parts, and P/N & drawing No. for all fabricated parts along with other details.
2. The SUPPLIER shall be responsible for any loss to the BHEL consequent to the furnishing of the incorrect data/drawings.
3. Specification, design and drawing issued by BHEL to the SUPPLIER along with tender specification and ORDER are not to be sold or given on loan to any third party. These documents continue to remain property of BHEL OR THEIR ASSIGNEE AND ARE SUBJECT TO RECALL BY BHEL. The SUPPLIER and its employees shall not make use of the drawings, specification and technical information for any purpose at any time and shall not disclose the same to any person, firm or corporate authorities, without written permission of BHEL. All such details shall be kept confidential from outside party including the ultimate customer.

8. MATRIX OF BEC (BID EVALUATION CRITERIA):

Supplier shall furnish clause wise reply to this enquiry. Bid should be complete in all respects covering entire scope of job / supply and should confirm to the technical specification furnished in our specification, duly supported with technical catalogues / literature. Incomplete and non-confirming bids will be rejected.

Bidder shall submit completely filled up matrix of BEC (Bid Evaluation Criteria) provided as per **Annex.3** for evaluation of offer at our end. BEC should be submitted along with the techno commercial offer.

9. ALL CORRESPONDENCE TO BE ADDRESSED TO :

Ms. Shalini Sharma
Dy. Manager (MM) SCR
BLOCK IV ANNEXE
BHEL, BHOPAL-462021
Tel. No.: 0091-755-2505676
Fax no. :0091-755-2500513
shalini@bhelpl.co.in
& copy to: rshingwekar@bhelbpl.co.in

10. DRAWING / DOCUMENT APPROVAL:

- (i) Supplier to submit documents as mentioned in para 7B above, within one week after receipt of LOI / PO whichever is earlier.
- (ii) Within one weeks of receipt of LOI / PO supplier shall depute their engineer along with document as per Para 7B. BHEL will provisionally approve / give their

suggestion for improvements and comments (if any) within two days of receipt of drawings and based on discussion with suppliers engineer. Final approval shall be furnished only after verification of assembled job.

- (iii) Manufacturing schedule shall be furnished by supplier so that BHEL / ultimate customer can optionally make any visit to the supplier/s manufacturing plant during engineering and manufacturing.
- (iv) Supplier to note that design, erection / installation, testing and successful performance demonstration to testing agency of enclosure is sole responsibility of supplier. Supplier has to ensure good aesthetic, ergonomics sound, engineering practices, good workmanship & proper finish. During approval BHEL shall only scrutinize and suggest improvement, if any required in supplier's drawing. Approval or inspection by BHEL shall not absolve the supplier in any manner from their responsibility of fulfilling requirements of this specification, meeting statutory norms, complying law of the land, ensuring safety of equipment and personnel and various others aspects mentioned above.

11. PROGRESS REPORTS:

Regular progress report on design, manufacturing and supply shall be sent to BHEL by supplier on fortnight basis in form of PERT / bar chart. As detailed in clause 14 the supplier shall keep BHEL informed regarding their communication/ correspondence with testing agency for engaging the same.

12. ACCEPTANCE INSPECTION AT SUPPLIER'S WORK & INSPECTION ON RECEIPT AT BHEL:

A. QA PLAN SUBMISSION & APPROVAL:

Bidder shall submit QA plan for acceptance inspection, within two weeks of LOI / PO. QA plan shall be as per supplier's standard but covering following minimum tests:

1. Dimensional checks of all parts.
2. Square-ness & flatness of important components and finished job.
3. Compatibility/Matching of part
4. Welding quality
5. Thickness of sound absorbing material.
6. TC/ Proof of procurement of specified sound absorbing material.
7. Aesthetic aspects.
8. List of items covered under stage inspection.
9. Paint quality.

QA plan shall have test procedure & reference standards, recording format and limiting values. QA plan submitted for approval shall be reviewed by BHEL .Incase any modification is desired by BHEL the same shall be included by supplier and QA plan shall be approved by BHEL.

B. STAGE INSPECTION:

Bidder should have the required facilities for testing of quoted equipment / material as per international standards at their premises. As the job involves intensive fabrication BHEL shall

depute their engineers to supplier premises for stage / final inspection as and when required and deemed necessary by BHEL. BHEL and / or ultimate customers can make visit as and when required to supplier's plant to monitor the progress and quality and give suggestion for improvement. It is supplier's responsibility to provide unhindered access to the job, ensure presence of their engineers and workers as required and attend to BHEL queries & suggestion.

C. STAGE INSPECTION OF THE FIRST ENCLOSURE:

BHEL shall be closely associated during manufacturing, assembly and inspection of first acoustic enclosure. The supplier shall offer each and every component for stage inspection in black (unpainted) condition for inspection and quality checks to BHEL inspector posted at supplier's works. Dimension, welding quality and quality aspects shall be checked by BHEL inspector and the observation shall be given. These observations shall be discussed with supplier's engineer and shall be adopted for future jobs as per mutual agreement recorded by BHEL & supplier. After clearance of components by BHEL the enclosure shall be completely assembled by the supplier in black (unpainted) condition without filling insulation. The assembled enclosure in black condition (prior to insulation filling) shall be inspected by BHEL. Observation of BHEL inspector including modification if any shall be incorporated by supplier and shall be complied in future jobs also. On clearance by BHEL the job shall be cleared for painting. After painting the (first) job shall be assembled once more for final inspection by BHEL as per approved QA plan.

It is envisaged that subsequent jobs shall not require such intensive inspection however based on experience of subsequent jobs and on discretion, BHEL may carry out inspection as deemed necessary by BHEL for the future jobs.

D. FINAL INSPECTION:

It is planned that final acceptance inspection of each enclosure shall be done in two stages:

1. Enclosure assembled in black condition before painting & insulation filling.
2. Each component separately after painting and before filling insulation.

Final acceptance test shall be carried out based on approved QA plan, duly approved by BHEL and as per observation during inspection of the first enclosure. The supplier shall provide 15 day's prior intimation to BHEL for inspection as above. Equipment offered for inspection must be complete with all sub assemblies and duly tested by suppliers. Prior to inspection the supplier shall make available to BHEL internal test reports & TC of BO items, drawing, acceptance inspection, relevant standards, approved drawings and documents etc.

Prior to taking up of surface preparation of 2nd and onwards job the first job must have been inspected and accepted by BHEL. After successful inspection / testing of material/s as per QA plan, a duly signed inspection and acceptance certificated shall be issued by supplier and counter signed by BHEL. All enclosures and material under this PO shall be subjected to inspection as above, before acceptance.

All reasonable facilities including measuring tools and equipments for testing and inspection shall be provided by supplier free of charge. If enclosure or any sub-assembly does not meet acceptance criteria it will be rejected. The same shall be rectified by supplier and fresh inspection call shall be given.

It is to be noted that inspection by BHEL / ultimate customers shall not be any way absolving suppliers of their warranty / performance / contractual obligations.

E. DEFICIENCIES & DEFECTIVE GOODS:

BHEL shall inspect the items after receipt of the same at works (BHEL Bhopal). Supplier may depute their representative, at their discretion during Inspection. However it will be the responsibility of the supplier to inform BHEL in advance if they would like to participate in material inspection and verification process. Should any deficiency or defect noticed in the goods during inspection the same shall be replaced by the supplier without any extra charge under no charge invoice. Any complaint in regard to the material will be notified to supplier who shall replace same promptly. The rejected/damaged material will have to be accepted back by the supplier who will bear it's to and fro freight also & the supplier will supply the items to BHEL, duly customs duty (if applicable) and all applicable taxes and duty & freight paid "on defective supply and/or un notified short shipments".

13. PACKING & FORWARDING:

Enclosure shall be suitably packed polythene wrapped to avoid transit damage and any water or dust ingress. Any touchup work required, scratches etc. taking place during transportation shall be repaired by supplier during erection & commissioning. Rectification on account of transit damage, improper packing shall be to supplier's account.

Loose items like muffler stand etc. shall be cardboard & polythene wrapped and packed in separate boxes. Each box shall have one packing list inside the box and another packing list pasted above the box.

Suppliers may on it own discretion opt for dispatching items in dismantled condition, to reduce volume or transit safety. In that case supplier shall provide detailed list of dispatchable units (items) and assembly on receipt at BHEL Bhopal/ erection site at no extra cost shall be responsibility of supplier.

14. METHODOLOGY OF PROJECT EXECUTION:

The job involves close co-ordination with supplier, testing agency, BHEL and ultimate customer. It is proposed to carry out the job in following steps (supplier to furnish their specific confirmation for the same):

1. Prior to submission of offer, supplier shall contact any of the testing agency and furnish a consent letter from testing agency that they shall conduct performance test for 1430 KVA DG Set acoustic enclosure at customer site and certify the same duly stamped for insertion loss having reference to BHEL drawings for performance of enclosure, on successful witnessing the test.
2. After receipt of order the supplier shall supply acoustic enclosure meeting requirements of this specification and install acoustic enclosure on it at BHEL Bhopal as covered in this specification.

3. BHEL shall dispatch the job (DG Housing with BHEL master skid & acoustic enclosure) to customer site and carry out installation of engine, alternator and radiator on the master skid and complete activities for start-up of DG Set.
4. The supplier shall contact the testing agency and complete necessary formalities for engaging the agency for testing at site. Such correspondence between supplier and testing agency may be marked to BHEL. All formalities for engaging testing agency must be completed by supplier one month prior to dispatch date of first acoustic enclosure from supplier's works. Fees of testing agency, their travel charges, lodging, boarding and other incidental expenses as required shall be borne by supplier. If during the first testing the job does not clear the required criteria of meeting 25 dB(A) insertion loss and if it is required to retest the job, all expenses of testing agency towards such visit and any subsequent visit till the job is actually cleared shall be borne by supplier and to be considered in their offer.
5. Based on BHEL communication supplier's engineer/s shall reach site. Temperature rise test shall be conducted by supplier in presence of BHEL engineer/s as per schedule provided by BHEL. Supplier's engineer shall also carry out necessary preparation prior to measurement of noise level by testing agency and to carry out internal tests/ measurement.
6. Acoustic levels testing shall be performed by supplier's engineers after installation of acoustic enclosure. Test instrument with calibration certificate shall be brought by supplier's engineers on returnable basis. In case of any problem or acoustic enclosure not able to render sufficient attenuation, modification as required shall be carried out by the supplier and the test shall be carried out again till satisfactory performance is achieved. During internal test if any panel is required to be changed to achieve desired sound attenuation the same shall be done by supplier such activity must be completed within 3 (Three) weeks of identification.
7. On successful completion of internal test and measurement, call shall be given by supplier to testing agency, under intimation to BHEL for measurement of noise of engine & alternator without acoustic enclosure. Supplier shall co-ordinate with testing agency to ensure prompt deputation. Co-ordination with testing agency and demonstration of sound level at various points shall be in the scope of supplier. Noise level shall be demonstrated by supplier and recorded by testing agency. The supplier shall be obliged to ensure that the testing agency reaches BHEL on pre-decided date.
8. On pre decided date the performance test of acoustic enclosure shall be witnessed by testing agency. Co-ordination with testing agency and demonstration of sound level at various points shall be in the scope of supplier. After successful demonstration of performance, necessary co-ordination with testing agency shall be done by supplier for obtaining duly stamped performance approval type test certificate by the testing agency. The certificate shall broadly have following details:

1. Make : BHEL
2. Model No. :
3. BHEL Drawing No. :
4. Engine Model Make & rating : ...
5. Alternator Model Make & rating : ...

6. Measured Insertion Loss of Acoustic Enclosure...
7. Signature & stamp of recognized analyst of Testing Agency

Certificate shall be on letterhead of testing agency and shall have other details as per CPCB/ MOEF/ Testing agency's standard procedure.

9. The pre-condition for PO subsequent to this enquiry is that certification for acoustic enclosure performance shall be in the name of BHEL and shall have reference to BHEL drawing only, without any reference to supplier's drawing or document/s. BHEL shall be sole beneficiary of certification and drawing stamping received from testing agency. BHEL shall have full commercial right for quoting approval and certification by testing agency and shall quote the same in all future / existing tenders as per BHEL discretion and sell the equipment with certification by CPCB/ MOEF authorized testing agency. Copyright and patent right of complete Power Pack/ it's housing and/ or it's parts including enclosure shall also be solely owned by BHEL.
10. For subsequent DG Sets, i.e. after successful type testing of one set by testing agency, the testing agency shall not be involved and testing shall be conducted by BHEL at BHEL discretion. In case of any problem or not achieving desired performance BHEL shall inform the supplier accordingly and the supplier shall be liable to attend the problem under warranty on no charge basis. For testing instrument for measurement shall be brought by the supplier on returnable basis.
12. Scope of BHEL will be limited to activities as mentioned above. All manpower for welding/ installation shall be in supplier's scope. If modification in the system (supplied by supplier) is envisaged for proper functioning supplier to carry out such modification(s) free of cost. All services and material for this purpose shall be rendered by supplier free of charge. Price shall remain firm irrespective of number of days required by supplier's representative for completion of job. In case supplier's engineers and workman are required to make more trips, it will be to supplier's account and BHEL shall not bear any cost to wards travel & services required during installation, testing and warranty.
13. The date of commissioning of acoustic enclosure will be the date of successful type test and issue of certificate by testing agency. In case, at the time of certification any particular enclosure is having problem, date of commissioning for such enclosure shall be considered that date, on which this particular enclosure is repaired by supplier. For remaining enclosures which are performing well at the time of certification, the date of commissioning shall be treated as date of certification.
14. In case the installation and testing/ commissioning is delayed on account of the SUPPLIER, the warranty period shall automatically get extended for the period of delay at no extra cost to BHEL, so that clear warranty of 12 months after commissioning is available. This shall be applicable to available warranty period after dispatch as well as after certification at ONGC site. In such situation based on BHEL communication, supplier shall be obliged to issue a written revised warranty certificate for warranty extension, as above.
15. **WARRANTY:**

All items supplied by supplier will have supplier's warranty. Suppliers shall fully warrant the products to be free from defects in material workmanship and design to comply with

specification and intended use. The supplier shall provide warranty for 12 months from the date of commissioning at rig site or 24 months from the date of dispatch from their works whichever is earlier. Date of start of warranty after commissioning shall be as per clause 14.13 & 14.14. Supplier shall be fully responsible for design, workmanship and functioning of equipment supplied, for warranty period. Any problem related to enclosure shall be referred to supplier. Diagnosis of symptom and identification of failure shall be done by supplier. Components to be replaced, it's packing, forwarding, freight, insurance etc. and service engineers visit for the same shall be to the supplier's account. Service for diagnosis and replacement shall be provided free of cost.

After installation and commissioning, if the supplied item/s under scope of supply are not operating as per specification during warranty period, the same shall be attended by the supplier free of charge and warranty period shall be extended accordingly.

If supplier has a design situation that require supplier service engineer to perform service, supplier warranty service rendered shall be at no charge to BHEL, with all travel expenses related to warranty service calls to supplier's account. If modification in enclosure or any other item under scope of supply is envisaged for proper functioning supplier to carry out such modification free of cost. All material and services including travel and deputation expenses of service engineer for this purpose shall be rendered by supplier free of cost.

A. COMMITMENT BY SUPPLIER:

1. The bidder shall give an undertaking that the provision for supplying spares and services of equipment for 15 years after supply will be continued. Thereafter in case of equipment (spares) going out of production, intimation shall be given 1 year in advance for ONE TIME purchase of spare parts.
2. The manufacturer shall give a commitment that the offered equipment is new and of first quality and recent manufacture.
3. The bidder shall also give a commitment that it will notify BHEL whenever there is technology/design up gradation takes place in their system in future, and furnish offer for up gradation to BHEL for their consideration.
4. In case any portion of installation & commissioning job is sublet, the contractual responsibility shall remain with the supplier. However supplier shall intimate full contact details of any subcontractor/s engaged by them during erection and commissioning.
5. Equipment or spare part thereof replaced shall have further warranty for a period of 12 months from the date of acceptance.
6. In case defect are of such nature that EQUIPMENT shall have to be taken to SUPPLIER's works for rectification etc., SUPPLIER shall take the EQUIPMENT at his costs after giving necessary undertaking or security as may be required by BHEL/ ONGC. BHEL/ ONGC shall, if so required by the SUPPLIER, dispatch the EQUIPMENT by quickest mode on "Freight-to-pay" basis to the SUPPLIER's works. After repairs SUPPLIER shall deliver the EQUIPMENT AT SITE on freight per-paid basis. All risks in transit to and fro and all expenses on account of to and fro freight, insurance, customs clearance, transportation and handling, port charges and custom duty etc. shall be borne by SUPPLIER.

7. Damage to the machinery and/or EQUIPMENT due to incomplete and erroneous instructions issued by SUPPLIER will be the responsibility of the SUPPLIER and will be treated according to the provisions of warranty clause. Normal wear & tear shall not come under purview of this clause.
8. If the repairs, replacement or modification referred are of such nature as may affect the efficiency of the equipment, BHEL shall have the right to give to the SUPPLIER within one month of such replacement/renewal, notice in writing to carry out test as may be required for acceptance of the equipment.
9. If the SUPPLIER fails to honor his obligation to repair or replace defective goods within a reasonable period of time, if SUPPLIER refuses to carry out work under the warranty conditions, if danger is anticipated or in case of severe urgency, BHEL shall be entitled to carry out, at SUPPLIER's cost and risk, repair work or replacement deliveries or have it done by a third party. In case SUPPLIER has delivered not all goods, BHEL is entitled to procure the remaining goods at SUPPLIER's cost and risk. This does not relieve SUPPLIER of any of his warranty/ guarantee obligations. Taxes and duties of any kind whatever imposed by the authorities of the country of the SUPPLIER or his sub-contractors for delivery shall be borne by SUPPLIER.
10. If the supplier fails to take proper corrective action to repair/replace defects satisfactorily within a reasonable period BHEL shall be free to take such corrective action as may be deemed necessary at supplier 's risk and cost after giving notice to the SUPPLIER.

16. **BANK GUARANTY:**

Supplier will furnish a Performance Bank Guarantee of 7.5% of the PO value with validity up to 3 month beyond warranty, along with 90% invoice. The term warranty is explained in clause no. 14 & 15, above. The Performance Bank Guarantee will cover all the items and terms in the P.O.

Bank Guarantee format will be provided by BHEL Bhopal.

17. **INDEMNITY / LIABILITY:**

During the performance of PO/ contract (entered into by BHEL & Supplier, consequent to this enquiry), the indemnity obligations of the supplier shall apply in events to any geographic location where the contract shall be executed/ performed by supplier, or following the Delivery Date, where Equipment is being used by or for the benefit of BHEL.

The supplier shall agree to defend, protect, release, indemnify, and hold BHEL Group (BHEL, M/s ONGCL, their employee, subcontractors or its employee/ contract worker) harmless from and against all Claims arising in favor of supplier Group that are asserted for personal injury, death, or loss of or damage to any property arising out of, resulting from or relating in any way to PO/ contract regardless of whether BHEL or others may be wholly, concurrently, or solely negligent or otherwise at fault, and regardless of any defect in premises, Equipment or material, irrespective of whether preexisting at execution of the contract/ PO.

18. APPLICABLE STANDARDS:

The enclosure & accessories covered by this specification shall be designed, manufactured and tested in accordance with latest relevant applicable standards and codes & practices published by Bureau of Indian Standards (BIS), CPCB norms, British Standards, IEC & ISO Standards, as furnished below :-

- | | | | |
|----|---------------------------------|---|--|
| 1 | CPCB Norms | : | “Noise limit for generator set run with diesel”. |
| 2 | CPCB Norms | : | System & procedure for compliance with noise limit for diesel generator set (up to 1000 KVA) – effective from 15/01/2008 – Part- III “Test Equipment Procedure”. |
| 3 | ISO 8525 (Part 10) | : | Reciprocating internal combustion engine driven alternating current generating sets -- Part 10: Measurement of airborne noise by the enveloping surface method. |
| 4 | IS 8183 : 1993 | | Bonded mineral wool |
| 5 | IS 7885 | : | Method of test for flexible polyurethane foam. |
| 6 | IS 8923, 1978 (reaffirmed 2000) | : | Warning symbol for dangerous label. |
| 7 | IS 3043, 1987 | : | Code & practice for earthing. |
| 8 | IS-5, 1994 (reaffirmed 2000) | : | Columns for ready mixed paint & chemical. |
| 9 | IS 10000, Part | : | Method of test for internal combustion engine. |
| 10 | BS ISO 15550: 2002 | : | Reciprocating Internal Combustion Engine- Determination and method of measurement of Engine power- General requirements |
| 11 | BS ISO 3046: 2002 Part 1-6 | | Reciprocating Internal Combustion Engine- Performance |
| 12 | IEC – 34, 1996, Part – 1-2 | : | Rotating electrical machine. |
| 13 | IS 4722, 2001 | : | Rotating electrical machine specification. |

Standard not listed above but are applicable also to be followed. In case any contradiction in specification, this and above listed standard, this specification (OR 12534) shall get precedent.

19. TECHNICAL SPECIFICATION:

Acoustic enclosure shall be designed to provide min 25 dB(A) insertion loss of sound level to the noise generated by DG Set comprising of CAT 3512B diesel engine, BHEL OA 7002 / 7001 or equivalent alternator and standard radiator for 3512B engine for Oil Rig application supplied by M/s Caterpillar. The shape of enclosure shall be approximately cuboid any projection towards radiator side should be modular & removable.

Enough working space should be provided for O&M near engine, alternator and radiator. A space of approximately 0.6m is required for a person to stand and carry out the maintenance, except radiator sides. Baffles (if required) provided for sound attenuation, should be fastener tightened, so that it could be removed whenever required. Alternator can be removed after removing the baffles. Two to four hinged doors shall be provided at each side along the length. There will be minimum one number glass windows for observing inside status from outside. Louvers or suitable arrangement shall be provided to facilitate fresh air entry whenever required.

The base of enclosure shall be welded on BHEL master skid. Base shall be made of 150mm square tubular 5-6mm thick/ 150 mm ISMC channel. The external periphery of the base shall match with periphery of BHEL master skid, with space left for welding as detailed below. Columns & panels shall be bolted on the top of enclosure (supplier's) base. The insulation material to be sandwiched two walls of sheet metal. The outer wall shall be made of 2.5 mm CRC corrugated/ plain sheet whereas inner wall shall be 1mm perforated sheet for holding insulation material. Side walls shall be supported at corner with 5mm thick rectangular tabular. The columns shall be provided at suitable interval and made by bending of 4-5 mm thick plate or equivalent C-channel. Enclosure shall have robust, modular & bolted construction for proper mating & sealing. If required windows at tubular base for fastening of column shall be provided.

Silicone sealant shall be applied at mating surface, after installation of column, panels and roof for protection from water ingress. The entire job should be fabricated on CNC machines only. Durable EPDM / neoprene rubber gasket lining shall be provided, wherever required at mating surface for sealing, avoiding water ingress and sound leakage.

Exhaust stack shall be taken up to front horizontally on roof and shall be taken to approx. 7.7 m height from ground level. Weight of exhaust piping with muffler shall be approximately 750 kg. Roof should be strong enough and shall be of minimum 3 mm thick CRC sheet having sufficient strength to bear human footfall & movement of 2-3 persons, during muffler and associated exhaust component removal, as these components are removed during each movement of rig. Cross stiffener across full width shall be provided at suitable place to bear load, human footfall & movement during exhaust component removal. The roof shall be bolted and removable, so that the same can be lifted and removed for taking out of equipments like radiator and engine. Two/four hooks shall be provided for each roof segment for facilitating lifting by crane. Roof shall be having a slope of 3-4° to avoid rain water accumulation. Roof shall have inbuilt transverse box to counterbalance sideways sling pressure during lifting.

Threaded / welded boss with threads inside shall be provided at the top for fixing of muffler mounting stand at roof. Muffler stand and exhaust mounting stand shall be in two parts. The lower part shall be permanently installed with roof but shall have minimum height on which main stand shall be fastener tightened. The purpose of two part structure is to reduce transportation height. The upper part should be removal by opening the bolting and shall be taken out during transportation, thus minimizing transportation height. Similarly base (lower part) for supporting exhaust structure of 7.7 mtr height (bolted type) shall be provided by supplier at top of acoustic

enclosure. Supplier shall submit tentative arrangement with OGA along with offer, with proposed drawing for holding the stack above roof only (without any ground support), whereas final arrangement of muffler mounting stand & stack mounting shall be decided at the time of drawing approval.

The finished power pack is subjected to transportation from one site to other in every three months. The enclosure shall have additional requirement of locking provision for safety of costly equipment inside. Additional excellent quality latches to be provided at columns and mating surface of two doors (one each side) at 1.5 height, for providing outside padlock by ultimate customer during transportation Each door shall have sturdy tower bolt for locking from inside.

The exact location/ arrangement for Lube Oil Drain, Breather outlet, Coolant drain, Glass Window, Latches and padlock, exact muffler & exhaust item mounting arrangement, Label (Labels in BHEL scope) mounting locations, ladder location, lighting bracket mounting location shall be finalized during drawing approval stage. However bidder shall confirm in their offer that they shall provide these features and cover these items in OGA drawing submitted with offer, to the extent possible. Roof shall have two cut-out for exhaust pipe outlet and radiator water filling, with location shall matching with OGA of CAT3512B- BHEL OA 7002/7001 alternator. Bidder shall design exhaust outlet opening of enclosure with min gap to avoid sound leakage, cover plate & muffler mounting structure/stand and submit for approval along with other drawing within a week of LOI/PO.

Enclosure shall comply broad technical specification as under:

Sl. NO.	Parameters	Description / Values
01	Application	To provide acoustic attenuation for BHEL Make DG Set (Power pack) with CAT 3512B & BHEL Make OA 7002 or equivalent alternator.
02	Acoustic attenuation provided	Min 25 dB(A)
03	Method of measurement	At different points 0.5 m from the acoustic enclosure & then averaged as per para 2.2 of CPCB norms "Noise Limit For Generator Set run with Diesel" . Measuring procedure applicable shall be as per ISO : 8528 (part 10) meeting requirements of grade 2 accuracy as suggested by applicable CPCB norm (refer clause 1)
04	Allowable temperature different inside the enclosure (away from hot spot) & outside enclosure	Not more than 7°C (test to carry out at ambient temperature minimum 25°C). Measurement to be made 50 mm away from combustion air intake. Acoustic enclosure must allow sufficient air flow without any forced ventilation (Requirement of air flow to be obtained from authentic source and BHEL is not liable to provide any information on the same.)
05	BHEL Master skid design on which enclosure shall be assembled	4 Runner, welded with grid of cross beams. External dimension 9m (L) X 3m (W). 7 mm chequered/ 6 mm plane sheet provided at floor area with trench cutout

for cable, diesel, & air line at four sides and cutout opening at boundary for cable, diesel, & air line at four sides

- 06 Insulating material 100 m thick Rockwool (min), with 64 kg/ Cubic m, density.
- 07 Dimension of enclosure Limiting 8.98 m (L) x 2.98 m (W) x 2.82 m (H).

Explanation:

1. Length is from one external end to other external end of BHEL skid, minus 20mm.
2. Width is from one external end to other external end of BHEL skid, minus 20mm
3. Height is from top surface (floor of master skid) to top part of enclosure. Further clarified that height from bottom of base frame of supplier's enclosure to the highest part of enclosure, after removable of upper detachable part of muffler stand, shall be within 2.82 m.
4. Length & width kept 20 mm less than BHEL master skid to provide space for welding

- 08 Louver Inside projection to reduce external dimension. Louver shall be adequately supported by hardware to avoid fall during transportation. Louver shall be so designed that rain water cannot enter inside & Rockwool does not get wet, during rains.
- 09 Shape Broadly cuboid with floor open. Roof to have min 4° slope both sides to avoid water acumination.
- 10 Base 150x150 square tubular 5-6 thick with windows (windows if required) at regular internal for tightening by torque spanner/ 150 ISMC Channel
- 11 Base Dimension 8.98 m (L) x 2.98 m (W), External periphery of base shall be 20 mm less than BHEL master skid periphery, to provide welding space.
- 12 Installation of base on BHEL Master Skid By 5 thick continuous welding to be carried out by supplier in BHEL premises.
- 13 Columns Side Column: 100 x150, 5 thick rectangular tubular / C section. Corners pillars: 100x150, 5 thick formed pillars / covered C channels. Holes at side for fixing acoustic panel.
- 14 Outer wall sheet thickness 2.5 mm CRC sheet plain/ corrugated.

15	Inner wall sheet thickness	1 mm perforated GI sheet/ Powder coated CRC sheet
16	Columns fixing	M10 or higher hardware fastening at base frame & top.
17	Panel fixing	Though M10 or higher hardware 2 at top & bottom each & min 3 at side.
18	Doors.	2 to 4 nos at each side along the length. All doors shall be hinged with horizontal swing. Suitable door shall be provided for entry in front/sides of radiator for maintenance. Inside & outside handle (dia 16 mm) shall be provided in each door. Door shall be properly aligned during installation for proper movement & locking.
19	Glass window	1 no. minimum on side door rectangular glass window. Window shape – rectangular, Indicative size – 300x150 mm. Location & size shall be finalized during drawing approval. 2mm sheet cover & studs at window corners on canopy shall be provided for protection during transportation.
20	Door hinges	Heavy duty SS hinges. Supplier shall get the sample approved prior to fitment.
21	Door lock & latches	Heavy duty SS. On pressing to close position it should get latched, but not locked. Lock shall have press to open arrangement from inside in all doors, so that person is not locked inside when door is closed accidentally. Door should be lockable by using keys.
22	Tower bolt / pad lock arrangement	Requires for locking prior to transportation as explained above by putting external lock (External lock in BHEL Bhopal / ultimate customers scope). Tower bolt should be sturdy heavy duty rust proof MS/Al/SS of reputed make. For each door tower bolt is to be provided at inside each door. Sample to be submitted to BHEL and got approved before assembling first enclosure. Locking arrangement / hook shall be provided at one door at each side for putting external pad lock.
23	Construction	Modular, bolted construction, replaceable by easy fastening. Supplier shall make best effort to reduce variety.
24	Radiator maintenance provision	Minimum clear 600 mm space in front of radiator and additional side/ front door for entry in to this area.

- 25 Roof Modular construction in pieces of full width.
- 26 Hardware External: SS for rust prevention, with SS weld nut. Internal: HTS. Min M10 hardware shall be used except final fixing. All weld nut shall have min 75% welding around periphery.
- 27 Ladder Ladder to be provided for climbing to top, Flushing with enclosure (Projected ladder not acceptable), by providing rectangular vertical pocket gap at side wall Successive steps to be at height of 200 mm for good ergonomics Ladder to be made of 25 dia pipe, as step. Two Nos. Grips with 25 mm dia pipes shall be provided at top (at roof) for holding of climber. Ladder should not obstruct during transportation. Supplier to take approval for this prior to manufacturing.
- 28 Opening at roof Two openings :
1. For radiator Coolant filling.
 2. For exhaust outlet.
- Adequate steps required to avoid rain water ingress and to avoid sound emission from these opening. Location to match CAT 3512B- BHEL OA 7002 Engine alternator combination. Supplier to take approval prior to manufacturing.
- 29 Radiator cap Chained to roof/ hinged arrangement to avoid detachment.
- 30 Muffler exhaust outlet opening Two different covers shall be supplied:
1. For covering while transportation of Power Pack with muffler removed.
 2. 5 mm thick plate for passing exhaust pipe while in operation.
- Design shall be finalized during approval stage.
- 31 Muffler mounting Boss with M12/ M10 thread to be provided at load bearing location where muffler stand lower part shall be installed.
- 32 Muffler support Two part structure. Lower part (four pairs) of minimum height shall be permanently fixed whereas top part shall be detachable. Top part (four numbers) made of 50 mm or more angle structure, across full width, installed by fasteners on bottom part. Muffler to be fitted on it using steel belt. Boss, Lower part, Top part & Steel belt for this also in the scope of supplier. This shall have to be got approved prior to manufacturing. Arrangement shall be finalised during

- drawing approval.
33. Stack support mounting
Boss with M12/ M10 thread to be provided at load bearing location (two pairs) where muffler stand lower part shall be installed.
34. Stack support
Two part structure. Lower part of minimum height shall be permanently fixed whereas top part shall be detachable. Top part made of 50 mm or more angle structure, installed by fasteners on lower part. Boss and lower part in scope of supplier. This shall have to be got approved prior to manufacturing. Arrangement shall be finalised during drawing approval.
35. Water ingress protection
Silicone sealant at mating surface of BHEL master skid & enclosure base. Suitable neoprene / EPDM rubber gasket to be provided at door mating point and all other location from where water seepage may take place.
36. Baffle plate
Baffle plate (if required) at alternator side for noise attenuation should be fastener tightened and removable.
37. Lighting arrangement
Supplier shall provide aesthetically good looking metal pipe & rods on canopy wall/ roof for holding and tying PVC conduits as required for lying of 4x10 mm dia cable (cables & PVC conduit in BHEL scope). Six nos. 4 mm thick fixtures shall be provided for hanging of light fittings. Cable and light fittings shall be in BHEL scope.

Supplier shall provide 400 * 400 mm plate at suitable location with thread/ weldnut for mounting of DB by drilling & tapping (DB in BHEL scope). Arrangement shall be finalized during drawing approval stage.
38. Paint finish
Inside 1 mm sheet: GI Perforated sheet to zinc thickness 70 micron minimum/ 1 mm perforated and powder coated CRC sheet with paint thickness of 70 micron.

Outer 2.5 mm sheet (Both sides): Shot blast to SA 2½. Apply zinc silicate primer, minimum thickness 70 microns, intermediate coat High built intermediate epoxy- 150 mm. Finish coat (for external wall only)- Full gloss PU paint-75 micron, shade – 275 as per IS-5. (Opaline green)

Base, Muffler stand items: Suitable peroxide primer- 2 coats then black highbuilt epoxy tarcoal paint to 200

micron thickness. Acceptable make: M/s Berger / M/s Akzonoble / M/s Asian.

Supplier to supply minimum 2 liter of each type of paint used for touch up work with each enclosure.. Waviness, buckling, bending etc. on sheet metal in not acceptable.

Near welding spots- Lower mating surface of base shall be supplied with grease based removable TRP. Paint shall be applied 10 mm above the bottom only during dispatch from supplier's work to avoid paint burning during welding. Painting and touch up after welding shall be done inside BHEL by the supplier.

Alternatively 9 tank powder coating with spray treatment process having proven performance at NE (north east India) sites shall also be acceptable.

NOTE:

Paint shade and process shall be either as per BHEL specification or of as per supplier's proven practices, however details of process, shade and performance to be furnished by supplier for assessment and acceptance by BHEL (in case supplier is suggesting any deviation from BHEL specification) along with the offer.

- | | | |
|----|---|--|
| 39 | Cut Out required in base frame for: | <ol style="list-style-type: none"> 1. Lube Oil drain 2. Breather Outlet 3. Coolant Drain 4. Earthing Strip connections <p>All cut-out shall be sealed with 5 mm cover with rubber gasket lining. Exact location of cut-out shall be finalized during drawing approval stage.</p> |
| 40 | Sheet length | Sheet length shall be of full height for side panel and of full width for roof. |
| 41 | Items for which sample shall be submitted for approval before assembly in first enclosure | <ol style="list-style-type: none"> (1) Tower bolt, (2) Hinges (3) Door Lock (4) Rubber gasket |
| 42 | Wire mess for radiator hot air outlet | Shall be of SS (min 2mm thick), with adequate support |
| 43 | Loose items to be supplied with each power pack | Following loose items shall be supplied with each enclosure to take care of any problem during installation: |

- | | | |
|----|--|--|
| | | <ol style="list-style-type: none"> (1) Rubber gasket 15 mtr (2) Rockwool 0.25 Cubm (3) Rivets 100 Nos (4) Paint / primer of each type -2 ltr each (5) Silicon sealant; 4 bottles/ ltr (6) Hardware-10 Nos each type (7) Stretch film (wrapping material) sufficient to wrap the finished job for transportation from BHEL. (8) Boss for muffler mounting: 4 Nos. each (9) Boss for stack support: 4 Nos. each (10) Muffler support (lower part) : 2 nos. each (11) Stack support (lower part) : 2 nos. each |
| 44 | Riveting pitch | Max 250 mm. Each sheet however small to be riveted at minimum 2 places. |
| 45 | Approved make for structural steel & CRC sheet | M/s SAIL / M/s Tata steel / M/s Bhushan steel / M/s Jindal steel / M/s Essar steel |
| 46 | Type of Ventilation | Natural. Forced ventilation not acceptable. |

20. GENERAL REQUIREMENT:

Through a board out line on requirement has been made yet the scope should include anything not mentioned but required for - (i) Completeness of Power Pack with acoustic enclosure having minimum 25 dB(A) insertion loss for use in Oil Field Environment and also (ii) To render end product, i.e. power pack excellent aesthetic, robust construction, transportability, durability, user friendly design and suitability for frequent transportation and easy dismantling, handling & installation.

21. INSTALLATION EQUIPMENTS AND TOOLS & TACKLES:

All installation equipments, tools & tackles and testing equipments required for installation and testing of acoustic enclosure shall be in the scope of supplier. These items shall be brought inside BHEL premises by the supplier on returnable basis.

22. DESIGN, PATENTS AND ROYALTIES:

If any material used or methods or processes practiced or employed in the manufacture of items to conform with the requirements of the contract is/are covered by a patent(s) in respect of which supplier is not licensed, the supplier (of items covered in this specification) shall, before using the method or process, as the case may be, obtain such license(s) and pay such royalty (ies) and license-fee(s) as may be necessary. The supplier shall keep BHEL & ONGCL indemnified from and against any and all claims, actions, demands and proceedings whatsoever brought or made against BHEL & ONGCL on the basis of any patent or infringement thereof claimed or otherwise relating to and arising from any method or process employed or thing done



to or in connection with any work executed by the supplier shall, at their own risk and expense defend any suit for infringement of patent or like suit brought against BHEL and/ or ONGCL (whether with or without the supplier being a party thereof) and shall pay any damages and costs awarded in such suit, and keep BHEL and ONGCL indemnified from and against all consequence thereof.

23. QUALIFICATION CRITERIA FOR BIDDER:

The bidder must fulfill the following qualification criteria:

- (i) **EXPERIENCED IN SUPPLYING ACOUSTIC ENCLOSURE FOR OIL RIG POWER PACK:** The bidder must have supplied minimum 3 (three) number acoustic enclosure in last 5 (five) years, for Oil Rig Power Pack with rating equal to or above 1215 KVA to drilling company/ies and / or Oil Rig equipment manufacturing company/ies. Bidder shall submit proof of supplying minimum 5 (five) number acoustic enclosure in last 5 (five) years for Oil Rig Power Pack with rating equal to or above 1215 KVA to drilling company/ies and / or Oil Rig manufacturing company/ies, and their customer PO's, with their offer to BHEL.

- (ii) **CNC MACHINE FACILITY FOR MANUFACTURING ENCLOSURE:** The enclosure panels and sheet metal components for enclosure shall be punched and bend on CNC machines only, for ensuring compatibility and one to one replacement in case of future replacement requirement. The supplier or it's sub-vendor (from where enclosure components are sourced by supplier) must have CNC Turret punch and CNC bending machine. The details of CNC machine facility to be used for manufacturing enclosures and available with supplier / their sub vendor must be submitted along with offer.

Note:

Offers submitted by Bidders not meeting clause 23(i) & (ii), above shall not be considered for further evaluation

LIST OF ANNEXURE

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|----|------------------|---|----------|
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ANNEXURE-I, ENCLOSED WITH BHEL SPEC NO OR12534 Rev 00

NOISE LIMIT FOR GENERATOR SETS RUN WITH DIESEL

(Noise Limit for Generator Sets run with Diesel were notified by Environment (Protection) second Amendment Rules vide GSR 371(E), dated 17th May 2002 at serial no.94 and its amendments vide GSR No 520(E) dated 1st July 2003; GSR 448(E), dated 12th July 2004; GSR 315(E) dated 16th May 2005; GSR 464(E) dated 7th August 2006; GSR 566(E) dated 29th August 2007 and GSR 752(E) dated 24th October 2008; G.S.R. 215 (E), dated 15th March, 2011 under the Environment (Protection) Act, 1986)

Noise Limit for Generator Sets run with Diesel

1. **Noise limit for diesel generator sets (upto 1000 KVA) manufactured on or after the 1st January, 2005**

The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st January, 2005 shall be 75 dB(A) at 1 metre from the enclosure surface.

The diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself.

The implementation of noise limit for these diesel generator sets shall be regulated as given in paragraph 3 below.

2. **Noise limit for DG sets not covered by paragraph 1.**

Noise limits for diesel generator sets not covered by paragraph 1, shall be as follows:-

- 2.1 Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.
- 2.2 The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/acoustic treatment. Under such circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably, in the night time). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure/ room, then averaged.
- 2.3 The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

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- 2.4 These limits shall be regulated by the State Pollution Control Boards and the State Pollution Control Committees.
- 2.5 Guidelines for the manufacturers/ users of Diesel Generator sets shall be as under:-
01. The manufacturer shall offer to the user a standard acoustic enclosure of 25 dB (A) insertion loss and also a suitable exhaust muffler with insertion loss of 25 dB(A).
 02. The user shall make efforts to bring down the noise levels due to the DG set, outside his premises, within the ambient noise requirements by proper citing and control measures.
 03. Installation of DG set must be strictly in compliance with the recommendations of the DG set manufacturer.
 04. A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

3.0 Limits of Noise for DG Sets (upto 1000 KVA) Manufactured on or after the 1st January, 2005

3.1 Applicability

01. These rules apply to DG sets upto 1000 KVA rated output, manufactured or imported in India, on or after 1st January, 2005.
02. These rules shall not apply to –
 - a) DG sets manufactured or imported for the purpose of exports outside India; and
 - b) DG sets intended for the purpose of sample and not for sale in India.

3.2 Requirement of Certification

Every manufacturer or assembler or importer (hereinafter referred to as the "manufacturer") of DG set (hereinafter referred to as "product") to which these regulations apply must have valid certificates of Type Approval and also valid certificates of Conformity of Production for each year, for all the product models being manufactured or assembled or imported from 1st January, 2005 with the noise limit specified in paragraph 1.

3.3 Sale, import or use of DG sets not complying with the rules prohibited

No person shall sell, import or use of a product model, which is not having a valid Type Approval Certificate and Conformity of Production certificate.

ANNEXURE-I , ENCLOSED WITH BHEL SPEC NO OR12534 Rev 00**3.4 Requirement of Conformance Labelling**

- i) The manufacturer of the 'product' must affix a conformance label on the product meeting the following requirements:
 - (a) The label shall be durable and legible,
 - (b) The label shall be affixed on a part necessary for normal operation of the 'product' and not normally requiring replacement during the 'product' life.
- ii) The conformance label must contain the following information:
 - (a) Name & address of the manufacturer (if the address is described in the owner's manual, it may not be included in the label),
 - (b) Statement "this product conforms to the Environment (Protection) Rules, 1986",
 - (c) Noise limit viz. 75 dB(A) at 1 m
 - (d) Type Approval certificate number
 - (e) Date of manufacture of the product

3.5 Nodal Agency

- i) The Central Pollution Control Board shall be the nodal agency for implementation of these regulations.
- ii) In case of any dispute or difficulty in implementation of these regulations, the matter shall be referred to the nodal agency.
- iii) The nodal agency shall constitute a Committee to advise it on all matters; including the disputed matters, related to the implementation of these regulations.

3.6 Authorised agencies for certification

The following agencies are authorized to carry out such tests as they deem necessary for giving certificates for Type Approval and Conformity of Production testings of DG sets and to give such certificates:

- i) Automotive Research Association of India, Pune;
- ii) Naval Science & Technology Laboratory, Visakhapatnam;
- iii) Fluid Control Research Institute, Palghat;

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- iv) National Aerospace Laboratory, Bangalore;
- v) International Centre for Automotive Technology, Manesar, Haryana; and
- vi) National Test House (Northern Region), Ghaziabad, Uttar Pradesh.

3.7 Compliance and Testing Procedure

The compliance and testing procedure shall be prepared and published by the Central Pollution Control Board, with the help of the certification agencies.

4.0 Exemption from the provisions of paragraph 1 and 3, for the products (diesel generator sets upto 30 KVA) purchased by the Ministry of Defence, Government of India.

The products manufactured in or imported into India till 30th April, 2007 for the purpose of supplying to the Ministry of Defence, shall be exempted from the regulations given in paragraphs 1 to 3 above, subject to the following conditions, namely:-

- i) The manufacturer shall manufacture or import the products only after getting purchase order from the Ministry of Defence and shall maintain the record of receipts, production / import, dispatch, etc., for inspection by the Central Pollution Control Board.
- ii) The special dispensation for noise norms shall be only for the mobile Defence vehicles which, with the present design / configuration, cannot carry the gensets with acoustic enclosures.
- iii) Director, Ministry of Defence shall ensure and maintain the serial number of all gensets for the Army and he shall also direct the manufacturers of these gensets to emboss on the engine and the main body of the gensets, the words "For the use of Army only".
- iv) The genset serial number shall be specially assigned by the Ministry of Defence with the request for proposal and contract purchase order and this information shall be forwarded to the Central Pollution Control Board for inspection as and when required.
- v) Registers shall be maintained at the manufacturers premises and in the Ministry of Defence to ensure that the number of gensets manufactured under special dispensation are not misused.
- vi) The gensets procured under this dispensation shall be operated in the remote areas and not in the cities.

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- vii) This shall be a one-time exemption during which the Army shall remodel its vehicles to contain the new gensets and also obtain the necessary Type Approval of the gensets.

5.0 Exemption from the provisions of paragraph 1 and 3 for sixteen Diesel Generator sets of 45 KVA purchased by the Ministry of Defence, Government of India.

The 45 KVA DG sets manufactured in India for the purpose of their use in Mobile Decontamination System for use by the Ministry of Defence shall be exempted from the regulations given in paragraph 1 to 3 above subject to the following conditions, namely:-

- i) The special dispensation for the noise norms shall be only for the DG sets to be used in Mobile Decontamination System (MDS) by Army which, with the present design/configuration cannot carry the gensets with acoustic enclosures.
- ii) The Director, Ministry of Defence, shall ensure and maintain the serial numbers for sixteen gensets and he shall also direct the manufacturers of these generator sets to emboss on the engine and main body of the gensets, the words "For the use of Army only in Mobile Decontamination System (MDS)"
- iii) A register shall be maintained at the manufacturers premises and in the Ministry of Defence to ensure that only sixteen numbers of 45 KVA gensets are manufactured under special dispensation and are not misused elsewhere.

6.0 Transportation of Diesel Generator Sets (above 250 KVA)

- i) Diesel Generator set shall be transported after fulfilling the requirement of certification specified in paragraph 3.2 as a complete unit with acoustic enclosure, or dismantled, with relevant genset number specified on acoustic enclosure and silencer for reassembling at the site of its operation.
- ii) Compliance with the noise norms shall be monitored after reassembling the DG set at the location of the installation by the concerned State Pollution Control Board or, as the case may be, the Union Territory Pollution Control Committee.

ANNEXURE-II , ENCLOSED WITH BHEL SPEC NO OR12534 Rev 00

PART –III**TEST EQUIPMENT AND PROCEDURE****1.0 GENERAL**

- 1.1 The determination of sound power levels of a genset should be carried out according to ISO:8528 (part 10), meeting the requirement of grade 2 accuracy.
- 1.2 In case the material used in the enclosure is foam or any inflammable material, a test report on flammability as per IS:7888 "Methods of Test for Flexible Polyurethane Foam" should be produced by the supplier from an accredited laboratory.
- 1.3 The product (genset) to be tested for type approval or conformity of production shall be complete system and shall include the engine, the alternator, the air inlet system, exhaust system and the cooling system in the acoustic enclosure. The silencer should be provided without extension of exhaust piping. The exhaust pipe tail end shall be within the hypothetical parallelepiped surface at 1 m distance from the enclosure.

2.0 MEASUREMENT PROCEDURE

- 2.1 Run the product and adjust the load and engine speed ISO: 8528 (part 10)
- 2.2 Run the Generator set for half an hour at the rated load. Measure the difference between the air temperatures inside the enclosure at 50 mm from combustion air intake, away from the hot spot, and outside the enclosure. This difference should not be more than 7° C. The ambient air temperature while this test is carried out shall not be less than 25 °C.
- 2.3 Carry out the exhaust back-pressure measurement at rated load at the location as mentioned in IS: 10000 (as per Annexure – VII). The back-pressure measured shall not exceed the maximum pressure requirement specified by the engine manufacturer in its application for Type Approval for compliance with the emission limit for the engine.
- 2.4 If the specified temperature and backpressure requirements are not met, the test should be discontinued.
- 2.5 Carry out noise measurements as per ISO: 8528 (part 10)
- 2.6 Calculate A-weighted Sound Pressure Level from Sound Power Level, assuming free field over ground, at 1 m.

MATRIX OF BID EVALUATION CRITERIA

Bidder to submit this document completely filled up for evaluation of its offer

Sl. No.	Clause / Para	Yes / No	Comments
1	Has the bidder noted and confirmed supply and testing requirements as per applicable CPCB norms detailed clause 1 (Introduction)?		
2	Has the bidder noted and confirmed scope of supply for material as per clause 2.1?		
3	Has the bidder noted and confirmed scope of supply of services at BHEL Bhopal for first Acoustic enclosure, as per clause 2.2?		
4	Has the bidder noted and confirmed scope of supply of services at BHEL Bhopal for subsequent Acoustic Enclosure, as per clause 2.3?		
5	Has the bidder noted and confirmed scope of supply of services at site for Performance testing as per clause 2.4?		
6	Has the bidder noted and confirmed to comply note point (i) as per clause 2, last paragraph?		
7	Has the bidder noted site location note point (ii) as per clause 2, last paragraph?		
8	Has the bidder noted and confirmed delivery as per clause 3?		
9	Has the offer been submitted in two bid system as per clause 4?		
10	Has the bidder submitted prices against goods/services as per clause- 4.2.(a), 4.2(b), 4.2(c) and 4.2(d)?		
11	Has the bidder noted and confirmed points 1 to 4 of notes provided at the end of clause-4?		
12	Has the bidder noted and confirmed the clause- 5 regarding terms of payment?		
13	Has the bidder submitted OGA drawings with details as per clause 6 along with bid?		
14	Has bidder submitted documents 1-11, required with bid as per clause 7A ?		
15	Has the bidder confirmed to submit documents 1-9, for approval, as per clause 7B, two weeks after LOI/PO whichever is earlier?		
16	Has bidder confirms to supply documents 1-5, at the time of dispatch as per clause 7C; and 1-4 as per clause 7D after performance testing &		

	installation?		
17	Has the bidder confirmed the notes (1) to (3) at the end of clause 7?		
18	Has the bidder noted clause 8 & submitted completely filled up matrix of bid evaluation criteria as per clause 8?		
19	Has the bidder noted address for correspondence as per clause 9?		
20	Has the bidder noted and confirmed clause 10 regarding Drawing/ document approval?		
21	Has the bidder agreed to provide progress report as per clause 11?		
22	Has bidder noted and confirmed clause 12 regarding providing QA plan and inspection by BHEL/ ultimate customer at supplier's works & inspection on receipt at BHEL Bhopal ?		
23	Has the bidder noted and shall comply with clause-13 regarding packing & forwarding?		
24	Has the bidder noted and confirmed clause 14 regarding Methodology of Project execution?		
25	Has bidder noted & confirmed clause 15 regarding warranty & confirmation to clause 15 A (Commitment By Supplier)?		
26	Has the bidder noted and confirmed to provide performance bank guarantee as per clause 16?		
27	Has bidder noted & confirmed clause 17 regarding indemnity?		
28	Has the bidder noted and confirmed cl. 18 regarding applicable standards?		
29	Has the bidder noted and confirmed cl. 19 Technical Specification Para 1-8 in page 21-22.?		
30	Has the bidder noted and confirmed point 01 of broad technical specification in cl. 19 Technical Specification, regarding application?		
31	Has the bidder noted and confirmed point 02 of broad technical specification in cl. 19 Technical Specification, regarding attenuation to be provided?		
32	Has the bidder noted and confirmed point 03 of broad technical specification in cl. 19 Technical Specification, regarding method of measurement?		
33	Has the bidder noted point 04 of broad technical specification, in cl. 19 Technical Specification, regarding allowed temperature rise?		
34	Has the bidder noted point 05 of broad technical specification in cl. 19 Technical Specification, regarding BHEL master skid?		
35	Has the bidder noted and confirmed point 06 of broad technical specification in cl. 19 Technical Specification, regarding insulating material?		

36	Has the bidder noted and confirmed point 07 of broad technical specification in cl. 19 Technical Specification, regarding limiting dimension?		
37	Has the bidder noted and confirmed point 08 of broad technical specification in cl. 19 Technical Specification, regarding louver projection?		
38	Has the bidder noted and confirmed point 09 of broad technical specification in cl. 19 Technical Specification, regarding shape?		
39	Has the bidder noted and confirmed point 10 of broad technical specification in cl. 19 Technical Specification, regarding base of enclosure.		
40	Has the bidder noted and confirmed point 11 of broad technical specification in cl. 19 Technical Specification, regarding base dimension?		
41	Has the bidder noted and confirmed point 12 of broad technical specification in cl. 19 Technical Specification, regarding installation on BHEL master skid?		
42	Has the bidder noted and confirmed point 13 of broad technical specification in cl. 19 Technical Specification, regarding column?		
43	Has the bidder noted and confirmed point 14 of broad technical specification in cl. 19 Technical Specification, regarding outer wall thickness?		
44	Has the bidder noted and confirmed point 15 of broad technical specification in cl. 19 Technical Specification, regarding inner wall thickness.		
45	Has the bidder noted and confirmed point 16 of broad technical specification in cl. 19 Technical Specification, regarding column fixing?		
46	Has the bidder noted and confirmed point 17 of broad technical specification in cl. 19 Technical Specification, regarding panel fixing?		
47	Has the bidder noted and confirmed point 18 of broad technical specification in cl. 19 Technical Specification, regarding door?		
48	Has the bidder noted and confirmed point 19 of broad technical specification in cl. 19 Technical Specification, regarding glass window?		
49	Has the bidder noted and confirmed point 20 of broad technical specification in cl. 19 Technical Specification, regarding door hinges?		
50	Has the bidder noted and confirmed point 21 of broad technical specification in cl. 19 Technical Specification, regarding door lock & latches?		
51	Has the bidder noted and confirmed point 22 of broad technical specification in cl. 19 Technical Specification, regarding tower bolt / pad lock arrangement?		

52	Has the bidder noted and confirmed point 23 of broad technical specification in cl. 19 Technical Specification, regarding construction?		
53	Has the bidder noted and confirmed point 24 of broad technical specification in cl. 19 Technical Specification, regarding space for radiator maintenance space provision?		
54	Has the bidder noted and confirmed point 25 of broad technical specification in cl. 19 Technical Specification, regarding roof?		
55	Has the bidder noted and confirmed point 26 of broad technical specification in cl. 19 Technical Specification, regarding hardware.		
56	Has the bidder noted and confirmed point 27 of broad technical specification in cl. 19 Technical Specification, regarding ladder?		
57	Has the bidder noted and confirmed point 28 of broad technical specification in cl. 19 Technical Specification, regarding opening (Cut out) at roof?		
58	Has the bidder noted and confirmed point 29 of broad technical specification in cl. 19 Technical Specification, regarding radiator cap?		
59	Has the bidder noted and confirmed point 30 of broad technical specification in cl. 19 Technical Specification, regarding muffler exhaust outlet opening?		
60	Has the bidder noted and confirmed point 31 of broad technical specification in cl. 19 Technical Specification, regarding muffler mounting?		
61	Has the bidder noted and confirmed point 32 of broad technical specification in cl. 19 Technical Specification, regarding muffler support?		
62	Has the bidder noted and confirmed point 33 of broad technical specification in cl. 19 Technical Specification, regarding Stack Support mounting.		
63	Has the bidder noted and confirmed point 34 of broad technical specification in cl. 19 Technical Specification, regarding stack support?		
64	Has the bidder noted and confirmed point 35 of broad technical specification in cl. 19 Technical Specification, regarding water ingress protection?		
65	Has the bidder noted and confirmed point 36 of broad technical specification in cl. 19 Technical Specification, regarding baffle plate?		
66	Has the bidder noted and confirmed point 37 of broad technical specification in cl. 19 Technical Specification, regarding Lighting arrangement?		
67	Has the bidder noted and confirmed point 38 of broad technical specification in cl. 19 Technical Specification, regarding paint finish?		
68	Has the bidder noted and confirmed point 39 of broad technical specification in cl. 19 Technical		

	Specification, regarding cutout required in base frame?		
69	Has the bidder noted and confirmed point 40 of broad technical specification in cl. 19 Technical Specification, regarding Sheet length?		
70	Has the bidder noted and confirmed point 41 of broad technical specification in cl. 19 Technical Specification, regarding sample of items to be submitted for approval?		
71	Has the bidder noted and confirmed point 42 of broad technical specification in cl. 19 Technical Specification, regarding wire mess for radiator hot air outlet?		
72	Has the bidder noted and confirmed point 43 of broad technical specification in cl. 19 Technical Specification, regarding loose items to be supplied?		
73	Has the bidder noted and confirmed point 44 of broad technical specification in cl. 19 Technical Specification, regarding Riveting pitch?		
74	Has the bidder noted and confirmed point 45 of broad technical specification in cl. 19 Technical Specification, regarding Approved make for structural steel & CRC sheet?		
75	Has the bidder noted and confirmed point 46 of broad technical specification in cl. 19 Technical Specification, regarding Type of Ventilation?		
76	Has the bidder noted and confirmed General requirement as per cl. 20?		
77	Has the bidder noted and confirmed cl. 21 regarding installation equipment's and tools & tackles?		
78	Has the bidder noted and confirmed cl. 22 regarding Design, patents & royalties?		
79	Has bidder noted and confirmed to experience criteria as per clause 23(i) and has submitted proof of supplying acoustic enclosure as per clause 23(i)?		
80	Has bidder noted and confirmed clause 23(ii) regarding CNC machine facility and submitted details of CNC machine facility as per clause 23(ii)?		
81	Has bidder noted the note mentioned at the end of clause 23.?		



TECHNICAL INFORMATION TO BE FURNISHED BY THE VENDOR ALONG WITH BID

SL. NO.	DESCRIPTION	TO BE CONFIRMED BY SUPPLIER
1.	Acoustic attenuation provided by offered Enclosure. Furnish detail data sheet	
2.	Weight of the offered Enclosure	
3.	Dimension of external periphery of base of enclosure	
4.	Outer sheet thickness	
5.	Inner sheet thickness	
6.	Sheet thickness of roof	
7.	Surface preparation & paint process	
8.	Insulating material used	
9.	Thickness of insulating material used	

OGA OF BHEL MASTER SKID

