

BPC 0007

ENQUIRY

TWO PART BID

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, पिप्लानी, भोपाल - ४६२०२२(भारत)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, पिप्लानी, भोपाल - ४६२०२२(भारत)

BHARAT HEAVY ELECTRICALS LIMITED, PIPLANI, BHOPAL -- 462022(INDIA)

MATERIALS MANAGEMENT DIVISION

TIN NO. 23573600001 | ECC NO.AAACEB4146PXM009 | MPCT NO. HEL/05/01/0001/SL/5/11/79

PHONE: 91-755-2500100 (7 LINE) | FAX: 91-755-2500023 | WWW.BHEL.BHOPAL.COM

ENQUIRY NO
E5143212

ENQUIRY DATE
06/12/24

ENQUIRY DUE DATE
16/12/24

SUPP NAME AND ADDRESS		SUPP CODE	REV CD	REV NO	REV DATE	NO OF CATY2	NO OF CATY3	ENQ NO OF ITEMS	INDENT NO
OFFICE COPY			1	0	NA	0	0	1	120543035
		GUARANTEE CERTIFICATE		Y	SUPPLY CONDITION		IDENTIFICATION MUST		
		TEST CERTIFICATE		Y	TECHNICAL CONDITION		AS PER PI		
		INSTRUCTION BOOKLET		N	INSPECTION CONDITION		BY TPIA AT VENDOR'S WORKS		
		SAMPLE		N					
GATE PASS				Y					

NOTE: QUOTE PRICE BOTH IN FIGURES & WORDS.IN CASE OF MISMATCH PRICE IN WORDS WILL BE VALID,QUOTATIONS NOT BEARING ENQUIRY NO AND DUE DATE LIABLE TO BE REJECTED.

SL NO	MATERIAL CODE	DESC	UNIT	ITEM QTY	LOT NO	LOT QTY	DEST	DELIVERY DATE
1	BP9094877724	BELLOWS AS PER BHEL DRG. NO. 24450105052 REV.00. ITEM 01 & ITEM 02. (QAP--QAP/QTM/VENDOR QAP/2023-24/TM3004/BELLOW FOR AIR INLET ARRANGEMENT DTD.12.12.2023. REV.00)	ST	128.000	2	28.000	205	04/03/25
					1	100.000	205	04/02/25

REMARK REFER NIC E- TENDER PORTEL FOR DETAILS.

DRAWING	Y	PURCH SPEC	Y	CATALOGUE	N	PLAN	Y	TWO PART BID	Y
S.NO	INDENT NO	ITEM NO	CATEGORY	ENQUIRY QTY.					
1	120543035	1	598100	128.000					

NOTE:BHEL,BHOPAL'S Standard Terms & Conditions BP4255/MM5533 rev02 for imports and BP4255/MM5527 rev03 for indigenous procurements form a part of this Enquiry.Bidders may obtain from us copies of these terms and conditions if not already available.

SPECIAL REMARKS	NAME : SHRI MANOJ KUMAR DUBEY DESG : ENGINEER
	SIGN & SEAL

TENDER DETAILS

ENQUIRY NO. – E5143212, DUE ON 16-12-2024

Description: RATE CONTRACT FOR BELLOWS AS PER BHEL DRG. NO. 24450105052 REV.00, ITEM 01 & ITEM 02. (QAP: -QAP/QTm/VENDOR QAP/2023-24/TM3004/BELLOW FOR AIR INLET ARRANGEMENT DTD.12.12.2023. REV.00).

TENDER QTY: 128 Sets +/- 30%

DELIVERY REQUIREMENT – DELIVERY FOR THE 1ST LOT OF 100 SETS (CUMMULATIVE) SHALL BE WITHIN 60 DAYS FROM THE PO DT.& THEREAFTER FOR SUBST. LOT OF 28 SETS. (CUMMULATIVE) SCHEDULED DELY. DT. SHALL BE WITHIN 30 DAYS FROM THE SCHEDULED DELY. DT. OF THE PREV. LOT.

IT IS HEREBY MENTIONED THAT THIS IS E-TENDER SO OFFER SUBMITTED THROUGH E-PROCUREMENT PORTAL (www.eprocurebhel.co.in) SHALL ONLY BE CONSIDERED.

NOTE: ALL THE TERMS OF SUBJECT TENDER SHALL BE IN ACCORDANCE WITH “GENERAL TERMS AND CONDITIONS TO ENQUIRY BP 200102B”. VENDORS ARE REQUIRED TO COMPLY AFORESAID ENQUIRY TERMS OF BHEL.

1) RATE CONTRACT TERMS: WE INTEND TO ENTER INTO RATE CONTRACT FOR ORDERING UPTO 12 (TWELVE) MONTHS FROM RC FREEZING DATE.

2) NO. OF BID PARTS: 2 (TWO)

3) DELIVERY TERMS: F.O.R. DESTINATION

4) DELIVERY AT: CRX, BHEL, BHOPAL- 462022

5) VALIDITY OF OFFER: 90 DAYS FROM TECHNICAL BID OPENING DATE

6) PRICE BASIS: FIRM.

7) BHEL STANDARD PAYMENT TERMS: 100% payment in 90 days of receipt (45 days for Micro & Small and 60 days for Medium enterprises as registered in Udyam certificate as per relevant MSME act in force) and subject to acceptance of material and relevant documents at BHEL. PI refer GTC BP200102B.

8) PENALTY: APPLICABLE, AS PER ATTACHED GTC BP 200102B and LD WILL BE APPLICABLE ON UNDELIVERED QTY. OF LOT.

9) INSPECTION CONDITION: BY TPIA AT VENDOR'S WORKS

10) SUPPLY CONDITION: IDENTIFICATION MUST

11) TECHNICAL CONDITION: AS PER DRG, PQR, QAP & SPECIFICATION ETC AS ATTACHED

12) GUARANTEE CERTIFICATE: YES

13) TEST CERTIFICATE: YES

14) SAMPLE: NO

15) TOOLS / GAUGES / FIXTURES CONDITION: NA

16) EVALUATION CRITERIA: OVERALL L1 BASIS (SINGLE LINE ITEM IN TENDER)

17) SPLITTING OF ORDER: APPLICABLE

RATE CONTRACT TO BE FINALIZED ON TWO SOURCES WITH QUANTITY DISTRIBUTION RATIO OF 65% & 35% TO L-1 VENDOR AND THE OTHER BIDDER ACCEPTING L-1 RATES RESPECTIVELY, SUBJECT TO MINIMUM 3 QUALIFIED BIDDERS. FOR ASCERTAINING BIDDER FOR 35% QUANTITY, HESG EQUIVALENT RATES OF L-1 BIDDER WILL BE SEQUENTIALLY COUNTER-OFFERED TO L-2, L-3 AND SO ON BIDDER UNTILL ANY BIDDER ACCEPTS THE SAME. IN CASE OF ONLY 2 QUALIFIED BIDDERS, BHEL RESERVES THE RIGHT FOR DISTRIBUTION/ NON-DISTRIBUTION BETWEEN 2 BIDDERS. IN CASE OF ONLY ONE QUALIFIED BIDDER OR IN CASE NO BIDDER AGREES TO ACCEPT THE COUNTEROFFERED HESG EQUIVALENT RATES OF L-1, BHEL MAY DECIDE TO AWARD ENTIRE 100% QUANTITY TO L-1 BIDDER. DISTRIBUTION IN COMPLIANCE WITH LATEST GUIDELINES FOR MSE AND MII WILL ALSO BE FOLLOWED FURTHER

18) TENDER FEE: NOT APPLICABLE

19) REVERSE AUCTION: APPLICABLE

It is declared upfront that Enquiry No. E5143212 shall be subjected to Reverse Auction (RA). Bidders may kindly note the Reverse Auction (RA) field as mentioned and asked for in enquiry template & ensure to proceed with choosing "YES" against same when asked during submission of their offer to give their acceptance for participation in RA.

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno- commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

20) EVALUATION CURRENCY: SHALL BE INR.

21) QTY. VARIATION: QTY. IS TENTATIVE & MAY VARY UPTO +/-30%

22) QAP: APPLICABLE.

23) ADDITIONAL TENDER REMARKS:

ENQUIRY IS FOR RATE CONTRACT WHICH IS TO BE KEPT VALID FOR ORDERING UPTO 12 MONTHS FROM RC FREEZING DATE. ORDERING WILL BE DONE AGAINST FIRM REQUIREMENT AS & WHEN NEEDED AND RC MAY BE CLOSED AT ANY TIME WITHOUT ASSIGNING REASONS WHATSOEVER IT MAY BE.

SUBMIT YOUR TENDER IN TWO PART BID BASIS.

ANNEXURE-IX OF NIT TO BE DULY FILLED / SIGNED & SHOULD FORM PART OF TECHNO-COMMERCIAL OFFER.

SPECIAL / GENERAL TERMS & CONDITIONS OF ENQUIRY, RA TERMS AND CONDITIONS AS PER NEW GUIDELINES, PQR ETC. ARE ENCLOSED.

UNREGISTERED VENDORS ARE REQUESTED TO SUBMIT THE REQUISITE DOCUMENTS FOR REGISTRATION BY BHEL ONLINE REGISTRATION PORTAL (<https://supplier.bhel.in>).

SPECIAL CONDITIONS OF NIT:

1. For this procurement, Public Procurement (Preference to Make in India) Order (PPP-MII Order), 2017 vide No. P-45021/2/2017-B.E.-II dated 15.06.2017, 28.05.2018, 29.05.2019 & 04.06.2020 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO / WO against this NIT.

2. Technical Pre-Qualification Requirements (PQR) for procurement of Item: Technical PQR for “BELLOWS – 128 Set, +/- 30%” is attached as a part of NIT. The same is to be followed and complied with. Duly filled PQR shall be submitted along with the offer along with desired documents as per PQR.

3. FINANCIAL PQR IS APPLICABLE: NO

4. DULY FILLED INTEGRITY PACT FORMAT – NOT APPLICABLE.

5. Offers of suppliers who are in ‘Hold/Banned’ status in BHEL Bhopal PMD shall not be considered.

6. ANY DEVIATION OF GTC BP200102B (GENERAL TERMS & CONDITIONS OF ENQUIRY ATTACHED) WHERE VENDOR RESPONSE IS NOT AFFIRMATIVE TO BE CLEARLY INDICATED, ELSE BHEL WILL CONSIDER THAT ALL THE TERMS & CONDITIONS OF GTC BP200102B ARE ACCEPTABLE TO VENDORS.

7. IDENTIFICATION MUST AS PER TENDER TECHNICAL (DRAWING, SPECIFICATION ETC.) TERMS. REJECTION CLAUSE APPLICABLE AS PER GTC BP 200102B.

8. EVALUATION IN CASE OF MORE THAN ONE L-1 BIDDER:

IN THE COURSE OF EVALUATION, IF MORE THAN ONE BIDDER HAPPENS TO OCCUPY L-1 STATUS, EFFECTIVE L-1 WILL BE DECIDED BY SOLICITING DISCOUNTS FROM THE RESPECTIVE L-1 BIDDERS.

IN CASE MORE THAN ONE BIDDER HAPPENS TO OCCUPY THE L-1 STATUS EVEN AFTER SOLICITING DISCOUNTS, THE L-1 BIDDER SHALL BE DECIDED BY A TOSS / DRAW OF LOTS, IN THE PRESENCE OF THE RESPECTIVE L-1 BIDDER(S) OR THEIR REPRESENTATIVE(S).

RANKING WILL BE DONE ACCORDINGLY. DECISION OF BHEL IN SUCH SITUATIONS SHALL BE FINAL AND BINDING.

9. THE BIDDER DECLARES THAT THEY WILL NOT ENTER INTO ANY ILLEGAL OR UNDISCLOSED AGREEMENT OR UNDERSTANDING, WHETHER FORMAL OR INFORMAL WITH OTHER BIDDER(S). THIS APPLIES IN PARTICULAR TO PRICES, SPECIFICATIONS, CERTIFICATIONS, SUBSIDIARY CONTRACTS, SUBMISSION OR NON-SUBMISSION OF BIDS OR ANY OTHER ACTIONS TO RESTRICT COMPETITIVENESS OR TO INTRODUCE CARTELIZATION IN THE BIDDING PROCESS.

IN CASE, THE BIDDER IS FOUND HAVING INDULGED IN ABOVE ACTIVITIES, SUITABLE ACTION SHALL BE TAKEN BY BHEL AS PER EXTANT POLICIES / GUIDELINES.

10. No request for extension of tender due date will be entertained after due date and time of tender opening under any circumstances. Hence all vendors are requested to submit their bid well within due date and time only.

11. The bidder / supplier / contractor will, when presenting his bid, declare whether other family firms or sister concern affiliates / subsidiary firms are participating in the same tender, so as to eliminate the possibility of cartel formation. Format for declaration is available in the NIT documents for this enquiry.

12. For this procurement, Public Procurement (Preference to Make in India) Order (PPP-MII Order), 2017 vide No. P-45021/2/2017-B.E.-II dated 15.06.2017, 28.05.2018, 29.05.2019 & 04.06.2020 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO / WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable.

13. Vendors to also inform:

- a. Self-certification of Minimum Local content if more than 50%: Yes / No.
- b. Spell out details of location of value addition.

Bidders or successors can be debarred for false declarations for up to 2 years. Debarred suppliers not eligible for preference in any other procuring entity.

14. Margin of purchase preference to make in India is 20% as per Govt. of India Order No. P-45021/2/2017-BE-II DTD 15.06.17, 28.05.2018, 29.05.2019 & 04.06.2020 and subsequent Orders issued by the respective Nodal Ministry. Suppliers to comply & take a note of the same.

15. For this procurement, the local content to categorize a supplier as a Class I local supplier / Class II local Supplier / Non-Local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

16. FRAUD PREVENTION POLICY: THE BIDDER ALONG WITH ITS ASSOCIATE / COLLABORATORS / SUB-CONTRACTORS / SUBVENDORS / CONSULTANTS / SERVICE PROVIDERS SHALL STRICTLY ADHERE TO BHEL FRAUD PREVENTION POLICY DISPLAYED ON BHEL WEBSITE [HTTP://WWW.BHEL.COM](http://www.bhel.com) AND SHALL IMMEDIATELY BRING TO THE NOTICE OF BHEL MANAGEMENT ABOUT ANY FRAUD OR SUSPECTED FRAUD AS SOON AS IT COMES TO THEIR NOTICE. BHEL CONCILIATION SCHEME SHALL BE APPLICABLE.

17. GST TDS CLAUSE: VIDE NOTIFICATION NO. 50/2018 DATED 13.09.18, SECTION 51 CGST HAS BEEN IMPLEMENTED BY CBIC WHICH PROVIDES FOR GST TDS @ 2% (IGST 2% OR CGST 1% + SGST 1%) & SHALL BE APPLICABLE WHERE CONTRACT VALUE IS MORE THAN RS. 2.5 LAKHS & SUPPLIER IS REGISTERED UNDER GST. TDS RETURN SHALL BE FILED AND TDS CERTIFICATES SHALL BE ISSUED BY BHEL AS PER APPLICABLE PROVISIONS. AS PER SEC 51 OF CGST ACT READ WITH NOTIFICATION 50 OF CENTRAL TAX DATED 13TH SEP 2018, TDS SO DEDUCTED SHALL BE REFLECTED ON THE GST PORTAL OF THE VENDOR / CONTRACTOR. IT SHALL BE AS PER PREVAILING GOVERNMENT NORMS AS APPLICABLE.

18. As you are kindly aware that Government e-Marketplace (GeM) is a one stop portal to facilitate online procurement of Goods & Services required by various Government Departments/ Organizations/ PSUs. GeM aims to enhance transparency, efficiency and speed in public procurement. Detailed Instructions/ Guides/ Videos/ FAQs for registration and processes are available on the portal (<https://gem.gov.in>).

BHEL being a PSU, would like that its suppliers / contractors also have visibility on this portal so that GeM can be used for procurement by BHEL.

Hence, you are requested to get yourselves registered on GeM.

19. "The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the firms debarred across BHEL, shall be rejected. The list of firms debarred across BHEL is available on BHEL web site www.bhel.com.

1.0 Integrity commitment, performance of the contract and punitive action thereof:

1.1. Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

1.2. Commitment by Bidder/ Supplier/ Contractor:

1.2.1. The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

1.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

1.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in malpractices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on [www. bhel.com](http://www.bhel.com) and/or under applicable legal provisions”.

20. "A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

a) they have controlling partner (s) in common; ·

or

b) they receive or have received any direct or indirect subsidy/ financial stake from any of them;

or

c) they have the same legal representative/agent for purposes of this bid;

or

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; ·

or

e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from. one bidding manufacturer in more than one bid;

or

f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent/dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf; and
2. Indian/foreign agent on behalf of only one principal, ·

or

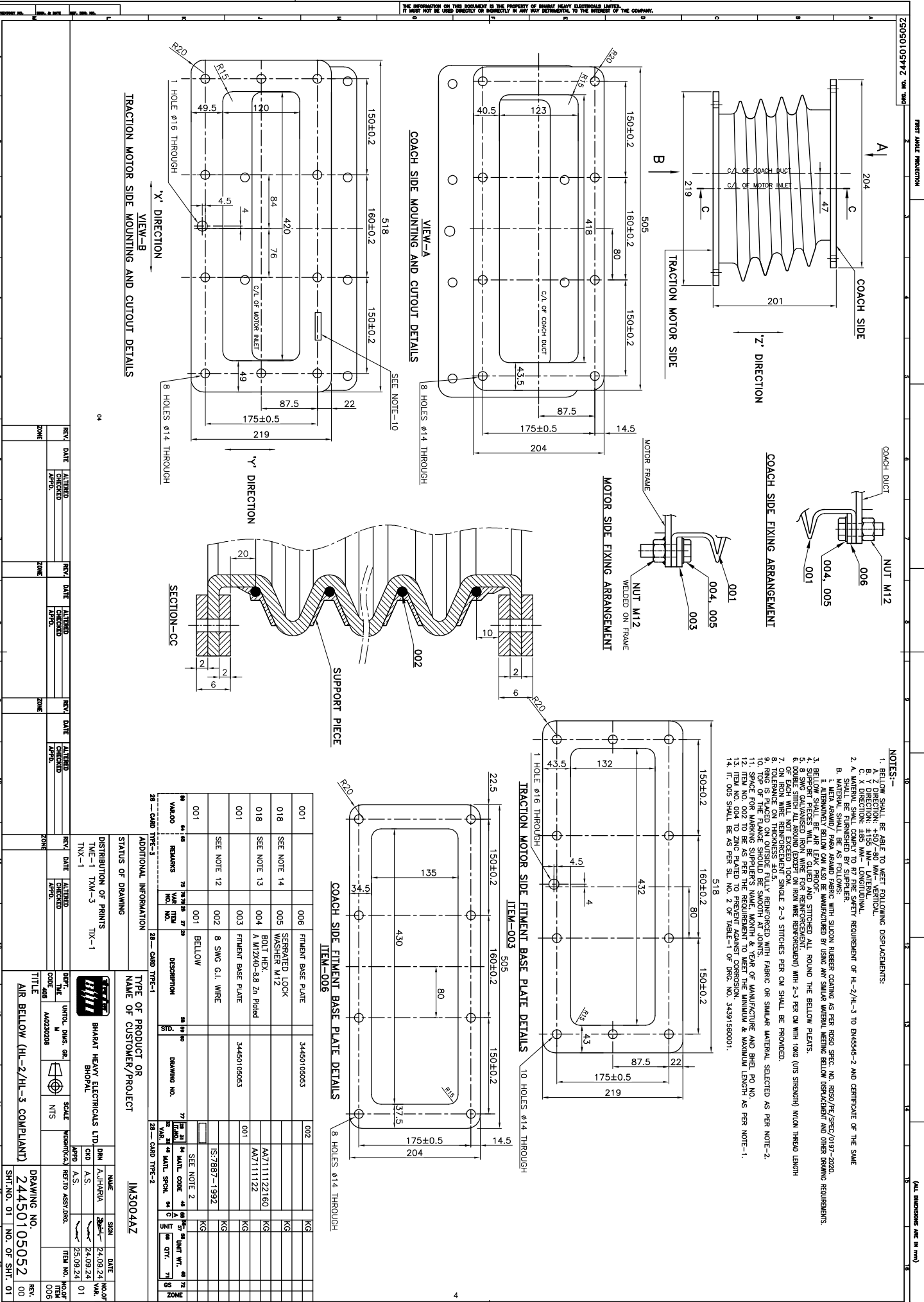
g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, ·

or

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "

21. PERFORMANCE SECURITY: NOT APPLICABLE

GENERAL & SPECIAL TERMS AND CONDITIONS OF ENQUIRY AND INDIGENOUS P.O., BHEL SPECIFICATION, DRAWINGS, DECLARATION AGAINST CARTEL FORMATION ARE ENCLSOED. PLEASE FILL UP TECHNO-COMMERCIAL ANNEXURE AND DECLARATION AGAINST CARTEL FORMATION DULY SEALD AND SIGNED PROPERLY AND SEND IT ALONG WITH YOUR OFFER.



[illegible]

QUALITY PLAN NO. -QAP/QTM/VENDOR QAP/2023-24/ IM3004/ BELLOW FOR AIR INLET ARRANGEMENT DTD. 12.12.2023 REV 00
Reference Document- PO DRAWING/SPECIFICATION

SL. NO	COMPONENT	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	INSPECTION AGENCY	REMARKS
				TP	TP/A					
1)	Raw material (leather for bellows)	1 Physical test 2 Chemical test	TC verification	100%	100%	As per specification mentioned in drawing	As per specification mentioned in drawing	MTC	BHEL/TP/A	1. TC from NABL Lab/ raw material manufacturer to be submitted along with supply 2. Supplier to get the raw material TC correlated with material TC
2)	Dimension	Dimension	TC verified & Measurement	100%	10%	As per drawing & specification	As per drawing & Specification	Supplier record	BHEL/TP/A	Dimension to be Witnessed
3)	Type test	As per specification	TC verification	1 sample per PO	1 sample per PO	As per drawing & specification	As per drawing & Specification	Supplier record	BHEL/TP/A	Record verification
4)	Routine test	As per specification	TC verification	1 sample per lot	1 sample per lot	As per drawing & specification	As per drawing & Specification	Supplier record	BHEL/TP/A	Witness
5)	Identification vendor name, PO & job serial no.	Visual	Visual	100%	10%	As per drawing & specification	As per drawing & Specification	Supplier record	BHEL/TP/A	Witness

Issued By

QTM

PRODUCT STANDARD
TME DIVISION, BHOPAL

TME/2015

TM 12543

Rev.01

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SPECIFICATION OF LEATHER BELLOWS FOR TRACTION MOTOR OF IM3601

1.0 SCOPE :

This specification covers the quality and performance requirements of leather bellows to be used in traction motor type IM3601 for 25 KV ACEMU applications.

1.1 In preparing this specification, reference has been made to the following publications:

- IS: 578 – 1985, 3rd revision, Amendment 1, November 1992- Indian Standard Specification for full chrome upper leather.
- IS: 4054 – 1966, Amendment 1, Reaffirmed 1992 - Indian Standard Specification Neatsfoot oil.
- IS: 582 – 1970, 1st revision, Amendment 1, Reaffirmed 1990 - Indian Standard Specification method of chemical testing of leather.



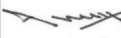
1.2 While the above specification will apply in general, provisions in this specification will prevail in case of any deviation. Any deviations from this specification designed to improve the performance, utility, quality and efficiency of the equipment, proposed by the manufacturer will however be considered provided full particulars of the deviation with justifications thereof are furnished along with detailed drawings and calculations.

2.0 Conditions in which the Bellows are to work:

The Bellows are used to convey atmospheric air to the air inlet chamber of the traction motor. They are required to take up the relative motion between the EMU coach body and the bogies. They are required to convey maximum 45 m³/min. of air at about 47°C without leakage and with the minimum pressure drop across the Bellows. The pressure difference between the air inside the Bellow and the ambient pressure outside will be about 317.06 Pa.

2.1 The Bellows shall be suitable for service in ambient temperature of up to 55° C with maximum relative humidity of 100% under dusty atmospheric conditions.

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Revision Details: As per revision sheet			Distribution	Qty.	Approved	 Manish Verma Sr. DGM/TME	Dt. of 1 st Issue
Rev. No.	Date of Rev	Reaffirmed Year	TME TXM TNX QTM	1 1 1 2	 Prepared J. Kumar Dy. Mgr./TME		
01	11/03/15	Feb 2022			 Checked A. Sharma Manager/TME		22/09/12



TIME/2015

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- 2.2** The outside of the Bellows are likely to be exposed to different types of lubricating oils, apart from the metallic brake block dust and sparks from brake blocks. Further, oil fumes & exhaust fumes from the compressor and exhauster will also be found in the vicinity.
- 2.3** During operation, the Bellows will be subjected to deflection and twisting.
- 2.4** The Bellows are fitted between the air inlet of traction motor and air duct of EMU coach.

3.0 Manufacturing requirements of the traction motor Bellows:

The bellows shall be manufactured in accordance with BHEL drawing no. 24450103001.

- 3.1 The material of the Bellow shall be free from pin holes, cuts and any open surface blemishes likely to cause leakage of air.
- 3.2 The Bellow material shall be oil and water resistant, spark proof and shall remain flexible for long periods.
- 3.3 The Bellows shall be embossed with the name of the manufacturer, month and year of manufacture and the letter 'BHEL' in the location shown in the drawing which should be clearly legible with naked eyes.
- 3.4 All the stitches shall be made by machine. At least two stitches per cm shall be provided throughout. Further, there should be two parallel lines of stitching at each joint, the distance between the lines being not less than 5 mm.
- 3.5 Nylon threads of good quality with minimum of 10kg ultimate breaking strength should be used for stitching.
- 3.6 There should not be more than two joints in the leather throughout length. The joint may be suitably skewed to prevent tearing.
- 3.7 SWG Galvanised Iron Wire stiffeners should be provided all around the leather bellow encasing each 'GI' wire periphery as shown in the BHEL Drg No. 24450103001.



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5. Test required on the finished leather bellow:

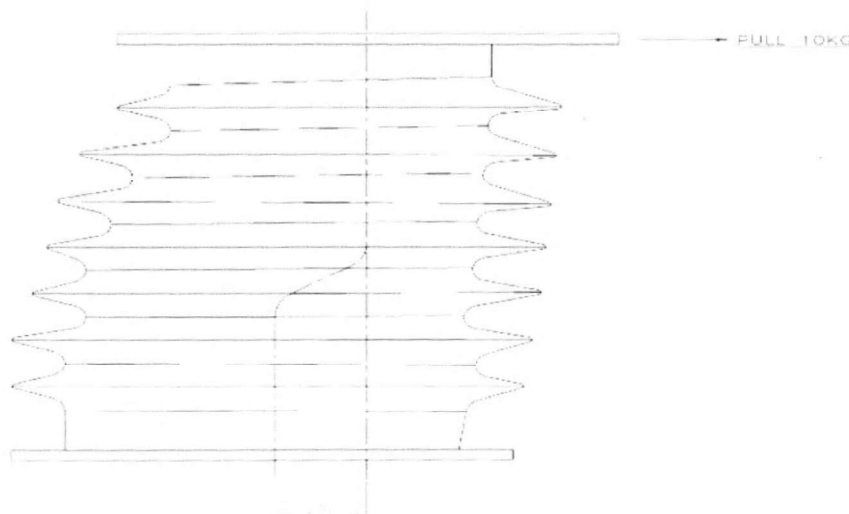
5.1. TYPE TEST

5.1.1 Appearance & Dimensional Check:

The appearance of the bellows shall be checked and no abnormality shall be permitted in respect of rubbing impairment on the leather surface, pin holes, stripping off of the sewn on adhered parts and exposed wire. Bellows shall be dimensionally verified for all the dimensions as per BHEL drawing No. 24450103001.

5.1.2 Maximum Stretch test:

- a) The bellow will be stretched using 200kg weight on the bottom periphery. In the stretched condition angular twist of 5° shall be given, while keeping an offset of 250mm between top and bottom opening. There shall be no failure, breaking of stitches, crack etc. The test shall be repeated three times.
- b) When the bellow is transformed as shown in the figure given below, the amount of transverse movement shall not be less than 75 mm.





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5.1.3 Leak & balloon test:

A suitable test rig should be available with the manufacturer to build up air pressure inside the bellow. The bellow will neither allow any appreciable air leak nor balloon up when air under pressure of 0.5 psi is maintained inside.

5.1.4 Leather quality:

The quality of the leather of buffalo hide will be confirmed to IS: 578 – 1985, 3rd revision, amendment 1, November 1992. The test of leather can be conducted at:

- Central Leather Research Institute, Chennai or its branches.
- F.D.D.I, Noida
- HBTI, Kanpur

For such test on leather quality, one sample from the total ordered quantity will be taken at random. The testing charges will be borne by the supplier & one number extra leather bellow will be manufactured by the supplier for cutting the sample for necessary testing.

The leather test labs must also confirm that there is no splitting of leather being used to manufacture leather bellow.

5.1.5 Endurance Test:

The finished bellow will be subjected to 1,00,000 bellowing operations stretching the bellow from 120mm to 320 mm. The number of cycles per minute shall be 45 ± 5 for the first 50,000 operations and 100 ± 6 cycles per minute for rest of the operations. After the trials, the bellow will be inspected for any cracks / collapse of the bellows, opening of stitches in leather bellows and any other visible physical deterioration.



TIME/2015

PRODUCT STANDARD
TME DIVISION, BHOPAL

TM 12543

Rev.01

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6. Routine Tests:

The tests as detailed above vide **Para 5.1.1 to 5.1.4** shall be carried out as routine tests on all lots of supplies.

7. Special Test:

7.1 Test for fitment at site for development only:

The bellows will be visually inspected for any physical damages or deterioration before fitment. Correct fitment of bellow and tightness of bolts/nuts shall be verified after fitment on the EMU Coach, ensuring that there is no mechanical damage during fitment. A test for air leakage shall be carried out and there will be no leakage of air from the bellows/joints with the traction motor running on full speed.

8. Inspection:

8.1 Prototypes for Development :

Prototype samples will be inspected by representative of BHEL. Inspection shall include visual inspection on the general finish of the product such as quality of finishing, gluing, stitching and marking dimensional accuracy. Type tests including routine tests, as specified in this specification, as well as special tests to be stipulated by BHEL for ascertaining the suitability of the prototype, will also be conducted, either at the premises of the manufacturer or in a NABL/RDSO approved test laboratory at the cost of manufacturer. These type tests will be witnessed by BHEL at an interval of 2 years. However, in case failure is reported for the bellow supplied by the vendor, BHEL at his discretion may call for prototype inspection before 2 years. In addition, BHEL authorities inspecting the prototype may at his discretion, call for such special tests as are not specified in this specification, as he may consider necessary for determining the quality of the material and workmanship.

8.2 Routine Tests:

Routine tests as detailed above vide Para 5.1.1 to 5.1.4 will be witnessed by BHEL or BHEL authorised third party agency. The inspection will be done as per IS: 2500 (Part-I) – 1992 titled 'Sampling Inspection Procedures: Indexed by acceptable quality level (AQL) for lot-by-lot inspection second (revision) at AQL of 1 per cent and third level inspection as per table 1 with single sampling plans.

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CORPORATE STANDARD

GENERAL TOLERANCES – TOLERANCES FOR LINEAR AND ANGULAR DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS

0.0 GENERAL

When selecting the tolerance class, the respective customary workshop accuracy has to be taken into consideration. If smaller tolerances are required or larger tolerances are permissible and more economical for any individual feature, such tolerances should be indicated to the relevant nominal dimension(s).

General tolerance for linear and angular dimensions apply when drawings or associated specifications refer to this standard in accordance with clauses 3 and 4. If there are general tolerances for other International standards, reference shall be made to them on the drawings or associated specifications. For a dimension between an unfinished and a finished surface, e.g. of cast or forged parts, for which no individual tolerance is directly indicated, the larger of the two general tolerances in question applies, e.g. for castings, see ISO 8062, Castings - system of Dimensional Tolerances.

1.0 SCOPE

The standard is intended to simplify drawing indications and it specifies general tolerances for linear and angular dimensions without individual tolerance indications in four tolerance classes.

It applies to the dimensions of parts that are produced by metal removal or parts that are formed from sheet metal.

NOTE:

- 1) The concepts behind the general tolerancing of linear and angular dimensions are described in Annex-A.
- 2) These tolerances may be suitable for use with materials other than metals.

This standard only applies for the following dimensions which do not have an individual tolerance indication:

- a) Linear dimensions (e.g. external sizes, internal sizes, step sizes, diameters, radii, distances, external radii and chamfer heights for broken edges).
- b) Angular dimensions, including angular dimensions usually not indicated, e.g. right angles (90°), unless reference to IS: 2102 (Part 2) is made, or angles of uniform polygons.
- c) Linear and angular dimensions produced by machining assembled parts.

It does not apply for the following dimensions:

- Linear and angular dimensions which are covered by reference to other standards on general tolerances.
- Auxiliary dimensions indicated in brackets.
- Theoretically exact dimensions indicated in rectangular frames.

2.0 COMPLIANCE WITH STANDARDS

This standard is based on IS: 2102 (Part 1)-1993 (ISO 2768-1).

3.0 GENERAL TOLERANCES

- 3.1** Linear dimensions are given in Table 1 and 2.
- 3.2** Angular dimensions: General tolerance specified in angular units control only the general orientation of lines or line elements of surfaces, but not their form deviations.

The general orientation of the line derived from the actual surface is the orientation of the contracting line of ideal geometrical form. The maximum distance between the contacting line and the actual line shall be the least possible value (see IS: 12160).

The permissible deviations of angular dimensions are given in Table 3.

