



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
QUALITY CONTROL TRANSPORTATION
QUALITY ASSURANCE PLAN (QAP)

QUALITY PLAN NO. - QAP/QTM/VENDORQAP/2023-24/ cast steel ventilators (cast by Investment casting process)/IM3004 REV 00 DTD 08.04.2023
Part 1: Final inspection of the ventilators before dispatch from vendor works (#)

Sl. No	Name of the process	Parameters for inspection	Quantum of check*		Mode of inspection/ equipment used	Drawing No./Spec./ Std.	Acceptance norms***	Requirement from supplier (See note 1)
			TP/Supplier	TP/IA/QC*				
1	Heat Treatment	Soaking temperature/ Soaking time	100%	100% TC to be verified	Temperature recorder/ Time temperature charts	Heat treatment requirement as per BHEL specification mentioned in the drawing	Mechanical properties as specified in the BHEL specification	Heat treatment report and graph to be provided to BHEL
2	Shot/Sand blasting	Casting surface finish	100%	20%	Instrument	As per BHEL drawing	Surface finish to be less than 15µm Ra in 100% area except profile transition zone (Ref. IS: 3073)	Report of shot/sand blasting and surface finish to be provided to BHEL
3	Melt Analysis	Chemical composition mentioned in the BHEL specification /drawing	One sample per heat/ per treatment batch	100% TC to be verified	Spectrometer / Wet analysis method	As per BHEL drawing/ specification	As per BHEL drawing/specificat ion	TC (from casting manufacturer or NABL accredited lab) to be provided to BHEL. Three test samples \$ per heat / per heat treatment batch is to be verified by TPIA (for
4	Mechanical Testing	Mechanical properties mentioned in the BHEL specification /drawing	One sample per heat/ per treatment batch	100% TC to be verified	Mechanical testing equipment	As per BHEL drawing/ specification	As per BHEL drawing/specificat ion	


अभिषेक सेन / AMIT SEN

अभिषेक / Engineer

कर्मचारी विभाग / Q.T.M. Division

भारत भारती, भोपाल/B.P. EL, BHOPAL

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			TP/Supplier	TP/IA/QC*				
								heat & heat treatment batch punched by supplier matching with test certificate reports above) to be provided to BHEL.
\$.: 1) As item manufactured is by investment casting, 3 test pieces of size Ø30 X 260 ±10 to be supplied.								
5	Hardness checking on casting	Hardness limit mentioned in the BHEL specification/ drawing	20% of ventilators/ Heat treatment batch / Lot	10% of ventilators / Heat treatment batch / Lot	Hardness testing equipment	As per BHEL drawing/ specification	As per BHEL drawing/specificat ion	Hardness test report to be provided to BHEL
6	Non Destructive Tests (NDT) (DP/MP/UT) (Before final machining)	DP/MP/UT tests as mentioned in the BHEL drawing/ specification	100% (DP) or Sampling percentage as mentioned in the BHEL drawing / specification	20% (DP)	NDT equipment	As per BHEL drawing/ specification	As per BHEL drawing/ specification	NDT (DP/MP/UT) report of 100% ventilators or sampling percentage as mentioned in the BHEL drawing / specification shall be submitted along with consent. Report issuing inspector shall be
			100% (MP) or Sampling percentage as mentioned in the BHEL drawing / specification	20% (MP)				


 अभिषेक / AMIT SEN
 अभिषेक / Engineer
 अभिषेक / अभिषेक / C.T.M. Division
 अभिषेक / अभिषेक / अभिषेक / अभिषेक

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			TP/Supplier	TP/A/QC*				
								ISNT/ASNT level-II in respective NDT test and reports shall be duly signed & stamped by inspector.
								Radiography report & films of 10% ventilators or sampling percentage as mentioned in BHEL drawing / specification shall be submitted. Report issuing inspector shall be ISNT/ASNT level-II in radiography and reports shall be duly signed & stamped by inspector.
7	Non Destructive Tests (NDT) (Radiography) (Before final machining)	Radiography tests as mentioned in the BHEL drawing/ specification	10% (Radiography) or Sampling percentage as mentioned in the BHEL drawing/ specification/ PO (whichever is higher)	Verification of radiography report & films for meeting drg. requirement & correlation with ventilators	NDT equipment	As per BHEL drawing/ specification	As per BHEL drawing/ specification	

Note: BHEL reserve the right to carry out radiography test at BHEL Bhopal on randomly selected jobs or jobs for which radiography report & films have been submitted by the supplier for ensuring radiography requirement.


31/03/2017/AMIT SEN

Inspector / Engineer

Q.T.M. Division

Q.T.M. Division

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			TP/Supplier	TP/IA/QC*				
8	Dimensional Inspection	Critical to quality (CTQ) dimensions as marked in drawing	100%	20% (Min.)	3D CMM/ Instruments & Gauges	As per BHEL drawing	As per BHEL drawing	Dimensional report to be provided to BHEL
		Other dimensions (machined/ un-machined)						
9	Balancing	Static & Dynamic balancing	100%	5%	Visual	As per BHEL drawing	As per BHEL drawing	Balancing report to be provided to BHEL
10	Visual Inspection	Free from visual defect	100%	100%	Visual	-	Ventilator to be free from any abnormality such as blow hole, pin hole, dent etc.	-
11	Identification Marking	Identification marking on the location shown in drawing or location may be taken from BHEL Engg. Dept.	100%	100%	Verification	As per BHEL drawing/ specification TM12458	Identification marking as per BHEL drawing/specification TM12548	-
12	Temporary rust preventive (TRP)	TRP on ventilator all over	100%	100%	Visual	As per BHEL drawing	As per BHEL drawing	-
13	Packing	Packing suitability for transit & storage	100%	-	Visual	-	-	Each ventilator shall be suitably packed & wrapped to avoid any damage to ventilators during transit and ingress of water. Note: In case any damage to machine surface found during inspection at BHEL, job will be liable to be rejected.


 अमित सेन / AMIT SEN
 अभियंता / Engineer
 गुण रक्षा विभाग / Q.T.M. Division

14	List of Calibration records of used measuring & Testing Equipment's	Calibration due date, accreditation status of master instruments	100%	100%	Verification	-	-	List of Calibration records of measuring and Testing instruments is to be provided to BHEL.
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Notes:

- 1) All test records checked by TP, TPJA/QC (dully signed & sealed) as per above QAP requirement shall be submitted along with consignment.
- 2) Final acceptance will be based on inspection at BHEL, Bhopal.
- 3) (*) Quantum of inspection shall be in line with QAP unless otherwise mentioned in the drawing.
- 4) (**) Job shall be randomly selected from offered lot, the quantum of check (min. 1 no.) from the offered lot to be checked by TPJA or QC. (e.g.: If lot size is 2 then minimum one no is to be checked).

- 5) (***) Sample inspection of ventilator does not mean that the supplier will not meet drawing & specification requirements in remaining ventilators. In case any defect / non-conformance is observed at any stage (during processing or before and after fitment in any job), the same is liable to be rejected and same shall be replaced immediately by the supplier at BHEL or BHEL Customer site (wherever deficiency is observed) and necessary penal action will be taken as per BHEL norms.

Part II: Requirement of clearance of 1st lot from BHEL:

- 1) First lot of item shall be supplied after meeting all QAP requirements to BHEL Bhopal and supply of subsequent lots shall be undertaken only after clearance of first lot by BHEL Bhopal.
- 2) Vendor has to initiate the supplies as per PO delivery only. Delay in supply of first lot of ventilators or rejection of ventilators due to any non-conformity/ quality deficiency shall not be considered as reason for delay in supply of ventilators in subsequent deliveries as per PO delivery requirement.
- 3) Initial clearance of 1st lot of items does not absolve the supplier from supply of items as per drawing and specification requirement in subsequent lots.

Meaning of Legends: '#' - Supplier to submit test certificates & reports of above mentioned parameters.

Abbreviation: TPJA –BHEL appointed third Party Inspecting Agency, T P – Task Performer (Vendor), QC- Quality Control (QIX / BHEL appointed inspection agency)

Issued

BY
अमित सेन / AMIT SEN
अभियंता / Engineer
आर.पी.एम. विभाग / Q.T.M. Division
भारतीय रेल, भोपाल/BHEL, BHOPAL

Approved

BY
गोबिंद सिंह राठौर / G.S. RATHORE
अधीक्षक / Dy. Manager
आर.पी.एम. विभाग / Q.T.M. Division
भारतीय रेल, भोपाल/BHEL, BHOPAL