

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

QA Plan for Frame casting (semi-finished)

QAP No: QTM/QAP/VENDOR/25-26/024 REV.00 Dt:01.07.2025

Part 1: Raw material Inspection

I.N o.	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	Raw Material Inspection	Chemical properties, Mechanical Properties	Per Batch/lot	100 % TC verification	RR	As per PO Drawing/ spec	As per PO Drawing/ spec	Material Certificate, Inspection Report

गजेन्द्र सिंह राठौर / G.S. RATHORE  
उप प्रबंधक / Dy. Manager  
क्यू. टी. एम. विभाग / Q.T.M. Division  
बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL

EX.sinh

अमित सेन / AMIT SEN  
इंजीनियर / Engineer  
क्यू. टी. एम. विभाग / Q.T.M. Division  
बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL

राजेश कुमार / RAJESH KUMAR  
उप महाप्रबंधक / Dy. General Manager  
टी.एक्स.एम. विभाग / T.X.M. Division  
बी.एच.ई.एल., भोपाल / B.H.E.L., BHOPAL

Signature  
Signature

## Part 2: Final Inspection

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	TPIA/QC**				
1.	Casting properties	1.Chemical , Mechanical properties	Per heat/heat treatment batch	100 % TC Verification	Verification	Supplier internal standard	As per drawing & specification	1.NABL/govt. Approved lab Test report per heat to be reviewed by TPIA.
2.	Heat treatment	Soaking temperature/ soaking time	Per heat/heat treatment batch	100 % TC Verification	Temperature recorder/ time temperature chart	Supplier internal standard	As per drawing & specification	Heat treatment report and graph shall be provided to BHEL Duly reviewed by TPIA.
3	Test sample	sample with frame casting	3 sample Per heat	2 sample Per heat	RR			3 no. of test sample to be submitted to BHEL duly punched by TPIA.
4	Shot/Sand blasting	Casting surface finish	100%	20%	Instrument	As per BHEL drawing	As per BHEL drawing	Report of sand blasting to be provided to BHEL.
5.	Appearance of casting-surface acceptance/ visual Examination	Assessment of surface roughness (SG of raw casting (SG iron castings)	100%	20%	IS-3073 / ASTM A 802	As per drawing	As per drawing	Internal visual/ surface acceptance reports duly reviewed by inspection agency & witness reports shall be provided to BHEL.

अमित, सेन / AMIT SEN

अभियंता / Engineer

क्यू. टी. एम. विभाग / Q.T.M. Division

बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

B.K. Singh

गजेन्द्र सिंह राठोड़ / G.S. RATHORE

उप प्रबंधक / Dy. Manager

क्यू. टी. एम. विभाग / Q.T.M. Division

बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

राजेश कुमार / RAJESH KUMAR

उप प्रबंधक / Dy. General Manager

टी.एक्स.एम. विभाग / TXM Division

बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

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			TP/Supplier	TP/A/QC**				
6.	Dimensional inspection	Dimension check by instrument & Gauges	100%	20%	Measurement by instrument & Gauges	As per drawing	As per drawing	Internal Dimensional reports duly reviewed by inspection agency & witness reports shall be provided to BHEL.
7	NDT testing	Ultrasonic testing	100%	10%	NDT equipment	As per drawing & specification	As per BHEL drawing & specification	To be performed by ISNT/ASNT, Level -2 NDT certified person at vendor works & witnessed by TPIA.
		MPI	100%	10%				
8	Embossing	Visual	100%	100%	Visual	As per drawing	As per drawing	All information as per drawing to be embossed on stator chambers at the location as mentioned in drawing.
9	Identification	Frame SI no., supplier details, PO and other details	100%	100%	Visual	As per drawing/ specification	As per drawing/ specification	
10	Visual Inspection	Check for surface defects like cracks, porosity, and finish quality.	100%	100%	Visual	-	Component shall be free from any abnormality such as blow hole, pin hole, dent, scratch etc.	-
11	Paint (Visual, Dry paint thickness and adhesion test)	Inorganic ethyl zinc silicate primer paint (Specification AA56113) on cast surface	100%	100% (Visual) & 10% per lot (DFT & adhesion test)	Visual and instruments	As per relevant BHEL drawing/ specification TM94217 (latest revision)	As per relevant BHEL drawing/ specification TM94217	Report to be submitted for <ul style="list-style-type: none"> <li>• Visual</li> <li>• DFT</li> <li>• Adhesion</li> </ul>

राजेश कुमार / RAJESH KUMAR  
उप महाप्रबंधक / Dy. General Manager  
टी.एस.एम. विभाग / TSM Division  
बी.एच.ई.एल. भोपाल / BHEL Bhopal

गजेन्द्र सिंह राठौर / G.S. RATHORE  
उप प्रबंधक / Dy. Manager  
टी.एस.एम. विभाग / TSM Division

BK Singh

अमित सेन / AMIT SEN  
अभियंता / Engineer  
क्यू.टी.एम. विभाग / Q.T.M. Division

अमित सेन / AMIT SEN

सिद्धार्थ / Siddharth  
सि.एम. विभाग / S.M. Division  
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12.	List of calibration records of measuring and testing instrument	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
13..	Packing	Packaging suitability for transit & storage	100%	-	Visual	-	-	Each component shall be suitably packed & wrapped to avoid any damage to components during transit and ingress of water. Note: In case any damage to machined surface found during inspection at BHEL, job will be liable to be rejected.

**Notes:**

- 1) All test records checked by TP, TP/IA/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 TPIA or QC. (e.g.: If lot size is 2 then minimum one no is to be checked).

- 5) Sample inspection of component does not mean that the supplier will not meet drawing & specification requirements in remaining components. In case any defect / non-conformance is observed at any stage (during machining 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.

अमित सेन / AMIT SEN

अभिज्ञान / Engineer

महेश कुमार, टी.एम. विभाग / Q.T.M. Division  
बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

गजेन्द्र सिंह राठौर / G.S. RATHORE

उप प्रबंधक / Dy. Manager

क्यू.टी.एम. विभाग / Q.T.M. Division  
बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

राजेश कुमार / RAJESH KUMAR

उप महाप्रबंधक / Dy. General Manager




टी.एक्स.एम. विभाग / T.X.M. Division  
बी.एच.ई.एल., भोपाल / BHEL, BHOPAL


## Part II: Requirement of clearance of 1<sup>st</sup> 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 components or rejection of components due to any non-conformity/ quality deficiency shall not be considered as reason for delay in supply of components 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: TPIA -BHEL appointed third Party Inspecting Agency, T P – Task Performer (vendor), QC-QIX.**

Prepared by:	Approved by:	Issued by:
 <b>QTM</b> अमित सेन /AMIT SEN अभियंता /Engineer क्यू.टी.एम. विभाग /Q.T.M. Division बी.एच.ई.एल., भोपाल/BHEL, BHOPAL	 <b>QTM</b> राजेन्द्र सिंह राठौर /G.S. RATHORE उप प्रबंधक /Dy. Manager क्यू.टी.एम. विभाग /QTM Division बी.एच.ई.एल., भोपाल/BHEL, BHOPAL	 <b>QTM</b> राजेश कुमार /Rajesh Kumar उप महाप्रबंधक /Dy. General Manager टी.एक्स.एम. विभाग /TXM Division बी.एच.ई.एल., भोपाल/BHEL, BHOPAL

  
**Manager**  
 विपिन कुमार धल्ले /Vipin Kumar Dhal  
 प्रबंधक /Manager  
 डलाई विभाग / Foundry Division  
 बी.एच.ई.एल., भोपाल /B.H.E.L., BHOPAL