

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

QA Plan for casting/ rough machined cast components No : QTM/QAP/VENDOR/13-14/001 Rev.02 Dt:01.08.2017

Part 1: Final inspection of the component 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	Remarks (See note 1)
			TP/Supplier	TPIA/QC*				
1	Casting for magnet frame and bearing assembly components (End shields, wipers, bearing cap/ covers etc).	Source of casting	100%	100%	Proof of source of casting	-	Casting manufacturer shall be RDSO approved class A foundry	Proof of source of casting to be provided to BHEL
2	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 spec.	Heat treatment report and graph to be provided to BHEL.
3	Shot/Sand Blasting	Casting surface finish	100%	20%	Instrument	As per BHEL drawing	Surface finish to be less than 50µm in 100% area except profile transition zone (Ref. IS:3073)	Report of shot/sand blasting and surface finish to be provided to BHEL
4	Melt analysis	Chemical Composition	One sample/ heat / Lot	100% TC to be verified	Spectrometer / Wet analysis method	As per BHEL Drawing/ specification	As per BHEL Drawing/spec	TC (as per specification) along with test sample duly approved by TPIA to be provided to BHEL.
5	Mechanical Testing	Mechanical properties mentioned in the BHEL spec./drawing	One sample/ Heat treatment batch / Lot	100% TC to be verified	Mechanical testing Equipment	As per BHEL Drawing/ specification	As per BHEL Drawing/spec	

Sl. No	Name of the process	Parameters for inspection	Quantum of check		Mode of inspection/ equipment used	Drawing No./Spec/ Std.	Acceptance norms	Remarks (See note 1)
			TP/Supplier	TPIA/QC*				
6	Identification marking	Identification marking by embossing on castings along with embossing of pattern no. on casting	100%	100%	Visual	As per BHEL drawing/ specification TM12548	Identification marking as per BHEL drawing/spec. TM12548 & embossed pattern no.	-
7	Dimensional Inspection	Cast Dimensions	All drawing dimension of 100% component	All drawing dimension of 10% component	Instrument	As per BHEL drawing	1) a) In case order is as per casting drawing: As per BHEL drawing. b) In case order is as per rough m/cd drawing: As per BHEL drawing along with concentricity less than 1mm. c) In case order is from finish machined drawing: 4(+/- 0.5)mm machining allowances on each tool point along with concentricity less than 1mm. 2) Centre line on each job should be marked to ensure the cast, rough m/cd dimensions as per the casting, rough m/cd drawing requirement or machining allowance on each tool point of finish machined drawing.	Dimensional witness report to be provided to BHEL.
		Rough machined Dimensions	All drawing dimension of 100% component	All drawing dimension of 20% component				

Sl. No	Name of the process	Parameters for inspection	Quantum of check		Mode of inspection/ equipment used	Drawing No./Spec/ Std.	Acceptance norms	Remarks (See note 1)
			TP/Supplier	TPIA/QC*				
8	Non Destructive Tests (NDT)	NDT tests as mentioned in the BHEL drg/ spec.	100% or Sampling percentage as mentioned in the BHEL drg/ spec. (whichever is higher).	100%	NDT equipment	As per BHEL Drawing/ specification	As per BHEL Drawing/ specification	NDT report to be provided to BHEL
9	Visual Inspection	Component to be free from any abnormality such as blow hole, pin hole, dent etc.	100%	100%	Visual	As per BHEL drawing/ Specification	Free from visual defect.	-

Notes:

- 1) All test records checked by TP, TPIA/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) If at any stage during processing of job any defect is observed then job/ lot is liable to be rejected.
- 4) (*) Job shall be randomly selected as per quantum of check (min. 1 no.) from the offered job by TPIA/QC.

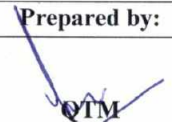
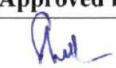
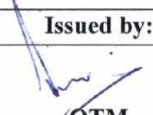
Part II: Requirement of prototype clearance by firm from BHEL:

1. In case of any supply of components (against a particular drawing) for which no supply has been done earlier by vendor to BHEL, prototype clearance of 2 nos./sets (in case of procurement in kit form) of components from BHEL will be required before bulk supply.
2. In case of change of pattern for any castings against a particular drawing, prototype clearance of 2 nos./sets (in case of procurement in kit form) of component from BHEL will be required before bulk supply.

Note: Prototype clearance of castings does not absolve the supplier from supply of castings as per drawing & specification requirements during bulk supply.

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 / Supplier.

Prepared by:	Approved by:		Issued by:
 QTM (P. Paigvar)	 TME	 TXM (S. Chandrasekar)	 QTM (S.M.D. LOGH)
			 QTM (P. Paigvar)