

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

QA Plan for forging/ rough machined forge components No : QTM/QAP/VENDOR/13-14/002 REV.02 Dt:02.08.2017

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	Requirement from supplier (See note 1)
			TP/Supplier	TPIA/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 spec.	Heat treatment report and graph to be provided to BHEL.
2	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	1.TC (as per specification format) from NABL approved Lab for shaft forging. 2.TC (as per specification format) for other forging.
3	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	3.Test sample duly approved by TPIA to be provided to BHEL.
4	Reduction Ratio	Reduction ratio from Ingot to bloom & bloom to blank	100%	100% TC to be verified	Dimensional measuring instruments	As per BHEL Drawing/ specification	Stage wise reduction ratio calculation & its measurement on actual job.	Dimensional measurement report for reduction ratio.
5	Identification marking	Identification marking by punching/ engraving on forging	100%	100%	Visual	As per BHEL drawing/ specification TM12548	Identification marking as per BHEL drawing/spec. TM12548	-

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*				
6	Dimensional Inspection	Forge Dimension	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 forging 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 forge, rough m/cd dimensions as per the forging, 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 dimension	All drawing dimension of 100% component	All drawing dimension of 20% component				
7	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

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*				
8	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) and test sample as per above QAP requirement shall be submitted along with consignment.
- 2) Final acceptance will be based on inspection and testing 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.

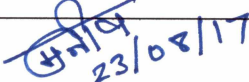
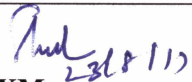
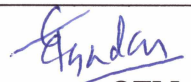
Part II: Requirement of prototype clearance by firm from BHEL:

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.

Note: Prototype clearance of forging does not absolve the supplier from supply of forging 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:
 QPM	 TME	 TXM	 QTM