

QA Plan for Rotor Shaft (Rough)) for HS15250

QAP No : QTM/QAP/VENDOR/24.25/004 REV.00 Dt:15.05.2024

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	Melt analysis	Chemical Composition	One sample/ heat / Lot	100% TC Verification	Spectrometer / Wet analysis method	As per PO drawing/ specification	As per PO drawing/ specification	a). TC (as per specification format or supplier's format with all parameters of specification format) from NABL accredited Lab. b). Three shafts with extended length of 300 mm per heat / per heat treatment batch to be punched marked on extended portion by supplier. Same to be correlated by TP/IA (for heat & heat treatment batch punched by supplier matching with test certificate reports, provided against clause 1(a)). Extended portion of 3 nos. shaft per heat per heat treatment batch (correlated above) shall be duly seal marked by TP/IA before parting from shaft. Extended portion of shaft (Duly seal marked by TP/IA) to be supplied along with consignment.
2	Mechanical Testing	Mechanical properties mentioned in the PO BHEL drawing/ specification/ drawing	One sample/ Heat treatment batch / Lot	100% TC Verification	Mechanical testing equipment	As per PO drawing/ specification	As per PO drawing/ specification	
3	Heat treatment	Soaking temperature/ soaking time	100%	100% TC Verification	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 shall be provided to BHEL

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No.	Process	Inspection	TP/Supplier		Inspection equipment used	No./L Std.	Acceptance norms***	Requirement from supplier (See note 1)
			TP/Supplier	TP/IA/QC**				
4	Reduction Ratio	Reduction ratio from Ingot to shaft bar (i.e. min. 6)	Reduction ratio shall be ensured in 100% jobs. Measurement on actual job (min. 1 no. per supplied lot)	100% TC (per heat per heat treatment batch) to be verified	Dimensional measuring instruments	As per PO drawing/ specification	As per PO drawing/ specification	
5	Metallographic parameters	Metallographic parameters (inclusion, grain size, ferrite content etc.) applicable as mentioned in the BHEL drawing/ specification	One sample/ Heat treatment batch / Lot	100% TC Verification	Instrument	As per PO drawing/ specification	As per PO drawing/ specification	Microstructure report shall be submitted to BHEL
6	Non Destructive Tests (NDT)	Ultrasonic testing (UT) as mentioned in the PO drawing/ specification.	100%	10% (To be witnessed by TPIA, Level-2 NDT certified person at vendor works)	NDT equipment	As per PO drawing/ specification	As per PO drawing/ specification	NDT report shall be provided to BHEL along with consignment.
7	Magna Flux test	Magna Flux test as mentioned in the PO drawing/ specification.	100%	10% (To be witnessed by TPIA)	Instrument	As per PO drawing/ specification	As per PO drawing/ specification	Test report to be submitted to BHEL
8	Hardness check on forging	Hardness limit mentioned in the BHEL specification/ drawing	100% of components of each lot	100% of components of each lot	Hardness tester	As per PO drawing/ specification	As per PO drawing/ specification	Hardness test report shall be provided to BHEL
9	Dimensions	Critical to quality (CTQ) dimensions	100%	20%	Instruments	As per PO drawing/ specification	As per PO drawing/ specification	Dimensional report shall be provided to BHEL.

No.	Name of the process	Parameters for inspection	Quantum of Check*		Mode of inspection/ equipment used	Draw. No./Spec./ Std.	Acceptance norms***	Requirement from supplier (See note 1)
			TP/Supplier	TP/IA/QC**				
10	Identification marking	Identification marking by punching/ engraving on the location shown in drawing.	100%	100%	Visual	As per PO drawing/ specification	As per PO drawing/ specification	
11	Visual Inspection	Free from visual defect.	100%	100%	Visual	-	Component shall be free from any abnormality such as blow hole, pin hole, dent, scratch etc.	-
12	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 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 TP/IA 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 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.

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Part II: Requirement of clearance of 1st lot by 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.

Abbreviation: TPJA –BHEL appointed third Party Inspecting Agency, T P – Task Performer (Vendor), QC-QIX.

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