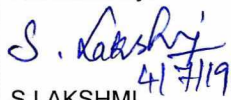


**Advanced Technology Products
High Pressure Boiler Plant**

Generic QAP for Hemi Spherical Ball Housing

CUSTOMER	Nuclear Power Corporation of India Limited (NPCIL)
PROJECT	Gorakhpur Haryana Anu Vidyut Pariyojana (GHAVP-1&2)
W.O.	D157 to D160-001-1-93-171

BHEL / Quality Assurance & Engineering			NPCIL
Prepared by:  O R NITHIN  NITHIN K KRISHNAN	Reviewed by:  S LAKSHMI  M ARUN KUMAR	Approved by:  M LAKSHMINARASIMHAN	

REVISIONS			
REVISION No.	DATE	DESCRIPTION	ORIGINATOR
00	01.07.2019	Initial Issue	Nithin K Krishnan

Supplier's LOGO	Supplier's Name and Address	Quality Plan for Hemi Spherical Ball Housing						Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No.: To be filled				
		(QAP: GHAVP: HEMI SPHERICAL BALL HOUSING: 01/ Rev 00)										
		Item: Hemi Spherical Ball Housing Material of Hemi Spherical Ball: 34CrNiMo6 (EN 10269:1.6582) Material of Ball Housing: SA193 GR. B7 Sub-system: Steam Generator			QP No.: To be filled by Supplier Rev. No.: To be filled by Supplier Date: To be filled by Supplier Page No: 1 of 4							
Sl. No	Component & Operations	Characteristics	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record		Agency M B N			Remarks
1.	2.	3.	4.	5.	6.	7.	8.	D *	9. **			10.
1.0	Raw Material:											
1.1	Verification of Documents	Chemical	T.C. Verification	Sample/ heat	As per approved specification no. BHEL: 700MWe: Hemi Spherical Ball Housing: 001	TC	√	P	R	R	Refer note-1	
1.2		Mechanical	T.C. Verification	Sample/ heat	As per approved specification no. BHEL: 700MWe: Hemi Spherical Ball Housing: 001	TC	√	P	R	R	Refer note-1	
2.0	Testing of raw material:											
2.1	Ultrasonic testing of blanks	Material Integrity	NDE of metal	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001& approved procedure: (UT Procedure to be submitted)	TC	√	P	R	R	Refer note-5 & 7	
3.0	Ball Housing:											
3.1	Proof machining of ball housing	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	

				LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: SUPPLIER B: BHEL N: NPCIL/TPI P: PERFORM R: REVIEW W: WITNESS AND H: HOLD TC: TEST CERTIFICATE RD: RECORD HD: HISTORY DOCKET IR: INSPECTION REPORT
Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled		BHEL	NPCIL	

Nithin
04/07/19
[Nithin-K-Krishnam]

N.K.R
04/07/19
[NITHIN.K.R]

Supplier's LOGO	Supplier's Name and Address	Quality Plan for Hemi Spherical Ball Housing							Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No.: To be filled			
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3.2	Heat Treatment	Quenching and Tempering	Verification of HT record	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001 & approved procedure: (HT Procedure/plan to be submitted)	TC	√	P	R	R	Refer note-4	
3.3	LPE & MPE of Ball housing	Surface/Sub Surface defects.	NDE of metal	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001 & approved procedure: (LPE & MPE Procedure to be submitted)	TC	√	P	R	R	Refer note-5, 6 & 7	
3.4	Drilling of dia. 20 mm holes	Drilling	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	
3.5	Machining of spherical face	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	
3.6	Groove making for greasing	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	
3.7	M8 x 1.25 Threading	Threading	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	
3.8	M100 x 6 threading	Threading	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5	
3.9	LPE of Ball housing on Machined surfaces (Other than threaded area and holes)	Surface defects	NDE of metal	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001 & approved procedure: (LPE Procedure to be submitted)	TC	√	P	W	W	Refer note-5, 6 & 7	

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Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled		BHEL	NPCIL	

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Supplier's LOGO		Supplier's Name and Address		Quality Plan for Hemi Spherical Ball Housing						Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No.: To be filled			
				(QAP: GHAVP: HEMI SPHERICAL BALL HOUSING: 01/ Rev 00)									
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3.10	Hardness check on the spherical surface of radius, R70	Hardness measurement	Hardness	100%	As per standard	TC	√	P	W	W	Refer note-5 & 8		
3.11	Final Dimensional Check	Dimension , Gauge check of threads	Measurement, Gauge Check	100%	As per drawing (Drg: To be submitted)	TC	√	P	W	R			
4.0	Hemi Spherical Ball:												
4.1	Proof machining of Hemi spherical ball	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5		
4.2	Heat Treatment	Quenching and Tempering	Verification of HT record	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001 & approved procedure: (HT Procedure/plan to be submitted)	TC	√	P	R	R	Refer note-4		
4.3	LPE & MPE of Hemi spherical Ball	Surface/Sub Surface defects.	NDE of metal	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001 & approved procedure: (LPE & MPE Procedure to be submitted)	TC	√	P	R	R	Refer note-5, 6 & 7		
4.4	Machining of spherical face	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	---	--	P	R	--	Refer note-5		
4.5	Drilling of holes	Drilling	Measurement	100%	Approved Drawing (Drawing to be submitted)	--	--	P	R	--	Refer note-5		

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Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled			BHEL	
			NPCIL	

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04/07/19

Supplier's LOGO		Supplier's Name and Address		Quality Plan for Hemi Spherical Ball Housing						Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No.: To be filled			
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4.6	LPE of hemi spherical ball other than hole areas.	Material Integrity	NDE of metal	100%	As per BHEL: 700MWe: Hemi Spherical Ball Housing: 001& approved procedure: (LPE Procedure to be submitted)	TC	√	P	W	W	Refer note-5, 6 & 7		
4.7	Hardness check on the hemispherical surface	Hardness measurement	Hardness	100%	As per standard & Specification BHE:700MWe:SPH BRNG:001	TC	√	P	W	W	Refer note-5 & 8		
4.8	Final Dimensional Check	Dimension	Measurement	100%	As per drawing (Drg: To be submitted)	TC	√	P	W	R			
5.0	Assembly of Hemi Spherical Ball Housing:												
5.1	Lapping of Hemi Spherical ball and ball housing	Lapping	Visual check , Surface finish & Blue matching	100%	As per approved procedure (Lapping Procedure to be submitted)	TC	--	P	W	R	Refer note-5		
6.0	Packaging	Rigidity	Verification and Visual	100%	As per approved procedure (Packing Procedure to be submitted)	---	--	P	R	R	---		
7.0	Documentation	Compilation of documents	Verification	100%	As per Tender document	HD	--	P	H	R	---		

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Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled		BHEL	NPCIL	

Signature
04/04/19

Signature
04/04/19

Supplier's LOGO	Supplier's Name and Address	Quality Plan for Hemi Spherical Ball Housing (QAP: GHAVP: HEMI SPHERICAL BALL HOUSING: 01/ Rev 00)		Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No.: To be filled
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Note:

1. Co-related original material test certificate is acceptable. In the absence of co-related material test certificate, sample per lot (a lot means, all material having same heat mark / material specification requirements) for chemical and physical test shall be drawn and witnessed by BHEL. All material verification reports and test reports as per material specification shall be submitted to NPCIL for checking / verification and clearance.
2. Stamping of raw material and stamp transfer shall be done by BHEL.
3. MSTP (Material Sampling Plan), MPP (Manufacturing Process plan), Heat Treatment Plan, Ultrasonic Test Procedure, Liquid penetrant examination procedure, magnetic particle examination procedure, lapping procedure, packing procedures etc. shall be submitted by supplier and the same will be subjected to both BHEL & NPCIL approval.
4. Heat treatment shall be carried out in calibrated furnaces. Signed HT chart shall be submitted in case of heat treatment.
5. Calibrated instruments shall be used for inspection, examination and testing.
6. NPCIL approved chemicals for liquid penetrant examination shall be used.
7. Nondestructive examinations shall be done by qualified personnel.
8. Hardness of ball housing shall be at least 4 HRC higher than hemispherical ball (on the contact surface). If Hardness difference is not achieved, Suitable hardening method shall be followed by Supplier to achieve the above mentioned requirement. The method for achieving hardness requirement shall be mentioned in the offer (with a detailed flow chart) and subsequently in the quality Plan.

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SUPPLIER'S NAME: To be filled		BHEL	NPCIL	

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