

QUALITY ASSURANCE PLAN

SJVN Shimla	Manufacturer's Name & Address M/s BHEL, Bhopal		Manufacturing Quality Plan of HVGF Coating on:					PROJECT : RAMPUR HEP (6 UNITS X 66.67 MW)				
			Item: Turbine Parts: Wicket Gates (Guide vanes), Runners, Labyrinths, Facing Plates (Check plates)			QP No. QA/HI/627 Rev. No. 02 Dated: 19.5.2009 Page No. 1/2		PACKAGE : ELECTROMECHANICAL				
			MIV & BFV Parts: Seal Seats, Bypass Needle Valves.					REF NO. : SJVN/ECB/RHEP/08.2003				
								DATED 16.09.2008				
								MAIN-SUPPLIER : BHEL, BHOPAL				
Sl. No.	Component & Operation	Characteristics	Class	Type of Check	Quantum of Check	Reference Document	Acceptance Norms	Format Of Record	Agency			Remarks
									L	C	S	
1	2	3	4	5	6	7	8	9	10	11	12	13
10	Hard coating on Francis Hydro Turbine Underwater parts	In-Process Check by contractor										
		a) Job Temperature during coating (°C)	Major	Temperature test	100%	As per LOA & Tech Spec	As per LOA & Tech Spec	Time-Temperature record		P	V	
		b) Machine & Process-use certificate regarding gun, passes, velocity etc	Major	Visual	Once	As per LOA & Tech Spec	As per LOA & Tech Spec	Certificate from Contractor		P	V	
		c) Surface preparation and roughness	Major	Visual	Random	As per LOA & Tech Spec	As per LOA & Tech Spec	Certificate from Contractor		P	V	
		d) Dimensions check before coating at machine shop by BHEL QC or SJVN QAI	Major	Dimensions	Components-100% Checking-Random	As per LOA & Tech Spec	As per LOA & Tech Spec	Certificate from Contractor		P	V	
		After coating on Job										
		a) Visual inspection of coated surface	Major	Visual	Random	As per LOA & Tech Spec	As per LOA & Tech Spec	Internal Inspection from Contractor		P	W	

Manufacturer/ Contractor/ Sub-Contractor

Signature

Manufacturer

Contractor

Legends

M : Manufacturer

C : Contractor /BHEL/BHEL APPROVED AGENCY.

S : SJVN

L : Test Lab

P : Perform

W : Witness

V : Verification

For SJVN Use

Prepared by

Reviewed by

by

Doc No

GM (QA & D)

Name & Sign of Approving Authority & Seal SJVN



QUALITY ASSURANCE PLAN

SJVN Manufacturer's Name & Address
Shirali M/s BHEL, Bhopal

Manufacturing Quality Plan of HYDRO Generator on:
 Item: Turbine Parts, Valve Gears (Guide vanes), Runner, Labyrinth, Facing Plates (Check pieces)
 OP No. QA/H/627
 Rev No. 02
 Dated 19.5.2009
 Page No. 2/2

PROJECT : RAMPUR HEP 66 UNITS X 66 MW
PACKAGE : ELECTROMECHANICAL
REF NO. : SJVN/ELDR/HEP/08.2003
DATED 16.09.2008
MAIN-SUPPLIER : BHEL, BHOPAL

MIV & BIV Parts Seal Seat, By pass Needle Valves.

Sl. No.	Component	Characteristics	Class	Type of Check	Quantum of Check	Reference Document	Acceptance Norms	Format Of Record	Agency			Remarks
	1 & Operation								L	C	S	
1	2	3	4	5	6	7	8	9	10	11	12	13
20	Hard coating on Francis Turbine Underwater parts	On Sample after Coating	*One Sample for each component. However in case of guide vane sealing ring, one sample in 12 rings.									
	a) Micro Hardness in Hv	Major	Mechanical test	Sample*	As per LOA & Tech Spec	As per LOA & Tech Spec	Test Certificate from Test Lab		P		V	
	b) Surface Roughness in Ra (microns)	Major	Mechanical test	Sample*	As per LOA & Tech Spec	As per LOA & Tech Spec	Test Certificate from Test Lab		P		V	
	c) Thickness of coating in microns	Major	Mechanical test	Sample*	As per LOA & Tech Spec	As per LOA & Tech Spec	Test Certificate from Test Lab		P		V	
	d) Porosity of coating (%)	Major	Mechanical test	Sample*	As per LOA & Tech Spec	As per LOA & Tech Spec	Test Certificate from Test Lab		P		V	
	On Coated Components (Jobs)											
	a) Checking of coating of components using portable probes	Major	Mechanical Tests	Components-100% Checking-10 % per unit	As per LOA & Tech Specification	As per LOA & Tech Specification	Documentation		P		V/W	
	- Thickness in microns by elcometer											
	Discrepancy of the values in component will be recorded by the contractor											

Notes: 1. Dimensions of the various components will be recorded by the contractor.
 2. Testing of samples shall be done at NABL approved labs.
 3. Calibration certificates from NABL/Government/BHEL/International approved labs for all the testing equipments used in the testing of hard coating shall be submitted to SJVN.
 4. Certified Test reports duly authenticated by the contractor shall be submitted to SJVN.

Manufacturer/ Contractor/ Sub- Contractor
 Signature: *[Signature]*
 Date: 20/5/09

Manufacturer
 Signature: *[Signature]*
 Date: 20/5/09

Contractor
 Signature: *[Signature]*
 Date: 20/5/09



For SJVN Use
 Prepared by: *[Signature]*
 Reviewed by: *[Signature]*
 Date: 20/5/09
 Name & Sign of Approving Authority & (GAT)

Sl. No. Manufacturer's Name & Address
M/s. BHEL, Bhopal

Item Supply to User/Coating Material

Of No. Q/AD/11633
Rev. No. 01
Dated : 19.5.2009

Product : MAGNETIC COATING
PACKAGE : ELECTRODEPOSITIONAL
REF. NO. : SP/NECD/BEH/PM/2003
DATED 16.09.2008

MAIN SUPPLIER : BHEL, BHOPAL

Format Of Record

Agency M L C S

Remarks

Sl. No.

Component & Operation

Characteristics

Class

Type of Check

Quantum of Check

Reference Document

Acceptance Norms

9

10

11

12

13

14

15

16

17

18

19

20

21

22

Supply of Hard Coating Material

Raw Material

Major

Chemical Test

One per lot

As per I.O.A. & Tech Specification

As per I.O.A. & Tech Specification

Test Certificate from Test Lab.

P

V

V

V

V

V

V

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V

Chemical composition of powder 86 WC-10 Co-4 Cr for % of Tungsten Cobalt, Chromium, Carbon and Iron

Major

Chemical Test

One per lot

As per I.O.A. & Tech Specification

As per I.O.A. & Tech Specification

Test Certificate from Test Lab.

P

V

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Data from Manufacturer/authorized Distributor for micro-hardness, porosity, band strength, surface roughness

Major

Data

Once

As per I.O.A. & Tech Specification

As per I.O.A. & Tech Specification

Manufacturer's Data sheet/Letter

Data

V

V

V

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V

V

Preparation of Test Coupons (50X50X10 mm) using coating powder on Equivalent to Parent material (preferably 13/4 or 16/5) with thickness of 500 ± 75 microns, in presence of SJVN representatives

Major

Mechanical Tests as per Clause (c)

Five coupons (Three for lab/s testing, two for SJVN use)

As per I.O.A. & Tech Specification

As per I.O.A. & Tech Specification

Test Certificates from Test Lab.

P

V

V

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V

Job Temperature (°C) during coating of Test Coupons

Major

Temperature test

100%

As per I.O.A. & Tech Spec

As per I.O.A. & Tech Spec

Time-Temperature record

P

P

P

P

P

P

P

P

P

P

P

P

P

P

Checking of coupons Surface roughness in Ra

Major

Mechanical Tests

Component 18-100%

As per I.O.A. & Tech Spec

As per I.O.A. & Tech Spec

Documentation

P

P

P

P

P

P

P

P

P

P

P

P

P

P

Micro hardness in Hv

Major

Micro hardness in Hv

Thickness in microns by elcometer

Tests for powder and on testing coupons shall be conducted at NABL approved labs

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Notes

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