



V2-S2.1.4:
Quality Assurance Plan (QAP) — Mechanical
Package-A

1. QUALITY ASSURANCE PLAN (QAP) of LIGNITE HANDLING SYSTEM

GENERAL QUALITY ASSURANCE REQUIREMENTS

Quality Assurance for plan is hereby mentioned below which are minimum inspection requirements. Contractor/OEM has to provide the detailed quality assurance plan for approval.

Contractor shall furnish a detailed Quality Assurance/Quality Control Plan (QA/QC) for each Mechanical, Electrical, Instrument/system covered under this specification for PURCHASER/CONSULTANT's review and approval. The QAP shall be subject to PURCHASER's approval.

2. INSPECTION REQUEST FORM

From: _____

Date: _____

To : _____

Attn: Mr. _____

Dear Sirs,

Items detailed below are ready for inspection. Please arrange inspection and confirm the date of inspection:

Sl. No.	Particulars	Details
1.	OWNER / CONSULTANT	
2.	Project	
3.	OWNER's order reference	
4.	Consultant's reference	
5.	Sub-order reference	
6.	Sub-contractor's name and full address	
7.	Place of Inspection (full address)	
8.	Contact people, telephone no. and fax no.	
9.	Description of item and quantity	
10.	Nature of inspection required	
11.	Proposed date(s)	
12.	Weekly holiday	

We confirm that the items have been fully inspected/tested by us at all stages of inspection as per quality plan, and all material test certificates, QC records, test Reports, calibration records of measuring/testing instruments with traceability to National Level* are available with us.

Thanking you and awaiting your confirmation,
Yours faithfully,

cc: Sub-contractor

NOTE:

1. Following clear notice periods (date of receipt to date of inspection) are required:

(a) Local Inspection– 14 days

3. INFORMATION TO VENDORS ON QUALITY PLANS AND GENERAL INSPECTION REQUIREMENTS

Quality Assurance / Quality Control Programme

Only critical inspection stages have been indicated in the enclosed "Minimum Inspection Requirements" documents. This is, however, not intended to form a comprehensive programme as it is the vendor's responsibility to draw up and implement such programme duly approved by the purchaser.

The detailed Quality Plans for manufacturing and field activities should be drawn up by the bidders, separately in the format attached and shall be submitted to purchaser at the time of submitting his offer.

All the sub-vendors proposed by the vendor for procurement of major bought out items including castings, forgings, semi-finished and finished components/equipment shall be subject to Purchaser's review/clearance for systems and packages.

A consolidated list of all major equipment including bought outs etc. shall be submitted by the vendor along with the offer for purchaser's review/comments.

The purchaser reserves the right to carry out quality audit and quality surveillance of the systems and procedures of the vendor's or their sub-vendor's quality management and control activities. The vendor shall provide all necessary assistance to enable the purchaser to carry out such audit & surveillance.

The vendor shall undertake an inspection and testing programme during manufacture in his works and that of his sub-contractor to ensure the mechanical accuracy of components, compliance with drawings, conformance to functional and performance requirements, identification and acceptability of all materials, parts and equipment. He shall carry out all tests/inspections required to establish that the items/equipment conform to requirements of contract specification and the relevant codes/standards specified therein, in addition to carrying out tests as per the approved Quality Plan.

Vendor shall use calibrated instruments for testing, with traceability to national/international levels. If not, the Purchaser/Consultant will not witness the

tests till the same is organised. Only the latest edition of codes/standards and specifications shall be used for materials and testing. The latest edition is reckoned with the date of contract awarded.

Copies of all the test certificates/calibration reports/internal inspection reports shall be furnished by the vendor during the relevant inspection stages to the purchaser/consultant.

The bidder shall furnish his fully documented, operational manual on the QAP indicating the following minimum details:

- Organisation chart for quality inspection activities: Purchasing of raw materials and bought out items; Engineering and design; Manufacturing.
- Applicable quality standards and procedures for material, design and manufacture including non-destructive testing.
- QAP for design engineering and documentation control system.
- The inspection and tests programme indicating details of inspections/tests to be carried out during various manufacturing stages indicating acceptance norms. Purchaser will review and approve the programme by indicating his 'HOLD' points. These stages will be witnessed by the purchaser's engineer/authorised representative.
- Procurement of control system for equipment or services purchased outside including approval of sub-suppliers/sub-contractors and surveillance on sub-suppliers/sub-contractors.
- Material control to ensure that only the approved materials are used in the manufacture.
- Details of final stages of inspection and tests at shops.
- Corrective actions on items or systems containing significant conditions adverse to quality.
- Control and inspection of material handling, storage, packing and shipping.
- Quality records/test certificates/calibration reports of testing & measuring instruments with traceability to National Standards, to provide objective evidence that all quality assurance requirements have been met.
- Quality assurance based on feedback received from the previous operating installations.

**MINIMUM INSPECTION REQUIREMENTS
FOR BELT CONVEYORS**

Sl. No.	Stage / Component	Inspection Document / Test	Quantum	Insp. Category
A. BELT [Ref: IS-4588, IS-3400, ASTM Part 38, CAN/CSA-M422-487 Grade-C for Fire Resistance]				
A1	Raw Material TC Verification	TC Verification	100%	C
A2	Dimensional Inspection	Dimensional Report	100%	B
A3	Testing for Mechanical Properties (Tensile strength, Elongation, Ply adhesion, Abrasion of covers etc.)	Test Report	100%	B
A4	Troughability tests	Test Report	100%	A
A5	Testing for Cover Properties	Test Report	100%	A
A6	Testing for Fire resistance properties	Test Report	100%	A
B. IDLER ASSEMBLY [Ref: IS: 9295, IS: 8598]				
B1	Raw Material (M.S. Tubes, Shafts, Brackets) – TC Verification	TC Verification	100%	C
B2	WPS / PQRS	Welding Documents	100%	C
B3	Brackets – Final Inspection	Dimensional / Visual Report	100%	B
B4. FINAL INSPECTION – IDLER WITH BRACKET				
B4i	Dimensional and Troughing angle measurements	Dimensional Report	100%	B
B4ii	Free movement of rollers	Inspection Report	100%	B
B4iii	Gap between roller edges	Inspection Report	100%	B
B4iv	Level of rollers	Inspection Report	100%	B
B4v	Verification of thrust bearing, swiveling of self-aligning idlers about the pivot	Inspection Report	100%	B
B5. FINAL INSPECTION – IDLER ROLLERS				
B5i	Dimensions, Quality, Radial runout checks	Test Report	100%	A
B5ii	Dust ingress test	Test Report	100%	A
B5iii	Water ingress test	Test Report	100%	A
B5iv	Friction coefficient test	Test Report	100%	A
B5v	Shore hardness of rubber discs	Test Report	100%	A

	(for impact rollers)			
B5vi	Open inspection of bearings and rollers (at random)	Inspection Report	Random	A
C. PULLEYS [Ref: IS-8531, IS-1891, IS-4776 Part-I]				
C1	Raw material TC verification (Pulley shell, shaft, hubs, end discs, plumber blocks, bearings etc.)	TC Verification	100%	C
C2	Welding documents review	WPS / PQR	100%	C
C3	Inspection as per drawing	Dimensional Report	100%	B
C4	Lagging rubber examination and verification of hardness	Hardness Test Report	100%	C
C5	Lagging rubber peel off test on random samples	Test Report	Random	B
C6	Verification of bearings	TC / Inspection Report	100%	B
C7	Examination of hub and shaft fixing arrangement	Inspection Report	100%	B
C – SHAFTS				
CS1	Material (Physical & Chemical properties) TC verification	TC Verification	100%	C
CS2	UT for shafts dia > 50 mm	UT Report	100%	B
D. BELT SCRAPERS / CLEANERS				
D1	Raw material for blades – TC verification	TC Verification	100%	C
D2	Final Inspection of Assembly – Visual, Dimensional	Inspection Report	100%	A
D3	Movement of blades and elastomount on spindle	Functional Test Report	100%	A
E. CHUTES & LINERS				
E1	Material	TC Verification	100%	C
E2	Welding Document	WPS / PQR	100%	C
E3a	Final Inspection – Visual	Inspection Report	100%	B
E3b	Final Inspection – Dimensional	Dimensional Report	100%	B
E3c	Final Inspection – 10% PT on Welds	PT Report	10%	B
E3d	Examination of liner fixing arrangement	Inspection Report	100%	B
F. SPEED REDUCERS (For capacity > 30 KW)				
F1	Raw material TC verification	TC Verification	100%	C

Gujarat Industries Power Company Limited (GIPCL)

NIT No.: GIPCL/SLPP/R&M/LHS/FB-RELOCATION/EPC/2026

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	(Casing, shafts, Gear & Pinions, bearing etc.)			
F2	Machining Tolerances verification	Dimensional Report	100%	C
F3a	NDT – Casing: MT/PT on critical area	MT/PT Report	100%	C
F3b	NDT – Shafts, Gears, Pinions: Ultrasonic test; PT on teeth and Machined Portion	UT/PT Report	100%	C
F3c	NDT – Bonding check on lined bearings (UT & PT)	UT/PT Report	100%	C
F4	Other Test Certificates – Manufacturers certificate for oil pumps, coolers, filters	Manufacturer's TC	100%	C
F5a	Final Inspection – Dimensional	Dimensional Report	100%	B
F5b	Final Inspection – Gear/Pinion tooth hardness, case depth and tooth profile	Hardness Report	100%	B
F5c	Final Inspection – Dynamic Balancing of gear and pinion	Dynamic Balancing Report	100%	C
F5d	Final Inspection – Tooth contact and back-lash check	Inspection Report	100%	B
F6	Running Trial (1 hour after bearings attain steady temp.) – Temp. rise, smooth running, vibrations, noise level, bearing temperatures	Running Trial Report	100%	A
F7	Review of stage inspection records	Stage Inspection Records	100%	A

NOTE: For speed reducers ≤ 30 KW – Manufacturer's TC to be verified for all above quality requirements

G. ELECTRIC MOTORS (> 30 KW) [Ref: IS-325]

G1	Overall Dimensions	Dimensional Check	100%	A
G2	Insulation resistance	Test Report	100%	A
G3	No load run	Test Report	100%	A
G4	Locked rotor test, reduced voltage running test	Test Report	100%	A
G5	H.V. Test	Test Report	100%	A
G6	Temperature rise test	Test Report	100%	A
G7	Stator and Rotor resistance	Test Report	100%	A
G8	Full load voltage, current,	Test Report	100%	A

	power input and slip			
G9	Momentary overload test	Test Report	100%	A
G10	Overspeed test	Test Report	100%	A
G11	Vibration test	Test Report	100%	A
NOTE: For motors ≤ 30 KW – review of manufacturer's test reports				
H. FLEXIBLE COUPLING				
H1	Raw material	TC Verification	100%	C
H2	Dynamic Balancing certificate	Dynamic Balancing Report	100%	C
H3	Dimensional report	Dimensional Report	100%	C
H4	Ultrasonic test report	UT Report	100%	C
H5	Torque test	Torque Test Report	100%	A
I. FLUID COUPLINGS				
I1	Material	TC Verification	100%	C
I2	Test certificate for oil	Oil TC	100%	C
I3	Dynamic balancing	Dynamic Balancing Report	100%	C
I4	Slip	Test Report	100%	C
I – FINAL INSPECTION (FLUID COUPLINGS)				
I5a	Dimensional	Dimensional Report	100%	A
I5b	Running test	Test Report	100%	A
I5c	Temperature rise test	Test Report	100%	A
I5d	Leakage of oil	Test Report	100%	A
I5e	Operation of Thermostat	Test Report	100%	A
I5f	Review of performance curves	Performance Curves	100%	A
I5g	Operation of scoop tube, oil cooler, oil pump and interlocks in the control panel	Functional Test Report	100%	A
I5h	Vibration & noise level	Test Report	100%	A
I5i	Scoop withdrawn on stopping / breaking of test load	Test Report	100%	A
I5j	Fusing plugs blow off test	Test Report	100%	A

REFERENCE DOCUMENTS:

- IS-4588, IS-3400, ASTM Part 38, CAN/CSA-M422-487
- IS: 9295, IS: 8598
- IS-8531, IS-1891, IS-4776 Part-I
- IS-325
- Data Sheets
- Approved Quality Plans
- GA Drawings



INSPECTION CATEGORY:

- A – Witnessed by OWNER’S ENGINEER / Purchaser
- B – Witnessed by OWNER’S ENGINEER / Purchaser's Discretion
- C – Certificates Review by OWNER’S ENGINEER / Purchaser

ABBREVIATIONS:

- DFT – Dry Film Thickness
- HT – Heat treatment
- MT – Magnetic Particle Testing
- PQR – Procedure Qualification Records
- PT – Liquid Penetrant Testing
- PWHT – Post Welding Heat Treatment
- RT – Radiographic Testing
- TC – Test Certificate
- UT – Ultrasonic Testing
- WPQ – Welder Performance Qualification
- WPS – Welding Procedure Specification

MINIMUM INSPECTION REQUIREMENTS FOR GEAR BOX

Sl. No.	Stage / Component	Inspection / Test / Document	Quantum	Insp. Category
1.0 MATERIALS				
1.1 GEAR BLANKS				
1.1.1	Properties as per specification	Material test certificates – one/heat	100%	C
1.1.2	Heat treatment	HT report	100%	C
1.1.3	NDT	UT	100%	C
1.1.4	Gear tooth	PT	100%	C
1.1.5	Hardened and ground gears	Hardness Check, Case depth	100%	C
1.2 PLATES FOR FABRICATION				
1.2.1	Properties as per specification	Material test certificates – one/heat	100%	C
1.2.2	NDT – UT for thickness > 25 mm	UT Report	100%	C
1.3 CASTING				
1.3.1	Properties as per specification	Material test certificates – one/heat	100%	C
1.3.2	NDT	MT	100%	C
1.3.3	Heat treatment	HT charts	100%	C
1.4 SHAFT				
1.4.1	Properties as per specification	Material test certificates – 01/heat	100%	C
1.4.2	Heat treatment	HT report	100%	C
1.4.3	NDT if dia ≥ 50 mm	UT	100%	C
2.0 INPROCESS CONTROL				
2.1	Welding qualification records	WPS, PQR, WPQ	100%	C
2.2	Shaft Machined surface	PT	100%	C
2.3	Butt welds	UT / RT – Film review	100%	C
2.4	All welds – MT for magnetic materials; PT for non-magnetic materials	MT/PT Report	100%	C
2.5	PWHT	HT chart	100%	C
2.6	Dimensional conformity	As per drawing	100%	C
2.7	Leak tightness of casing	Hydrostatic test	100%	C

2.8	Shaft assembly	Run out and Dynamic balancing	100%	C
2.9	Gear Box assembly	Bearing clearance, Backlash, Gear tooth contact, Axial clearance	100%	B
3.0 FINAL INSPECTION				
3.1	Mechanical Run test	Noise level, Vibration, Oil pressure, Bearing temperature rise	100%	A
3.2	Dimensional conformity	As per drawing	100%	A
3.3	Paint Check	Appearance & DFT	100%	C
3.4	Documentation review	As per stage inspection records	100%	C

STANDARDS:

Materials: As per material specification

Welding: As per ASME BPVC

Non-Destructive Testing: As per ASME BPVC

Dimensional Tolerance: As per Drawing

Dynamic Balancing: As per ISO 1940

Noise Level: Max. 85 dB at 1.0 m distance

Vibration: ISO 10816-Part 3

INSPECTION CATEGORY:

A – Witnessed by owner's Engineer / Purchaser

B – Witnessed by owner's Engineer / Purchaser's Discretion

C – Certificates Review by owner's Engineer / Purchaser

ABBREVIATIONS:

ASME – American Society of Mechanical Engineers

DFT – Dry Film Thickness

HT – Heat treatment

MT – Magnetic Particle Testing

PQR – Procedure Qualification Records

PT – Liquid Penetrant Testing

PWHT – Post Welding Heat Treatment

RT – Radiographic Testing

TC – Test Certificate

UT – Ultrasonic Testing

WPQ – Welder Performance Qualification

WPS – Welding Procedure Specification

NOTES:

Weld repair of Cast Iron / Ductile Iron casting is not acceptable.

MINIMUM INSPECTION REQUIREMENTS
(FEEDER BREAKER)

Sl. No.	Stage / Component	Inspection / Test / Document	Quantum	Insp. Category
1.0 MATERIALS				
1.1 PLATES				
1.1.1	Properties as per specification	Material test certificates	100%	C
1.1.2	Volumetric examination if thickness > 25 mm	UT	100%	C
1.1.3	Wear resistant plates	Hardness	100%	C
1.2 SHAFT				
1.2.1	Properties as per specification	Material test certificates	100%	C
1.2.2	Heat treatment	HT report	100%	C
1.2.3	NDT if dia ≥ 50 mm	UT	100%	C
1.3 CASTING				
1.3.1	Properties as per specification	Material test certificates	100%	C
1.3.2	NDT	MT/PT	100%	C
1.3.3	Heat treatment	HT charts	100%	C
1.3.4	Hardness	Hardness report	100%	C
1.4	Bearings and couplings	Material test certificates	100%	C
2.0 INPROCESS CONTROL				
2.1	Welding qualification records	WPS, PQR, WPQ	100%	C
2.3	All weld joints	PT	10%	C
2.4	Leak tightness of body & end cover plate	Hydrostatic test	100%	C
2.5	PMI Test for all Stainless Steel & Alloy Steel	PMI Test	100%	C
3.0 FINAL INSPECTION				
3.1	No load run test – Smoothness, speed, alignment, noise, vibration, Current, Voltage, Direction of Rotation	No-Load Run Test Report	100%	A
3.2	Motor Routine test certificate	Motor Routine Test Certificate	100%	C
3.3	Gear Box – Material test certificate, run test, back lash, contact pattern	Gear Box Test Report	100%	C
3.4	Dimensional conformity	IS 12059 / BS 5816	100%	A
3.5	Surface Preparation / Paint Check	Appearance & DFT	100%	C
3.6	Documentation review	As per QC Dossier / Manufacturing Record Book (MRB)	100%	C



STANDARDS:

Materials: As per material specification

Welding: As per ASME / AWS

Non-Destructive Testing: As per ASME / AWS

Dimensional Tolerance: IS 12059 / BS 5816

INSPECTION CATEGORY:

A – Witnessed by owner's Engineer / Purchaser

B – Witnessed by owner's Engineer / Purchaser's Discretion

C – Certificates Review by owner's Engineer / Purchaser

ABBREVIATIONS:

AWS – American Welding Society

ECT – Eddy Current Testing

DFT – Dry Film Thickness

HT – Heat treatment

MT – Magnetic Particle Testing

PQR – Procedure Qualification Records

PT – Liquid Penetrant Testing

PWHT – Post Welding Heat Treatment

RT – Radiographic Testing

TC – Test Certificate

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WPQ – Welder Performance Qualification

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