DATASHEET-A (MILL REJECT SYSTEM)

S. No.	Items/Description	NABINAGAR STPP
1	Type of mill reject system	Pneumatic Pressure Conveying
2	Material handled	Coal Mill reject
3	No of mills/Unit	9
4	Reject generation design rate	0.901 TPH per mill
5	Mill layout	Side Mill Arrangement
6	Elevation of Mill Reject Spout (wrt FFL in Mill Area)	2.900 M from 0.0M elevation
7	Type of Mills	HP 1203 Bowl Mill with Planetary Gearbox
8*	Silo Location	Refer Layout
9	Compressor Location	Refer Layout
10	Water spray system (Pyrite quenching)	Required
11	No of compressors	2x100% (1W+1S), non-lubricated reciprocating type compressor.(Each sized to cater air requirement of two units at design rating for system)
12	Sump Pumps	4 Nos. Fixed Type (1 per mill bay).
13	Type of control/ Main control panel location	DCS based control system (BHEL scope of supply)
14	Pneumatic/ local control panel	Yes with DOP of IP 55
15	Mandatory spares	Applicable
NOTE	* Silo location is tentative only and final location may vary by 10% which shall be finalized during detail engg.	

ANNEXURE – II

EQUIPMENT DESIGN/SELECTION CRITERIA

EQUIPMENT DESIGN/SELECTION CRITERIA

S. No.	Equipment	Design/Selection/Sizing Criteria
01	Conveying Air Compressor	Each compressor shall be selected to meet the following requirements: a) Each Compressor shall be sized such that it can cater air requirement of two units. b) A margin of 50 % shall be considered over and above the required/ calculated/ minimum compressor capacity arrived for conveying of total reject generated. c) Guaranteed reject conveying rate 901 kg/hr per mill. d) RH – As per project information (Climatological table) e) Air Temperature - As per project information (Climatological table) f) Height above MSL- As per project information. g) Noise level- Shall be limited to 85dBA at a distance of 1.0 m in horizontal direction from the nearest surface of the machine and at a height of 1.5 m from the floor level in elevation. Noise level measurement shall be carried out using applicable and internationally acceptable standards. The measurement shall be carried out with calibrated integrating sound level meter meeting the requirement of IEC 651 or BS: 5969 or IS 9779.
02	Air Receiver	As per IS 2825 Capacity: The air receiver capacity shall be selected to convey one complete cycle with a minimum margin of 25% provided over and above the arrived air receiver capacity.
03	Pyrite Hopper & Accessories	*a)* Number of outlet – Three (3) *b)* Capacity – 2-3 times denseveyor / transporter vessel capacity. *c)* MOC for plates – MS as per IS 2062 Gr. A (min), min 10 mm thk with sizing grid. *d)* Explosion vent *1)* Rupture Disc type (One no. per hopper) *2)* Rupture Disc Bursting Pressure – 0.5 kg /cm^2 (g) *3)* Sizing Grid Details – Shall be made from minimum 10 mm dia./thk MS bars/flats with opening suitable for entrapping reject larger than 40 mm in size. *4)* Surface Temperature – The surface temperature of the equipment shall be maintained within 60 °C. Insulation, if required, to achieve the same shall be provided by the bidder without any commercial implication. *5)* Water Spraying arrangement with Solenoid Valve – Yes *e)* Valves 1) Inlet valve – Pneumatically Operated KGV with expansion joint & deflection cone with open & closed limit switch for interlock purpose. 2) Maintenance valve – Pneumatically operated KGV with open & closed limit switch for inter lock purpose 3) Over size chute – Pneumatically operated KGV with open & closed limit switch for inter lock purpose

		4) Emergency chute – Pneumatically operated KGV with open & closed limit switch for inter lock purpose *f)* Min. instruments required 1) Two nos. of level switches (High/High-High) 2) One (1) no. of temperature switch
04	Denseveyor (transporter vessel) & its Accessories	a) MOC 1) Denseveyor – Mild Steel IS – 2062, Gr B 2) Dome Valve / Inlet Valve – Refer S.No.08 below b) Quantity of material to be conveyed per hour by each denseveyor – Refer Datasheet-A c) Capacity of denseveyor - To suit the conveying rate with 85% filling d) Any cooling envisaged for dome valve – Bidder to decide e) Air supply pressure available – Bidder to decide f) Distance over which material is to be conveyed and the lift – Refer Layout Drawing
05	Bunker & its Accessories	*a)* Effective Storage Capacity – 130 T (min) *b)* Number of outlet - One *c)* Minimum free board – 500 mm *d)* Bunker Plate – 10 mm thk. MS Plate conforming to IS 2062 Gr A/B *e)* Liner – 3 mm SS 304 Liner in complete bunker *f)* Minimum Valley Angle - 60 Degrees *g)* Discharge Gate i. Size – 400 mm x 400 mm (clear open) (min) ii. Type – Twin Sector, Manually operated. iii. MOC – CI to IS 210/ MS 10 mm thick (min) to IS 2062 (Gr. A min) with 8 mm thick SAILHARD/TISCRAL LINER on inner surface. Min 400 BHN. *h)* Level probe (high) shall be as per C&I specification requirement. *i)* Counter weight type Pressure relief valve designed for max. pressure subjected. **Bag Filter** Each Bag filter shall be sized considering simultaneous firing of one normal and one emergency cycle. a) Material of Filter Cloth – Polyester felt needle suitable for prolonged operation up to a temperature of 200°C without losing its collection efficiency & durability. b) Air to Cloth Ratio – 1.5 m/min (Further 10 % additional bags shall be provided) c) Bag filter casing – MS, IS 2062, Gr. A (min), 3.0 mm thick (min) d) Bag Cage – MS, IS 1079 galvanized. e) Outlet Air Quality – 50 mg/nm^3 (max) f) Bag Cleaning Mechanism – Automatic and shall comprise of solenoid valves, air nozzles, adjustable solid state timer, pressure switches, piping and fittings etc. g) Test on bag filter casing: In case bag filter is assembled in casing at site, smoke/ bubble test shall be carried out on the bag filter casing to ensure that the casing is free of welding defect. However, if assembly of bag filter & casing is done at shop, relevant NDT shall be carried out as per approved MQP for checking the soundness of weld.

		h) Chain Pulley Block over bag filter: Shall have 25% margin over weight of bag filter, but in no case the capacity shall be lower than 1.0 T, same shall be as per IS 3832
06	Lines for Various Services	As per the LP Piping Specifications given under Annexure VI. Mill reject conveying pipelines shall comply to IS:1239/ IS: 3589 heavy grade.
07	Knife Gate/Plate Valve (pyrite hopper inlet, oversize discharge, emergency discharge, hopper isolation/maintenance)	Operation: Manual/Pneumatic – As per flow diagram. Material of Construction Body – CI to IS 210 Gr FG 260 Gate/Plate – SS (ASTM A 240 type 304) with wearing parts provided with abrasion resistant material of hardness 350-400 BHN Size – 200 NB (min) for all valves (All knife gate valve shall be provided with open & close limit switches for interlock and control) Deflection cone : Required before the pyrite hopper inlet knife gate valve
08	Dome Valve/ Swing Disk Inlet Valve	Material of construction Body – CI to IS 210 Gr. FG 260 Dome – Alloy CI with hardness as 180-225 BHN with leak proof seat. Shaft – SS 304 Disk – SS 304/ Alloy CI, hardness of 500 BHN (min)
09	Conveying pipe bend	MOC & Hardness – Alloy CI, 400 BHN min with min 2% Ni End connection- Flanged
10	Fittings, Flanges, Fasteners & Gaskets	As per the LP Piping Specifications given under Annexure VI
11	Valves for Air & Water Lines	As per the LP Piping Specifications given under Annexure VI
12	Sump Pumps	Capacity – To meet system requirement but not less than 10 m^3/hr MOC i. Casing & suction bell – 2.5 % Ni-CI to IS 210, FG260 ii. Impeller – 2.5 % Ni-CI to IS 210 , FG260 iii. Shaft/Sleeves – EN-8
13	Hand Operated Chain Pulley Block with Geared Trolley	i. Capacity (In Kg) - To suit the heaviest equipment lifting on silo top ii. Service condition - Class II outdoor iii. No. of CPB - Four Nos. iv. Lift (m) - To suit the requirement/16 m (min.) v. Type of suspension- Traveling Trolley vi. Head Room - As per Vendor data vii. Type of gear in CPB - Spur Gear viii. Type of bearing - Ball/Roller ix. Grade of Load Chain - Alloy Steel /Gr. 80. x. Grade of Hand Chain - Steel / Gr. 30 xi. Factor of Safety - As per Relevant IS

ANNEXURE – III

MANUFACTURING QUALITY PLANS AND CUSTOMER INSPECTION REQUIREMENT

	S/Contactor : **Mfgr:-** **Works:-**			**Manufacturing Quality Plan** **Item :-Local Panels** **QAP No.** **LOI Nos:-** **Contractor :- M/s BHEL**			**Project:-** **Package :- Mill Rejects System** **Client :-** **Consultant :-**					
Sl. No.	**Components / Operations**	**Characteristics Checked**	**Category**	**Type/Method of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**			**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**			**11**
								TYPE	**D**	**M**	**C**	**N**	
1	**Materials**												
	CRCA Sheet	Visual	Major	Visual	100%	Appr. Drg / IS: 513	Appr. Drg / IS: 513	IR	-	P	-	-	
		Chem. & Physical.	Major	Chem.& Physical.	100%	Do	Do	TC	√	V	V	V	
		Thickness	Major	Measurement	100%	App. Drawing	App. Drawing	IR/TC	√	V	V	V	
2	**Bought outs**												
	Verification of type, size & Make of FLV unit, PG, PS, SV	Visual	Major	Visual	100%	Appr. Drawing / Data Sheet	Approved Drawing / Data Sheet	IR/TC	√	V	V	V	
3	**Painting**												
	Pre Treatment 7 tank process	Physical	Major	DFT / Shade / Finish	100%	Appr. Painting Schedule	Appr. Painting Schedule	IR/TC	√	V	V	V	
4	**Final Inspection**												
		Visual	Major	Visual	100%	Appr. Drawing / Data Sheet	Appr. Drawing / Data Sheet	IR/TC	√	P	**W**	V	
		Dimension	Major	Measurement	100%	Appr. Drawing / Data Sheet	Appr. Drawing / Data Sheet	IR/TC	√	P	**W**	V	
		Check for Pneumatic Circuit	Major	Visual	100%	Appr. Drawing / Data Sheet	Appr. Drawing / Data Sheet	IR/TC	√	P	**W**	V	
		Check for Wiring / Mountings / Terminations	Major	Visual / Continuity	100%	Appr. Drawing / Data Sheet	Appr. Drawing / Data Sheet	IR/TC	√	P	**W**	V	
		Functional Check for Solenoid Valve	Major	Functional	100%	Appr. Drawing / Data Sheet	Appr. Drawing / Data Sheet	IR/TC	√	P	**W**	V	
5	**QA Documents**	Review	Major	verification	100%	-	-	-					

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC-Test Certificate , IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N ->CLIENT	For Client Use:- **Document. No.:**
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

	S/Contactor : Mfgr:- Works:-			Manufacturing Quality Plan Item :- Transport vessel QAP No. LOI Nos:- Contractor :- M/s BHEL			Project: Package :- Mill Rejects System Client : Consultant :-					
Sl. No.	**Components / Operations**	**Characteristics Checked**	**Category**	**Type/Method of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**		**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**		**11**
								TYPE	**D**	**M**	**C**	**N**	
1	**Raw Materials**												
1.1	Dome & dome Valve Body	Dimensions	Major	Measurement	100%	App. Drg. / Data Sheet / Standard	App. Drg. / Data Sheet / Standard	-	-	P	-	-	
		Surface Defects		Visual	100%			-	-	P	-	-	
		Physical Check		TS & Hardness	1/Heat			TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			TC	√	P/V	V	V	
1.2	Plates for Vessel	Dimensions	Major	Measurement	100%	App. Drg. / Data Sheet / IS Standard	App. Drg. / Data Sheet / IS Standard	-	-	P	-	-	
		Surface Defects		Visual	100%			-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat			TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			TC	√	P/V	V	V	
1.3	Insert Seal	Surface Defects	Major	Visual	100%	Mfr's Drg. / Std	Mfr's Drg. / Std	-	-	P	-	-	
		Hardness		Measurement	1/Lot			IR	√	P/V	V	V	
1.4	Shaft	Physical Check	Major	TS & Elongation	1/Heat	App. Drg./ IS Std.	App. Drg./ IS Std.	TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat								
2	**In - Process Insp.**												
2.1	Welders & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL / CLIENT
		Welding Defects	Major	DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
			Major	DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
2.3	Machining of Dome & dome Valve	Visual & Dimension	Minor	Visual, Measurement	100%	Mfr's Drg / Standard	Mfr's Drg / Standard	-	-	P	-	-	
2.4	Hydotest of Vessel	Soundness / Leakage	Major	Visual, Hydro Pressure Test	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual / Measurement	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	At Painted Condition
3.2	Run Test / Performance	Operation of Dome Valve	Minor	Visual, 5 times Cycle operation	100%	Mfr's Standard	Mfr's Standard	IR	√	P/V	**W**	**W**	
3.3	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR	√	P/V	**W**	**W**	
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan		–	P/V	V	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC-Test Certificate , IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT **P->Perform, V-> Verification, W-> Witness**	For Client Use:- Name & Signature of Approving Authority with Seal
SIGNATURES			**Document No.**

	S/Contactor : Mfgr:- Works:-	Manufacturing Quality Plan Item :- Pyrite Hopper QAP No. LOI Nos Contractor :- M/s BHEL	Project: Package :- Mill Rejects System Client :-

Sl. No.	Components / Operations	Characteristics Checked	Category	Type/Method of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	N	
1	**Raw Materials**												
1.1	Plates for Body	Dimensions	Major	Measurement	100%	App. Drg. / Data	App. Drg. / Data	-	-	P	-	-	
		Surface Defects		Visual	100%	Sheet / IS Standard	Sheet / IS	-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat		Standard	MTC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			MTC	√	P/V	V	V	
1.2	Spray Nozzle	Surface Defects	Major	Visual	100%	Mfr's Drg. / IS Standard	Mfr's Drg. / IS Standard	-	-	P	-	-	
		Chemical Check		Chemical Comp.	1/Lot			MTC	√	P/V	V	V	
		Dimensions		Measurement	100%			IR	√	P	V	V	
2	**In - Process Insp.**												
2.1	Welders & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL
		Welding Defects		DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
				DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	**W**	**W**	
2.2	Fabrication	Fit up, Marking, Cutting, Grinding	Minor	Visual, Measurement	100%	Mfr's Standard	Mfr's Standard	-	-	P	-	-	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W***	**W***	* -> Witness10%
3.2	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR	-	P/V	**W**	-	Painting shall be Heat Resistance
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan		–	P/V	V	V	

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SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal	

	S/Contactor :-. Mfgr:-	Manufacturing Quality Plan Item :- Terminal Box QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :- .

Sl. No.	Components / Operations	Characteristics Checked	Category	Type/Method of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Materials**												
1.1	Plates for Body	Dimensions	Major	Measurement	100%	App. Drg. / Data	App. Drg. / Data	-	-	P	-	-	
		Surface Defects		Visual	100%	Sheet / IS Standard	Sheet / IS	-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat		Standard	MTC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			MTC	√	P/V	V	V	
2	**In - Process Insp.**												
2.1	Welders Qualification & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL / KPCL
		Welding Defects	Major	DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
			Major	DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	**W**	V	
2.2	Flange Machining and Drilling	Dimensions	Major	Measurement	100%	Mfr/Appr. Drg	Mfr/Appr. Drg	IR	–	P	-	-	
2.3	Connection -pipe to flange, pipe to body	Fit up	Major	Joint set up, PCD, Orientation	100%	Mfr/Appr. Drg	Mfr/Appr. Drg	IR	–	P	-	-	If Applicable
2.4	Fabrication	Fit up, Marking, Cutting, Grinding	Minor	Visual, Measurement	100%	Mfr's Standard	Mfr's Standard	-	-	P	-	-	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3.2	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR	–	P/V	**W**	-	Painting before disp.
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan		–	P/V	V	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC-Test Certificate , IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT **P->Perform, V-> Verification, W-> Witness**	For Client Use:-	**Document No.:-**
SIGNATURES			Name & Signature of Approving Authority with Seal	

	S/Contactor :-. Mfgr:- Works:-	Manufacturing Quality Plan Item :- Bunker Discharge Gate QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :-

Sl. No.	Components / Operations	Characteristics Checked	Category	Type/Method of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Materials**												
1.1	Plates for Body	Dimensions	Major	Measurement	100%	App. Drg. / Data	App. Drg. / Data	-	-	P	-	-	
		Surface Defects		Visual	100%	Sheet / IS Standard	Sheet / IS Standard	-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat			TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			TC	√	P/V	V	V	
1.2	Shaft	Physical Check	Major	TS & Elongation	1/Heat	do	do	TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			TC	√	P/V	V	V	
		UT If Dia > 50 mm		Internal defect	100%			IR	√	P/V	V	V	
1.3	Cylinder / Actuator	Visual / Specification	Major	Visual	100%	do	do	Mfr's TC	√	V	V	V	
2	**In - Process Insp.**												
2.1	Welders & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL / CLIENT
		Welding Defects	Major	DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
			Major	DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	**W**	V	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3.2	Operation with job / shop actuator	Opening & Closing of Gate	Major	Visual	100%	Proper Working	Smooth Operation	IR	√	P/V	**W**	**W**	
3.3	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR	–	P/V	**W**	-	Painting before disp.
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan		–	P/V	V	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation.TC -Test Certificate,IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N-> CLIENT **P->Perform, V-> Verification, W-> Witness**	For Client Use:-	**Document No.:-**
SIGNATURES			Name & Signature of Approving Authority with Seal	

	S/Contactor :-	Manufacturing Quality Plan	Project:-
	Mfgr:-	Item :- Pressure Relief Valve	Package :- Mill Rejects System
	Works:-	QAP No. :	Client :- .
		LOI Nos:-	
		Contractor :- M/s BHEL	Consultant :-

Sl. No.	Components / Operations	Characteristics Checked	Category	Type/Method of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Materials**												
1.1	Plates for Body	Dimensions	Major	Measurement	100%	App. Drg. / Data Sheet / IS Standard	App. Drg. / Data Sheet / IS Standard	-	-	P	-	-	
		Surface Defects		Visual	100%			-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat			MTC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			MTC	√	P/V	V	V	
2	**In - Process Insp.**												
2.1	Welders & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL / KPCL
		Welding Defects	Major	DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
			Major	DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	**W**	V	
2.2	Fabrication	Fit up, Marking, Cutting, Grinding	Minor	Visual, Measurement	100%	Mfr's Standard	Mfr's Standard	-	-	P	-	-	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3.2	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR	–	P/V	**W**	-	Painting before disp.
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan		–	P/V	V	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC-Test Certificate , IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT **P->Perform, V-> Verification, W-> Witness**	For Client Use:-	**Document No.:-**
SIGNATURES			Name & Signature of Approving Authority with Seal	

	S/Contactor :- **Mfgr:-** **Works:-**			**Manufacturing Quality Plan** **Item :- Air Receiver** **QAP No. :-** **LOI Nos:-** **Contractor :- M/s BHEL**			**Project:-** **Package :- Mill Rejects System** **Client :-** **Consultant :-**					
Sl. No.	**Components / Operations**	**Characteristics Checked**	**Category**	**Type/Method of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**			**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**			**11**
								TYPE	**D**	**M**	**C**	**K**	
1	**Raw Materials**												
1.1	Plates for Shell, Dished End & Flange	Dimensions	Major	Measurement	100%	App. Drg. / Data	App. Drg. / Data	-	-	P	-	-	
		Surface Defects		Visual	100%	Sheet / IS Standard	Sheet / IS Standard	-	-	P	-	-	
		Physical Check		TS & Elongation	1/Heat			TC	√	P/V	V	V	
		Chemical Check		Chemical Comp.	1/Heat			TC	√	P/V	V	V	
1.2	Formed Dished End	Dimensions	Major	Measurement	100%	App. Drg. / Data	App. Drg. / Data	IR	√	P	-	-	
		Thickness/Thinning		Measurement	100%	Sheet	Sheet	IR	√	P	-	-	
		DPT of Knuckle		DP Test	100%	ASTM E-165	ASTM E-165	TC	√	P/V	V	V	
2	**In - Process Insp.**												
2.1	Welders & Welding	WPS / PQR / WPQ	Major	Procedure / Qualification	100%	ASME sec - IX	ASME sec - IX	WPS / PQR	√	P/V	V	V	Welders to be approved by BHEL / CLIENT
		Welding Defects	Major	DPT on Root run	100%	ASTM E-165	ASTM E-165	IR	√	P/V	V	V	
		do	Major	DPT on Final run	10%	ASTM E-165	ASTM E-165	IR	√	P/V	**W**	**W**	
		do	Critical	Radiography Test on all C/S & L/S including T & X	100%	IS 2825 Class-II / ASME Sec VIII	IS 2825 Class II / ASME Sec VIII	RT Film / Report	√	P/V	V	V	
2.2	Fabrication	Marking, Cutting, Rolling, Edge Preparation, Joint & Nozzle set up	Major	Visual, Measurement (Ovality, off set orientation)	100%	Mfr's Standard / Approved Drg.	Mfr's Standard / Approved Drg.	IR	-	P	-	-	
3	**Final Inspection**												
3.1	Final Assly	Completeness & Dimension	Major	Visual / Measurement	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3.2	Hydotest of Vessel	Soundness / Leakage	Major	Visual, Hydro Pressure Test	100%	App. Drg. / Data sheet	App. Drg. / Data sheet	IR	√	P/V	**W**	**W**	
3.3	Painting	Finish / DFT	Major	Visual, Measurement	100%	App. Painting Schedule	App. Painting Schedule	IR		P/V	**W**	**-**	Painting before disp.
4	**QA Documentation**												
4.1	TC & IR	Completeness	Major	Verification & approval	100%	App. Quality Plan	App. Quality Plan	-	–	P/V	V	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC -> Test Certificate , IR - Inspection Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N-> CLIENT **P->Perform, V-> Verification, W-> Witness**	For Client Use:- Name & Signature of Approving Authority with Seal
SIGNATURES			**Document No.:-**

	S/Contactor :- Manufacturer :-	Manufacturing Quality Plan Item :- Rupture Disc QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :-

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1 ->	**Materials** Rupture Disc Material	Physical & Chemical Properties	Major	Chemical Analysis, YTS & UTS	1 per Heat	ASTM A240 Type - 304 / Appved Data Sheet / Drg.	ASTM A240 Type - 304 / Appved Data Sheet	MTC	√	V	V	V	
2 -> ->	**Final Inspection** Dimension Burst Test of Rupture Disc	Measurement Functional	Major Major	Mesurement Burst Test @ 200 Degree Centigrade	100% 1 per lot offered	App. Drawing Approved drawing / Datasheet	App. Drawing Min 0.4 bar (g) @ 200 degree C Max 0.6 bar (g) @ 200 degree C / App. Data Sheet	IR IR / Burst Test Certificate	√ √	P P	**W** **W**	**W** **W**	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & K ->Client	For Client Use:-	**Document No.:-**
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal	

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-			Manufacturing Quality Plan Item:- CHAIN PULLY BLOCK QAP No. :- LOI Nos:- Contractor :- M/s BHEL			Project:- Package :- Mill Rejects System Client :- Consultant :-					
Sl. No.	**Components / Operations**	**Characteristics**	**Classification**	**Type of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**			**Remarks**
1	2	3	4	5	6	7	8	9		10			11
								TYPE	**D**	**M**	**C**	**K**	
1	**Materials**												
->	Load Chain	Mech. Properties Breaking Load Test, Proof Load test	Major	Review of Mfr's Test Certificate	1 per Lot	IS:6216 /Appr. Drg / Appr. Data sheet	IS:6216 /Appr. Drg / Appr. Data sheet	MTC	√	P/V	V	V	
->	Load Sheave	Mech. Properties Chemical Composition	Major	Lab Analysis	1 per Heat	IS:1865 /Appr. Drg / Data sheet	IS:1865 /Appr. Drg / Data sheet	MTC	√	P/V	V	V	
->	Gear & Pinion	Chemical Composition	Major	Lab Analysis	1 per Heat	IS:4432/Appr. Drg / Data sheet	IS:4432/Appr. Drg / Data sheet	MTC	√	P/V	V	V	
->	Hook	Mech. Properties Chemical Composition	Major	Lab Analysis	1 per Heat	IS:8610 / IS:1875 /Appr. Drg / Data sheet	IS:8610 / IS:1875 /Appr. Drg / Data sheet	MTC	√	P/V	V	V	
2	**In Process**												
->	Hook	Proof Load Test	Major	Load Test	100%	IS:8610 /Appr. Drg / Appr. Data sheet	IS:8610 /Appr. Drg / Appr. Data sheet	MTC / IR	√	P	V	V	
		DPT after Load Test	Major	DPT	100%	ASTM E-165	ASTM E-165 / No Defects	IR	√	P	V	V	
3	**Final Inspection**												
->	Assembly	Operation Check	Major	Visual	100%	Smooth Operation / IS 3832 Appr. Drg / App. Data Sheet	Smooth Operation / IS 3832 Appr. Drg / App. Data Sheet	IR	√	P	**W**	V	
		Functional Test	Major	Visual	100%			IR	√	P	**W**	V	
		Load Test & Over Load Test	Major	Load Test	100%			IR	√	P	**W**	V	
		Overall Dimensions	Major	Measurement	100%			IR	√	P	**W**	V	
		Visual (After Load Test)	Major	Visual	100%	IS 3832	IS 3832	IR	√	P	**W**	V	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	For Client Use:-	**Document No.:-**
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal	

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-	Manufacturing Quality Plan Item :- Bag Filter (Without Enclosure) QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :-

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Materials**												
1.1	Manifold Body / Casings (MS Plate / Sheet / Pipe)	Chemical & Physical	Major	Chemical & Mechanical	1 per Lot	App. Drawing / Data Sheet / IS:2062 Gr. A / IS:1079 Gr. 0 / IS: 1239 Class Med.	App. Drawing / Data Sheet / IS:2062 Gr. A / IS:1079 Gr. 0 / IS : 1239 Class Med.	MTC	√	V	V	V	
1.2	Bag Cages (Inserts)	Chemical & Physical	Major	Chemical & Mechanical	1 per Lot	App. Drawing / data sheet / IS:7887 Gr.8 / IS:1079 Gr. 0	App. Drawing / data sheet / IS:7887 Gr.8 / IS:1079 Gr. 0	MTC	√	V	V	V	
1.3	Solenoid Valves	Functional	Major	Operational	100%	Approved Drawing / Appr. Data Sheet	Approved Drawing / Appr. Data Sheet	MTC	√	P	V	V	
1.4	Sequence Controller	Functional	Major	Operational	100%	Approved Drawing / Appr. Data Sheet	Approved Drawing / Appr. Data Sheet	MTC	√	P	V	V	
1.5	Filter Bags (Make :- Charminar / Supreme)	Physical	Major	Visual / Measurement	100%	Approved Drawing / Appr. Data Sheet	Approved Drawing / Appr. Data Sheet	MTC	√	P	V	V	
2	**In Process**												
2.1	Manifold	Dimensional & Visual	Minor	Dimensional & Visual	100%	As per Mfr's Drg.	As per Mfr's Drg.	IR	√	P	V	V	** -> DPT & Hydro - Test of Manifold to be witnessed by vendor
2.2		Welding	Major	DPT on Final Weld	100%	ASTM E-165	No Defect	IR	√	P	V**	V	
2.3		Hydro Test for 30 Minutes	Major	Leakage	100%	Appr. Data sheet	No Leakage	IR	√	P	V**	V	

Document No.:-

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
3	**Final Inspection**												
3.1	Assembly	Dimensional	Major	Measurement	100%	Appr. Drawing	Appr. Drawing	IR	√	P	**W**	V	**Pressure Drop across Filter Bags & Emission Level at Filter outlet shall be checked at Site**
	$-> Pneumatic Test at 1.1 times W/Pressure	Pne. test $of Manifold in Assly.	Major	Leakage by soap solution	100%	Appr. Data Sheet	No Leakage	IR	√	P	**W**	V	
		Functional Test of Pulsing System	Major	Pulse Sequence	100%	Appr. Data sheet / Testing Procedure	Appr. Data sheet / Testing Procedure	IR	√	P	**W**	V	
4	**Painting**	Measurement & Visual	Major	DFT / Finish	100%	Appr. Painting Schedule	Appr. Painting Schedule	IR	√	P	-	-	

TESTING PROCEDURE TO BAG FILTER

1-> Functional test through compressed air , Sequential pulsing through valves and sequential controller on **No - Load Condition** to be conducted.

2-> The Soenoid valve shall be connected to the sequential timer and suitable electric supply shall be provided. Air header to be connected to supply of compressed air. The Timer is set and Sequential operation of Solenoid operated valve is observed.

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	For Client Use:- **Document No.:-**
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- **Manufacturer :-**			**Manufacturing Quality Plan** **Item :- MS GI ERW Pipes (IS:1239/IS3589)** **QAP No. :-** **LOI Nos:-** **Contractor :- M/s BHEL**			**Project:-** **Package :- Mill Rejects System** **Client :-** **Consultant :-**					
Sl. No.	**Components / Operations**	**Characteristics**	**Classification**	**Type of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**			**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**			**11**
								TYPE	**D**	**M**	**C**	**K**	
1	Final Inspection of Finished Pipes	Physical	Major	Visual	100%	IS:1239 / IS:3589 / Approved Data Sheet	IS:1239 / IS:3589 / Approved Data Sheet	IR	-	P	W*	V	* -> Random 5% of offered lot irrespective of size
		Dimensional	Major	Measurement	100%			IR	√	P	W*	W*	
		Mechanical Properties	Major	Tensile, elon-gation, Bend or Flattening	IS: 4711			IR / TC	√	P / V	V	V	
		Chemical	Major	Chemical Analysis	1 per heat			TC	√	P / V	V	V	
		Hydro Test	Major	Pressure Testing	100%			IR / TC	√	P	W *	W*	
2	Galvanising (For GI Pipes	Uniformity & mass of Zinc Coating, Adhesion test, Free bore test	Major	As per IS:4736	As per IS:4736	As per IS:4736 / Approved Data Sheet	As per IS:4736 / Approved Data Sheet	IR	√	P	W #	V	# one sample for each size
3	Identification	Verification of Batch No. / Mfg stamp / Heat No.	Major	Visual	100%	Mfgr Practise / IS 1239 / IS 3589	Mfgr Practise / IS 1239 / IS 3589	IR	√	P	W	V	
4	Review of QA Documents	----------	----------	----------	----------	As per QAP	As per QAP	----------	√	V	V	V	
	NOTES :- For SAIL Pipes verification of reports for the tests mentioned in Sl. No. 1 & 2 by BHEL & KPCL. For GI Pipes, Galvanising Check as per relevant standard shall be done. All material shall be as per approved data sheet in case of ambiguity in QAP, material as data sheet shall be final.												
Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT					For Client Use:-	**Document No.:-**					
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**					Name & Signature of Approving Authority with Seal						

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-	Manufacturing Quality Plan Item :- ACI Bends QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :-. Consultant :- .

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Material**												
1.1	Scrap Receipt	Chemical	Major	Lab Analysis	Random Sample / Lot	Mfg's Std	Mfg's Std	Mfg's Log Sheet	–	P	–	–	
1.2	Ferro Alloys	Chemical	Major	Lab Analysis	Random Sample / Lot	Mfg's Std	Mfg's Std	Mfg's Log Sheet	–	P	–	–	
2	**Final Inspection**												
2.1	Product Analysis	Chemical Analysis	Major	Chemical	1 / heat	Mfg's Standard	Mfg's Standard	MTC	√	P	V**	V	** Chemical. Analysis to be Witnessed by Vendor
2.2	Leakage	Hydro Test	Major	Pressure Test	100%	Approved Drg / Data Sheet	No Leakage	IR	√	P	W*	W*	* 10% by Vendor / BHEL / CLIENT
2.3	Dimension	Dimension	Major	Measurement	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR	√	P	W*	W*	
2.4	Hardness	Hardness	Major	Measurement	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR/TC	√	P	W*	W*	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	For Client Use:-
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

Document No.:-

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-			Manufacturing Quality Plan Item :- Knife Gate Valve [Manual / Pneumatic] QAP No. : LOI Nos:- Contractor :- M/s BHEL				Project:- Package :- Mill Rejects System Client :- Consultant :-					
Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Material / Bought Out's**												
1.1	Body	Chemical & Mechanical	Major	Foundary TC	1 per Heat	Relevent IS / Appr. Drg / Data Sheet	Relevent IS / Appr. Drg / Data Sheet	TC	√	P/V	V	V	
1.2	Gate	do	Major	Lab Analysis	1 per lot	do	do	Mill / Lab TC	√	P/V	V	V	
1.3	Stem (For Manual Valve)	do	Major	Lab Analysis	1 per batch	do	do	do	√	P/V	V	V	
1.4	Pneumatic Cylinder (For Pneu. Valve)	Visual & Functional	Major	Mfr's TC Review	100%	Smooth Operation	Smooth Operation	Mfr's TC	√	P/V	V	V	
2	**In - Process Inspection**												
2.1	Body, Gate	Dimensional	Major	Measurement	100%	Mfr's Drawing	In-Process Insp. Record	-		P	V	V	**# -> Test Pressure as per Data Sheet**
2.2	Body Shell Test	Leak Tightness	Major	Hydro Static Test #	100%	Approved Drg / Data Sheet	No Leakage	IR	√	P	V	V	
3	**Final Inspection**												
3.1	Assembled Valve	Dimension	Major	Measurement	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR	√	P	**W**	**W**	**BHEL / Vendor/CLIENT to Witness 10 % of Quantity.**
3.2	do	Function	Major	Operation	100%	Smooth Opertaion	Smooth Opertaion	IR	√	P	**W**	**W**	
3.3	do	Seat Leakage	Major	Hydro Static Test #	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR	√	P	**W**	**W**	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	For Client Use:-
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

Document No.:-

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-	Manufacturing Quality Plan Item :- Compressor QAP No. :- LOI Nos:- Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :-

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Material / Bought Out's**												
1.1	Cylinder	Chemical & Mechanical	Major	Mfr's TC	1 per Heat or Lot	Relevent IS / Appr. Drg / Data Sheet	Relevent IS / Appr. Drg / Data Sheet	TC	√	P/V	V	V	
1.2	Frame Head	do	Major	do	do	do	do	do	√	P/V	V	V	
1.3	Outer Head	do	Major	do	do	do	do	do	√	P/V	V	V	
1.4	Crank Shaft	do	Major	do	do	do	do	do	√	P/V	V	V	
1.5	Connecting Rod	do	Major	do	do	do	do	do	√	P/V	V	V	
1.6	Temp. Switch	Mfr's TC	Major	Visual Review	100%	do	do	do	√	V	V	V	
1.7	Control Panel	Mfr's TC	Major	Visual Review	100%	do	do	do	√	V	V	V	
2	**In - Process Inspection**												
2.1	Cylinder, Frame Head & Outer Head	Leak Tightness	Major	Hydro Static Test	100%	Appr drg. / Data Sheet	No Leakage	IR	√	P	V	V	
2.2	After Cooler	Leak Tightness	Major	Hydro Static Test	100%	Approved Drg / Data Sheet	No Leakage	IR	√	P	V	V	
3	**Final Inspection**												
3.1	After Cooler	Dimension / Visual	Major	Measurement	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR	√	P	W	W	
3.2	Control Panel	Dimension / Visual	Major	Measurement	100%	Approved Drg / Data Sheet	Approved Drg / Data Sheet	IR	√	P	W	W	
3.3	Compressor Assly	Nozzle Test (Mech. Run Test)	Major	Performance	100%	Approved Drg / Data Sheet / BS 1571 Part-2	Approved Drg / Data Sheet	IR	√	P	W	W	

Manufacturer / Sub Vendor	Contractor	LEGENDS:-	For Client Use:-	Document No.:-
SIGNATURES		Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT **P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal	

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-			Manufacturing Quality Plan Item :- Sump Pump QAP No. :- LOI Nos:- Contractor :- M/s BHEL			Project:- Package :- Mill Rejects System Client - Consultant :- .					
Sl. No.	**Components / Operations**	**Characteristics**	**Classification**	**Type of Check**	**Quantum of Check**	**Reference Documents**	**Acceptance Norms**	**Format of Records**		**Agency for Checking**		**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**		**11**
								TYPE	**D**	**M**	**C**	**K**	
1	**Raw Material / Bought Out's**											
1.1	Casing	Chemical, Mechanical, Hardness, Surface Defect	Major	Chem. Comp. Mechanical Hardness Visual	1 per Heat 1 per Heat 1 Per Heat 100 %	Relevent IS / Appr. Drg / Data Sheet	Relevent IS / Appr. Drg / Data Sheet	TC	√	P/V	V	V	
1.2	Impeller	do	Major	do	do	do	do	do	√	P/V	V	V	
1.3	Shaft	Chemical, Mechanical, Surface Defect	Major	Chem. Comp. Mechanical Visual & UT if Dia >50 mm	1 per Heat 1 per Heat 100 %	Relevent IS / Appr. Drg / Data Sheet / ASTM E 388 for UT	Relevent IS / Appr. Drg / Data Sheet / ASTM E 388	do	√	P/V	V	V	
1.4	Shaft Sleeve	Chemical Hardness	Major	Chem. Comp. Hardness	do	do	do	do	√	P/V	V	V	
2	**In - Process Inspection**											
2.1	Casing	Soundness of Casting / Leakage	Major	Hydro Static Test	100%	Appr drg. / Data Sheet / IS 5120	No Leakage	IR	√	P	V	V	Hyd. Test at 200% of pump rated head or 150% of Shut off head which ever is higher for 30 min.
2.2	Impeller	Residual unbalance	Major	Dyanamic / Static Balancing	100%	Approved Drg / Data Sheet / ISO 1940 Gr. 6.3	ISO 1940 Gr. 6.3	IR	√	P	V	V	

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
3	**Final Inspection**												
3.3	Performance Test with Calibrated Test Lab Motor	Q Vs Head, Power & Efficiency, Noise & Vibration	Major	Measurement & Curves	100%	Approved Drg / Data Sheet / HIS	Approved Drg / Data Sheet / HIS	IR	√	P	**W**	**W**	Noise - 85 db max. & Vibration - 50 microns max.
3.2	Pump strip test in case of doubt due to abnormal sound	Undue Wear	Major	Visual / Strip Test	100%	Mfr's Standard	No Undue Wear	IR	√	P	**W**	**W**	
3.3	Painting	Visual & Measurement	Major	Visual & Measurement	100%	As per approved Painting Schedule	As per approved Painting	IR	–	P	-	-	

Manufacturer / Sub Vendor	Contractor	**LEGENDS:-** Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	For Client Use:-
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

Document No.:-

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	S/Contactor :- Manufacturer :-	Manufacturing Quality Plan Item :-EXPANSION BELLOW QAP No. :- LOI Nos:- - Contractor :- M/s BHEL	Project:- Package :- Mill Rejects System Client :- Consultant :-)

Sl. No.	Components / Operations	Characteristics	Classification	Type of Check	Quantum of Check	Reference Documents	Acceptance Norms	Format of Records		Agency for Checking			Remarks
1	2	3	4	5	6	7	8	9		10			11
								TYPE	D	M	C	K	
1	**Raw Material**												
1.1	Bellows	physical & Chemical	Major	Lab Analysis	1 per Heat	AS204 TP304/ Approved Drg.	AS204 TP304/ Approved Drg.	MTC	√	V	V	V	
1.2	Fianges/ End Pipe	physical & Chemical	Major	Lab Analysis	1 per lot	IS 2062 / Approved Drg.	IS 2062 / Approved Drg.	MTC	√	V	V	V	
2	**In - Process Inspection**												
2.1	Bellows & Pipe	Dimension	Major	Measurement	100%	Approved Drg.	Approved Drg.	IR	√	P	V	V	
	** For Bellows	Soundness Of Weld of L-Seam	major	DPT **(Before & After Forming)	100%	ASTM E- 165	No Cracks/ Linear Indication	IR		P	V	V	
3	**Final Inspection**												
3.1	Assembly	DP Test of Fillet Weld of Bellows to Pipe & Pipe to Fiange	Major	visual	100%	ASTM E-165	No Crack / Linear Inication	IR	√	P	**W**	V	
3.2	Testing	Dimensions	Major	Measurement	100%	Approved Drg	Approved Drg	IR	√	P	**W**	**W**	
		pressure	Critical	Hydraulic	100%	EJMA D.3.2.1/ Data sheet	EJMA D.3.2.1/ Approved Drg.	IR	√	P	**W**	**W**	
		Spring Rate Test (Axial)	Critical	Stiffness Test	100%	EJMA / Data Sheet	EJMA / Data Sheet	IR	√	P	**W**	**W**	
		Deflection	Critical	Deflection Test	100%	EJMA / Data Sheet	EJMA/Data Sheet	IR	√	p	**W**	**W**	
3.30	Painting	Visual/ Measurement	Major	DFT	100%	Approved Painting Schedule	Approved Painting Schedule	IR	√	p	_	_	

		LEGENDS:-	For Client Use:-
		Records identified by √ shall be essentially included in QA documentation. TC- Test Certificate, IR - Insp. Report	**Document No.:-**
Manufacturer / Sub Vendor	Contractor	M-> Manufacturer/Sub Contractor, C-> Contractor (BHEL) or their nominated agency & N -> CLIENT	
SIGNATURES		**P->Perform, V-> Verification, W-> Witness**	Name & Signature of Approving Authority with Seal

Note :- In case of any difference in parameters specified in Drawing / Data Sheet & QAP, Value specified in Drg / Data Sheet shall be Final

	Manufacturer's Name & Address :		MANUFACTURING QUALITY PLAN										
			Item : MS Plates & Structures		QP No. :			Project :					
					Rev. No. : 0			BHEL Ref. :					
			Sub-System :		Date :			Contract No.:					
					Page No.: 11 of 1			Contractor : BHEL SUB-CONTRACTOR-					

Sl. No.	Components & Operations	Characteristic/Item	Class	Type/method of check	Extent of Check	Reference Document	Acceptance	Format of Record		Agency			Remarks
										P	W	V	
1	2	3	4	5	6	7	8	9	D	10			11
	RAW MATERIAL												
1	Steel Plates	Chemical composition and Mechanical test	Major	Review of corelated MTC	One/heat	IS:2062	IS:2062	Mfgr. TC	√	3		2,1	Refer Note Below
2		Visual and dimensional Check	Major	Visual and measurement	100%	Mfgr. TC	Mfgr. TC IS 1852	Mfgr. TC	√	3	2,1		
3		Identification / Marking	Major	Co-relation establish	100%	AS per manufacturing practice	AS per manufacturing practice IS 2062	Mfgr. TC	√	3	2	1	

		LEGEND :		BHEL Doc. No. PE-QP-279-166-A801	Rev. 0
		1 - BHEL / CUSTOMER 2 - VENDOR 3 - Manufacturer	P - Agency Performing the Test W - Agency Witnessing the Test V - Agency Verifying the Test		
MANUFACTURER/ SUBCONTRACTOR	**CONTRACTOR**	CR - Critical Characteristics MA - Major Characteristics MI - Minor Characteristics			
SIGNATURE				REVIEWED BY	NAME & SIGNATURE OF APPROVING AUTHORITY

Notes:

1 In case material is despatched directly from SAIL/TISCO plant/stockyard or procured from dealer against co-related TC's witnessing by BHEL is waived off and material will be accepted based on MTC of SAIL/TISCO.

2 In case material is procured from dealer and co- related TC's are not available, check on 100% quantity of plates will be performed on sample drawn from each plate at NABL certified/ approved laboratory or any govt approved laboratory for chemical & physical properties, However dimensional check shall be witnessed by BHEL.

3 There will not be any inspection by CUSTOMER.

SUB-SECTION-VII:QM5

MILL REJECT HANDLING SYSTEM

1.00.00 **PNEUMATIC CONVEYING SYSTEM**

1.01.00 **PIPING, VALVES, STRAINERS AND FITTINGS**

(a) All pipes and fittings shall be tested as per applicable code.

(b) All valves shall be hydraulically tested for body, seat and back seat (if applicable) as per relevant Standard. Check valves shall also be tested for leak tightness test at 25% of the specified seat test pressure. Valves shall be offered in unpainted condition only.

(c) Functional checks of the valves for smooth opening and closing shall also be done.

(d) Strainer body shall be hydraulically tested. One of each type and size of Strainer shall be tested for Pressure drop v/s flow rate, if not tested earlier.

1.02.00 **PRESSURE AND STORAGE VESSELS:**

(a) Atmospheric Tank

(i) All weld joints shall be DP tested and complete tanks shall be water fill tested.

(ii) All atmospheric storage tanks fabricated and erected at site shall be subjected to all tests (Hydro, NDT and Vacuum) according to design code as applicable.

(b) Pressure Vessel

(1) NDT on weld joint shall be as per respective code requirements or the minimum as specified as below:

(i) 100% DPT on root run of butt weld, nozzle welds and finished fillet welds.

(ii) 10% DPT on all finished butt welds

(iii) 10% RT (covering all 'T'/cross joints) of butt welds

(2) Butt Welds of dished ends shall be stress relieved and subjected to 100% RT.

(3) Each finished vessels shall be hydraulically tested to 150% of the design pressure for a duration of 30 minutes.

1.03.00 **PACKAGE AIR COMPRESSOR**

In addition to Hydraulic tests of pressure parts, performance test of the compressor shall be done for FAD, pressure, power consumption, as per relevant code. Noise and vibration shall also be measure.

1.04.00 **BAG FILTERS:**

1.04.01 Leakage test shall be carried out for casing and other pressure parts

1.04.02 Pulsing and sequential test on bag filter cages shall be done.

1.05.00	**MANO RAIL HOIST/CHAIN PULLEY BLOCKS:**
1.05.01	Chain pulley blocks shall be tested as per IS:3832
1.05.02	UT & MPI/DPT shall be done on gear blank, pinion shaft, axles.
1.05.03	Proof Load Test on hooks shall be carried out followed by DPT.
1.05.04	100% Radiography on weld joints under tension and 25% radiography on compression butt joints followed by 100% DPT shall be done for rope drum, girder, end carriage etc.
1.05.05	Complete hoists shall be tested for load and overload test as per IS:3177
1.06.00	**VENTILATION SYSTEM:**
1.06.01	Shop Run Test for all Centrifugal Fans to check noise, temp. rise & vibration.
1.06.02	Performance test on one fan of each type for capacity, pressure, efficiency and power consumption.

ANNEXURE – IV

SUB-VENDOR LIST

2X800 MW DARLIPALI STPP - MILL REJECT HANDLING SYSTEM					
VENDOR LIST					
Sl. No	**ITEM/SERVICE**	**QAP/ INSP.CAT.**	**Scope of supply/manufacturer**	**Place**	**Remarks by BHEL**
I	**SELF MFG ITEMS**				
1	Pyrite Hopper	I	SELF MANUFACTURER		
2	Blow Tank	I	SELF MANUFACTURER		
3	Local Control Panel with accessories	I	SELF MANUFACTURER		
4	Mill Reject Conveying fittings/Bends	I	SELF MANUFACTURER		
5	Swing Valve(Pneumatic operated)	I	SELF MANUFACTURER		
6	Bunker Discharge Gate (Sector Gate)	I	SELF MANUFACTURER		
7	Pressure Relief Valve	I	SELF MANUFACTURER		
II	**BOUGHT OUT ITEMS**				
A	**MECHANICAL**				
1	Terminal Box	I	BHEL/ NTPC APPROVED FABRICATORS	INDIA	
2	AIR RECEIVER	I	PARKARE	DELHI	
		I	UNITED ENGG WORKS	NASIK	
		I	INTEGRATED ENGINEERS	PUNE	
		I	TEMASME VESELLEX	NOIDA	
		I	DIAMOND FABRICATIONS	PUNE	
3	DRAIN TRAP	III	SPIRAX MARSHAL	MUMBAI	
		III	GREAVES COTTON	MUMBAI	
		III	TRIDENT	COIMBOITORE	
4	Gate, Globe, Check valves/ NRV - C.I	II	LEADER	JULLANDHAR	
		II	BANKIM	HOWRAH	
		II	H SARKAR	HOWRAH	
		II	KBL	PUNE	
		II	AV VALVES	AGRA	Upto 300 NB
5	Gate, Globe, Check valves/ NRV - G.M	III	LEADER	JULLANDHAR	
		III	BOMBAY METALS & ALLOYS (GG)	MUMBAI	
		III	SANT VALVES	JULLANDHAR	
6	Knife Gate/Plate Valve (H/W Operated & Cylinder Optd)	I	FOURESS	MUMBAI	
		I	VASS	CHENNAI	
		I	(ORBINOX)	COIMBATORE	
7	Ball Valves	III	PRECISION ENGG	MUMBAI	
		III	Weir BDK	HUBLI	
		III	LEADER	JULLANDHAR	
		III	FLOW CHEM	GUJRAT	
8	Safety Relief Valve	III	LEADER	JULLANDHAR	
		III	SPIRAX MARSHAL	PUNE	
		III	KAYSTONE(TYCO FLOW CONTROL)	HALOL	
		III	BHEL	TRICHY	

9	M.S G.I / ERW PIPES	I	JINDAL	GHAZIABAD	UPTO 350 NB
		I	SURYA ROSHINI	BAHADURGARH	
		II	SAIL	ROURKELA	
		I	WELLSPUN	ANJAR	
		I	INDUS	GB NAGAR	UPTO 300NB
		II	TISCO	JAMSHEDPUR	UPTO 150NB
		I	MAHARASHTRA SEAMLESS	MAHARASHTRA	200NB TO 400NB IS 3589
10	Metallic Expansion Bellow(Metallic)	I	METALLIC BELLOWS	CHENNAI	
		I	SUR INDUSTRIES	KOLKATA	
		I	LONESTAR	CHENNAI	
11	Rupture Disc	II	BS & B SAFETY SYSTEM	CHENNAI	
12	Chain pulley Block (1 Ton)	II	hercules (INDEF)	mumbai	
		II	TRACTEL	FARIDABAD	
		II	LIFTING EQUIPMENTS & ACESSORIES	DELHI	
13	Conveying Air Compressor (Reciprocating Type)	I	KIRLOSKAR PNEUMATIC	PUNE	
		I	INGERSOLL RAND	AHMEDABAD	
14	Sump Pump (Water Service)	II	KSB PUMP	PUNE	
		II	MATHER & PLATT	PUNE	
		II	SAM	COIMBOITORE	
		II	FLOW MORE	GHAZIABAD	
		II	B & C	CHENNAI	
		II	KIRLOSKAR	PUNE	
		II	WORHTINGTON	GHAZIABAD	
15	Pneumatic Actuator/Cylinder(Metallic)	III	SCHRADDER	MUMBAI	
		III	NUCON	HYDERABAD	
		III	ROTEX	MUMBAI	
		III	VAAS	CHENNAI	
16	Tools and Tackles	III	BRANDED		
17	Steel Plate/ Structure/ Section/ SS liner	III	SAIL		
		III	JSW STEEL LTD		
		III	JINDAL STEEL & POWER LTD		
		III	TISCO		
		III	ESSAR		
		III	IISCO		
		III	LLOYDE		
		III	RINL		
18	Grating	III	INDIANA	PUNE	
19	Bag Filter	II	ACCO	KOLKATA	
		II	THERMAX	PUNE	
		II	BATLIBOI	DELHI	

B	ELECTRICAL & INSTRUMENTATION				
1	Motor (LT)	I	MARATHON	KOLKATA	Refer Note 3
		I	SIEMENS	MUMBAI	
		I	NGEF	BANGALORE	Upto 15KW, refer note 3
		I	KEC	BANGALORE/HUBLI	HUBLI upto 90 kw,refer note 3
		I	CGL	AHMED NAGAR	Refer note 3
		I	ABB	FARIDABAD/BANGLORE	Faridabad upto 55kw, Bangalore above 55kw & upto 200kw, refer note 3
		I	BBL	MUMBAI	upto 100kw refer note 3
2	Air Filter/Lubricator/Regulator	III	SHAVONORGAN	MUMBAI/BANGLORE	
		III	PLACKA	CHENNAI	
3	Level Probes(RF)	II	EIP ENVIRO LEVEL CONTROL	NOIDA	
		II	E&H	GERMANY / AURANGABAD	
		III	FLOW STAR	FARIDABAD	
4	Annunciator	III	HC	MUMBAI	
		III	PECON	AHEMDABAD	
		III	PROCON	CHENNAI	
5	Solenoid Valves	III	NUCON	HYDERABAD	For Nucon Cylinder only
		III	JEFFERSON	ARGENTINA	
		III	HARION	GERMANY/ AURANGABAD	
		III	ASCO(I)	CHENNAI	
		III	SCHRADDER DUNCAN LTD.	MUMBAI	For Schrader Duncan cyl only
		III	AVCON CONTROLS	MUMBAI	
		III	ROTEX AUTOMATION	BARODA/VV NAGAR	
6	Pressure Switch ,DP Switch/ Temp.Switch	II	SWITZER	CHENNAI	Except 900 series
		II	GAUGE BOURDON (FOR PRESSURE SWITCH)	PANVEL	Not for temp switch
		II	TRAFAG	RANIPET	
			INDFOS IND	GHAZIABAD	
		II	ASHCROFT	USA /GERMANY	
		II	ASHCROFT	GHAZIABAD	
7	Pressure Gauge & DP Gauge	III	GAUGES BOURDON INDIA	PANVEL	
		III	AUXITROL	UK	
		III	MANOMETER INDIA	MUMBAI	
		III	BUNDENBURG	UK	
		III	AN INSTRUMENTS	KOLKATA	
		III	GOA THERMOSTATIC	GOA	
		III	GUCK INDIA	MUMBAI	
		III	WIKA	PUNE	
		III	SWITZER (DP INDICATOR)	CHENNAI	
		III	H GURU (SI)	BANGALORE	
8	Temperature Gauge	III	WIKA	PUNE	
		III	AN INSTRUMENTS	KOLKATA	
		III	GENERAL INST	MUMBAI /GOA	
		III	BUDENBURG	UK	
		III	H GURU (SI)	BANGALORE	

		III	GOA THERMOSTATIC	GOA	
		III	WAREE	MUMBAI	
9	Pulse Jet Valves	III	ASCO	CHENNAI	
		III	MANIK	CHENNAI	
10	Cable Lug	III	DOWELLS	MUMBAI	
		III	BILLET (3D)	VALSAD	
		III	CHETNA	NASIK	
11	Limit Switch	III	SIEMENS	MUMBAI	
		III	JAIBALAJI	NEWDELHI	
12	Junction Boxes & Earthing Material ROD, FLAT etc.	III	NTPC / BHEL APPROVED VENDOR		Main contractor approved sorces with galvanizing at NTPC accepted sources
13	INSTRUMENT CABLE / SIGNAL CABLE	II	DELTON CABLES	BANGALORE	
		II	PARAMOUNT CABLES	FARIDABAD	
		II	POLYCAB	DAMAN	
		II	UNIVERSAL CABLES	SATNA	
		II	NICCO	KOLKATA	
		II	CORDS	BHIWADI	
		II	INCAB	PUNE	
14	Cable Tray	II	MJ ENGG	DELHI /BHIWADI	
		II	JAMUNA METALS	DELHI / SONEPAT	
		II	INAR PROFILES	ANAKAPALLI	
		II	INDIANA	MUMBAI	
		II	TECHNO	CHANDIGARH	
		II	INDUSTRIAL PERFORATION	KOLKATA	
15	Cable Gland	III	COMMET	MUMBAI	
		III	SUNIL & CO.	KOLKATA	
		III	ARUN ENGG.	KOLKATA	
		III	QUALITY PRECISION	KOLKATA	
16	Local panel/ LPBS	I	CONTROL DEVICES	KOLKATA	
		I	PYROTECH	UDAIPUR	
		I	C&S	NOIDA/ HARDWAR	
		I	INDUST CONTROLS & APPLIANCES	MUMBAI	
		I	POSITRONICS	BARODA	
		I	SWITCHING CIRCUIT	KOLKATA	
		I	JACKSON	GR. NOIDA	
		I	JOLLY ENGG.	KOLKATA	
17	FRP JUNCTION BOXES	III	BHEL/NTPC approved sources	India	
18	LEVEL INDICATOR / GAUGE	III	SBEM PVT LTD	PUNE	
		III	PUNE TECHTROL	PUNE	
		III	LEVCON	KOLKATA	
		III	SIGMA	MUMBAI	
		III	DK INSTRUMENTS	KOLKATA	

	LEGENDS
	1. QP/ INSPN CATEGORY : CAT-I : For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC. CAT-II : For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP. CAT -III : For these items main supplier approves the quality plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier. UNIT/WORKS : Place of manufacturing Place of Main Supplier of multi units/works
	NOTE-1 For steel following modalities to be adopted a) Steel plate, structural steel and section shall be procured from main producers like SAIL/ TISCO/ ISSCO/ RINL/ JINDAL/ ESSAR/ ISPAT/ LLOYD'S STEEL/ JSW. b) Material will be delivered directly from manufacturer's plant/ stock yard/ godown to NTPC project site. c) Correction of material with MTC will be done by main contractor before delivery and correlated MTC along with deelivery challan will be NTPC-RIO for issuance of MDCC. NOTE-2 It that the same Qulaity Plans as approved for main equipment and identified in the vendor list shall be applicable for the type of control measure i.e. make /test/ check the procuremeent of mandatory spares. However, for those spares which are not covered in the approved QP, main supplier shall furnish Certificate of Conformance (COC) along with guarantee and interchangibilty certificate shall be generated by the main item manufacturer, for which the spares are made. NOTE-3 A) LESS THAN 30 KW:- Acceptance of motor less than 30 KW is based on COC of the manufacturer & the contractor confirming as follows: It is here confirmed that the above mentioned motor/ motors was / were manufacture taking care of NTPC specific requirements regarding ambient temp., voltage & frequency variation, hot starts, pull out torque, starting KVA/KW, temp. rise, distance between centre of stud & gland plate, space heater and tested in accordance with approved drawing/ data sheet B) 30 KW AND ABOVE & UPTO 50 KW:- Acceptance of Motor rating between 30 KW & 50 KW is based on NTPC review of Routine Test inspection report as per IS 326 witnessed by main contractor along with COC of the manufacturer & the contractor confirming as follows: It is hereby confirmed that the above mentioned motor / motors was /were manufactured taking care of NTPC specific requirements regarding ambient temperature, voltage and frequency variations, hot starts, pull out torque, starting KVA/KW, temp. rise, distance between centre of stud & gland plate, space heater and tested in accordance with approved drawing / data sheet.

ANNEXURE – V

PAINTING SCHEDULE

PAINTING SCHEDULE

Sl. No.	Equipments	Surface Preparation	Primer Coat			Intermediate coat			Finish Coat			Total DFT (Micron)	Colour Shade	Remarks
			Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFTper coat (Micron)			
I	**Self Manufactured (Fabricated Items)**													
A)	Denseveyor ,Pyrite Hopper	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Heat resistant aluminium paint	2	20	~	~	~	Heat resistant aluminium paint	2	20	~ 80		
B)	Air Receiver, Bunker Discharge Gate , Pressure Relief Valve, Terminal Box.	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-140	Ref. Annexure-I enclosed	
C)	Pneumatic Panel for Denseveyor	Seven Tank Process	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-145	Ref. Annexure-I enclosed	
II	**Bought Out Items**													
1	Compressor Panel, Main Control Panel	Seven Tank Process	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-145	Ref. Annexure-I enclosed	
2	Conveying air compressor, Motors	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-140	Ref. Annexure-I enclosed	

Sl. No.	Equipments	Surface Preparation	Primer Coat			Intermediate coat			Finish Coat			Total DFT (Micron)	Colour Shade	Remarks
			Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFTper coat (Micron)			
3	Plate Valves (Cylinder Optd. & Hand Wheel Optd.) , Metallic Expansion Bellow .	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Heat resistant aluminium paint	2	20	~	~	~	Heat resistant aluminium paint	2	20	~ 80		
4 a	C.I valves , Rupture Disc , Chain Pulley Block & Bag Filter Casing for temp<= 90 deg C	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Red Oxide Zinc Chromate as per IS:2074 (Alkyd medium)	2	25-35	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	3	20-25	~ 110-145	Ref. Annexure-I enclosed	
b	Inlet Valve for temp. >90 deg c		Heat Resistant Aluminium paint	2	20	~	~	~	Heat Resistant Aluminium paint	2	20	80	Aluminium	
5	Structural Steel works including mill rejects storage bunker	SA 2 1/2	Inorganic Zinc Silicate Primer	1	75	Epoxy based Titanium di-oxide	1	75	Epoxy based two pack finish paint	2	35	~ 250	Ref. Annexure-I enclosed	Site Painting Work
									Final coat of PU paint	1	30			
6	Compressed air piping, Mill Rejects conveying piping, cooling water piping, service water piping. pipe fittings and ACI Bends.	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Red Oxide Zinc Chromate as per IS:2074 (Alkyd medium)	2	25-35	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	3	20-25	~ 110-145	Ref. Annexure-I enclosed	Site Painting Work

Notes:

1 Surface preparation shown is as per Swedish standard SIS 05-5900.Degreasing will be as per Standard SSPC-SP1
2 GM / SS Valves and Galvanised Instrument Air Pipes will not be painted.
3 All instruments shall be painted as per manufacturer standard practice.
4 Method of painting application shall be as per paint manufacturer's recommendation.
5 Item/Material as per s.no 5 & 6 shall be painted at site.
6 Paint makes - As per BHEL / NTPC approved makes

COLOUR AND CODING SCHEME

Sl. No.	Equipment Description	Ground Colour		Identification Tag/Band			Legend	Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.		
1	Air Receiver	Blue	5012	White		9010		
2	Motor	Blue	5012					Enamel Paint to be used
3	Pneumatic panel for Transport Vessel	Blue & Grey	5012 9002					Front & Rear panels in Grey.End Panels sides in Blue
4	Conveying Air Compressor/After Cooler	Blue	5012	White		9010		Identifying legends to be used
5	Compressor panel, main control panel	Grey	9002					
6	Rupture Disc,Bag filter casing ,Bunker Discharge gate, Pressure Relief Valve, Terminal box	Grey	9002					
7	Structural steel works including mill rejects storage bunker	Blue & Grey	5012 9002					Primary strl menbers(columns & beams) in Blue Secondary members in Grey
8	Compressed air piping, Valves & Fittings.	Grey	9002	Sky Blue	101		PA	
9	Mill rejects convey piping valves & fittings, ACI Bends	Grey	9002	White		9010		
10	Service water lines, valves & fittings	Grey	9002	Sea Green	217		RW/ SW	
11	DMCW water lines, valves & fittings	Grey	9002	Sea Green	217		DMW	
12	Chain Pulley Block with Monorail	Golden Yellow	1004					
13	Hook	Signal Red	3001					
Note: Above are subject to final approval of NTPC								

ANNEXURE – VI

LOW PRESSURE PIPING SPECIFICATION

LOW PRESSURE PIPING

1.00.00 **EQUIPMENT SIZING CRITERIA**

1.01.00 All the piping systems and equipment supplied under this package shall be designed to operate without replacement and with normal maintenance for a plant service life of 30 years, and shall withstand the operating parameter fluctuations and cycling which can be normally expected during this period.

1.02.00 For all L.P. piping system covered under this specification, sizing and system design shall be to the requirements of relevant codes and standard indicated elsewhere. In addition to this, requirements of any statutory code as applicable shall also be taken into consideration.

1.03.00 Inside diameters of piping shall be calculated for the flow requirements of various systems. The velocities for calculating the inside diameters shall be limited to the following:

a) **Water Application**

	Pipe Size	Water Velocity in m/sec Below 50 mm	50-150 mm	200 mm & above
(a)	Pump suction	------	1.2-1.5	1.2-1.8
(b)	Pump discharge and recirculation	1.2-1.8	1.8-2.4	2.1-2.5
(c)	Header	------	1.5-2.4	2.1-2.4

Pipe line under gravity flow shall be restricted to a flow velocity of 1 m/sec generally. Channels under gravity flow shall be sized for a maximum flow velocity of 0.6 m/sec.

WILLIAM & HAZEN formula shall be used for calculating the friction loss in piping systems with the following "C" value:

(i)	Carbon steel pipe	100
(ii)	C.I Pipe/ Ductile Iron.	100
(iii)	Rubber lined steel pipe	120
(iv)	Stainless steel pipe	100

For calculating the required pump head for pump selection, at least 10% margin shall be taken over the pipe friction losses and static head shall be calculated from the minimum water level of the tank/ sump/ reservoir from which the pumps draw water.

(b) **Compressed Air Application**

Compressed air 15.0 m/sec.(under Average Pressure & Temp. conditions)