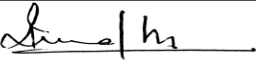
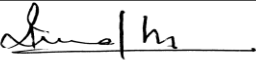


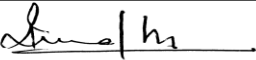
 Ranipet		MANUFACTURER'S NAME AND ADDRESS BHARAT HEAVY ELECTRICALS LTD, BOILER AUXILIARIES PLANT RANIPET-632 406		STANDARD QUALITY PLAN										
				ITEM: GGH SYSTEM SUB SYSTEM: FGD System	QP NO.: GGH 101 REV. NO.: 01 DATE: 18.02.2019 PAGE: PAGE 1 OF 9	PROJECT: STANDARD	PACKAGE: FGD PACKAGE							
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.			11.
1.0 RAW MATERIALS														
1.1	Raw Material for structural components.	Review of TC for chemical composition, mechanical properties, UT*	Major	Review of MTC	100%	100%	P.O. specification / approved drawing	P.O. specification/ approved drawing	MTC	√	P	R	-	Plate above 40mm shall be UT tested.
2.0 WELDING REQUIREMENT														
2.1	Welding procedure welder's performance & Qualification	Procedure, personnel qualification	Major	Review of docs.	100%	100%	AWS D 1.1/ ASME Sec. IX	AWS D 1.1/ ASME Sec. IX	WPS,PQR, WPQ	-	R	R	-	
3.0 COLD END CENTER SECTION & CONNECTING PLATE(SECTOR BEAM LOWER)- BHEL SUPPLY														
3.1	Cold end center section	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	√	P	R	-	
3.2	Bearing support	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	√	P	R	-	
3.3	Sealing plate	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	-	P	W	-	
3.4	Cold End connecting plate assy	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	√	P	R	-	
4.0 HOT END CENTER SECTION & CONNECTING PLATE(SECTOR BEAM UPPER)- BHEL SUPPLY														
4.1	Hot end center section	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	√	P	R	-	

 RAKESH KUMAR MADHU SR.ENGR/ QA MANUFACTURER/SUB-SUPPLIER	 K.C. GANDHI PARIMALAM DGM/QA MAIN-SUPPLIER	LEGENDS: **M: Manufacturer/sub supplier B: BHEL, C: CUSTOMER, MTC: Material test certificate. P: Perform, W: Witness, V: Verification as appropriate R: review of certificate / Records *Records, Identified with Tick (√) shall be essentially included in QA Documentation. COC: Certificate of conformance.		Doc No:		
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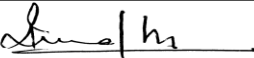
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
4.2	Bearing support	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Mfg. Worksheet	√	P	W	-	
4.3	Sealing Plate	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	-	P	W	-	
4.4	Hot end connecting Plate assy	Workmanship & Dimension	Major	Visual & Measurement	100%	100%	Drawing	Drawing	Inspection Report	√	P	R	-	
5.0	SUB DELIVERIES (BWSC Supply) All major bought out items & manufacturing should be as per BHEL Specification/PO/Approved Drawing.													
5.1	Gear reducer (for Rotor Drive)	Compliance to PO	Major	Visual & Identification	100%	100%	Purchase Spec	Purchase Spec	COC	√	R	R	-	
5.2	Seal air fan motor , Drive motor, lube oil circulation system motor, Purge air fan motor.	Make Type, Rating, Routine Test for Motor	Major	Test	100%	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	TC/COC	√	R	R	-	
5.3	Guide & Support Bearing	Compliance to PO	Major	Verification	100%	100%	Purchase Spec	Purchase Spec	Supplier's catalog	√	R	R	-	
5.4	Purge air fan	Compliance to PO/Drawing	Major	Visual, Dimensions & Identification	100%	100%	Purchase Spec/PO/ Drawing	Purchase Spec/PO/ Drawing	Inspection report & COC	√	R	R	-	
5.5	Sealing air fan	Compliance to PO	Major	Visual & Identification	100%	100%	Purchase Spec	Purchase Spec	Inspection report & COC	√	R	R	-	
5.6	LP Pump skid with motor	Compliance to PO	Major	Visual & Identification	100%	100%	Purchase Spec	Purchase Spec	COC	√	R	R	-	

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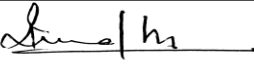
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
5.7	HP Pump skid with motor	Compliance to PO	Major	Visual & Identification	100%	100%	Purchase Spec	Purchase Spec	COC	√	R	R	-	
5.8	Soot blower	Compliance to PO	Major	Verification	100%	100%	Purchase Spec	Purchase Spec	COC	√	R	R	-	
5.9	Air motor	Compliance to PO	Major	Verification	100%	100%	Purchase Spec	Purchase Spec	COC	√	R	R	-	
5.10	Support bearing housing -stress relieve after welding	Compliance to drawing & weld procedure	Major	Review HT chart	100%	100%	Drawing & weld procedure	Drawing	HT chart	-	P	R	-	
5.11	Guide bearing housing-stress relieve after welding	Compliance to drawing & weld procedure	Major	Review HT chart	100%	100%	Drawing& weld procedure	Drawing	HT chart	√	P	R	-	
5.12	Lube oil system	Compliance to drawing/PO/Spec	Major	Visual & Dimensional inspection	100%	100%	Drawing/Spec/PO	Drawing/Spec/PO	Inspection Report & COC	√	P	R	-	
5.13	Rotor Drive Assembly	Compliance to drawing Spec & PO.	Major	Visual & Identification, Dimensional & No load Test run test. Noise Level.	100%	100%	Drawing/Spec/PO	Drawing/Spec/PO	Inspection report	√	P	W	-	
6.0 HOUSING (BHEL SUPPLY)														
6.1	Housing pedestal main	Compliance to drawing for critical dimensions & completeness etc.,	Major	Visual, check fit, tock & weld	100%	100%	Drawing	Drawing	Inspection report	√	P	R	-	

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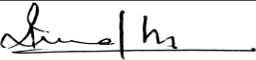
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
6.2	Housing pedestal & panels	Compliance to drawing for critical dimensions & completeness etc.,	Major	Visual, check fit, Tack & weld, dimensional inspection	100%	100%	Drawing	Drawing	Inspection report	-	P	R	-	
6.3	Rotor, Axial & bypass seals materials	Chemical composition & mechanical properties	Major	Chemical analysis mechanical testing	100%	100%	Drawing	Drawing	MTC	-	P	R	-	
7.0	ROTOR ASSEMBLY (BHEL SUPPLY)													
7.1	Diaphragms & Stay plate	Chemical composition & mechanical properties	Major	Chemical analysis & mechanical testing	100%	100%	Specification/A pproved Drawing	Specification/A pproved Drawing	MTC	-	P	R	-	
7.2	Diaphragms Plates	Compliance to drawing	Major	Check Fit, Tack & Weld Dimensional check	100%	100%	Drawing	Drawing	Report	-	P	R	-	
7.3	Rotor post assembly stub diaphragms plate to post welds	Compliance to drawing for critical dimensions & completeness etc.,	Major	Check Fit, tack & weld dimensional check	100%	100%	Drawing	Drawing	Inspection report	√	P	R	-	
7.4	Rotor post assembly MT of stub diaphragms plate to post welds	MT of welds	Major	NDT	100%	100%	Drawing & Procedure	Drawing & ASME section V or equivalent standard	Inspection report	√	P	W	-	
7.5	Rotor compartment assembly & weld stay plates to diaphragms	Compliance to drawing for critical dimensions & completeness etc.	Major	Check fit, tack & weld dimensional check	100%	100%	Drawing	Drawing	Inspection report	√	P	W	-	
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
7.6	Basket gauge	Workmanship, dimension	Major	Visual & Measurement	100%	Random check	Drawing	Drawing	Inspection report	-	P	W	-	BWSC SUPPLY
7.7	Heating element basket assembly inspection	Workmanship, Dimension, pairs of elements	Major	Visual & Measure	100%	Random check	Drawing / data sheet / specifications	Drawing / data sheet / specifications	Inspection report	√	P	W	-	
7.8	Rotor component assembly or segments / check each cell with gauge.	Workmanship, Dimension	Major	Visual & measurement	100%	Random check	Drawing	Drawing	Inspection report	√	P	W	-	
8.0	ROTOR POST, SUPPORT & GUIDE TRUNNION ASSEMBLY (BHEL SUPPLY)													
8.1	Rotor post headers, support flange	Chemical composition, Mechanical properties	Major	Chemical analysis & Mechanical testing	100%	100%	Specification/ approved drawing	Specification/ approved drawing	MTC	√	R	R	-	
8.2	Rotor Post Shells	Chemical composition, Mechanical properties	Major	Chemical analysis & Mechanical testing	10%	10%	Specification/ approved drawing	Specification/ approved drawing	MTC	√	R	R	-	
8.3	Rotor post shell. Support shell, Header plates (Guide, support, support flange)>25mm UT	Soundness and conformity	Major	UT	100%	100%	Drawing & Procedure	Drawing & Procedure	NDE Report	√	R	R	-	UT as per ASTM A435
8.4	Trunnion shaft	Chemical composition, Mechanical properties	Major	Chemical analysis & Mechanical testing	10%	10%	Drawing	Drawing & data sheet	MTC	√	R	R	-	Trunnion BWSC Supply.

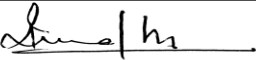
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
8.5	Trunnion shaft	Soundness and conformity	Major	UT	100%	100%	Drawing	Drawing	NDE Report	√	R	R	-	UT as per ASTM A388
8.6	Trunnion shaft	Soundness and conformity	Major	MT after rough machining at mill	100%	100%	ASTM	ASTM	NDE Report	√	R	R	-	MT: ASTM A275
8.7	Rotor post assembly	Compliance to drawing for critical dimensions, completeness etc.	Major	Check fit, tack & weld dimensional check	100%	100%	Drawing	Drawing	Inspection report	√	P	R	-	
8.8	Trunnion shell weld	Compliance to procedure	Major	UT	100%	100%	ASME section V	ISO 5817	NDE Report	√	P	W	-	
8.9	Post Shell & Trunnion shell to header weld	Compliance to procedure	Major	MT	100%	100%	ASME section V	ISO 5817	NDE Report	√	P	W	-	
8.10	Rotor post assembly / visual & dimensional inspection after machining	Visual & Dimensional	Major	Physical	100%	100%	Drawing	Drawing	Inspection report	√	P	W	-	
8.11	Rotor Post assembly	Workmanship, Final assy Dimension	Major	Visual & measurement	100%	100%	Drawing	Drawing	Inspection report	√	P	R	-	
9.0	FINAL INSPECTION													
9.1	Dimensional inspection of main components as listed in remarks cells	Workmanship, Dimension	Major	Visual & measurement	100%	100%	Drawing	Drawing	Inspection report	√	P	W	-	Cold connecting plate, Hot end center section, Hot connecting plate, Rotor assembly & Rotor compartment segments.

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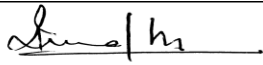
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					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.			11.
9.2	Assembled baskets	Compliance to drawing	Major	Measure	100 %	10%	Drawing & data sheet/specification	Drawing & data sheet/specification	Inspection report	√	P	W	-	
9.3	Painting	Paint thickness	Major	Visual, DFT check	100%	Random	Spec/PO /Approved painting scheme	Spec/PO /Approved painting scheme	Report	√	P	R	-	
9.4	All components- Final Inspection	All general items Final	Major	Documentation review & Quality	100%	100%	Drawing & Specs	Drawing & Specs	COC	√	R	R		

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			ITEM: AIR PREHEATER Heating elements & basket SUB SYSTEM: FGD System		QP NO.: GGH 101 REV. NO.: 00 DATE: 14.01.2019 PAGE 8 OF 9		PROJECT:		PACKAGE:					
							PACKAGE SUPPLIER:		BHEL CUST NO:					
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	B/C					M	B	C	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.			11.

B	FOR BASKETS WITH ENAMELING HEATING ELEMENTS(VENDOR SUPPLY)													
1	RAW MATERIAL													
1.1	Basket Heating element Material(element coil)	Material chemical analysis & mechanical certificate	Major	Review of MTC / Lab test report	100%	100%	BWSC Drawing approved by NHEL.	Relevant material specification as per drawing	MTC / Lab test report / COC	√	P	R	-	MTC Review w.r.t drawing / engineering specification during final inspection
2	IN PROCESS INSPECTION													
2.1	Welding procedure welder's performance & qualification	Procedure, personnel qualification	Major	Review of WPS, PQR & WPQ	100%	100%	AWS D1.1 / ASME Sec. IX	AWS D1.1 / ASME Sec. IX	WPS,PQR, WPQ	-	P	R	-	
2.2	Weld appearance inspection	Weld visual and dimensional	Major	Weld visual and dimensional	100%	NA	ISO5817 C		COC	√	P	R	-	
2.3	Enamel Quality Check	Sulfuric acid test	Major	Sulfuric acid test	Every 6 Tons	NA	EN ISO 28706-2:2011		COC	√	P	R	-	
2.4		Thermal shock test	Major	Thermal shock test	Every 6 Tons	NA	EN ISO 28763 : 2011							
2.5		Adherence test	Major	Adherence test	Twice per steel heat	NA	EN 20109:2013							

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