

# **FIELD QUALITY PLAN**

**OF**

**BOILER**

**PRESSURE PARTS**

**(Erection & Commissioning)**

**FOR**

**BHEL-JHANSI**



**BHARAT HEAVY ELECTRICALS LIMITED**  
**BHEL-JHANSI**

**DOC. NO.:**  
**REV. NO. : R00**

# FIELD QUALITY PLAN

OF


## BOILER

PRESSURE PARTS

(Erection & Commissioning)

FOR

**BHEL-JHANSI**

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DOCUMENT NO.		
ORIGINAL DATE OF ISSUE	--/--/----	
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**BHARAT HEAVY ELECTRICALS LIMITED**

**BHEL JHANSI**



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## STATUS OF AMEDMENTS

Doc. No. :

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SHEET 1 / 1 SHEET

**S I. Reference of Sheet(s)  
No. Revised**

**Revision No.  
& Date**

**Remarks**

NIL

SAMPLE



**AUTHORISATION FOR DIFFERENT  
CATEGORIES OF CHECKS**

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Classification of Check                      Checking Authority                      Accepting Authority

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Symbol      Description

A	Critical	BHEL & Task Performer	HOS
B	Major	BHEL & Task Performer	HOS
C	Minor	Task Performer	Task Performer

Legend:

HOS: Head of section

**NOTE:**

1. Quantum of check shall be 100% for all characteristics unless otherwise mentioned in reference documents.
2. QAE is also authorized to carry out Surveillance in any of the B & C category of checks at his discretion.
3. In case of non-conformity, accepting authority shall ensure dispositioning before accepting and the dispositioning shall be reflected in log sheets / Protocols.



## STATEMENT OF CHECKS

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SHEET 1 / 12 SHEETS

**Capacity** : 12MTPH

**System** : BOILER

**Sub System** : PRESSURE PARTS

**Area** : ERECTION & COMMISSIONING

- " For checks where log sheets are not called for, suitable records should be maintained in the form of log book / protocols.
- " As an evidence of having carried out the work satisfactorily, a general-purpose log sheet L-00 shall be maintained for all the checks.
- " Abbreviations used in the column %type of check+are :
- R : Record Verification
- M : Measurement
- V : Visual





**(STATEMENT OF CHECKS)**

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SHEET 3 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS				AREA : ERECTION			
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS	
2.0	<b>HEADERS :</b>								
2.1	Check for Inspecting Authority's stamp on headers and certificate.	V/R		A	100%	Drawing / IBR certificate			
2.2	Identification of the headers.	V/R		C	100%	Shipping List / Drawing			
2.3	Clearance during lifting of Headers.	V		B	100%	Drawing			
2.4	Cleanliness of headers.	V/R		C	100%				
2.5	Bow in headers ( <b>Tolerance : 1 mm / M, Max. 8mm for membrane panel headers and Max. 10mm for other headers</b> ).	M/R	Water level / Tape	B	100%	Drawing			
2.6	Header scarfing line ( <b>Tolerance : 2 mm Max. for membrane panels and 4mm Max. for others</b> ).	M/R	-do-	B	100%	-do-			
2.7	Completion of supports.	V		C	100%	-do-			
2.8	Alignment of headers and elevation, horizontally and distance from reference axes.	M/R	Water level / Tape	A	100%	- do -	L-03		
3.0	<b>WELDING :</b>								
3.1	Qualification of welders.	V / R		A	100%	IBR Welders Certificate / Welding Manual / WPS / PQR / WPR			
3.2	Adoption of correct procedure, method and approved consumables.	V/R		B	100%	EWS / Welding Manual			



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SHEET 4 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION			
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
3.3	Completion of pre-heating, welding and post heating of weld joints.	V		B	100%	Drawing / EWS / Welding Manual / Heat Treatment Manual		
3.4	NDE of welds.	V/R		A	As per Ref. Doc.	EWS / NDE Manual		
3.5	Post Weld Heat Treatment (PWHT) of welds.	M/R	Time-Temp. Recorder	A	- do -	EWS / Heat Treatment Manual		
3.6	Identification of weld joints and maintenance of records indicating number of weld joint, heat treatment carried out, NDE results, acceptance and rejection / repair details.	V / R		A	100%	Drawing / EWS / Welding Manual / Heat Treatment Manual / NDE Manual		
4.0	<b>PANELS :</b>							
4.1	Identification of panels.	V		C	100%	Shipping List / Drawing		
4.2	Width, diagonals & location of openings of the panels ( <b>Tolerance : Panel width : + 2mm or – 5mm. Diagonal difference (D1 ~ D2) : 10mm Max.</b> )	M	Tape	C	100%	Drawing		
4.3	Cleanliness of the panels (sponge test with compressed air).	V		C	100%	Cleaning Procedure		
4.4	Completion of supports.	V		C	100%	Drawing		
4.5	Completion of panel to panel joints	V		B	100%	-do-		



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## (STATEMENT OF CHECKS)

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SHEET 5 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION				
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS	
4.6.	Verticality of panels.	M	Plumb / Tape /Piano wire	B	100%	Drawing	L-04		
4.7	Alignment of Combustor.	M	Tape / Scale	A	100%	- do -	L-05		
4.8	Welding of refractory anchor pin.	M		C	100%	-do-			
5.0	<b>GRATE PANELS:</b>								
5.1	Alignment of panel with header.	M	Tape	B	100%	Drg//EWS			
5.2	Height of Expansion sleeves from pin.	M/R	Tape	C	100%	Drawing			
5.3	Expansion sleeves welding ( NDT check as per EWS).	V/R		C	100%	EWS /Welding manual			
5.4	Identification of Nozzles.	V		B	100%	Drawing			
5.5	Height of Nozzles.	M/R	Tape	B	100%	-do-			
5.6	Nozzle welding.	V		C	100%	EWS /Welding manual			
6.0	<b>COILS AND TUBES :</b>								
6.1	Identification of the coils.	V		C	100%	Shipping list / Drawing			
6.2	Cleanliness of the coils (sponge test with compressed air).	V		C	100%	Cleaning Procedure			
6.3	Alignment of coils w.r.t. inlet and outlet headers.	M/R	Tape / Water level	B	100%	Drawing			



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## (STATEMENT OF CHECKS)

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SHEET 6 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION				
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS	
7.0	<b>PLATEN SUPER HEATERS:</b>								
7.1	a) Identification of SH Coils.	V		C	100%	Drawing /Shipping List			
	b) Clearance between end coil assembly and steam cooled wall (Front & rear).	M/R	Tape	B	100%	Drawing	L-06		
	c) Individual pitches between coils.	M	Tape	B	100%	-do-	L-06		
	d) Clearances between coil ends and steam cooled front rear wall).	M	Tape	A	100%	-do-	L-07		
8.0	<b>ECONOMISER :</b>								
	a) Identification of economiser coils.	V		C	100%	Drawing / Shipping list			
	b) Clearance between coil end and duct front/ rear wall.	M	Tape	B	100%	-do-	L-07		
	c) Individual pitches between coils.	M	Tape	B	100%	-do-	L-07		
	d) Pitch between end coil assembly and duct side walls.	M	Tape	A	100%	-do-	L-07		
	e) Alignment and locking of cassette baffles.	M/R	Tape	B	100%	-do-			





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SHEET 8 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION				
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/ FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS	
10.0	<b>DOWNCOMER PIPES (DC PIPES) :</b>								
10.1	Identification of the DC pipes.	V		C	100%	Shipping list / Drawing			
10.2	Cleanliness of the pipes.	V/R		C	100%	Cleaning Procedure			
10.3	Orientation of DC pipes.	V		B	100%	Drawing			
10.4	Alignment of DC pipes ( <b>Verticality of DC pipes : 1mm / M, 5mm Max.</b> )	M	Tape / Plumb bob	B	100%	- do -			
10.5	Alignment of supports.	V		C	100%	-do-			
10.6	Completion of seismic guides.	V		C	100%	- do -			
11.0	<b>RISER TUBES / CORNER TRANSITION TUBES :</b>								
11.1	Identification of the tubes.	V		C	100%	Shipping list / Drawing			
11.2	Cleanliness of the tubes (sponge test with compressed air.)	V		C	100%				
11.3	Alignment of tubes.	M	Tape	B	100%	Drawing			
11.4	Completion of supports and seismic guides.	V		C	100%	- do -			



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SHEET 9 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION				
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS	
12.0	<b>BUCKSTAYS :</b>								
12.1.	Identification of the components.	V		C	100%	Shipping list / Drawing			
12.2	Completion of buck stay channel, stirrup angle with beams.	V		B	100%	Drawing			
12.3.	Completion of attachment welds such as scalloped plates and lugs.	V		B	100%	-do-			
12.4	Alignment of buck stay beams.	M	Tape	B	100%	- do -			
12.5	Completion of corner joints.	V		B	100%	-do-			
12.6	Completion of guides.	V		B	100%	- do -			
13.0	<b>GENERAL :</b>								
13.1.	Verticality and loading of suspensions.	V		B	100%	- do -			
13.2	Cold compression of all springs and locking of the Spring assembly.	V		B	100%	-do-			
13.3	Completion of pressure parts attachment welds.	V		B	100%	-do-			
13.4.	Closing of voids and cut-outs made during erection.	V		B	100%	-do-			
13.5	Locking of supports for hydraulic test.	V		B	100%	-do-			
13.6	Servicing of valves.	V		B	100%	-do-			



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SHEET 10 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : ERECTION			
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
13.7	Completion of drain / vent valves.	V		B	100%	Drawing		
13.8	Ensure welding of metal temperature pads on super- heater and reheater coils.	V		B	100%	- do -		
14.0	<b>HYDRAULIC TEST :</b>							
14.1	Welding of insulation hooks / studs and attachments to pressure parts completion before hydraulic test.	V		C	100%	Drawing		
14.2	Seal welding of all site RT plugs.	V	L P I kit	B	100%	Drawing / NDE Manual		
14.3	Readiness of total system for hydraulic test.	V		A	100%	Drawing	L-09	
14.4	Completion of air test of the system.	V/M	Pressure gauge	A	100%	Hydrostatic Test Procedure	L-10	
14.5	Rectification of leak joints and details.	V/R		A	100%		L-10	
14.6	Clearance of milestone activity.	V		A	100%			
14.7	Completion of hydraulic test.	V/M	Pressure gauge	A	100%	Hydrostatic Test Procedure	L-11	



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SHEET 11 / 12 SHEETS

SYSTEM : BOILER		SUB-SYSTEM : PRESSURE PARTS			AREA : COMMISSIONING			
SL NO.	CHARACTERISTICS / ITEM	TYPE OF CHECK	INSTRUMENT	CLASS	QUANTUM/FREQUENCY OF CHECK	REFERENCE DOCUMENT/ ACCEPTANCE STANDARD	FORMAT OF RECORD	REMARKS
1.	Completion of hydraulic test.	V/M	Pressure gauge	A	100%			
2.	Completion of gas tightness test of furnace and connected ducts.	V		A	100%	Commissioning Procedure		
3.	Availability of interlocks and protection to the equipments	V		B	100%	Drawing / O & M Manual		
4.	Completion of trial operation of individual equipments.	V		A	100%	Commissioning Procedure / O & M Manual		
5.	Clearance of milestone activity for light up.	V		A	100%	-do-		
6.	Completion and readiness of systems for initial light up.	V		A	100%	Drawing / Commissioning Procedure		
7.	Completions of alkali boil out of the system.	V		A	100%	-do-	L-12	
8.	Completion of chemical cleaning of the system.	V		A	100%	Commissioning Procedure / O & M Manual	L-13	
9.	Completion of passivation activity of the system.	V		A	100%	Commissioning Procedure		





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**DOCUMENTS REFERRED IN FIELD  
QUALITY PLAN**

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**Sheet:** 1 / 1 Sheet

<b>SL.NO.</b>	<b>Reference Document</b>	<b>Issuing Authority</b>
1.	Erection Welding Schedule (Erection drawing)	BHEL, Trichy
2.	Recommended Hydrostatic Test Procedure	BHEL, Trichy
3.	Welding Manual	BHEL, PSNR, NOIDA
4.	NDE Manual	BHEL, PSNR, NOIDA
5.	Heat Treatment Manual	BHEL, PSNR, NOIDA

