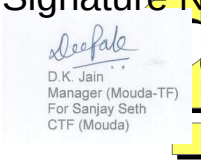
NTPC Telangana (customer no. 1819,1820)

Please find below reply for NTPC comments on EWS revision 01:

1) NTPC comment: 3% Hardness check on all alloy steel welds in boiler piping to be represented.
   BHEL reply: Included in right side bottom of each sheet for Circulation system, Superheater system, Reheater system. Economiser system, this note is not needed based on used materials.
2) NTPC comment: PWHT temp. to be in line with T22. Hardness checks, as per T22 (For SH system EWS)
   BHEL reply: Selected welding procedure is apt for the requirement in SH system. For panels with T22 in furnace zone, different welding procedure is being followed based on site experience. This is in line with previous NTPC contracts. It is requested to close this point.

Signature Not Verified



Digitally signed by D K JAIN
Date: 2019.04.25 09:28:32 IST
Reason: CAT IV
Location: NTPCEOC

ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
1	0-00-027-34643	FURN LOWER FRONT INLET HDR + FURN LOWER FRONT SPIRAL INLET TERM TUBE (F-01 NIPPLE + F-02TI)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2035	2419	-	-								
2	0-00-027-34685	FURN LOWER REAR I/L HDR + FURN REAR SPIRAL I/L TERM TUBE (F-07 NIPPLE + F-08TI)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2035	2419	-	-								
3	0-00-027-34643	FURN LWR FRONT SPIRAL I/L TERM TUBE+ FURN LOWER FRONT SPRL WALL PANEL (F-02TI + F-02L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
4	0-00-027-34685	LWR CORNER TUBES-LEFT+ FURN LOWER FRONT SPIRAL WALL PANEL (CORNER-LEFT + F-02L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
5	0-00-027-34685	FUR LWR FRNT SPIRAL WALL -BEND+FUR LWR FRONT SPIRAL WALL PANEL (F-02L-Bend + F-02L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							349	2636	4975	-	-								
6	0-00-027-34685	FURN LWR FRONT SPIRAL WALL + LWR CORNER TUBES- RIGHT (F-02L + CORNER-R)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
7	0-00-027-34685	FURN LWR FRONT SPIRAL WALL+ BURNER PANEL- RIGHT (F-02L + BURNER -RIGHT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
8	0-00-027-34685	FURN REAR SPIRAL I/L TERM TUBE+ FURN LWR REAR SPIRAL WALL (F-08TI + F-08L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
9	0-00-027-34685	FURN LWR REAR SPIRAL WALL+ LWR CORNER TUBES-RIGHT (CORNER-R + F-08L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
10	0-00-027-34685	FUR LWR REAR SPIRAL WALL-BEND+FUR LWR REAR SPIRAL WALL PANEL (F-08L-Bend + F-08L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							349	2636	4975	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	1/11

CAUTION :

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. NOTE: ALSO REFER QUALITY GUIDELINE NO. SIP:PP:29/REV.02. REV.NO.01 - DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820 | PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW) | SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME | PRESSURE PARTS/~~NON PRESSURE PARTS~~ | CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
11	0-00-027-34685	FURN LWR REAR SPIRAL WALL+ LWR CORNER TUBES-LEFT (F-08L + CORNER-LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
12	0-00-027-34685	FURN LWR REAR SPIRAL WALL+ BURNER PANEL-LEFT (F-08L +BURNER -LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
13	0-00-027-34684	FURN LWR SIDE SPIRAL WALL- LEFT+ CORNER TUBES -FRONT (F-17L-L + CORNER-FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
14	0-00-027-34684	FURN LWR SIDE SPIRAL WALL- LEFT+ CORNER TUBES -REAR (F-17L-L+ CORNER-REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
15	0-00-027-34684	FURN LWR SIDE SPIRAL WALL- LEFT+ BURNER PANEL-LEFT (F-17L-L+ BURNER - LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
16	0-00-027-34683	FURN LWR SIDE SPIRAL WALL-RIGHT+CORNER TUBES-FRONT (F-17L-R + CORNER-FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							280	2115	3992	-	-								
17	0-00-027-34683	FURN LWR SIDE SPIRAL WALL-RIGHT+CORNER TUBES-REAR (F-17L-R + CORNER-REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
18	0-00-027-34683	FURN LWR SIDE SPIRAL WALL-RIGHT+ BURNER PANEL-RIGHT (F-17L-R + BURNER -RIGHT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							142	1073	2025	-	-								
19	0-00-027-34681	FURN UPPER FRONT SPIRAL WALL+ BURNER PANEL-RIGHT (F-02U + BURNER-RIGHT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							358	2704	5104	-	-								
20	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+CORNER SOFA-RIGHT (F-02U + CORNER SOFA-R)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							154	1163	2196	-	-								

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	2/11

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C / TIME in mins	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos. Ø2.5	Ø3.15	Ø4.0					SPEC. NO	ACC NORM REF.		
21	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+ CORNER TUBES-RIGHT (F-02U + CORNER-RIGHT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							126	952	1797	-	-								
22	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+ BURNER PANEL-LEFT (F-02U + BURNER-LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							368	2779	5246	-	-								
23	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+ CORNER SOFA-LEFT (F-02U + CORNER SOFA-LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							164	1239	2338	-	-								
24	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+ CORNER TUBES-LEFT (F-02U + CORNER LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							106	801	1511	-	-								
25	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+ TRANSITION TUBES (F-02U + TRANSITION)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							124	937	1768	-	-								
26	0-00-027-34681	FURN UPR FRONT SPIRAL WALL+WALL SOFA TUBES (F-02U + WALL SOFA)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
27	0-00-027-34681	WALL SOFA TUBES +FURN UPR FRONT SPIRAL WALL (WALL SOFA + F-02U)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
28	0-00-027-34679	FURN LWR/UPR SIDE SPIRAL WALL+ BURNER PANEL-REAR (F-17L/U-R + BURNER-REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							368	2779	5246	-	-								
29	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+CORNER SOFA REAR (F-17U-R + CORNER SOFA REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							154	1163	2196	-	-								
30	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+CORNER REAR TUBES (F-17U-R + CORNER REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							106	801	1511	-	-								

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	3/11

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
31	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+ BURNER PANEL FRONT (F-17U-R + BURNER-FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							358	2704	5104	-	-								
32	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+CORNER SOFA FRONT (F-17U-R+ CORNER SOFA-FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							164	1239	2338	-	-								
33	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+CORNER TUBES FRONT (F-17U-R + CORNER-FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							104	786	1483	-	-								
34	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT TRANSITION (F-17U-R + TRANSITION)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							118	892	1682	-	-								
35	0-00-027-34679	FURN UPR SIDE SPIRAL WALL-RIGHT+ WALL SOFA (F-17U-R + WALL SOFA)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
36	0-00-027-34679	WALL SOFA TUBES +FURN UPR SIDE SPIRAL WALL-RIGHT (WALL SOFA + F-17U-R)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
37	0-00-027-34682	FURN UPR REAR SPIRAL WALL+BURNER RIGHT (F-08U + BURNER PANEL-R)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							358	2704	5104	-	-								
38	0-00-027-34682	FURN UPR REAR WALL +CORNER SOFA RIGHT (F-08U +CORNER SOFA-RIGHT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							154	1163	2196	-	-								
39	0-00-027-34682	FURN UPR REAR WALL +CORNER RIGHT TUBE (F-08U + CORNER-R)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							126	952	1797	-	-								
40	0-00-027-34682	FURN UPR REAR WALL +BURNER LEFT (F-08U + BURNER-LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							368	2779	5246	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	4/11

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ERECTION WELDING SCHEDULE

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CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
41	0-00-027-34682	FURN UPR REAR WALL +CORNER SOFA LEFT (F-08U+CORNER SOFA-LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							164	1239	2338	-	-								
42	0-00-027-34682	FURN UPR REAR WALL +CORNER LEFT (F-08U + CORNER LEFT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							106	801	1511	-	-								
43	0-00-027-34682	FURN UPR REAR WALL +TRANSITION (F-08U + TRANSITION)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							124	937	1768	-	-								
44	0-00-027-34682	FURN UPR REAR WALL+ WALL SOFA (F-08U + WALL SOFA)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
45	0-00-027-34682	WALL SOFA+ FURN UPR REAR WALL (WALL SOFA + F-08U)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
46	0-00-027-34678	FURN LWR/UPR SIDE SPIRAL WALL-LEFT +BURNER FRONT (F-17L/U-L+BURNER FRNT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							368	2779	5246	-	-								
47	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+CORNER SOFA FRONT (F-17U-L + CORNER SOFA FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							154	1163	2196	-	-								
48	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+CORNER FRONT (F-17U-L+ CORNER FRONT)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							106	801	1511	-	-								
49	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+ BURNER REAR (F-17U-L + BURNER REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							358	2704	5104	-	-								
50	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+CORNER SOFA REAR (F-17U-L + CORNER SOFA REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							164	1239	2338	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	5/11

CAUTION :

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. NOTE: ALSO REFER QUALITY GUIDELINE NO. SIP:PP:29/REV.02. REV.NO.01 - DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
51	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+ CORNER REAR (F-17U-L + CORNER REAR)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							104	786	1483	-	-								
52	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT + TRANSITION (F-17U-L + TRANSITION)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							118	892	1682	-	-								
53	0-00-027-34678	FURN UPR SIDE SPIRAL WALL-LEFT+WALL SOFA (F-17U-L + WALL SOFA)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
54	0-00-027-34678	WALL SOFA+FURN UPR SIDE SPIRAL WALL-LEFT (WALL SOFA + F-17U-L)	SA213T12 + SA213T12	42.4	8.8	GTAW + SMAW	8.8	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							92	695	1312	-	-								
55	0-00-027-34663	FUR FRONT SPIRAL O/L TERM TUBE+FUR FRNT SPIRAL TO VERTICAL TRANSITION PANEL (F-02TO + F-02X SPOOL)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
56	0-00-027-34663	FURN FRONT SPRL O/L TERM TUBE + FURN INTER FRONT HEADER (F-02TO + F-03 NIPPLE)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
57	0-00-027-34663	FUR REAR SPIRAL O/L TERM TUBE+FUR REAR SPIRAL TO VERT. TRANSITION PANEL (F-08TO + F-08X SPOOL)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
58	0-00-027-34663	FURN REAR O/L TERM TUBE+ FURN INTER REAR HEADER (F-08TO + F-09 NIPPLE)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
59	0-00-027-34662	FUR SIDE O/L TERM TUBE-LEFT+FUR SIDE SPIRAL TO VERTICAL TRANSITION PANEL (F-17TO-L + F-17X SPOOL)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
60	0-00-027-34662	FURN SIDE O/L TERM TUBE-LEFT+FURN INTER LHS HDR (F-17TO-L + F-18-L NIPPLE)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-19	1819-07-CIR-EWS	02	6/11

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
61	0-00-027-34662	FURN SIDE O/L TERM TUBE-RIGHT+FURN SIDE SPIRAL TO VERTICAL TRANSITION PANEL (F-17TO-R + F-17X SPOOL)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
62	0-00-027-34662	FURN SIDE O/L TERM TUBE-RIGHT+FUR INTER RHS HDR (F-17TO-R + F-18-R NIPP)	SA213T12 + SA213T12	38.1	7.11	GTAW + SMAW	7.11 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							140	1018	1210	-	-								
63	0-00-027-34677	FUR FRONT VERT. I/L TERM TUBE+FURN SIDE SPIRAL TO VERTICAL TRANSITION PANEL (F-04TI + F-02X SPOOL)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
64	0-00-027-34677	FURN FRONT VERTICAL I/L TERM TUBE+FURN INTER FRONT HDR (F-04TI + F-03 NIPPLE)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
65	0-00-027-34677	FUR REAR VER I/L TERM TUBE+FUR REAR SPIRAL TO VER TRANS. PANEL (F-10TI + F-08X SPOOL)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
66	0-00-027-34677	FURN REAR VER I/L TERM TUBE+ FUR REAR INTER HDR (F-10TI + F-09 NIPPLE)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
67	0-00-027-34677	FUR SIDE VER I/L TERM TUBE+ FUR SIDE SPIRAL TO VER TRANS PANEL (F-19TI-L + F-17X SPOOL)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
68	0-00-027-34677	FUR SIDE VER I/L TERM TUBE-LEFT+FUR INTER SIDE HDR (F-19TI-L + F-18 NIPPLE)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
69	0-00-027-34677	FUR SIDE VER I/L TERM TUBE-RIGHT+ FUR SIDE SPIRAL TO VER TRANS PANEL (F-19TI-R + F-17X SPOOL)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	
70	0-00-027-34677	FUR SIDE VER I/L TERM TUBE-RIGHT+FUR INTER SIDE HDR (F-19TI-R + F-18 NIPPLE)	SA213T22 + SA213T22	33.4	5.59	GTAW + SMAW	5.59 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift				01
							420	2835	2070	-	-			60				100% HC, 260HB (MAX)	

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	7/11

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
71	0-00-027-34677	FURN FRONT SPIRAL TO VERT. TRANS. PANEL +FURN LWR FRONT VER. WALL PANEL (F-02X + F-04L)	SA213T22 + SA213T22	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2786	4642	-	-			60					
72	0-00-027-34677	FURN LWR FRONT VERT WALL PANEL+FURN UPR FRONT VERT WALL PANEL (F-04L + F-04U)	SA213T22 + SA213T22	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2786	4642	-	-			60					
73	0-00-027-34651	FURN UPR FRONT VERT WALL+FUR UPR FRONT O/L HDR (F-04U + F-05 NIPPLE)	SA213T23 + SA213T22	38.1	11	GTAW + SMAW	11 ▽	ER90S-B3	E9018-B3			1053/04	200	745 ± 15	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2036	8200	-	-			60					
74	0-00-027-34677	FUR REAR SPIRAL TO VER TRANS PANEL+FUR REAR ARCH PANEL (F-08X + F-11)	SA213T22 + SA213T22	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2786	4642	-	-			60					
75	0-00-027-34677	FUR REAR ARCH PANEL+FURN REAR SCREEN TUBE (F-11 + F-12)	SA213T22 + SA213T23	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1053/04	200	745 ± 15	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							280	1857	3095	-	-			60					
76	0-00-027-34677	FUR REAR ARCH PANEL+FURN REAR HGR TUBE (F-11 + F-13)	SA213T22 + SA213T22	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							140	929	1548	-	-			60					
77	0-00-027-34677	FUR REAR SCREEN TUBE +FURN REAR O/L HDR (F-12 + F-14 NIPPLE)	SA213T23 + SA213T23	38.1	8.13	GTAW + SMAW	8.13 ▽	2CrWV-TIG/ TGS 2CW	Cromet 23L/CM 2CW			1052/06	200	745 ± 15	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							280	1857	5158	-	-			60					
78	0-00-027-34638	FUR REAR HGR TUBE +FURN REAR O/L HDR (F-13 + F14 NIPPLE)	SA213T23 + SA213T23	63.5	12.7	GTAW + SMAW	12.7 ▽	2CrWV-TIG/ TGS 2CW	Cromet 23L/CM 2CW			1052/06	200	745 ± 15	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							140	1636	2180	1563	-			60					
79	0-00-027-34677	FUR SIDE SPIRAL TO VERT TRANS PANEL+ FUR LWR LHS VERT. WALL PANEL (F-17X + F-19L-L)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					
80	0-00-027-34677	FUR SIDE SPIRAL TO VERT TRANS PANEL+ FUR LWR RHS VERTICAL WALL PANEL (F-17X + F-19L-R)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos. Ø2.5	Ø3.15	Ø4.0			TIME in mins		SPEC. NO	ACC NORM REF.		
81	0-00-027-34677	FUR LWR LHS VERT WALL+FUR UPR LHS VERT WALL PANEL (F-19L-L + F-19U-L)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					
82	0-00-027-34677	FURN LWR RHS VERT WALL+FURN UPR RHS VERT WALL PANEL (F-19L-R + F-19U-R)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					
83	0-00-027-34677	FURN UPR LHS VERT WALL PANEL+FURN SIDE O/L HDR (F-19U-L + F-20 NIPPLE)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					
84	0-00-027-34677	FURN UPR RHS VERT WALL PANEL+FURN SIDE O/L HDR (F-19U-R + F-20 NIPPLE)	SA213T22 + SA213T22	38.1	9.5	GTAW + SMAW	9.5 ▽	ER90S-B3	E9018-B3			1084/00	200	740 ± 10	20% RT subject to min 2 weld/welder/shift			100% HC, 260HB (MAX)	01
							420	2428	6211	-	-			60					
85	0-00-027-34643	FURN FRONT I/L HDR+ FURN SIDE I/L HDRS (F-01 + F-16 L&R)	SA106GRC + SA106GRC	406.4	80	GTAW + SMAW	70 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	237	59	96	818			200					
86	0-00-027-34643	FURN REAR I/L HDR+ FURN SIDE I/L HDRS (F-07 + F-16 L&R)	SA106GRC + SA106GRC	406.4	80	GTAW + SMAW	70 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	237	59	96	818			200					
87	0-00-027-34634	FURN FRONT RISER+ FURN UPR FRONT O/L HDR (F-06 + F-05 NOZZLE)	SA335P12 + SA182F12CL2	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							4	270	63	103	261			100					
88	1-07-318-01065 1-07-318-01066	FURN FRONT RISER+ FURN FRONT RISER (F-06 + F-06)	SA335P12 + SA234WP12CL1	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							8	539	126	206	521			100					
89	0-00-027-34634	FURN FRONT RISER+ SEPARATOR NOZZLE (F-06 + F-31 NOZZLE)	SA335P12 + SA182F22CL3	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							4	270	63	103	261			100					
90	0-00-027-34634	FURN UPR SIDE O/L HDR+FURN SIDE RISERS (F-20 NOZZLE + F-21)	SA182F12CL2 + SA335P12	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							8	539	126	206	521			100					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	9/11

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* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. NOTE: ALSO REFER QUALITY GUIDELINE NO. SIP:PP:29/REV.02. REV.NO.01 - DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos. Ø2.5	Ø3.15	Ø4.0			TIME in mins		SPEC. NO	ACC NORM REF.		
91	1-07-315-01059 1-07-315-01060 1-07-315-01061 1-07-315-01062	FURN SIDE RISER+FURN SIDE RISER (F-21 + F-21)	SA234WP12CL1 + SA335P12	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							24	1615	377	618	1562			100					
92	0-00-027-34634	FURN SIDE RISER+ SEPARATOR NOZZLE (F-21 + F-31 NOZZLE)	SA335P12 + SA182F22CL3	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							8	539	126	206	521			100					
93	0-00-027-34634	FURN REAR O/L HDR+ FURN REAR RISER (F-14 NOZZLE + F-15)	SA182F22CL3 + SA335P12	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							4	270	63	103	261			100					
94	1-07-316-01063 1-07-316-01064	FURN REAR RISER+ FURN REAR RISER (F-15 + F-15)	SA234WP12CL1 + SA335P12	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							12	808	189	309	781			100					
95	0-00-027-34634	FURN REAR RISER+ SEPARATOR NOZZLE (F-15 + F-31 NOZZLE)	SA335P12 + SA182F22CL3	219.1	40	GTAW + SMAW	35 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							4	270	63	103	261			100					
96	0-00-027-34650	SEPARATOR NOZZLE+ LINK TO STORAGE TANK (F-31 NOZZLE + F-32)	SA182F22CL3 + SA335P12	355.6	65	GTAW + SMAW	56.88 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							4	432	102	168	1030			165					
97	0-07-102-01748	LINK TO STORAGE TANK +LINK TO STORAGE TANK (F-32 + F-32)	SA335P12 + SA234WP12CL1	355.6	65	GTAW + SMAW	56.88 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							4	432	102	168	1030			165					
98	0-00-027-34650	LINK TO STORAGE TANK +STORAGE TANK NOZZLE (F-32 + F-33 NOZZLE)	SA335P12 + SA182F22CL3	355.6	65	GTAW + SMAW	56.88 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							4	432	102	168	1030			165					
99	0-07-110-01747	STORAGE TANK NOZZLE +FUR DOWNCOMER TO CONNECTING SPHERE (F-33 NOZZLE + F-49)	SA182F22CL3 + SA335P12	406.4	70	GTAW + SMAW	61.25 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% (ISRT + UT)				01
							2	253	59	96	673			175					
100	0-00-027-34650	FURN DOWNCOMER TO CONN. SPHERE+ FURN CONN. SPHERE (F-49 + F-50 NOZZLE)	SA335P12 + SA182F12CL2	406.4	70	GTAW + SMAW	61.25 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	253	59	96	673			175					

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	10/11

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ERECTION WELDING SCHEDULE

PG NO : 07

CUST No : 1819,1820

PG NAME : Circulation System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Circulation System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
									Qty in Nos.										
				SIZE	THICK		Qty in Nos.	Qty in gms	Ø2.5	Ø3.15	Ø4.0			TIME in mins		SPEC. NO	ACC NORM REF.		
101	0-00-027-34650	STORAGE TANK NOZZLE +STORAGE TANK VENT LINK (F-33 NOZZLE + F-34)	SA182F22CL3 + SA335P12	88.9	16	GTAW + SMAW	14 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							2	58	13	21	4			60					
102	0-07-217-01785	STORAGE TANK VENT LINK+STORAGE TANK VENT LINK (F-34 + F-34)	SA335P12 + SA335P12	88.9	16	GTAW + SMAW	14 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							8	231	51	84	16			60					
103	0-12-850-02915 0-12-850-02916	STORAGE TANK VENT LINK+SH CONNECTING PIPE NOZZLE (F-34 + S-01 NOZZLE)	SA335P12 + SA182F12CL2	88.9	16	GTAW + SMAW	14 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							1	29	7	11	2			60					
104		GAMMA PLUG	SA105 + SA106GRC			SMAW	7 ◺	-	E7018			1101/01	150	Nil	100% LPI or MPI				
							4	-	2	-	-								
105		GAMMA PLUG	SA335P12 + SA182F22CL3			SMAW	7 ◺	-	E8018-B2			1102/01	200	Nil	100% LPI or MPI				
							92	-	24	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-07-CIR-EWS	02	11/11

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ERECTION WELDING SCHEDULE

PG NO : 12

CUST No : 1819,1820

PG NAME : Superheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Superheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos. Ø2.5	Ø3.15	Ø4.0			TIME in mins		SPEC. NO	ACC NORM REF.		
1	0-12-850-02915, 0-12-850-02916	SEPARATOR+ SH CONNECTING PIPE (F-31 NOZZLE + S-01)	SA182F22CL3 + SA335P12	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							8	782	186	305	1638			150					
2	0-12-850-02915, 0-12-850-02916	SH CONN. PIPE+ SH CONN. PIPE (S-01 + S-01)	SA335P12 + SA234WP12CL1	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							16	1564	372	609	3275			150					
3	0-12-850-02915, 0-12-850-02916	SH CONN. PIPE+LINK TO SH DESUPER- HEATER (S-01 + S-01A NOZZLE)	SA335P12 + SA182F12CL2	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							8	782	186	305	1638			150					
4	0-12-862-02895	DESH MANIFOLD + DESH MANIFOLD (S-01A + S-01A)	SA335P12 + SA335P12	508	85	GTAW + SMAW	74.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							1	159	37	60	583			215					
5	0-12-862-02895	DESH MANIFOLD+ SH DESUPERHEATER-1 (S-01A + S-01B)	SA335P12 + SA335P12	508	85	GTAW + SMAW	74.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	318	73	120	1165			215					
6	0-12-862-02896	SH DESH-1 + LINK FROM SH DESH (S-01B + S-01C)	SA335P12 + SA335P12	508	85	GTAW + SMAW	74.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	318	73	120	1165			215					
7	0-12-862-02896	LINK FROM SH DESH + SH FURNACE ROOF I/L HDR (S-01C + S-02 TEE)	SA234WP12CL1 + SA234WP22CL1	406.4	100	GTAW + SMAW	87.5	ER80S-B2	E8018-B2			1012/04	150	680-720	100% (ISRT + UT)				01
							2	207	59	96	1126			250					
8	0-00-027-34636	SH FURNACE ROOF I/L HEADER + SH FURN ROOF PANEL (S-02 NIPPLE + S-03)	SA213T12 + SA213T12	54	8.13	GTAW + SMAW	8.13	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							208	2407	1928	300	-								
9	0-00-027-34636	SH FURNACE ROOF I/L HEADER + SH FURN ROOF PANEL (S-02 NIPPLE + S-03)	SA213T12 + SA213T12	50.8	8.64	GTAW + SMAW	8.64	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							2	21	17	4	-								
10	0-00-027-34636	SH FURN ROOF PANEL +SH FURN ROOF TUBES (S-03 + S-04)	SA213T12 + SA213T12	60.3	10.16	GTAW + SMAW	10.16	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2577	2043	796	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	1/10

CAUTION :

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

CUST No : 1819,1820			PG NO : 12
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)			PG NAME : Superheater System
WELDING CODE : I.B.R / ASME	PRESSURE PARTS/~~NON PRESSURE PARTS~~		SYSTEM DESCRIPTION : Superheater System
			CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
11	0-00-027-34636	SH FURN ROOF TUBE +SH FURN ROOF TUBES (S-04 + S-04)	SA213T12 + SA213T12	60.3	10.16	GTAW + SMAW	10.16 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2577	2043	796	-								
12	0-00-027-34636	SH FURN ROOF TUBES+SH FURN ROOF O/L HDR (S-04 + S-05 NIPPLE)	SA213T12 + SA213T12	60.3	10.16	GTAW + SMAW	10.16 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2577	2043	796	-								
13	1-10-291-01572	SH FURN ROOF O/L HDR ELBOW+SH FURN ROOF O/L HDR (S-05 ELB+S-05 HDR)	SA335P22 + SA234WP12CL1	508	122	GTAW + SMAW	106.75 ▽▽	ER80S-B2	E8018-B2			1012/04	150	680-720	100% (ISRT + UT)				01
							2	262	73	120	1978			305					
14	0-00-027-34664	SH FURN ROOF O/L HDR ELBOW+BP EXT SIDE I/L HDR (S-05 ELBOW + S-06 TEE)	SA234WP12CL1 + SA234WP12CL1	508	122	GTAW + SMAW	106.75 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	262	73	120	1978			305					
15	0-00-027-34664	BP EXT SIDE I/L HDR+BP EXT SIDE WALL PANEL (S-06 NIPPLE + S-07 L&R)	SA213T12 + SA213T12	44.45	7.62	GTAW + SMAW	7.62 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							152	1357	1739	-	-								
16	0-00-027-34664	BP EXT SIDE WALL PANEL+BP EXT SIDE FLOOR PANEL (S-07 L&R + S-08 L&R)	SA213T12 + SA213T12	44.45	7.62	GTAW + SMAW	7.62 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							152	1357	1739	-	-								
17	0-00-027-34664	BP EXT SIDE FLOOR PANEL+BP EXT SIDE FLOOR O/L HDR (S-08 L&R + S-09 NIPP)	SA213T12 + SA213T12	44.45	7.62	GTAW + SMAW	7.62 ▽	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							152	1357	1739	-	-								
18	0-00-027-34664	BP EXT SIDE FLOOR O/L HDR+ SC FURN ARCH SUPPT I/L HDR (S-09 + S-09A TEE)	SA335P12 + SA234WP12CL1	457	100	GTAW + SMAW	87.5 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							1	126	33	54	652			250					
19	0-00-027-34653	SC FURN ARCH SUPPORT I/L HDR+SC FURN ARCH SUPPT LINK (S-09A NOZZLE + S-09B)	SA182F12CL2 + SA335P12	168.3	47.6	GTAW + SMAW	41.65 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							20	786	242	396	1205			120					
20	0-00-027-34653	SC FURN ARCH SUPT LINK+SC FURN ARCH SUPPT O/L HDR (S-09B + S-09C NOZZLE)	SA335P12 + SA182F12CL2	168.3	47.6	GTAW + SMAW	41.65 ▽▽	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							20	786	242	396	1205			120					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	2/10

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* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02-NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 12

CUST No : 1819,1820

PG NAME : Superheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Superheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
21	0-12-184-02892	SC FURN ARCH SUPT O/L HDR + BP EXT SIDE CONNECTING LINK (S-09C TEE + S-10)	SA234WP12CL1 + SA335P12	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							2	196	47	77	410			150					
22	0-12-184-02892	BP EXT SIDE CONN. LINK+ BP EXT SIDE CONN. LINK (S-10 + S-10)	SA335P12 + SA335P12	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							9	880	209	343	1843			150					
23	0-00-027-34653	BP EXT SIDE CONN. LINK+ BP LWR FRONT HDR (S-10 + S-14)	SA335P12 + SA335P22	323.9	60	GTAW + SMAW	52.5	ER80S-B2	E8018-B2			1012/04	150	680-720	100% RT				01
							2	196	47	77	410			150					
24	1-12-184-01897	BP EQUALIZING LINE+BP EQUALIZING LINE (S-09D + S-09D)	SA213T12 + SA213T12	38.1	6.6	GTAW + SMAW	6.6	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							8	61	61	-	-								
25	0-00-027-34677, 0-00-027-34680	BP EXT SIDE I/L HDR +BP UPR SIDE I/L HDR (S-06 TEE + S-11 -L&R)	SA234WP12CL1 + SA335P12	406.4	90	GTAW + SMAW	78.75	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	222	59	96	969			225					
26	0-00-027-34680	BP UPR SIDE I/L HDR +BP UPR SIDE WALL PANEL (S-11 NIPPLE + S-12U L&R)	SA213T12 + SA213T12	50.8	8.64	GTAW + SMAW	8.64	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							278	2853	2336	507	-								
27	0-00-027-34680	BP UPR SIDE WALL PANEL+ BP INTER SIDE WALL PANEL (S-12U L&R + S-12I L&R)	SA213T12 + SA213T12	50.8	8.64	GTAW + SMAW	8.64	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							278	2853	2336	507	-								
28	0-00-027-34680	BP INTER SIDE WALL PANEL+ BP LWR SIDE WALL PANEL (S-12I L&R + S-12L L&R)	SA213T12 + SA213T12	50.8	8.64	GTAW + SMAW	8.64	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							278	2853	2336	507	-								
29	0-00-027-34680, 0-10-283-01694,-01695	BP LWR SIDE WALL PANEL+ BP LOWER SIDE HDRS (S-12L L&R + S-13 L&R)	SA213T12 + SA213T22	50.8	8.64	GTAW + SMAW	8.64	ER80S-B2	E8018-B2			1012/04	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							278	2853	2336	507	-			30					
30	0-00-027-34680, 0-10-185-01692	BP LWR FRONT HDR+ BP LOWER FRONT WALL PANEL (S-14 NIPPLE + S-15L)	SA213T22 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1012/04	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-			30					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	3/10

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

		PG NO : 12	
CUST No : 1819,1820		PG NAME : Superheater System	
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)		SYSTEM DESCRIPTION : Superheater System	
WELDING CODE : I.B.R / ASME	PRESSURE PARTS/~~NON PRESSURE PARTS~~	CUST DOC NO : 9591-102-102-QVM-V-001	CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
31	0-00-027-34680	BP LWR FRONT WALL PANEL+ BP UPPER FRONT WALL PANEL (S-15L + S-15U)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
32	0-00-027-34680	BP UPR FRONT WALL PANEL+BP UPR FRONT WALL PANEL (S-15U + S-15U)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
33	0-00-027-34680	BP UPR FRONT WALL PANEL+BP FRONT SCREEN TUBES (S-15U + S-16)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
34	0-00-027-34680	BP FRONT SCREEN TUBES+ BP FRONT O/L HDR (S-16 + S-22 NIPPLE)	SA213T12 + SA213T22	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1012/04	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-			30					
35	0-00-027-34680	BP FRONT O/L HDR+ BP ROOF PANEL (S-22 NIPPLE + S-21)	SA213T22 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1012/04	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-			30					
36	0-00-027-34680	BP ROOF PANEL+ BP UPPER REAR WALL PANEL (S-21 + S-20U)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
37	0-00-027-34680	BP UPR REAR WALL PANEL+ BP INTER REAR WALL PANEL (S-20U + S-20I)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
38	0-00-027-34680	BP INTER REAR WALL PANEL+ BP LOWER REAR WALL PANEL (S-20I + S-20L)	SA213T12 + SA213T12	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-								
39	0-00-027-34680	BP LWR REAR WALL + BP LWR REAR HDR (S-20L+S-17 NIPP)	SA213T12 + SA213T22	54	9.14	GTAW + SMAW	9.14	ER80S-B2	E8018-B2			1012/04	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							210	2299	1859	503	-			30					
40	0-00-027-34654	BP LWR FRONT HDR+ BP LWR SIDE HDRS (S-14 + S-13 ELBOW L&R)	SA335P91 + SA234WP91	406.4	90	GTAW + SMAW	78.75	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	222	98	130	1357			225					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	4/10

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ERECTION WELDING SCHEDULE

PG NO : 12

CUST No : 1819,1820 | **PG NAME : Superheater System**

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW) | **SYSTEM DESCRIPTION : Superheater System**

WELDING CODE : I.B.R / ASME | **PRESSURE PARTS/~~NON PRESSURE PARTS~~** | **CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01**

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
41	0-00-027-34654	BP LWR SIDE HDRS+ BP LWR REAR HDR (S-13 ELBOW L&R+ S-17)	SA234WP91 + SA335P91	406.4	90	GTAW + SMAW	78.75	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	222	98	130	1357			225					
42	0-12-852-02920	BP FRONT O/L HDR+ LINK FROM BP FRONT O/L HDR (S-22 + S-25A)	SA234WP12CL1 + SA335P12	457	80	GTAW + SMAW	70	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	282	66	108	941			200					
43	0-12-852-02920	LINK FROM BP FRNT O/L HDR+LINK FROM BP FRNT O/L HDR (S-25A + S-25A)	SA335P12 + SA335P12	457	80	GTAW + SMAW	70	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	282	66	108	941			200					
44	0-12-852-02921	LINK FROM BP FRNT O/L HDR+ LINK TO PLATEN SH (S-25A + S25B REDUCER)	SA335P12 + SA234WP12CL1	457	80	GTAW + SMAW	70	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	282	66	108	941			200					
45	0-12-852-02921	LINK TO PLATEN SH+ LINK TO PLATEN SH (S-25B + S-25B)	SA335P12 + SA335P12	508	80	GTAW + SMAW	70	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	326	73	120	1064			200					
46	0-00-027-34634	LINK TO PLATEN SH+ SH PLATEN FRONT I/L HDR (S-25B + S-26 TEE)	SA335P12 + SA335P12	508	80	GTAW + SMAW	70	ER80S-B2	E8018-B2			1010/06	150	650-670	100% (ISRT + UT)				01
							2	326	73	120	1064			200					
47	0-00-027-34634	BP BYPASS PIPE+ LINK TO SH PLATEN (S-24 + S-25B)	SA335P12 + SA182F12CL2	273	45	GTAW + SMAW	39.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							2	174	40	65	206			115					
48	0-00-027-34634	BP BYPASS PIPE+LINK FROM SH DESH-1 (S-24 + S-01C)	SA335P12 + SA182F12CL2	273	45	GTAW + SMAW	39.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							2	174	40	65	206			115					
49	0-12-187-02894	BP BYPASS PIPE+ BP BYPASS PIPE (S-24 + S-24)	SA335P12 + SA335P12	273	45	GTAW + SMAW	39.38	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							6	522	118	193	616			115					
50	0-11-078-03583, 0-10-176-01670	SH PLATEN FRONT I/L HDR+SH PLATEN FRONT ASSY (S-26 NIPPLE + S-27 (1))	SA213T22 + SA213T22	57.15	8.13	GTAW + SMAW	8.13	ER90S-B3	E9018-B3			1014/03	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							34	427	337	52	-			30					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	5/10

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ERECTION WELDING SCHEDULE

CUST No : 1819,1820
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)
WELDING CODE : I.B.R / ASME
PRESSURE PARTS/~~NON PRESSURE PARTS~~

PG NO : 12
PG NAME : Superheater System
SYSTEM DESCRIPTION : Superheater System
CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
51	0-11-078-03583, 0-10-176-01670	SH PLATEN FRONT I/L HDR+SH PLATEN FRONT ASSY (S-26 NIPPLE + S-27 (2-5))	SA213T22 + SA213T22	38.1	6	GTAW + SMAW	6 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							136	1082	866	-	-								
52	0-11-078-03583, 0-10-176-01670	SH PLATEN FRONT I/L HDR+SH PLATEN FRONT ASSY (S-26 NIPPLE + S-27 (6-8))	SA213T22 + SA213T22	38.1	7.62	GTAW + SMAW	7.62 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							102	709	1001	-	-								
53	0-11-078-03583, 0-10-176-01670	SH PLATEN FRONT I/L HDR+SH PLATEN FRONT ASSY (S-26 NIPPLE + S-27 (9-12))	SA213T22 + SA213T22	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B3	E9018-B3			1014/03	150	680-720	20% RT subject to min 2 weld/welder/shift				01
							136	902	1504	-	-			30					
54	0-11-078-03583, 0-10-176-01670	SH PLATEN FRONT I/L HDR+SH PLATEN FRONT ASSY (S-26 NIPP + S-27 (13-20))	SA213T22 + SA213T22	33.4	7.11	GTAW + SMAW	7.11 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							272	1579	2060	-	-								
55	0-00-027-34648	SH PLATEN FRONT ASSY+ SH PLATEN FRONT O/L TERM TUBE (S-27 (1) + S-27TO (1))	SA213T91 + SA213T91	50.8	8.13	GTAW + SMAW	8.13 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							34	360	488	64	-			30					
56	0-00-027-34648	SH PLATEN FRONT ASSY+ SH PLATEN FRONT O/L TERM TUBE (S-27 (2-20) + S-27TO (2-20))	SA213T91 + SA213T91	44.45	7.11	GTAW + SMAW	7.11 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							646	5968	10850	-	-			30					
57	0-00-027-34648	SH PLATEN FRONT O/L TERM TUBE+ SH PLATEN FRONT O/L HDR (S-27TO (1) + S-28 NIPPLE)	SA213T91 + SA213T91	57.15	8.13	GTAW + SMAW	8.13 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							34	427	562	70	-			30					
58	0-00-027-34648	SH PLATEN FRONT O/L TERM TUBE+ SH PLATEN FRONT O/L HDR (S-27TO (2-5) + S-28 NIPPLE)	SA213T91 + SA213T91	38.1	6.1	GTAW + SMAW	6.1 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							136	1074	1486	-	-			30					
59	0-00-027-34648	SH PLATEN FRONT O/L TERM TUBE+ SH PLATEN FRONT O/L HDR (S-27TO (6-8) + S-28 NIPPLE)	SA213T91 + SA213T91	38.1	8.13	GTAW + SMAW	8.13 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							102	677	1879	-	-			30					
60	0-00-027-34648	SH PLATEN FRONT O/L TERM TUBE+ SH PLATEN FRONT O/L HDR (S-27TO (9-20) + S-28 NIPPLE)	SA213T91 + SA213T91	33.4	7.11	GTAW + SMAW	7.11 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							408	2369	5150	-	-			30					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	6/10

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ERECTION WELDING SCHEDULE

CUST No : 1819,1820
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)
WELDING CODE : I.B.R / ASME
PRESSURE PARTS/~~NON PRESSURE PARTS~~

PG NO : 12
PG NAME : Superheater System
SYSTEM DESCRIPTION : Superheater System
CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
61	0-12-178-02929	SH PLATEN FRONT O/L HDR+ LINK TO SH DESUPERHEATER-2 (S-28 TEE + S-29)	SA234WP91 + SA234WP91	558.8	76.2	GTAW + SMAW	66.68	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	376	134	179	1544			195					
62	0-12-178-02929	LINK TO SH DESH-2+ LINK TO SH DESH-2 (S-29 + S-29)	SA234WP91 + SA335P91	558.8	76.2	GTAW + SMAW	66.68	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	376	134	179	1544			195					
63	1-12-800-01900	LINK TO SH DESH-2+ SH DESH-2 (S-29 + S-30)	SA335P91 + SA335P91	558.8	76.2	GTAW + SMAW	66.68	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	376	134	179	1544			195					
64	1-12-800-01901	SH DESH-2+ LINK FROM SH DESH-2 (S-30 + S-31)	SA335P91 + SA335P91	558.8	76.2	GTAW + SMAW	66.68	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	376	134	179	1544			195					
65	0-12-178-02930	LINK FROM SH DESH-2+ SH PLATEN REAR I/L HDR (S-31 + S-32 TEE)	SA234WP91 + SA234WP91	558.8	76.2	GTAW + SMAW	66.68	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	376	134	179	1544			195					
66	0-00-027-34760	SH PLATEN REAR I/L HDR+ SH PLATEN REAR I/L TERM TUBE (S-32 NIPPLE + S-33TI (1))	SA213T91 + SA213T91	57.15	7.11	GTAW + SMAW	7.11	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							34	449	735	-	-			30					
67	0-00-027-34760	SH PLATEN REAR I/L HDR+ SH PLATEN REAR I/L TERM TUBE (S-32 NIPPLE + S-33TI (2-5))	SA213T91 + SA213T91	50.8	6.6	GTAW + SMAW	6.6	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							136	1568	2282	-	-			30					
68	0-00-027-34760	SH PLATEN REAR I/L HDR+ SH PLATEN REAR I/L TERM TUBE (S-32 NIPPLE + S-33TI (6-12))	SA213T91 + SA213T91	38.1	5.08	GTAW	5.08	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							238	15568	-	-	-			30					
69	0-00-027-34760	SH PLATEN REAR I/L HDR+ SH PLATEN REAR I/L TERM TUBE (S-32 NIPPLE + S-33TI (13-20))	SA213T91 + SA213T91	33.4	4.19	GTAW	4.19	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							272	11330	-	-	-			30					
70	0-00-027-34760, 0-00-027-34761	SH PLATEN REAR I/L TERM TUBE+ SH PLATEN REAR ASSY (S-33TI (1) + S-33 (1))	SA213 UNS S30432 + SA213 UNS S30432	50.8	8.64	GTAW	8.64	Nittetsu YT304H	-			1054/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							34	4683	-	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	7/10

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ERECTION WELDING SCHEDULE

PG NO : 12

CUST No : 1819,1820

PG NAME : Superheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Superheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
71	0-00-027-34760, 0-00-027-34761	SH PLATEN REAR I/L TERM TUBE+ SH PLATEN REAR ASSY (S-33TI (2-20) + S-33 (2-20))	SA213TP347H + SA213TP347H	44.45	7.11	GTAW + SMAW	7.11	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							646	6082	6510	-	-								
72	0-00-027-34760, 0-00-027-34761	SH PLATEN REAR ASSY+ SH PLATEN REAR O/L TERM TUBE (S-33(1)+S-33TO (1))	SA213 UNS S30432 + SA213 UNS S30432	50.8	8.13	GTAW	8.13	Nittetsu YT304H	-			1054/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							34	4182	-	-	-								
73	0-00-027-34760, 0-00-027-34761	SH PLATEN REAR ASSY+ SH PLATEN REAR O/L TERM TUBE (S-33 (2-5) + S-33TO (2-5))	SA213TP347H + SA213TP347H	44.45	8.13	GTAW + SMAW	8.13	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							136	1193	995	240	-								
74	0-00-027-34760, 0-00-027-34761	SH PLATEN REAR ASSY+ SH PLATEN REAR O/L TERM TUBE (S-33 (6-20) + S-33TO (6-20))	SA213TP347H + SA213TP347H	44.45	7.62	GTAW + SMAW	7.62	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							510	4637	5835	-	-								
75	0-10-278-01696, 0-10-278-01697	SH PLATEN REAR O/L TERM TUBE+ SH PLATEN REAR O/L HDR (S-33TO (1) + S-34 NIPPLE)	SA213T91 + SA213T91	57.2	9.6	GTAW + SMAW	9.6	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							34	397	529	139	-			30					
76	0-10-278-01696, 0-10-278-01697	SH PLATEN REAR O/L TERM TUBE+ SH PLATEN REAR O/L HDR (S-33TO(2-5) + S-34 NIPPLE)	SA213T91 + SA213T91	50.8	10.16	GTAW + SMAW	10.16	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							136	1267	1764	607	-			30					
77	0-10-278-01696, 0-10-278-01697	SH PLATEN REAR O/L TERM TUBE+ SH PLATEN REAR O/L HDR (S-33TO (6-8) + S-34 NIPPLE)	SA213T91 + SA213T91	38.1	6.6	GTAW + SMAW	6.6	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							102	774	1284	-	-			30					
78	0-10-278-01696, 0-10-278-01697	SH PLATEN REAR O/L TERM TUBE+ SH PLATEN REAR O/L HDR (S-33TO (9-12) + S-34 NIPPLE)	SA213T91 + SA213T91	38.1	5.6	GTAW + SMAW	5.6	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							136	1116	1279	-	-			30					
79	0-10-278-01696, 0-10-278-01697	SH PLATEN REAR O/L TERM TUBE+ SH PLATEN REAR O/L HDR (S-33TO (13-20) + S-34 NIPPLE)	SA213T91 + SA213T91	33.4	5.1	GTAW	5.1	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							272	15702	-	-	-			30					
80	0-12-179-02925	SH PLATEN REAR O/L HDR+ LINK FROM SH DESUPERHEATER-3 (S-34 TEE + S-35)	SA234WP91 + SA335P91	558.8	88.9	GTAW + SMAW	77.79	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	357	134	179	1948			225					

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	8/10

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

CUST No : 1819,1820
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)
WELDING CODE : I.B.R / ASME
PRESSURE PARTS/~~NON PRESSURE PARTS~~

PG NO : 12
PG NAME : Superheater System
SYSTEM DESCRIPTION : Superheater System
CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
81	0-12-179-02925	LINK FROM SH DESH-3 +LINK FROM SH DESH-3 (S-35 + S-35)	SA234WP91 + SA335P91	558.8	88.9	GTAW + SMAW	77.79	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							4	713	268	357	3896			225					
82	1-12-900-01910	LINK FROM SH DESH-3+ SH DESUPERHEATER-3 (S-35 + S-36)	SA335P91 + SA335P91	558.8	88.9	GTAW + SMAW	77.79	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	357	134	179	1948			225					
83	1-12-900-01911, 0-12-179-02926	SH DESH-3+ LINK TO FINISH SH (S-36 + S-37)	SA335P91 + SA335P91	558.8	88.9	GTAW + SMAW	77.79	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	357	134	179	1948			225					
84	0-12-179-02926	LINK TO FINISH SH+ FINISH SH I/L HDR (S-37 + S-38 TEE)	SA335P91 + SA234WP91	558.8	88.9	GTAW + SMAW	77.79	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT			100% HC, 190HB TO 300HB	01
							2	357	134	179	1948			225					
85	0-00-027-34665	FINISH SH I/L HDR+ FINISH SH I/L TERM TUBE (S-38 NIPPLE + S-39TI (1))	SA213T91 + SA213T91	50.8	10.67	GTAW + SMAW	10.67	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							104	936	1313	540	-			30					
86	0-00-027-34665	FINISH SH I/L HDR+ FINISH SH I/L TERM TUBE (S-38 NIPPLE + S-39TI (2-4,7-10))	SA213T91 + SA213T91	44.45	10.67	GTAW + SMAW	10.67	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							728	5115	7607	3383	-			30					
87	0-00-027-34665	FINISH SH I/L HDR+ FINISH SH I/L TERM TUBE (S-38 NIPPLE + S-39TI (5,6,11))	SA213T91 + SA213T91	44.45	11.7	GTAW + SMAW	11.7	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							312	1993	3041	1884	-			30					
88	0-00-027-34665	FINISH SH I/L TERM TUBE+ FINISH SH FRONT ASSY (S-39TI (1) + S-39 (1))	SA213TP347H + SA213TP347H	44.45	8.13	GTAW + SMAW	8.13	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							104	912	761	183	-								
89	0-00-027-34665	FINISH SH I/L TERM TUBE+ FINISH SH FRONT ASSY (S-39TI (2-11)+ S-39 (2-11))	SA213TP347H + SA213TP347H	44.45	7.62	GTAW + SMAW	7.62	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							1040	9456	11898	-	-								
90	0-00-027-34665	FINISH SH FRONT ASSY+ FINISH SH REAR ASSY (S-39 (1-11) + S-40 (1-11))	SA213 UNS S30432 + SA213 UNS S30432	44.45	8.1	GTAW	8.1	Nittetsu YT304H	-			1054/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							1144	122256	-	-	-								

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-12-SH-EWS	02	9/10

CAUTION :

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 12

CUST No : 1819,1820

PG NAME : Superheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Superheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
91	0-00-027-34665	FINISH SH REAR ASSY+ FINISH SH O/L HDR (S-40 (1, 6-9) + S-41 NIPPLE)	SA213T92 + SA213T92	44.45	10.67	GTAW + SMAW	10.67 ▽	9CrWV TIG/ Thermanit-MTS616	E9015-B92			1058/02	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							520	3654	5434	2416	-			30					
92	0-00-027-34665	FINISH SH REAR ASSY+ FINISH SH O/L HDR (S-40 (2-5,10,11) + S-41 NIPPLE)	SA213T92 + SA213T92	44.45	11.68	GTAW + SMAW	11.68 ▽	9CrWV TIG/ Thermanit-MTS616	E9015-B92			1058/02	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	01
							624	3993	6090	3749	-			30					
93	0-10-135-01675 0-00-027-34639	SC FURN ARCH SUPPT I/L HDR+ STEAM COOLED SPACER TUBE (S-09A + S-44), (S-44+S-44)	SA213T22 + SA213T22	42.4	6.1	GTAW + SMAW	6.1 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				02
							12	111	88	-	-								
94	0-00-027-34639, 0-00-027-34640, 0-00-027-34641	SC SPACER TUBE + SC SPACER TUBE (S-44 + S-44)	SA213TP347H + SA213TP347H	57.15	9.65	GTAW + SMAW	9.65 ▽	ER347	E347			1016/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				02
							49	651	511	235	-								
95	0-00-027-34760, 0-00-027-34639	SC SPACER TUBE+SH PLATEN REAR I/L HDR (S-44 + S-32), (S-44 + S-44)	SA213T91 + SA213T91	42.4	6.1	GTAW + SMAW	6.1 ▽	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190HB TO 300HB	02
							12	111	146	-	-			30					
96		GAMMA PLUG	SA335P12 + SA182F22CL3			SMAW	7 ◺	-	E8018-B2			1102/01	200	Nil	100% LPI or MPI				
							117	-	30	-	-								
97		GAMMA PLUG	SA335P22 + SA182F22CL3			SMAW	7 ◺	-	E9018-B3			1103/01	200	Nil	100% LPI or MPI				
							2	-	1	-	-								

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RUDRABHATLA SAIKUMAR	**LAKAVATH PRAVEEN KUMAR**	**ANAND KUMAR S**	**02-04-2019**	**1819-12-SH-EWS**	**02**	**10/10**

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 17

CUST No : 1819,1820

PG NAME : Reheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Reheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
1	0-15-136-00363	LTRH I/L HDR + SPOOL PIPE (R-03 HDR + R-03 SPOOL)	SA335P12 + SA335P12	558.8	40	GTAW + SMAW	35	ER80S-B2	E8018-B2			1010/06	150	650-670	100% RT				01
							2	432	81	132	379			100					
2	0-00-027-34631	LTRH I/L HDR NIPPLE + LTRH I/L TERM TUBE (R-03 NIPPLE + R-04TI)	SA213T11 + SA213T11	69.85	4.57	GTAW + SMAW	4.57	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							936	17512	6844	-	-								
3	0-00-027-34631	LTRH I/L TERM TUBE +LTRH LWR ASSY (R-04TI + R-04L)	SA213T11 + SA213T11	69.85	4.57	GTAW + SMAW	4.57	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							936	17512	6844	-	-								
4	0-00-027-34631	LTRH LWR ASSY +LTRH LWR INTER ASSY (R-04L + R-04LI)	SA213T11 + SA213T11	69.85	4.57	GTAW + SMAW	4.57	ER80S-B2	E8018-B2			1009/03	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							936	17512	6844	-	-								
5	0-00-027-34631	LTRH LWR INTER ASSY+LTRH INTER ASSY (R-04LI + R-04I)	SA213T11 + SA213T22	69.85	5.08	GTAW + SMAW	5.08	ER80S-B2	E8018-B2			1011/01	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							936	17216	8177	-	-								
6	0-00-027-34631	LTRH INTER ASSY +LTRH UPR INTER ASSY (R-04I + R-04UI)	SA213T22 + SA213T22	69.85	5.08	GTAW + SMAW	5.08	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							936	17216	8177	-	-								
7	0-00-027-34631	LTRH UPR INTER ASSY+LTRH UPR ASSY (R-04UI + R-04U)	SA213T91 + SA213T91	69.85	4.57	GTAW	4.57	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190 HB TO 300HB	01
							936	93949	-	-	-			30					
8	0-00-027-34631	LTRH UPR ASSY + LTRH PENDANT ASSY (R-04U + R-07)	SA213T91 + SA213T91	63.5	4.2	GTAW	4.2	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190 HB TO 300HB	01
							936	74407	-	-	-			30					
9	0-00-027-34631	LTRH PENDANT ASSY +LTRH O/L TERM TUBE (R-07 + R-07TO)	SA213T91 + SA213T91	63.5	4.2	GTAW	4.2	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190 HB TO 300HB	01
							936	74407	-	-	-			30					
10	0-00-027-34631	LTRH O/L TERM TUBE +LTRH O/L HDR NIPPLE (R-07TO (1) + R-08 NIPPLE)	SA213T91 + SA213T91	63.5	4.2	GTAW	4.2	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT			100% HC, 190 HB TO 300HB	01
							104	8268	-	-	-			30					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-17-RH-EWS	02	1/3

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

CUST No : 1819,1820
PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)
WELDING CODE : I.B.R / ASME
PRESSURE PARTS/~~NON PRESSURE PARTS~~

PG NO : 17
PG NAME : Reheater System
SYSTEM DESCRIPTION : Reheater System
CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
11	0-00-027-34631	LTRH O/L TERM TUBE +LTRH O/L HDR NIPPLE (R-07TO (2-8)+ R-08 NIPPLE)	SA213T91 + SA213T91	50.8	7.62	GTAW + SMAW	7.62	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT				01
							728	7932	15864	-	-			30				100% HC, 190 HB TO 300HB	
12	0-00-027-34631	LTRH O/L TERM TUBE +LTRH O/L HDR NIPPLE (R-07TO (9) + R-08 NIPPLE)	SA213T91 + SA213T91	76.2	4.19	GTAW	4.19	ER90S-B9	E9015-B91			1036/08	220	745 ± 15	100% RT				01
							104	9883	-	-	-			30				100% HC, 190 HB TO 300HB	
13	1-17-174-00597	LTRH O/L HDR+ LINK TO RH DESH (R-08 + R-09)	SA335P91 + SA234WP91	813	45	GTAW + SMAW	39.38	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT				01
							2	646	195	260	966			115				100% HC, 190 HB TO 300HB	
14	1-17-174-00597	LINK TO RH DESH+ LINK TO RH DESH (R-09 + R-09)	SA234WP91 + SA335P91	813	45	GTAW + SMAW	39.38	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT				01
							2	646	195	260	966			115				100% HC, 190 HB TO 300HB	
15	1-17-174-00597	LINK TO RH DESH+ RH DESH (R-09 + R-10)	SA335P91 + SA335P91	813	45	GTAW + SMAW	39.38	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT				01
							2	646	195	260	966			115				100% HC, 190 HB TO 300HB	
16	0-17-900-00635, 0-17-900-00636	RH DESH+ LINK TO FINISH RH (R-10 + R-11)	SA335P91 + SA335P91	813	45	GTAW + SMAW	39.38	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT				01
							2	646	195	260	966			115				100% HC, 190 HB TO 300HB	
17	0-17-174-00634	LINK TO FINISH RH+ LINK TO FINISH RH (R-11 + R-11)	SA335P91 + SA234WP91	813	45	GTAW + SMAW	39.38	ER90S-B9	E9015-B91			1050/06	220	740-770	100% UT				01
							5	1614	486	648	2415			115				100% HC, 190 HB TO 300HB	
18	0-17-174-00634	LINK TO FINISH RH+ FINISH RH I/L HDR (R-11 + R-12)	SA335P22 + SA335P22	711	95	GTAW + SMAW	83.12	ER90S-B3	E9018-B3			1014/03	150	680-720	100% (ISRT + UT)				01
							2	480	102	168	2027			240					
19	0-00-027-34630	FINISH RH I/L HDR NIPP+ FINISH RH ASSY (R-12 NIPPLE + R-13 (1)	SA213T22 + SA213T22	76.2	5.59	GTAW + SMAW	5.59	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							51	1023	574	-	-								
20	0-00-027-34630	FIN. RH I/L HDR NIPP+ FINISH RH ASSY (R-12 NIPPLE + R-13 (2-5))	SA213T22 + SA213T22	57.15	4.57	GTAW + SMAW	4.57	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							204	3012	1221	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-17-RH-EWS	02	2/3

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 17

CUST No : 1819,1820

PG NAME : Reheater System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Reheater System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM		
									Ø2.5	Ø3.15	Ø4.0								
21	0-00-027-34630	FIN RH I/L HDR NIPP+ FINISH RH ASSY (R-12 NIPPLE + R-13 (6-8))	SA213T22 + SA213T22	38.1	4.5	GTAW + SMAW	4.5 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							153	1360	595	-	-								
22	0-00-027-34630	FIN RH I/L HDR NIPP+ FINISH RH ASSY (R-12 NIPPLE + R-13 (9-14))	SA213T22 + SA213T22	38.1	5.08	GTAW + SMAW	5.08 ▽	ER90S-B3	E9018-B3			1013/02	150	Nil	20% RT subject to min 2 weld/welder/shift				01
							306	2610	1459	-	-								
23	0-00-027-34630, 0-00-027-34646	FINISH RH ASSY+FIN. RH O/L TERM TUBES (R-13 (1) + R-13TO (1))	SA213 UNS S30432 + SA213 UNS S30432	76.2	5.08	GTAW	5.08 ▽	Nittetsu YT304H	-			1054/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							51	6800	-	-	-								
24	0-00-027-34630, 0-00-027-34646	FIN RH ASSY+FIN. RH O/L TERM TUBES (R-13 (2-14) + R-13TO (2-14))	SA213 UNS S30432 + SA213 UNS S30432	63.5	4.19	GTAW	4.19 ▽	Nittetsu YT304H	-			1054/02	Nil	Nil	20% RT subject to min 2 weld/welder/shift				01
							663	53507	-	-	-								
25	0-00-027-34630, 0-00-027-34646	FIN RH O/L TERM TUBE+FINISH RH O/L HDR NIPPLE (R-13TO (1) + R-14 NIP)	SA213T92 + SA213T92	76.2	5.08	GTAW	5.08 ▽	9CrWV TIG/ Thermanit-MTS616	E9015-B92			1058/02	220	745 ± 15	100% RT				01
							51	6672	-	-	-			30			100% HC, 190 HB TO 300HB		
26	0-00-027-34630, 0-00-027-34646	FINSH RH O/L TERM TUBES+FINISH RH O/L HDR NIPPLE (R-13TO (2-14) + R-14 NIP)	SA213T92 + SA213T92	63.5	5.08	GTAW	5.08 ▽	9CrWV TIG/ Thermanit-MTS616	E9015-B92			1058/02	220	745 ± 15	100% RT				01
							663	72279	-	-	-			30			100% HC, 190 HB TO 300HB		
27		GAMMA PLUG	SA335P12 + SA182F22CL3			SMAW	7 △	-	E8018-B2			1102/01	200	Nil	100% LPI or MPI				
							2	-	1	-	-								
28		GAMMA PLUG	SA335P22 + SA182F22CL3			SMAW	7 △	-	E9018-B3			1103/01	200	Nil	100% LPI or MPI				
							2	-	1	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	02-04-2019	1819-17-RH-EWS	02	3/3

CAUTION :

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98. REV.NO.01- DESCRIPTION ADDED. REV.NO.02- NOTE ADDED. NOTE:HARDNESS CHECK OF 3% OF TOTAL WELD JOINTS IN ALLOY STEEL PIPES (OTHER THAN GR91) TO BE CARRIED OUT (247 HB MAX).

ERECTION WELDING SCHEDULE

PG NO : 19

CUST No : 1819,1820

PG NAME : Economiser System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Economiser System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
									Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
				SIZE	THICK		Qty in Nos.	Qty in gms	Ø2.5	Ø3.15	Ø4.0								
1	0-00-027-34653, 0-19-850-02050	ECO I/L LINK + ECO I/L LINK (E-04 + E-04/VALVE)	SA106GRC + SA106GRC	610	82	GTAW + SMAW	71.75	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							12	2470	525	860	8168			205					
2	0-00-027-34653, 0-19-850-02050	ECO I/L LINK + ECO I/L LINK (E-04A + E-04A)	SA106GRC + SA106GRC	457.2	65	GTAW + SMAW	56.88	ER70S-A1	E7018-1			1004/04	100	610 ± 15	100% RT				01
							4	609	132	215	1380			165					
3	0-00-027-34653, 0-19-850-02050	ECO I/L LINK+ ECO I/L HDR (E-04 + E-05)	SA106GRC + SA106GRC	457.2	65	GTAW + SMAW	56.88	ER70S-A1	E7018-1			1004/04	100	610 ± 15	100% RT				01
							2	305	66	108	690			165					
4	0-00-027-34653, 0-19-850-02050, 1-19-850-02837	ECO I/L LINK+ ECO HANGER I/L HDR LINK (E-04 NOZZLE + E-04.01)	SA105 + SA106GRC	219.1	36	GTAW + SMAW	31.5	ER70S-A1	E7018-1			1004/04	100	610 ± 15	100% RT				01
							1	71	16	26	55			90					
5	0-00-027-34653, 1-19-850-02837	ECO HANGER I/L HDR LINK+ECO HANGER I/L HDR LINK (E-04.01 + E-04.01)	SA106GRC + SA106GRC	219.1	36	GTAW + SMAW	31.5	ER70S-A1	E7018-1			1004/04	100	610 ± 15	100% RT				01
							2	141	32	52	110			90					
6	0-00-027-34653, 0-19-850-02050	ECO HANGER I/L HDR LINK+ECO HANGER I/L HDR (E-04.01 + E-05A)	SA106GRC + SA106GRC	219.1	36	GTAW + SMAW	31.5	ER70S-A1	E7018-1			1004/04	100	610 ± 15	100% RT				01
							1	71	16	26	55			90					
7	0-00-027-34631	ECO I/L HDR NIPP+ECO I/L TERM TUBE (E-05 NIPPLE + E-06TI)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								
8	0-00-027-34631	ECO I/L TERM TUBE +ECO COIL LWR ASSY (E-06TI + E-06L)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								
9	0-00-027-34631	ECO COIL LWR ASSY +ECO COIL INTER ASSY (E-06L + E-06I)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								
10	0-00-027-34631	ECO COIL INTER ASSY +ECO COIL UPPER ASSY (E-06-I + E-6U)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	15-09-2018	1819-19-ECO-EWS	01	1/4

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* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98.
REV.NO.01- DESCRIPTION ADDED.

ERECTION WELDING SCHEDULE

PG NO : 19

CUST No : 1819,1820

PG NAME : Economiser System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Economiser System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
11	0-00-027-34631	ECO COIL UPPER ASSY +ECO O/L TERM TUBES (E-06U + E-06TO)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1 ▽	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								
12	0-00-027-34631	ECO O/L TERM TUBES +ECO JN. HDR NIPPLE (E-06TO + E-07 NIPPLE)	SA210GRC + SA210GRC	44.45	7.1	GTAW + SMAW	7.1 ▽	ER70S-A1	E7018-1			1003/04	20	Nil	20% RT subject to min 2 weld/welder/shift				01
							940	8690	9449	-	-								
13	0-00-027-34762, 0-00-027-34631	ECO HGR I/L HDR NIPP +ECO HGR I/L TERM TUBE (E-05A NIPPLE + E-06A-TI)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
14	0-00-027-34762, 0-00-027-34631	ECO HGR I/L TERM TUBE+ECO HGR TUBE (E-06A-TI + E-06A)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
15	0-00-027-34631	ECO HGR TUBE+ ECO LWR HGR TUBE (E-06A + E-06L HANGER)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
16	0-00-027-34631	ECO LWR HGR TUBE+ ECO INTER HGR TUBE (E-06L HANGER + E-06I HANGER)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
17	0-00-027-34631	ECO INTER HGR TUBE+ ECO UPPER HGR TUBE (E-06I HANGER + E-06U HANGER)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
18	0-00-027-34631	ECO UPPER HGR TUBE + ECO HGR O/L TERM TUBE (E-06U HANGER + E-06A-TO)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
19	0-00-027-34631	ECO HGR O/L TERM TUBE +ECO JN. HDR NIPPLE(E-06A-TO + E-07 NIPPLE)	SA210GRC + SA210GRC	44.45	13.49	GTAW + SMAW	13.49 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							472	2489	2414	3277	-			35					
20	0-00-027-34631, 0-00-027-34660	ECO JN. HDR NIPPLE +ECO LWR HGR TUBE (E-07 NIPPLE + E-08L)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	15-09-2018	1819-19-ECO-EWS	01	2/4

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* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98.
REV.NO.01- DESCRIPTION ADDED.

ERECTION WELDING SCHEDULE

PG NO : 19

CUST No : 1819,1820

PG NAME : Economiser System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Economiser System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
21	0-00-027-34631	ECO LWR HGR TUBE +ECO HGR TUBE (LTRH LWR ASSY) (E-08L + R-04L HANGER)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
22	0-00-027-34631	ECO HGR TUBE (LTRH LWR ASSY)+ECO HGR TUBE (LTRH LWR INTER ASSY) (R-04L HGR + R-04LI HGR)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
23	0-00-027-34631	ECO HGR TUBE (LTRH LWR INTER ASSY)+ECO HGR TUBE (LTRH INTER ASSY) (R-04LI HGR + R-04I HGR)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
24	0-00-027-34631	ECO HGR TUBE (LTRH INTER ASSY)+ECO HGR TUBE (LTRH UPR INTER ASSY) (R-04I HANGER + R-04UI HANGER)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
25	0-00-027-34631	ECO HGR TUBE (LTRH UPR INTER ASSY)+ECO HGR TUBE (LTRH UPR ASSY) (R-04UI HANGER + R-04U HANGER)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
26	0-00-027-34631	ECO HGR TUBE (LTRH UPR ASSY)+ECO UPR HGR TUBE (R-04U HGR + E-08U)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
27	0-00-027-34656, 0-00-027-34631	ECO UPR HGR TUBE +ECO HGR O/L TERM TUBE (E-08U + E-08TO)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
28	0-00-027-34656, 0-00-027-34631	ECO HGR O/L TERM TUBE +ECO O/L HDR NIPPLE (E-08TO + E-09 NIPP)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							416	5320	4188	4805	-			40					
29	0-00-027-34656, 0-00-027-34631	ECO O/L HDR NIPPLE+ ECO HGR TUBE (LTRH HDR SUPPT) (E-09 NIPP + E-08X)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							56	717	564	647	-			40					
30	0-00-027-34656, 0-00-027-34631	ECO HGR TUBE (LTRH HDR SUPPT)+ECO HGR TUBE (LTRH HDR SUPPT) (E-08X + E-08X)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							224	2865	2255	2587	-			40					

PREPARED	CHECKED (W.T.C)	APPROVED	DATE	DOC NO.	REV NO :	PAGE NO.
RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	15-09-2018	1819-19-ECO-EWS	01	3/4

CAUTION : THE INFMN ON THIS DOCUMENT IS THE PROPERTY OF BHEL. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO INTEREST OF BHEL.

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98.
REV.NO.01- DESCRIPTION ADDED.

ERECTION WELDING SCHEDULE

PG NO : 19

CUST No : 1819,1820

PG NAME : Economiser System

PROJECT : NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

SYSTEM DESCRIPTION : Economiser System

WELDING CODE : I.B.R / ASME

PRESSURE PARTS/~~NON PRESSURE PARTS~~

CUST DOC NO : 9591-102-102-QVM-V-001 CUST DOC REV : 01

SL. NO	DRG NO. FOR WELD LOCATION & IDENTIFICATION MARK	DESCRIPTION OF PARTS TO BE WELDED	MATERIAL SPEC.	DIMENSIONS		PROCESS OF WELDING	TYPE OF WELD	ELECTRODE FILLER SPEC				WPS NO/REV NO.	MIN. PRE HEAT TEMP. in °C	PWHT TEMP. in °C	NDT METHOD/ QUANTUM	* REF-.		REMARKS	REV
								GTAW	SMAW										
				SIZE	THICK		Qty in Nos.	Qty in gms	Qty in Nos.					TIME in mins		SPEC. NO	ACC NORM REF.		
									Ø2.5	Ø3.15	Ø4.0								
31	0-00-027-34656, 0-00-027-34631	ECO HGR TUBE(LTRH HDR SUPPT)+ECO O/L HDR NIPPLE (E-08X + E-09 NIPPLE)	SA210GRC + SA210GRC	69.85	14.1	GTAW + SMAW	14.1 ▽	ER70S-A1	E7018-1			1004/04	Nil	610 ± 15	20% RT subject to min 2 weld/welder/shift				01
							56	717	564	647	-			40					
32	0-19-851-02025, 0-00-027-34653	ECO O/L HDR+ECO O/L LINK (E-09 + EF-01)	SA106GRC + SA106GRC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	376	81	132	1103			195					
33	0-19-851-02025, 0-00-027-34653	ECO O/L LINK+ECO O/L LINK (EF-01 + EF-01)	SA106GRC + SA106GRC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							12	2255	481	788	6616			195					
34	0-19-851-02025, 0-00-027-34653	ECO O/L LINK+ECO MIXING LINE (EF-01 + EF-02)	SA106GRC + SA234WPC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	376	81	132	1103			195					
35	0-19-852-02032, 0-00-027-34653	ECO MIXING LINE+ECO WW I/L LINK (EF-02 + EF-03)	SA234WPC + SA106GRC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	376	81	132	1103			195					
36	0-19-853-02028, 0-00-027-34653	ECO WW I/L LINK+ECO WW I/L LINK (EF-03 + EF-03)	SA106GRC + SA106GRC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							4	752	161	263	2206			195					
37	0-19-853-02028, 0-00-027-34653	ECO WW I/L LINK+FURN SIDE I/L HDRS (EF-03 + F-16 L&R)	SA106GRC + SA234WPC	558.8	76.2	GTAW + SMAW	66.68 ▽▽	ER70S-A1	E7018-1			1004/04	150	610 ± 15	100% (ISRT + UT)				01
							2	376	81	132	1103			195					
38		GAMMA PLUG	SA105 + SA106GRC			SMAW	7 ◺	-	E7018			1101/01	150	Nil	100% LPI or MPI				
							36	-	10	-	-							FOR T >75 MM	
39		GAMMA PLUG	SA105 + SA106GRC			SMAW	7 ◺	-	E7018			1101/01	100	Nil	100% LPI or MPI				
							10	-	3	-	-							FOR T- (25-75) MM	

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RUDRABHATLA SAIKUMAR	LAKAVATH PRAVEEN KUMAR	ANAND KUMAR S	15-09-2018	1819-19-ECO-EWS	01	4/4

* REFER NDE MANUAL No.PS:CMX:002 REV.No.01/12-98.
REV.NO.01- DESCRIPTION ADDED.

BHARAT HEAVY ELECTRICALS LIMITED

TIRUCHIRAPALLI 620 014

QUALITY ASSURANCE

SIP: PP: 29 / 02

General Guidelines for Welding of T22 grade Panel Butt Joints at Sites for Once Through Supercritical Boilers

REV	DATE	PREPARED	REVIEWED	APPROVED
00	23.11.2016	A. Sakthi Ganesh	S.Selvarajan	U. Revisankaran
01	27.01.2017	A. Sakthi Ganesh	S.Selvarajan	U. Revisankaran
02	08.02.2017	A. Sakthi Ganesh 08-02-2017	S.Selvarajan 08/02/17	U. Revisankaran 08/02/17

RECORD OF REVISIONS

Rev. No.	Clause No.	Details of Revision
00	--	Fresh issue
01	3.25	New clause added for clarity.
	3.26	Clause introduced to include Hardness measurement by portable hardness testers.
	3.27 & 3.29	Clauses modified to effect the inclusion of hardness testing by portable hardness testers.
	3.27 to 3.30	Clauses renumbered.
02	The following clauses have been modified based on feedback from GE Power, USA	
	3.7	Modified for clarity in operation.
	3.13	Modified to bring clarity w.r.t. welding sequence and to introduce LPI on fin-to-fin weld.
	3.20	Modified to amend the minimum width requirement for PWHT heating band.

1.0 SCOPE

1.1 This procedure details out the general guidelines for welding of T22 grade panel butt joints at erection sites for Once Through Supercritical Boilers.

2.0 REFERENCE DOCUMENTS

2.1 ASME Sec I & Sec IX
2.2 IBR

3.0 GUIDELINES FOR PROCESSING OF GR. 22 PANEL BUTT JOINTS AT SITE

3.1 Welding shall be carried out as per the approved Field Welding Schedules (FWS), employing IBR qualified welders. In case of NTPC projects, the FWSs shall be approved by QSGM (Qualified Steam Generator Manufacturer).

3.2 The welding machines, PWHT accessories (PID Controlled/Automatic control panels, K Type thermocouples, temperature recorder, etc.), etc. shall have valid calibration status.

3.3 The electrode container should be in sealed condition and shall be free from punctures that may cause exposure to atmosphere.

3.4 The Low hydrogen flux coated electrodes shall be baked in a baking oven and kept in a holding oven till issue as per manufacturer's recommendation. The electrodes shall be carried in a preheated portable oven/ heated quiver from place of issue to welding site and held there at temperature between 100 and 150°C. Separate connection for portable oven shall be ensured.

3.5 Receipt and issue of consumable shall be recorded in a log by an authorized person in accordance with applicable WPS.

3.6 All IBR certified welders shall be retested as per applicable WPS and the same shall be ensured before their deployment on jobs.

3.7 The joining ends of the tubes shall be properly cleaned from inside and outside up to at least 50 mm from the weld face. Prior to tube end cleaning, compressed air shall be blown inside the tubes to ensure that there is no water inside the tubes. Welding shall be performed within 4 hours of tube end cleaning.

3.8 Fit-up of tubes for butt joint shall be done only by clamps, with a root gap of 2-3 mm and a land of 1-1.5 mm.

3.9 There shall be no misalignment and no mismatch.

3.10 Preheat shall be carried out by heating coils/ ceramic pads from both the sides of furnace water wall panels and the temperature shall be cross checked by thermal chalk/infrared thermometer/Thermocouples and records shall be maintained. The ceramic pads shall be wrapped uniformly for a width of 200 mm on both sides of the joints. The effect on hardness with/ without preheat or PWHT is represented in **Illustration 1**

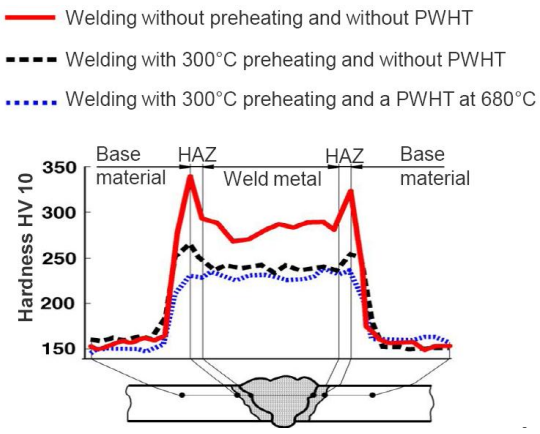


Illustration 1: Effect on hardness with/ without preheat or PWHT on T22 joints

3.11 Welding shall be carried out by GTAW process for the root pass and by SMAW process for further passes.

3.12 The inter-pass temperature shall not exceed 350°C as per approved WPS.

3.13 During fin welding in panels, fin-to-fin welding in transverse direction shall be performed and checked and cleared with LPI prior to the longitudinal welding between the fin and the tube. Fin-to-fin welds in the transverse direction shall be full penetration welds.

3.14 The shielding shall be done properly with gas purity greater than 99.95%.

3.15 Weaving shall not be greater than three times of the electrode diameter.

3.16 For GTAW process, the arc shall be initiated by High Frequency start facility only.

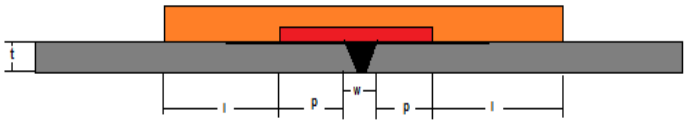
3.17 Visual inspection shall be carried out to check the weld surface to ensure that the weld joint is free from undercut, under-fill, lack of fusion, porosity, spatter, weaving etc.

3.18 PWHT shall be performed as per approved WPS:1084 (latest revision) and PWHT Instructions (For T22 water wall panel, the PWHT temperature shall be 740+/-10°C for a soaking time of 1 hr/inch of thickness, with a minimum of one hour).

3.19 For water wall panels, only resistance heating coils/ceramic resistance pads with PID controlled/ automatic control panels, K-type thermocouples shall be used for PWHT.

3.20 The PWHT arrangement shall meet the following conditions-

'When heat treating butt welds, the width of the circumferential heating band on either side of the weld must be at least 3 times the width of the widest part of the weld groove but not less than twice the thickness of the thicker part welded. In no case shall the heating band be less than 150mm. The width of the insulation band beyond the heating band shall be at least twice the total width of the heating band'. (refer **Illustration 2**).



w - max width of weld groove
p - width of heating band (atleast 3w or 2t - whichever is more)
i - with of insulation band {minimum = 2 X (2p+w)}
t- thickness of weld

Illustration 2: PWHT bands

3.21 The wrapping of heating coils/pads and location of thermocouples shall be ensured before covering with insulation.

3.22 PWHT shall be carried out with one thermocouple per two (alternate) joints minimum.

3.23 PWHT charts shall be signed during the process by representatives of BHEL and Customer, as required.

3.24 PWHT Chart shall be reviewed as per requirement (Soaking temp, time, rate of heating and rate of cooling).

3.25 The effectiveness of PWHT may be verified by doing hardness survey on the butt joints selected at random.

3.26 Hardness survey may be carried out using portable hardness testers. The maximum hardness value shall be within 260HV.

3.27 As an alternative to hardness measurement using portable hardness testers, in-situ MCF (Magnetic Coercive Force) measurement may be performed on these joints. The maximum acceptable MCF measurement value for these joints shall be 10 A/cm. Further, for validation of hardness values, 2 to 3 joints selected randomly shall be tested at lab and acceptable value of hardness shall be maximum 260 HV.

3.28 Radiography of the joints shall be performed as per approved Field Quality Plan/Field Welding Schedule. Selection of joints for RT should be at random per welder.

3.29 If the hardness using portable hardness tester is more than 260 HV (or MCF value is more than 10A/cm), PWHT procedure shall be repeated (upto a maximum of two more cycles) till the hardness (or MCF value) comes down to the maximum permissible value or below. Otherwise the joint shall be cut and a spool piece shall be inserted and the Steps from Sl. No.3.1 to 3.29 for joints shall be repeated.

3.30 PWHT shall be carried after fin welding and completion of all other welding.

4.0 PRECAUTIONS

4.1 Welding shall not be started till proper preheat temperature is reached on the weld joint ends of the tubes.

4.2 Unqualified welders shall not be employed for the jobs.

4.3 Use of unbaked welding consumables shall be avoided.

4.4 Welding shall not be commenced without proper fit up of tubes (tube IDs shall match).

4.5 There shall not be undue force on the tubes to cover up the mismatch while fit up of joints.

4.6 No tack welding is permitted on tubes for fit up.

4.7 There shall not be improper weld bead e.g. under fills, excessive reinforcement and poor weld toe blend angle with base material

4.8 Hydrostatic test shall not be carried out before PWHT.

5.0 DOCUMENTATION

5.1 The details of welding, PWHT and NDE shall be recorded in appropriate job cards/report formats as per the site Welding and Heat Treatment Manuals.

%%%%%%%%%%%%%%

FIELD WELDING SCHEDULE ENDORSEMENT

Project: NTPC / NTPC, TELANGANA STPP,PHASE-I(2X800 MW)

Reviewed the FWSs submitted within BHEL mail dated 02-04-2019 and found them to be in order and acceptable to follow at site.

The document no. for the circulation system is 1819-07-CIR-EWS rev02

The document no. for the economiser system is 1819-19-ECO-EWS rev01

The document no. for the reheater system is 1819-17-RH-EWS rev02

The document no. for the superheater system is 1819-12-SH-EWS rev02

General guidelines for welding of T22 grade panel butt joints at sites for OTSC boilers SIP:PP:29 / rev.02.S

SIGNED ON BEHALF OF

BHEL BY S. Anand

S. ANAND KUMAR
Sr. Dy. General Manager
Pressure Parts and L&I / PE (FB)
BHEL. TRICHY - 620 014

DATE : 2/4/2019

PLACE : TRICHY-14.

SIGNED ON BEHALF OF

ALSTOM/GE BY _____

DATE : 3rd April 2019

PLACE : Windsor, CT, USA