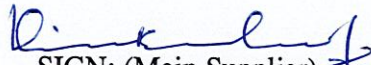




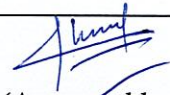
ENDORSEMENT SHEET FOR DRAWING / DOCUMENT

TO BE FILLED IN BY SUPPLIER AT TIME OF SUBMISSION

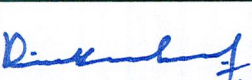
Project Name	PATRATU STPP PHASE-I – (3X 800 MW)
Contract No:	CS-9585-001-2 BHEL WORK ORDER NOS:- 7381, 7382, 7383, 7384, 7385 (MAIN BOILER) & 7386(AUX.BOILER)
Package name	EPC PACKAGE
Main Supplier	BHEL, Piping Centre, Chennai
Manufacturer Name	NTPC Approved Sub-Contractor and Sub-Vendors
Project/package Specific document	BHEL QP ref. : 7381:QPC:20:Rev 00.Date: 25.06.2018 NTPC ref. : 9585-001-102-QVM-Q-240
Drawing title	Quality Plan for SEAMLESS BW FITTINGS - Gr-91/92 MATERIAL.
Reference Project Name	TELANGANA STPP PHASE-I (2X 800 MW)
Reference Contract No:	CS-9591-101-2
Reference Package name	SG PACKAGE
Reference Main Supplier	BHEL, Piping Centre, Chennai
Reference Manufacturer Name	NTPC Approved Sub-Contractor and Sub-Vendors
Reference Project/package document	BHEL QP ref.: 7313:QPC:19:Rev 02. Date: 21.05.2018 NTPC Doc No.: 9591-102-102-QVM-Q-001A Rev 02. Date: 04.06.2018
Reference Drawing title	Quality plan for SEAMLESS BW FITTINGS - Gr-91/92 MATERIAL.
i) ☒ Certified that the item /component is identical to that considered for reference document approval.	
ii) ☐ That there are minor changes in the item / component with respect to that considered for reference document approval and the same affect the reference document slightly as indicated below.	

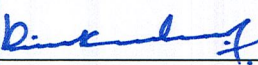
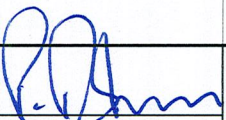

SIGN: (Main Supplier)

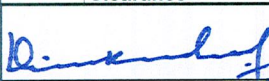
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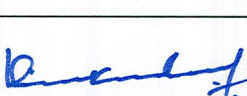
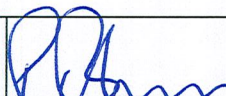

NTPC (Approved by/Date/Seal)

BHEL-UNIT: BHEL, Piping Centre, Chennai

		CONTRACTOR'S NAME & ADDRESS BHEL PIPING CENTRE, CHENNAI SUPPLIED BY NTPC APPROVED SUB-VENDORS		MANUFACTURING QUALITY PLAN				PROJECT : TELANGANA STPP PHASE-I (2X 800 MW) PACKAGE : SG Package CONTRACT No.: CS-9591-101-2 MAIN-SUPPLIER : BHEL, Piping centre						
				ITEM :SEAMLESS BW FITTINGS CONFORMING TO ASME SA234 WP91, ASTM A234WP92 & ASME SA182 F91/F92 (BOUGHT OUT ITEM) System : Power Cycle Piping BHEL Customer No's : 7313, 7314, 7325 (MAIN BOILER) & 7315(AUX.BOILER)										
S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT #	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6a	6b	7	8	9	D*	** 10			11
1.0 Raw Materials & Fittings shall be procured from NTPC approved Sources. The Test Certificate received from RM manufacturer shall meet IBR requirements.														
1.1	Seamless Pipe/Forging	a) Chemical Composition, Mechanical Properties	Major	Verification of MTC	100%	100%	ASME SA335P91/P92 ASME SA182F91/F92 For Grade 92 : Ni-03%Max and Cu-025%Max	MTC	X	P	V	V	MTC - Mill Test Certificate Refer Note 01	
		b) UT Condition	Major	Verification of MTC	100%	100%	## For P92 : UT as per EN10246:7 1996 or equivalent, with longitudinal notch of 5% epth of thickness (min 0.3mm and max. 1.5mm); For F92 : UT as per SA388 with Cl.3.3.4 of ASME Sec-VIII, Div.2 for Forging/Bars of dia or Thk >50mm		X	P	V	V	## : Hydro/UT for other material grades	
		c) Hardness test	Major	Verification of MTC	100%	100%	ASME SA335P91/P92 ASME SA182F91/F92		X	P	V	V		
		d) Dimensions Outer Dia.,Thk.etc	Major	Measurement	100%	100%	ASME SA335P91/P92 ASME SA182F91/F92	HC	X	P	V	V		
		e) Material confirmation Test (Chemical)	Major	Spectro / X-ray fluorescence	100%	100%	ASME SA335P91/P92 ASME SA182F91/F92	PMI Report	X	P	W**	V	W** : Witness by IBR	
2.0 IN PROCESS INSPECTION														
2.1	Material receiving inspection	Marking & transfer of identification	Major	Visual	100%	--		HC	X	P	V	V	HC : History card Refer Note 02	
2.2	Design Proof Test (only for Formed Fittings)	Qualification of Fittings	Major	Burst Test	100%	100%	As per ASME B16.9 / applicable design code	Internal report	X	P	V/W*	V	W*: Witness required if report is not available	
2.3	Fitting Forming Procedure	Procedure qualification	Major	Review	100%	100%	ASME SA234WP91/ASTM A234WP92 ASME SA182F91/F92	\$Appd.Procedure	X	P	V	V	\$ Vendor's procedure to be approved by BHEL	
 VIVEKANANDA YELLU Dy.Mgr /QA		 P RAVI SHANKAR AGM/Q		LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (X) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER, C: THIRD PARTY INSPECTING AGENCY APPROVED BY IBR&BHEL, N: NTPC; P: PERFORM, W: WITNESS, V: VERIFICATION & R: REVIEW AS APPROPRIATE CHP: NTPC SHALL IDENTIFY IN COLOUM 'N' AS 'W' #: NTPC INSPECTION ENGINEER TO CHECK,APPROVAL DATE/REVISION NO. OF REF.DOCUMENTS AT THE TIME OF INSPECTION				NTPC		DOC. NO. 9591-102-102-QVM-Q-001A REV..... CAT...				
MAIN-SUPPLIER		MAIN-SUPPLIER												
SIGNATURE		PAGE 01 OF 04						FOR NTPC USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL

		CONTRACTOR'S NAME & ADDRESS BHEL PIPING CENTRE, CHENNAI SUPPLIED BY NTPC APPROVED SUB-VENDORS		MANUFACTURING QUALITY PLAN				PROJECT : TELANGANA STPP PHASE-I (2X 800 MW) PACKAGE : SG Package CONTRACT No.: CS-9591-101-2 MAIN-SUPPLIER : BHEL, Piping centre						
				ITEM :SEAMLESS BW FITTINGS CONFORMING TO ASME SA234 WP91, ASTM A234WP92 & ASME SA182 F91/F92 (BOUGHT OUT ITEM) System : Power Cycle Piping						QP No: 7313:QPC:19 Rev: 02 Dt:21.05.2018				
				BHEL Customer No's : 7313, 7314, 7325 (MAIN BOILER) & 7315(AUX.BOILER)										
S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT #	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6a	6b	7	8	9	D*	** 10			11
2.4	Forming of fittings	Process parameters	Critical	Temperature, Measurement & Visual	100%	--	Appd.Procedure		Internal report	X	P	V	V	
2.5	Post forming/forging Heat Treatment	Rate of Heating, Rate of Cooling & Soaking time	Critical	Temp & Time graph	100%	100%	Refer Note 03		HT Chart	X	P	R	R	Refer Note 03
2.6	Test Piece Marking	Selection of Test coupons	Major	Measurement & Marking	One Sample / Heat / Size/ HT Batch	--	As per ASTM A370		Internal report	X	P	W	V	Refer Note 02 & Refer Note 07
3.0 TESTS														
3.1	Chemical properties	Product Analysis	Major	Chemical Composition	One Sample / Heat / Size	One Sample / Heat / Size	ASME SA234WP91/ASTM A234WP92 ASME SA182F91/F92		Test Report	X	P	W**	V	W** : Witness by IBR
3.2	Mechanical properties	YS, UTS, % Elongation (Mandatory)	Major	Tensile Strength,	One Sample / Heat / Size/ HT Batch	One Sample / Heat / Size/ HT Batch	ASME SA234WP91/ASTM A234WP92 ASME SA182F91/F92		Test Report	X	P	W**	V	Refer Note 04
3.3	Hardness test	Hardness	Major	Measurement	100%	10% / 10%	ASME SA234WP91/ASTM A234WP92 ASME SA182F91/F92		Test Report	X	P	W	W	
3.4	NDE	(a) Volumetric Defect	Major	UT#	100%	10% / 10%	ASME SA388	ASME SecVIII Div-2, CI3.3.4	Test Report	X	P	W	W	# : For dia>=200mm 100% witness by BHEL & 10% by NTPC
		(b) Sub-surface Defect	Critical	WET MPI	100%	10% / 10%	ASTM E709	ASME B31.1 CI. 136.4.3	Test Report	X	P	W	W	
3.5	Photomicrographic test	Microstructure	Critical	Insitu Micro	One Sample / Heat / Size/ HT Batch	One Sample / Heat / Size/ HT Batch	No micro fissures. Microstructure shall show tempered martensite. Grain growth if any has to be examined further. For P92 : Delta Ferrite - 3%Max.		Test Report & Photomicrograph (Magnification at 500x minimum)	X	P	W	V	Refer Note 08
 VIVEKANANDA YELLU Dy.Mgr /QA		 PRAVESH SHANKAR AGM/Q		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (X) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER, C: THIRD PARTY INSPECTING AGENCY APPROVED BY IBR&BHEL, N: NTPC; P: PERFORM, W: WITNESS, V: VERIFICATION & R: REVIEW AS APPROPRIATE CHP: NTPC SHALL IDENTIFY IN COLOUM 'N' AS 'W' #: NTPC INSPECTION ENGINEER TO CHECK,APPROVAL DATE/REVISION NO. OF REF.DOCUMENTS AT THE TIME OF INSPECTION						DOC. NO. 9591-102-102-QVM-Q-001A REV..... CAT...				
MAIN-SUPPLIER		MAIN-SUPPLIER												
SIGNATURE		PAGE 02 OF 04						FOR NTPC USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL

		CONTRACTOR'S NAME & ADDRESS BHEL PIPING CENTRE, CHENNAI SUPPLIED BY NTPC APPROVED SUB-VENDORS		MANUFACTURING QUALITY PLAN				PROJECT : TELANGANA STPP PHASE-I (2X 800 MW) PACKAGE : SG Package CONTRACT No.: CS-9591-101-2 MAIN-SUPPLIER : BHEL, Piping centre						
				ITEM :SEAMLESS BW FITTINGS CONFORMING TO ASME SA234 WP91, ASTM A234WP92 & ASME SA182 F91/F92 (BOUGHT OUT ITEM) System : Power Cycle Piping		QP No: 7313:QPC:19 Rev: 02 Dt:21.05.2018								
				BHEL Customer No's : 7313, 7314, 7325 (MAIN BOILER) & 7315(AUX.BOILER)										
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1	2	3	4	5	M	C/N	7	8	9	D*	M	C	N	11
3.6	First Off Trail (FOT)	Ovality, Thicknning & other dimensions	Major	Measurement	100%	100%	Drawings & applicable standards		FOT Report	X	P	W	V	
4.0 FINAL INSPECTION														
4.1	Dimensional Inspection	Surface check, Bend angle, Radius, End-to-end dimn, Ovality, Thickness, Wrinkles, d1 at ends, Edge preparation & other dimensions as per Drg.	Major	Measurement	100%	100%	ASME B16.9, BHEL Drg.. & P.O.		Report	X	P	W	W	
4.2	Positive Material Identification	Chemical check	Critical	Spectro / X-ray fluorescence	100%	100%	ASME SA234WP91/ASTM A234WP92 ASME SA182F91/F92		Test Report	X	P	W	V	Chemical properties shall meet the requirements of SI.No.1.1(g) above
4.3	Marking & Identification	Marking / Color coding	Major	Visual	100%	100%	Refer Note 12		Report	X	P	V	V	Refer Note 12
4.4	Surface Protection & Painting	Appearance & DFT		Visual & Measurement	100%	100%	Project Specific NTPC approved Painting Scheme		Report	X	P	W	V	Refer Note 13
4.5	Preservation & Packing	End Protection	Major	Visual	100%	100%	Refer Note 13		Report	X	P	V	V	Refer Note 14
5.0 DOCUMENTATION														
5.1	Inspection clearance	(a) IBR Certification	Major	All tests as per IBR	100%	100%	IBR		FORM-IIIC	X	P	V	--	
		(b) Documentation	Major	Verification	100%	100%	All reports as required in this QAP		Report	X	P	V	V	
5.2	Despatch Clearance	Despatch Clearance	Major	Verification	100%	100%			MDCC	X	P	V	CHP	Refer Note 11
 VIVEKANANDA YELLU Dy.Mgr /QA		 P RAVI SHANKAR AGM/Q		LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (X) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER, C: THIRD PARTY INSPECTING AGENCY APPROVED BY IBR&BHEL, N: NTPC; P: PERFORM, W: WITNESS. V: VERIFICATION & R: REVIEW AS APPROPRIATE CHP: NTPC SHALL IDENTIFY IN COLOUM 'N' AS 'W' #: NTPC INSPECTION ENGINEER TO CHECK,APPROVAL DATE/REVISION NO. OF REF.DOCUMENTS AT THE TIME OF INSPECTION				NTPC		DOC. NO. 9591-102-102-QVM-Q-001A REV..... CAT...				
MAIN-SUPPLIER		MAIN-SUPPLIER												
SIGNATURE		PAGE 03 OF 04						FOR NTPC USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL

		CONTRACTOR'S NAME & ADDRESS BHEL PIPING CENTRE, CHENNAI SUPPLIED BY NTPC APPROVED SUB-VENDORS		MANUFACTURING QUALITY PLAN				PROJECT : TELANGANA STPP PHASE-I (2X 800 MW) PACKAGE : SG Package CONTRACT No. : CS-9591-101-2 MAIN-SUPPLIER : BHEL, Piping centre							
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					M	C/N					M	C	N		
1	2	3	4	5	6a	6b	7	8	9	D*	** 10			11	
NOTES: 1.0 The raw materials shall be as per drawing and NTPC Technical Specifications and to be procured from NTPC approved vendors. 2.0 Seal transfer on pieces to be cut shall be done by IBR inspector. 3.0 POST FORMING / FORGING HEAT TREATMENT :- Normalise at 1050 - 1080 deg.C & Temper at 750-780 deg.C Normalising and Tempering shall be carried out within 72 hours after completion of forming. The items shall be kept dry and stress free. The temperature shall be brought down to 0 to 100 deg.C after hot forming before normalizing and also after normalizing before tempering. Normalising and tempering of Gr91/Gr92 shall be done encompassing the entire component. Soaking shall be 1Hrs minimum. 4.0 Chemical & Mechanical tests shall be performed at in-house or reputed laboratories. 5.0 All NDE procedures shall be submitted to BHEL for review. NDE procedures shall have Level-III certified personnel approval incase of in-house. Incase of non-availability of inhouse facility NDE shall be performed by reputed laboratories. 6.0 Items shall be visually checked. No hard scales shall be present on inside & outside surfaces. 7.0 Gas cutting & Plasma cutting are prohibited for Gr91/Gr92 material. Repair by welding is prohibited. 8.0 Three replicas in one fitting. Actual magnification shall be indicated in the photomicrograph. Photomicrographs shall be provided as records for review & acceptance and future in-service reference. Delta Ferrite <or=3%,when measured as per VD TUV1272 for P92 fittings 9.0 All items shall be inspected and cleared by BHEL, IBR authorities & NTPC. 10.0 Necessary IBR Requirements shall be fulfilled and IBR documents to be submitted. 11.0 The Sub Vendor shall co-ordinate with NTPC and obtain MDCC before despatch of finished material and same shall be furnished to BHEL. 12.0 The finished components shall be punched with DU code (14 digit work order du details), Heat number, material specification, maker's emblem, Inspectors seal and Statutory authorities seal. In addition, the DU code, Heat no. and Material specification shall also be paint stencilled. Colour Coding : Gr91 - Brown & Red; Gr92 - Brown & Blue 13.0 Surveillance of Surface preparation, adhesion, Painting process & DFT by NTPC inspector. 14.0 Machined ends shall be well protected using end caps and suitably packed to avoid transit & other damages. Tack welding is prohibited.															
 VIVEKANANDA YELLU Dy.Mgr /QA		 P RAVI SHANKAR AGM/Q		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (X) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER, C: THIRD PARTY INSPECTING AGENCY APPROVED BY IBR&BHEL, N: NTPC; P: PERFORM, W: WITNESS, V: VERIFICATION & R: REVIEW AS APPROPRIATE CHP: NTPC SHALL IDENTIFY IN COLOUM 'N' AS 'W' #: NTPC INSPECTION ENGINEER TO CHECK, APPROVAL DATE/REVISION NO. OF REF.DOCUMENTS AT THE TIME OF INSPECTION						DOC. NO. 9591-102-102-QVM-Q-001A REV..... CAT...					
MAIN-SUPPLIER		MAIN-SUPPLIER													
SIGNATURE		PAGE 04 OF 04						FOR NTPC USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL	