

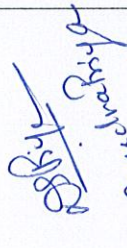



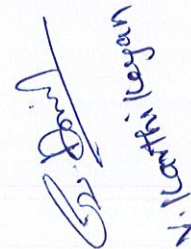




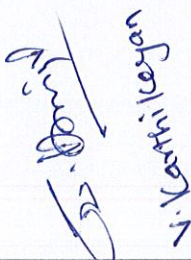
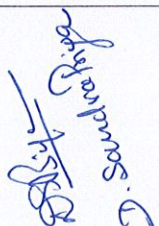
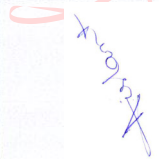
LIST OF TENDER ITEMS WITH DETAILS





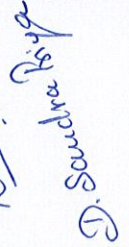
Enq Sl. No.	Material Code	Material Description	SPECIFICATION	Design Pressure	FITTING TYPES	TDC	Applicable QP	FITTING D1 VALUE	EDGE PREPARATION	ASM E SPEC	Sec Wt (kgs)	Max OD (mm)	Max Thk (mm)	Qty (No)	Total Weight (Kgs)
1	925043650099	BW 90 DEG ELBOW OD168.3X18.26 SA234WP91	SA234WP91	>70 bar	ELBOW	TDG 41:02	7480:QPX:01 Rev No 01	136.4	ASME B16.25 FIG-5B.	ASME B16.9	24.25	168.30	18.26	15.00	363.75
2	925043660099	BW 60 DEG ELBOW OD168.3X18.26 SA234WP91	SA234WP91	>70 bar	ELBOW	TDG 41:02	7480:QPX:01 Rev No 01	136.4	ASME B16.25 FIG-5B.	ASME B16.9	16.17	168.30	18.26	5.00	80.85
3	925043850099	BWLR 33DEG ELBOW OD168.3X18.26 SA234WP91	SA234WP91	>70 bar	ELBOW	TDG 41:02	7480:QPX:01 Rev No 01	FIG-5B/ 136.4	ASME B16.25 FIG-5B.	ASME B16.9	8.89	168.30	18.26	5.00	44.45
4	925043630099	BW 90 DEG ELBOW OD219.1X20.62 SA234WP91	SA234WP91	>70 bar	ELBOW	TDG 41:02	7480:QPX:01 Rev No 01	183	ASME B16.25 FIG-5B.	ASME B16.9	48.30	219.09	20.62	45.00	2,173.50
5	925043640099	BW 45 DEG ELBOW OD219.1X20.62 SA234WP91	SA234WP91	>70 bar	ELBOW	TDG 41:02	7480:QPX:01 Rev No 01	183	ASME B16.25 FIG-5B.	ASME B16.9	24.15	219.09	20.62	10.00	241.50
6	921173800099	BW RED OD33.4X9.09/OD21.3X7.47 SA234WP91	SA234WP91	>70 bar	REDUCER	TDG 41:02	7480:QPX:01 Rev No 01	17.2/6.4	ASME B16.25 FIG-5B.	ASME B16.9	0.21	33.40	9.09	10.00	2.10
7	921173790099	BWRED OD219.1X20.62 / OD168.3X18.26 WP91	SA234WP91	>70 bar	REDUCER	TDG 41:02	7480:QPX:01 Rev No 01	183/ 136.4	ASME B16.25 FIG-5B.	ASME B16.9	13.55	219.09	20.62	10.00	135.50
														100.00	3,041.65


MANUFACTURER'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN						PROJECT: TSGENCO YADRADRI STPP PACKAGE: 5x800MW MAIN SUPPLIER: BHEL HEEL, HARIDWAR CUST NO: 7480,7481,7482,7483 & 7484				
 BHEL PIPING CENTRE, CHENNAI / BHEL PPPU, THIRUMAYAM / BHEL HPBP TRICHY		ITEM : TURBINE INTEGRAL PIPING		REF SPEC: ST34001		QP NO: 7480:QPX:01 REV NO: 01		DATE: 27.01.2022				
		REF SPEC: ST34001		DATE: 27.01.2022								
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS		
1	2	3	4	5	M B/N	7	8	9	M B	10	11	
1.0 MATERIAL :												
1.1	Seamless Steel Pipes (SA106 Gr. B/C, SA335 P11/P22/ P91 & SA312 TP321.etc)	a) Chemical Composition b) Mech. Properties c) Flattening or bending test (as applicable as per ASME) d) Hydraulic test (For pipes with operating pressure < 70 bar) e) UT (For pipes with operating pressure >/= 70 bar and temp >/= 400 deg.C) f) Hardness test for P91 g) Surface finish h) Dimension	Critical	TC Verification & Co-relation	100%	Applicable Material Specification, ST34001 / ASTM E213 (with 5% notch, Min 0.3mm, max 1.5mm)	Mill TC	√	P	V		
1.2	Rolled & welded pipes (SA691/ 672.etc)	a) Chemical Composition b) Mech. Properties c) Hydraulic test & RT. d) UT (on plates used for making pipes)	Critical	TC Verification & Co-relation	100%	Applicable Material Specification, ST34001 / ASME Sec VIII Div.1 UW51.	Mill TC	√	P	V		
 PREPARED BY V. Karthikeyan		 CHECKED & APPROVED BY S. Sankar	LEGEND M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with "√" in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All 'W' indicated in column 'N' shall be CHP of customer. TC: Test Certificate, NDT : Non Destructive testing, RT: Radiographic Testing, UT : Ultrasonic Testing, MPT : Magnetic Particle Testing, LPT : Liquid Penetrant Testing			DOC. NO. REV... CAT...		Digitally signed by Nishant Kumar Date: 2022.02.01 11:46:13 +05'30'		APPROVED BY 		APPROVAL SEAL
FOR MANUFACTURER USE : SIGNATURE					FOR CUSTOMER USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL	

MANUFACTURER'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN						PROJECT: TSGENCO YADRADRI STPP PACKAGE: 5x800MW MAIN SUPPLIER: BHEL HEEL, HARIDWAR CUST NO: 7480,7481,7482,7483 & 7484			
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		REF SPEC: ST34001		ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY		REMARKS	
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS	
1	2	3	4	5	M B/N	7	8	9	M B	10	11
1.3	Pipe fittings - Elbows, Tees, Caps Reducers, stubs etc. (SA105, SA234 WPB, WPC, WP11, WP12, WP22 /WP91, SA182 F22/F321.etc)	e) Dimension and Surface finish a) Chemical Composition b) Mech. Properties c) UT (For Mother pipes) d) Surface NDE (MT/PT) e) Weld quality (in case of welded fittings if any) f) Dimension and Surface finish	Critical	TC Verification & Co-relation	100% 100% 100%	Applicable Material Specification, ST34001 / ASME Sec VIII Div.1 UW51.	Mill TC	√	P	V	Weld fittings are allowed as per cl 5 of ASTM A 234 100% RT on all fittings for use above 70 bar design condition.
1.4	Plates (as per drawing)	a) Chemical Composition b) Mech. Properties c) UT d) Surface NDE (MT/PT)	Major	TC Verification & Co-relation	100%	Applicable Material Specification, ST34001 / ASTM 435	Mill TC	√	P	V	UT shall be done for thick above 25mm

MANUFACTURER'S NAME & ADDRESS:	MANUFACTURING QUALITY PLAN	DOC. NO. REV...	CAT...
 BHEL PIPING CENTRE, CHENNAI / BHEL PPPU, THIRUMAYAM / BHEL HPBP TRICHY	M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with "√" in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All ' W ' indicated in column ' N ' shall be CHP of customer. TC: Test Certificate, NDT: Non Destructive testing, RT: Radiographic Testing, UT: Ultrasonic Testing, MPT: Magnetic Particle Testing, LPT: Liquid Penetrant Testing	Digitally signed by Nishant Kumar Date: 2022.02.01 11:46:31 +0530	
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LEGEND		REVIEWED BY	APPROVAL SEAL

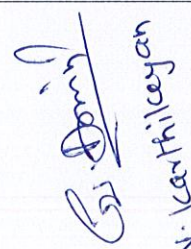
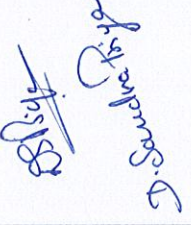
MANUFACTURER'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN						PROJECT: TSGENCO YADRADRI STPP PACKAGE: 5x800MW MAIN SUPPLIER: BHEL HEEL, HARIDWAR CUST NO: 7480,7481,7482,7483 & 7484								
 BHEL PIPING CENTRE, CHENNAI / BHEL PPPU, THIRUMAYAM / BHEL HPPB TRICHY		ITEM : TURBINE INTEGRAL PIPING		REF SPEC: ST34001		QP NO: 7480:QPX:01	REV NO: 01	DATE: 27.01.2022								
		SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS				
1	2	3	4	5	M	B/N	6	7	8	M	B	9	D*	10	11	
1.5	Flanges, Rods, Rounds & flanges (SA105, SA182 F11, F22 & F321)	a) Chemical Composition b) Mech. Properties c) UT d) Surface NDE (MT/PT)	Major	TC Verification & Co-relation	100%	Applicable Material Specification, ST34001 / ASTM A388 & ASME Section VIII Div.2 Cl.3.3.4	Applicable	Mill TC	✓	P	V					
1.6	Fasteners (IS1367, IS1364, SA193, SA194)	a) Chemical Composition b) Mech. Properties c) Dimension d) Hardness	Major	TC Verification & Co-relation	100%	Applicable Material Specification	Applicable	Mill TC	✓	P	V					
2.0 INPROCESS																
2.1	Marking, Cutting & Edge Preparation	Identification Check	Major	Visual	100%	As per approved Drawing	As per approved Drawing	-	✓	P	V				Refer Note 2	
2.2	NDE	Surface defects on edge preparation	Minor	LPT	100%	ST34001	ST34001	Report	✓	P	V					
2.3	Bending	a) Dimensions, Ovality, Wrinkles, Bend Angle b) Thinning by Ultrasonic D-meter c) Surface defects (On bend portion only)	Major	Measurement	100%	As per approved Drawing / ST34001	As per approved Drawing / ST34001	Report	✓	P	W					
			Major	Measurement	100%			Report	✓	P	W					
			Critical	MT	100%			Report	✓	P	V					
 PREPARED BY		 CHECKED & APPROVED BY		M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with "✓" in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All 'W' indicated in column 'N' shall be CHP of customer. TC: Test Certificate, NDT: Non Destructive testing, RT: Radiographic Testing, UT: Ultrasonic Testing, MPT: Magnetic Particle Testing, LPT: Liquid Penetrant Testing						DOC. NO. REV...			CAT...	 Digitally signed by Nishant Kumar Date: 2022.02.01 11:46:50 +05'30'	APPROVED BY	APPROVAL SEAL
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MANUFACTURER'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN						PROJECT: TSGENCO YADRADRI STPP PACKAGE: 5x800MW MAIN SUPPLIER: BHEL HEEL, HARIDWAR CUST NO: 7480,7481,7482,7483 & 7484							
 BHEL PIPING CENTRE, CHENNAI / BHEL PPPU, THIRUMAYAM / BHEL HPPB TRICHY		ITEM : TURBINE INTEGRAL PIPING		QP NO: 7480:QPX:01 REV NO: 01		REF SPEC: ST34001		DATE: 27.01.2022							
		SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS			
1	2	3	4	5	M	B/N	6	7	8	M	B	9	D*	10	11
2.4	Welding Qualification	a) Procedure b) Personnel	Major	Verify	100%		ASME Sec. IX	WPS, WPQ	√	P	V				
2.5	Welding	a) Fit-up b) Pre-heating c) Root run	Major Major Major	Visual Temp Visual & LPT	100% 100% 100%		HW0620599 Relevant WPS ST34001	- - -	- - -	P P P	- - V				
2.6	PWHT	Time/Temp control	Major	Review of Chart	100%		ANSI B 31.1	Report	√	P	V				
2.7	NDE after PWHT	a) Weld profile & Dimension b) Surface defects for fillet welds c) Hardness Survey on Weld & HAZ for AS d) Internal Defects (for butt welds only)	Major Critical Major Critical	Measurement & Visual MPT/LPT Hardness RT/UT	10% 100%		HW0620099 ST34001 As per Table AA & BB of ST34001 ST34001	- Report Report Report	- √ √ √	P P P P	- V # @				# - Random Witness @ - "W" for UT & "V" for RT (Review of RT Film RT).
3.0 FINAL INSPECTION															
3.1	Complete Fabricated Piping	Visual examination	Major	Visual	100%		HW0620099	Report	√	P	W				
3.2		PMI check for alloy steel	Major	Visual	100%		Applicable Material Specification	Report	√	P	W				
  PREPARED BY		  CHECKED & APPROVED BY		M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with "√" in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All ' W ' indicated in column ' N ' shall be CHP of customer. TC: Test Certificate, NDT: Non Destructive testing, RT: Radiographic Testing, UT: Ultrasonic Testing, MPT: Magnetic Particle Testing, LPT: Liquid Penetrant Testing						DOC. NO. REV.... CAT....		Digitally signed by Nishant Kumar Date: 2022.02.01 11:47:07 +05'30'		APPROVED BY APPROVAL SEAL	
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		REF SPEC: ST34001		M B/N		7		8		9 D*		M B		10	
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	M	B/N	7	8	9	D*	M	B	10	11	
1	2	3	4	5	6		7	8	9	D*	M	B	10	11	
3.3		Dimensions	Major	Measurement	100%		As per Drawing		Report	✓	P	W			
3.4		Marking	Major	Visual	100%		ST34001/As per Drawing		-		P	W			
3.5		Cleaning of Piping	Major	Visual	100%		BHEL Standards		-		P	W			
3.6		Preservation & Painting	Major	Visual	100%		Preservation & Painting as per customer approved Painting scheme		Report	✓	P	W			
3.7		End protection & packing	Major	Visual	100%		ST34001		-		P	W			
3.8		Documentation	Major	Compilation of records	100%		QP No:7480:QPX:01 & IBR		Data Folder	✓	P	P		IBR forms will be sent to site (if applicable)	


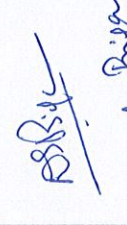
NOTES:


- Edge preparation shall be done by machining only.
- For small bore piping, where the individual stamping & stenciling may not be possible metal tags or plastic tags may be used for identification.
- i) Each item either individually or jointly will be segregated system wise for dispatch.
 ii) Small items like small reducers, elbows, tees, stubs, flanges etc. and other machines components duly preserved shall be packed in wooden boxes.
- Inside protection by VPI tablets/powder shall be ensured before end capping.

FOR MANUFACTURER USE : SIGNATURE		LEGEND		FOR CUSTOMER USE:		REVIEWED BY		APPROVED BY		APPROVAL SEAL	
 PREPARED BY		 CHECKED & APPROVED BY		M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with "✓" in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All 'W' indicated in column 'N' shall be CHP of customer. TC: Test Certificate, NDT : Non Destructive testing, RT: Radiographic Testing, UT : Ultrasonic Testing, MPT: Magnetic Particle Testing, LPT: Liquid Penetrant Testing		DOC. NO. REV...		CAT...		Digitally signed by Nishant Kumar Date: 2022.02.01 11:48:10 +05'30'	

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		REF SPEC: ST34001		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY		REMARKS	
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	M	B/N	7	8	9	D*	10	11
1	2	3	4	5	6								

- Check testing shall be carried out in case no co-relation is observed.
- Colour coding shall be done on the end of each pipe as per BHEL specification no.ST34001. Color coding to be done by way of color band/strip all along the length of loose and spare pipes.
- The material of construction shall be as per approved drawing /data sheet/pipe schedule.
- In case of IBR piping IBR code regulation shall be ensured and IBR certificates in original shall be given to Customer

 PREPARED BY		 CHECKED & APPROVED BY		M: Manufacturer B: BHEL/BHEL authorised inspection agency. * Records, identified with “√” in Records column shall be essentially included by contractor in QA documentation. Indicate P: Perform, W: Witness, V: Verification. All ‘W’ indicated in column ‘N’ shall be CHP of customer. TC: Test Certificate, NDT: Non Destructive testing, RT: Radiographic Testing, UT: Ultrasonic Testing, MPT: Magnetic Particle Testing, LPT: Liquid Penetrant Testing		DOC. NO. REV...		CAT... Digitally signed by Nishant Kumar Date: 2022.02.01 11:49:15 +05'30'			
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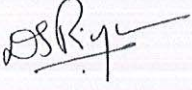
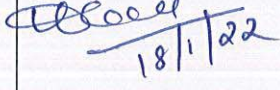
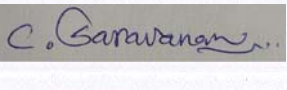

	Bharat Heavy Electricals Limited, Piping Centre, Chennai	
TDG : 41	Technical Delivery Conditions for Seamless Butt Weld Fittings & Forgings including Weldolets Conforming to ASME SA234, SA403, SA105, SA182.	Date : 13.01.2022
Rev. 02	Project : Turbine Integral Piping.	Page : 1 of 5

1.0 **SCOPE:-**

The fittings / forgings / flanges / weldolets shall meet the following requirements in addition to the requirements of the standards specified in the Purchase Order (PO) / approved drawings.

2.0 **RAW MATERIALS:-**

- a) The mother Pipe shall be Hydraulically Tested to the pressure mentioned in BHEL Drawing (for fittings with working/operating pressure less than or equal to 70 bar).
- b) UT 100% to be performed on all mother pipes, bar stocks and forgings for fittings for design temperature greater than 400 deg C and / or design pressure greater than 70 bar.
- c) UT shall be done as per - ASTM E 213 with longitudinal notch of 5% wall thickness with max.1.5mm and min. 0.3mm. Actual measured notch depth to be specified in Test Certificate.
- d) The raw forgings shall be ultrasonically tested as per SA388 and acceptance criteria as per Cl.3.3.4 of ASME Sec VIII Div. 2.
- e) **Test certificate to be produced for Chemical & Mechanical properties (Tension, Flattening/Bend test as applicable).**
- f) All raw materials used for SS fittings & forgings shall be checked by supplier to ensure freedom from radioactivity.
- g) Plates to be used for flanges > 25 mm shall be checked for laminations by UT as per ASTM 435.
- h) All Fittings & Forgings shall be of seamless construction unless otherwise specified in the purchase order. Pipes used for manufacturing of seamless fittings shall be seamless pipes or forgings only.
- i) For forgings : to ensure uniformity of structure and strength with reduction ratio in area 4:1 min from ingot to final forging, close to final size and shape. Flow lines to be parallel to the axis of openings. Forged items order to this TDC shall be forged to the nearest shape before machining to final dimensions as per respective drawing.

	 18/1/22		
D.Sandra Priya DM/ Q&BE	K Rajitha AGM / MM	C Saravanan AGM / Engineering	K V Ramani AGM / Q&BE
Prepared by	Reviewed by		Approved by



**Bharat Heavy Electricals Limited,
Piping Centre, Chennai**

TDG : 41	Technical Delivery Conditions for Seamless Butt Weld Fittings & Forgings including Weldolets Conforming to ASME SA234, SA403, SA105, SA182.	Date : 13.01.2022
Rev. 02	Project : Turbine Integral Piping.	Page : 2 of 5

- j) **For Gr-91/92 Pipes:** Shall be procured from the Mills listed in document ref.QCP:19 (latest revision). For pipe sources not listed in QCP:19, credentials shall be submitted by the vendor along with offer for BHEL review and approval.
- k) **For Gr-91/92 Forgings:** The raw material shall be procured from the Mills listed in document ref.QCP:18(latest revision). For raw material sources not listed in QCP:18, credentials shall be submitted by the vendor along with offer for BHEL review and approval.

3.0 **PROCESS:-**

Process of manufacture, Heat Treatment, Hardness shall conform to applicable standards.

4.0 **FINISHED FITTINGS & FORGINGS:-**

- (A) **Chemical Composition / Product Analysis** for one lot/size/heat to be furnished.
Carbon < or = 0.25% for WPB / SA105 (all thickness) and WPC (thickness < or = 20mm)
Carbon < or = 0.30% for WPC (thickness > 20mm)
SA182 F92: Si: 0.10-0.50, Ni: 0.30 max, Cu: 0.25 max
- (B) **NDE Test** : All Ferrous fittings & forgings shall be tested by MPI as per ASTM E-709 and SS fittings & forgings shall be LPI tested as per ASTM E 165. For WP91 / 92, F91 / 92 fittings, Wet MPI shall be done.
- (C) ONE Fitting / Forging of each size and specification per heat treatment lot shall be subjected to **Tension Test** as per applicable standard.
- (D) **Tensile properties** shall be as per Material Specification.
- (E) Wall Thickness of fittings & forgings shall be measured with Ultrasonic thickness gauge meter & minimum wall thickness shall be ensured.
- (F) All fittings & forgings shall have smooth, workmanlike finish. Repair by welding is NOT permitted.

D.Sandra Priya DM/ Q&BE	K Rajitha AGM / MM	C Saravanan AGM / Engineering	K V Ramani AGM / Q&BE
Prepared by	Reviewed by		Approved by



**Bharat Heavy Electricals Limited,
Piping Centre, Chennai**

TDG : 41	Technical Delivery Conditions for Seamless Butt Weld Fittings & Forgings including Weldolets Conforming to ASME SA234, SA403, SA105, SA182.	Date : 13.01.2022
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(G) Dimensions shall be as per ASME B 16.9, B16.28. Butt Weld edges shall be As given in Purchase order.

(H) Hardness test to be carried out on 10% of fittings & forgings at random and Reports shall be furnished.

(I) Hardness shall be as per material spec in ASME standard Hardness shall be tested 100% for all Gr91 and 92 fittings & forgings.

(J) All SS fittings & forgings shall be supplied in pickled & passivated condition as per ASTM A380 only.

(K) Unless otherwise specified in the PO WP11, WP22 and F11, F22 fittings shall be supplied as Cl 3; and WP12, F12 shall be of Cl 2 only.

(L) Grain Size for SS forgings shall be as per the standard referred.

(M) PMI for Alloy Steel Fittings & forgings – Each Alloy steel fitting / forging shall be checked for the correctness of the material during manufacturing and final inspection using X-ray fluorescence principle or spark emission spectography.

5.0 MARKING, PAINTING, COLOUR CODING, PACKING & END PROTECTION:-

MARKING:-

All fittings & forgings shall be PUNCHED with specification, Grade, Heat No, maker's emblem and Inspection Authorities seal.

Fittings & forgings of size above 76mm shall in addition be stenciled with above details.

PAINTING:

a) If delivered directly to Site – Painting shall be as per approved Painting scheme for the project. Annexure A

b) If delivered to BHEL Stores - Rust Preventive coating for transportation.

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- c) The internal surface shall be protected with rust preventive coating or rust inhibitor.
- d) Stainless steel and Galvanized fittings / forgings need not be painted.

COLOUR CODING:-

SA234 WPB/WPC/SA105	Red
WP11/SA182 F11	Yellow
WP22/SA182 F22	Green
WP91/SA182 F91	Blue
WP92/SA182 F92	Purple
SA 403 TP 321	Pink

PACKING & END PROTECTION:-

All fittings & forgings shall be suitably packed in box/crate to avoid transit/other damages.

Ends of fittings / forgings shall be well protected using end caps.

6.0 INSPECTION & CERTIFICATION:-

All fittings / forgings are to be Inspected at the manufacturer's works by the Inspection agencies/authorities as indicated in the P.O. Inspection certificate shall be submitted along with the Work Test Certificate countersigned by any of the above authorities and shall include the following.

01. Test Certificate Number & date
02. BHEL P.O. Number & Amendment Number.
03. BHEL P.O. Serial Number.
04. BHEL TDC Number.
05. Size-wise Quantity.
06. Specification, Grade & year of code.
07. Heat/Melt Number.

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- 08 Steel making/Forming Process.
- 09 Laddle or Product Analysis of Raw Material.
- #10 Heat Treatment chart.
- #11. NDE report. (VISUAL, MPI / LPI)
- #12. Tensile Test Report.
- #13. Hardness Test Report.
- #14 Dimensional conformance.
- # 15. Starting material details.
- 16. Guarantee of HTP shall be given as follows:- "Fittings / Forgings are capable of withstanding without failure, breakage or impairment of their serviceability a hydrostatic test pressure equal to that prescribed for the specified matching pipe of equivalent material".

#Details furnished in the Tests certificate in lieu of chart/report is acceptable.

7.0 Details not covered in this TDG, shall be complied with as per the applicable ASME standards.

8.0 RECORDS OF REVISIONS

Rev 00 – Prepared for Turbine Integral piping

Rev 01 – C.2d, 4k added, 6.09 - Laddle & Product analysis changed as Laddle or Product analysis, 11. NDR report for UT deleted.

Rev 02 – Inclusion of Grade 91 and 92 and general revision to comply to BHEL HEEP Specification ST 34001 Rev 08.

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