

BHEL	TECHNICAL OVERVIEW OF LP BYPASS SYSTEM	Doc. NO.: 4-12300-00001 Rev 00
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1. Introduction

LP bypass system is used to dump reheat steam from boiler to condenser (bypassing the intermediate and low pressure Steam Turbines). It also reduces the parameters of reheat steam suiting to condenser parameters.

2. Components of LP bypass system:

LP bypass system consists of the following components:

- A. **Pressure reducing control valves:** Bypass valve can be of two type either single stem or double stem. For single stem bypass valve, flow shut off function and control function is achieved through single valve while for double stem there are separate stop and control valve for flow shut off and for control function respectively. In double stem bypass valve both stop and control valve are housed in a single casing.
- B. **Electro-hydraulic actuators:** Bypass valve is equipped with Electro hydraulic actuators. Function of actuators is to open and close the valve and provide required seat tightness when valve is in closed condition. Fire resistant fluid is used as working medium.
- C. **Desuperheater:** Desuperheater is an integral part of valve body and is located at downstream of control valve. It is equipped with nozzles from which cooling water is sprayed. Upon passing through nozzles, cooling water gets atomized and mixes with outlet steam to bring its temperature down.
- D. **Water injection valve:** Water injection valve regulates the cooling water flow to desuperheater and supplies the cooling water as per system requirement. Quantity of water to be injected is calculated through *enthalpy based control* philosophy.
- E. **HPSU (Hydraulic power supply unit):** Its main function is to supply the working fluid to various actuators at predefined pressure. HPSU shall be provided with control fluid pumps (2X100%), filters, hydraulic accumulators, check valves, pressure and temperature measuring instruments, level measuring instruments, cooling cum filtration unit and regeneration unit.
- F. **Flow nozzle:** it is used to measure the cooling water flow that is supplied by the water injection valve.
- G. **Dump Tube:** Dump tube accepts the flow from desuperheater and dumps the steam into condenser.

Worked by	Adarsh Kumar Singh
Checked by	Nawnit Nirala/ Shubham Mittal
Approved by	Rajeev Rawat
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BHEL

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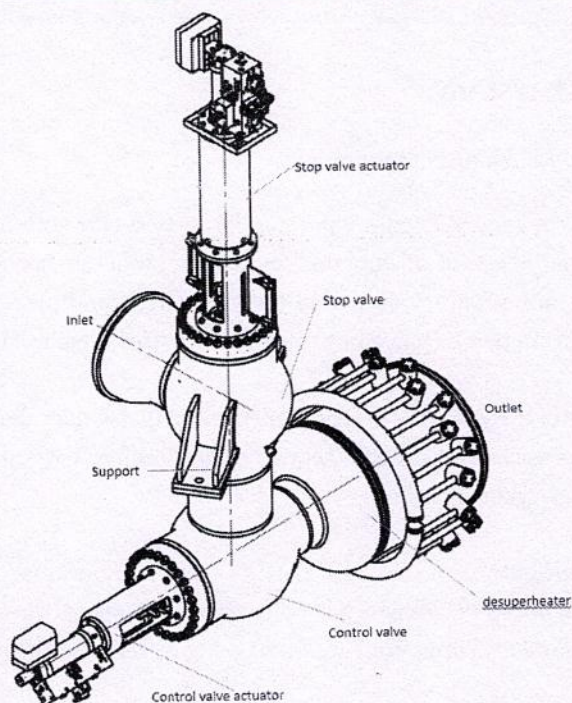


Figure-1: Overview of bypass valve

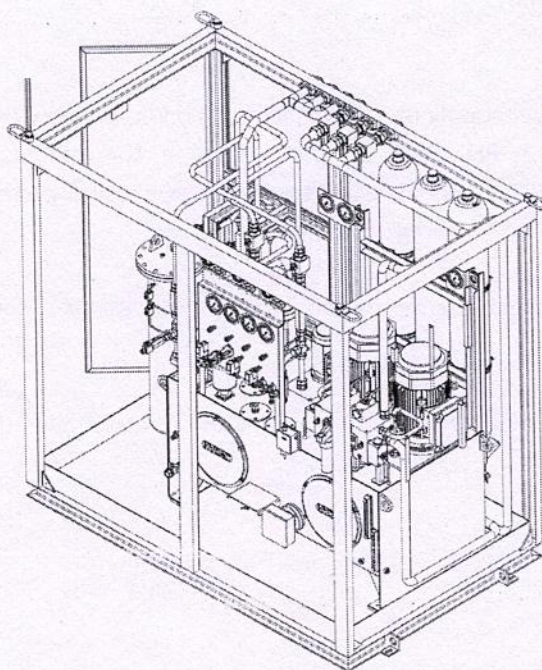


Figure-2: Overview of Hydraulic power supply unit

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3. Major design parameters (Typical):**A. For LP Bypass Valve**

Design pressure: 82 bar

Design temperature: 610 Deg C

Max volumetric flow: 32 m³/s**B. For water injection valve**

Design pressure: 47 bar

Design temperature: 100 Deg C

Max flow: 123 Kg/s

C. For Hydraulic Power Supply Unit:

Tank capacity: 650 lit

Max. Oil pressure: 160 bar

D. Operating fluid: Fire resistant fluid (phospahte ester based)**E. Type of LP bypass valve:** Single stem or Double stem**F. Quick closing time:** less than 1 sec.**G. Other requirements** shall be as per BHEL specifications and drawings**4. Brief scope of contract:**

The scope of the contract for the system shall be on the basis of the single point responsibility completely covering the following activities and services in respect of all the equipment covered under specification.

- Detailed functional design, calculation, analysis & engineering of all equipment, systems, all spares, special tools for assembly and disassembly of various equipment's & steam blowing devices.
- Material procurement
- Complete manufacturing including functional testing

The responsibility of correct design, manufacturing and testing & hence proper functioning of LP bypass system at site rests with the supplier.

5. General Scope of supply for 1 TG set:

Scope of supply shall be as per table below:

SL. No.	Description	Quantity/TG set
1	LP Bypass Valve with EHA & Desuperheater	02 Sets
2	Hydraulic Power Supply Unit (HPSU)	01 Set
3	Water Injection Control Valve with Hydraulic Actuator	02 Nos.
4	Flow Nozzle for WIV	02 Nos.
5	Dump Tube	02 Nos.

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MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL		VENDOR'S NAME		LP BYPASS SYSTEM		QP NO.		QA/BI/QP/114		DATED		10/09/2014			
		DRG. NO.		AS PER PO											
		SPEC.		AS PER PO											
		REV		02											
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	6	7	8	9	10	11	12	13	14	15	16

LPBYPASS STOP& CONTROL VALVE

1.0	RAW MATERIAL														
1.1	VALVE BODY	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		C. NDT	MAJOR	UT RT MPI	100% EXCEPT WELD ENDS ON WELD ENDS 100%	AS PER APPROVED DATASHEET/DRAWING	TC	✓	P	V					
1.2	BONNET	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		C. NDT	MAJOR	UT MPI	100% 100%	AS PER APPROVED DATASHEET	TC	✓	P	V					
1.3	NOZZLES	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		C. NDT	MAJOR	UT/MPI	100%	AS PER APPROVED DATASHEET	TC	✓	P	V					
1.4	TRANSITION PIECES	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					
		C. NDT	MAJOR	UT/MPI	100%	AS PER APPROVED DATASHEET	TC	✓	P	V					
1.5	SUSPENSION	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	✓	P	V					

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25

Sanjeev

27/01/2015

संजीव कुमार भारद्वाज
Sanjeev Kumar Bhardwaj

अभियन्ता/Engineer

गुणता आश्वासन/Quality Assurance

बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL		VENDOR'S NAME		ITEM	LP BYPASS SYSTEM		OP NO.	QA/B/OP/114							
				DRG. NO.	AS PER PO		DATED	10/09/2014							
				SPEC.	AS PER PO										
				REV	02										
				CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS	
SL. NO.	COMPONENT & OPERATIONS	3	4	5	6	7	8	9	D	10	11				
1	2														

		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	V	P	V		
		C. NDT	MAJOR	UT/MT	100%	AS PER APPROVED DATASHEET	TC	V	P	V		
1.6	BOLTS/NUTS	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATASHEET	TC	V	P	V		
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT	AS PER APPROVED DATASHEET	TC	V	P	V		
1.7	ACTUATOR	CHECKS ON ACTUATOR	MAJOR	TC REVIEW	PERPIECE	AS PER APPROVED DATASHEET	COC	V	P	V		
2.0	MANUFACTURING											
2.1	MACHINING PARTS	VISUAL & DIMENSIONAL INSPECTION	MAJOR	VISUAL/ MEASUREMENT	PERPIECE	SHOP TRAVELER	-	V	P			
2.2	WELDING & HEAT TREATMENT	WPS	MAJOR	VISUAL TIME/TEMPERATURE	PERPIECE	EN287/ASMEIX		V	P			
2.3	ASSEMBLY	ASSY. DRWG.	MAJOR	VISUAL	PERPIECE	AS PER APPROVED ASSY. DRAWING		V	P			
3.0	TESTING & INSPECTION											
3.1	NDE WELDING	RT/UT	MAJOR	RT/UT	PERPIECE	ASME SEC. V/VIII/ HW0980830	TC	V	P	W	-	IN CASE OF RT VERIFICATION OF X-RAY FILM
3.2	NDE WELDING	MT/PT	MAJOR	MT/PT	PERPIECE	ASME SEC. V/VIII/ HW0980829	TC	V	P	W	-	IN CASE OF RT VERIFICATION OF X-RAY FILM
3.3	HYDROSTATIC PRESSURE TEST	ASSY. DRWG.	MAJOR	HYDRAULIC TEST	ALL VALVES	AS PER APPROVED DATASHEET/ DRAWING	TC	V	P	W	-	IBR FORM
3.4	SEAT LEAKAGE	ASSY. DRWG.	MAJOR	LEAKAGE TEST	ALL VALVES	AS PER APPROVED DATASHEET/ DRAWING	TC	V	P	W	-	

MANUFACTURER/SUB CONTRACTOR		FOR CUSTOMER USE		APPROVED BY
		LEGEND: I RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY <u>Sanjeev Kumar</u> 27/01/15 संजीव कुमार भारद्वाज Sanjeev Kumar Bhargava अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

29

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN					TO BE FILLED BY BHEL				TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME			ITEM	LP BYPASS SYSTEM		QP NO.	QA/BI/QP/114									
						DATED	10/09/2014										
	DRG. NO.		AS PER PO														
	SPEC.		AS PER PO														
	REV		02		Page 3 of 11												
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		6	7	8		9		D	M	B	N	10	11

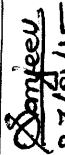
ITEM NO.	DESCRIPTION	WELDING+ MAIN DIMENSION	MAJOR	MEASUREMENT	ALL VALVES	AS PER DRAWING	TC	N	P	V	
3.5	DIMENSION & WALL-THICKNESS CHECK										
3.6	NDE MACHINED	PT	MAJOR	PT	ALL VALVES	ASMESEC V/VIII/HW0980829	TC	N	P	V	
3.7	FUNCTION / PERFORMANCE TEST	FUNCTIONAL TEST AS PER APPROVED TEST PROCEDURE	MAJOR	PERFORMANCE	ALL VALVES	AS PER APPROVED DATASHEET/ DRAWING	TC	N	P	W	ACTUATOR + VALVE
	NOISE LEVEL	CONFIRMATION FOR MEETING NOISE LEVEL	MAJOR	NOISE TEST					P	V	
3.8	CV TEST		MAJOR	CV TEST	PER DESIGN	AS PER APPROVED DATASHEET/ DRAWING	TC	N	P	V	
3.9	PAINTING, PACKING AND PRESERVATION		MAJOR	VISUAL	ALL VALVES	VENDOR'S STANDARD	-	N	P		

			FOR CUSTOMER USE	
		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHCL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		
MANUFACTURER/SUB CONTRACTOR				APPROVED BY <i>Sanyeev</i> 27/06/15 संजीव कुमार भारद्वाज

Sanjeev Kumar Bhardwaj
अभियन्ता/Engineer
गुणज्ञ आश्वासन/Quality Assurance
बी. एच. ई. एल., इण्डियन/ISHEL Haridwar

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				CHARACTERISTICS		CLASS	TYPE OF CHECK		QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS		FORMAT OF RECORDS	AGENCY	REMARKS
SL. NO.	2	3	4	5	6	7	8	9	10	11					
1															

HPSU															
1	INCOMING MATERIAL CONTROL														
1.1	OILTANK	DAMAGE	MAJOR	VISUAL	100%					MANUFACTURERDRAWING					
		DIMENSIONS	MINOR	MEASUREMENT	100%					MANUFACTURERDRAWING					
		VERIFICATION OF SUPPLIER CERTIFICATE, IDENTIFICATION& CORRELATION FORRAWMATERIAL PLATES	MAJOR	CERTIFICATE REVIEW	100%					MANUFACTURERDRAWING					
1.2	BOUGHT OUT ITEMS														
	LEVEL TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%					DRG./DATASHEET					
		MODEL CODE	MAJOR	VISUAL	100%					DRG./DATASHEET					
		CALIBRATION	MAJOR	VISUAL	100%					DRG./DATASHEET					
	PRESSURE TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%					DRG./DATASHEET					
		MODEL CODE	MAJOR	VISUAL	100%					DRG./DATASHEET					
		CALIBRATION	MAJOR	VISUAL	100%					DRG./DATASHEET					
	TEMPERATURE TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%					DRG./DATASHEET					
		MODEL CODE	MAJOR	VISUAL	100%					DRG./DATASHEET					
		CALIBRATION	MAJOR	VISUAL	100%					DRG./DATASHEET					

MANUFACTURER/SUB CONTRACTOR		FOR CUSTOMER USE		APPROVED BY	
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22

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL		VENDOR'S NAME		ITEM	LP BYPASS SYSTEM	QP NO.	QA/B/JP/114								
				DRG. NO.	AS PER PO	DATED	10/09/2014								
				SPEC.	AS PER PO										
				REV	02										
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	6	7	8	9	M	B	N	10	11		

	CFPUMPS	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET		COC	N	P			
	GEARPUMPS	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET		COC	N	P			
	COUPLING	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET		COC	N	P			
	FILTERS	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET		COC	N	P			
2	FUNCTION TEST /FINAL INSPECTION												
2.1	HPSU	DIMENSIONS	MAJOR	MEASUREMENT	100%	AS PER DRAWING		TC	N	P	W		
2.2	HPSU	CORRECT FITMENT	MAJOR	VISUAL	100%	AS PER DRAWING/CIRCUIT DIAGRAM		TC	N	P	W		
2.3	HPSU	FUNCTION TEST	MAJOR	MEASUREMENT	100%	FP_0019		TC	N	P	W		
2.4	HPSU	PAINTING	MAJOR	VISUAL	100%	DRG./VENDORPROCEDURE		-	N	P			

MANUFACTURER/SUB CONTRACTOR	LEGEND:		FOR CUSTOMER USE	APPROVED BY
	I RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER			
27/01/15 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियन्ता/Engineer			गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar	

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL				
VENDOR'S NAME		ITEM	LP BYPASS SYSTEM	Q.P. NO.	Q.A./B/QP/114	DATED		10/09/2014								
BHEL		DRG. NO.	AS PER PO													
		SPEC.	AS PER PO													
		REV	02													
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	6	7	8		9		10		11

WATER INJECTION VALVES

1.0	RAW MATERIAL															
1.1	BODY & BONNET	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT				AS PER APPROVED DATASHEET							
		B. MECHANICAL PROPERTIES	-	MECH. TEST	PERHEAT				AS PER APPROVED DATASHEET							
		C. APPEARANCE	-	VISUAL INSPECTION	PERLOT				MSS SP-55							
1.2	STUDS & NUTS	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT				EN 10204 TYPE 3.1 ASTM A193 B7							
		B. MECHANICAL PROPERTIES	-	MECH. TEST	PERHEAT				ASTM A194 2H							
2.0	ASSEMBLY								EN 10204 TYPE 3.1 ASTM A193 B7							
									ASTM A194 2H							
2.1	STEM	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT				DRAWING							
2.2	PLUG	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT				DRAWING							
2.3	SEATING	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT				DRAWING							
2.4	BODY ASSLY	A. HYDRO	MAJOR	HYDRO	ALL VALVES				AS PER APPROVED DATASHEET / DRG.							
		B. SEAT LEAKAGE	MAJOR	LEAKAGE	ALL VALVES				AS PER APPROVED DATASHEET / DRG.							
		C. FUNCTION	MAJOR	• FUNCTION • DIMENSION • PAINT	ALL VALVES				AS PER APPROVED DATASHEET / DRG.							
																ASSEMBLED WITH ACTUATOR

MANUFACTURER/SUB CONTRACTOR		FOR CUSTOMER USE	
LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY <i>Sanjeev</i> 27/01/15 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियंता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar	

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN					TO BE FILLED BY BHEL				TO BE FILLED BY BHEL				
BHEL		VENDOR'S NAME		ITEM	LP BYPASS SYSTEM		QP NO.	QA/BI/QP/114									
							DATED	10/09/2014									
				DRG. NO.	AS PER PO												
				SPEC.	AS PER PO												
		REV		02		Page 8 of 11											
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		6	7	8		9		M	B	N		
2.5																	
	TOPASSLY	A.DEMENSION / VISUAL		MAJOR	DIMENSIONAL / VISUAL		ALL VALVES	TOPASSLY DRWG.		-		N	P				ASSEMBLED WITH ACTUATOR
		B.PAINT		-	VISUAL		ALL VALVES	VENDOR'S STANDARD		-		N	P				
		C.PACKING		-	VISUAL		ALL VALVES	BHEL P.O. VENDOR'S STANDARD		-		N	P				

		FOR CUSTOMER USE	APPROVED BY
MANUFACTURER/SUB CONTRACTOR			

LEGEND:

! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER

INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION

ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER

27/01/15

संजीव कुमार भारद्वाज

Sanjeev Kumar Bhardwaj

गुणता आश्वासन/Quality Assurance
बी. एच. ई. एल., हरिद्वार/BIHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL		VENDOR'S NAME		ITEM		LP BYPASS SYSTEM		QP NO.		QA/B/OP/114					
				DRG. NO.		AS PER PO		DATED		10/09/2014					
				SPEC.		AS PER PO									
				REV		02									
SL. NO.		COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS	
1		2		3		4		5		6		7		8	
												9		10	
												D		11	
Page 9 of 11															

FLOW NOZZLE FOR WIV

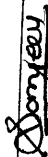
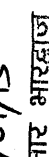
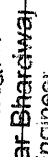
1.0	RAW MATERIAL															
	BRANCH PIPE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS		PER LOT		AS PER APPROVED DATASHEET/ DRG.	TC							
		B. MECHANICAL PROPERTIES		-MECH. TEST				AS PER APPROVED DATASHEET/ DRG.	TC							
		C. NDT		UT				AS PER APPROVED DATASHEET/ DRG.	TC							
	FLOW NOZZLE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS		-DO-		AS PER APPROVED DATASHEET/ DRG.	TC							
		B. MECHANICAL PROPERTIES		-MECH. TEST				AS PER APPROVED DATASHEET/ DRG.	TC							
2.0	MANUFACTURING								TC							
2.1	MACHINING PARTS	VISUAL & DIMENSIONAL INSPECTION	MAJOR	VISUAL/ DIMENSIONAL		PER PIECE		SHOP TRAVELER								
2.2	WELDING & HEAT TREATMENT	SEED DRAWING	MAJOR			PER PIECE		EN288 / ASME IX								
2.3	ASSEMBLY	SEED DRAWING	MAJOR	VISUAL		PER DESIGN		AS PER APPROVED DATASHEET/ DRG.								
3.0	TESTING & INSPECTION															
3.1	NDE WELDING	RT OR UT	MAJOR	RT/UT		PER PIECE		ASMESECV/VIII/HW/0980830	TC							
	NDE MACHINED WELD END	PT	MAJOR	PT		PER PIECE		ASMESECV/VIII/HW/0980830	TC							
3.2	HYDROSTATIC PRESSURE TEST	PRESSURE TEST	MAJOR	HYDRO		PER PIECE		AS PER APPROVED DATASHEET/ DRG./Follow HW/0980829	TC							

MANUFACTURER/SUB CONTRACTOR		LEGEND:		FOR CUSTOMER USE		APPROVED BY	
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		M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER					
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						Sanjeev 27/01/15 संजीव कुमार भारद्वाज Sanjeev Kumar Bhargava अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar	

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL		VENDOR'S NAME		ITEM	LP BYPASS SYSTEM		QP NO.	QA/B/JP/114							
				DRG. NO.			DATED	10/09/2014							
				SPEC.	AS PER PO										
				REV	02										
SL. NO.		COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		REMARKS		
1		2		3		4	5	6	7	8	9	10	11		
Page 11 of 11															

DUMP TUBE

1.0	RAW MATERIAL												
1.1	DUMP TUBE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT		AS PER APPROVED DATASHEET	TC					
		B. MECHANICAL PROPERTIES	MAJOR	-MECH. TEST	PERHEAT		AS PER APPROVED DATASHEET	TC					
		C. NDT	MAJOR	UT	100		AS PER APPROVED DATASHEET	TC					
2.0	IN PROCESS												
2.1	WELDING & HEAT TREATMENT	WPS	MAJOR	VISUAL TIME/TEMPERATURE	PERPIECE		ASMEIX / EN288						
2.2	NDE WELDING	RT MPI/DPT	MAJOR	RT MPI/DPT	PERPIECE		ASMESEC. V/VIII/ HW/0980830	TC					

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		 27/09/15		 27/09/15	

Sanjeev Kumar Bharadwaj
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