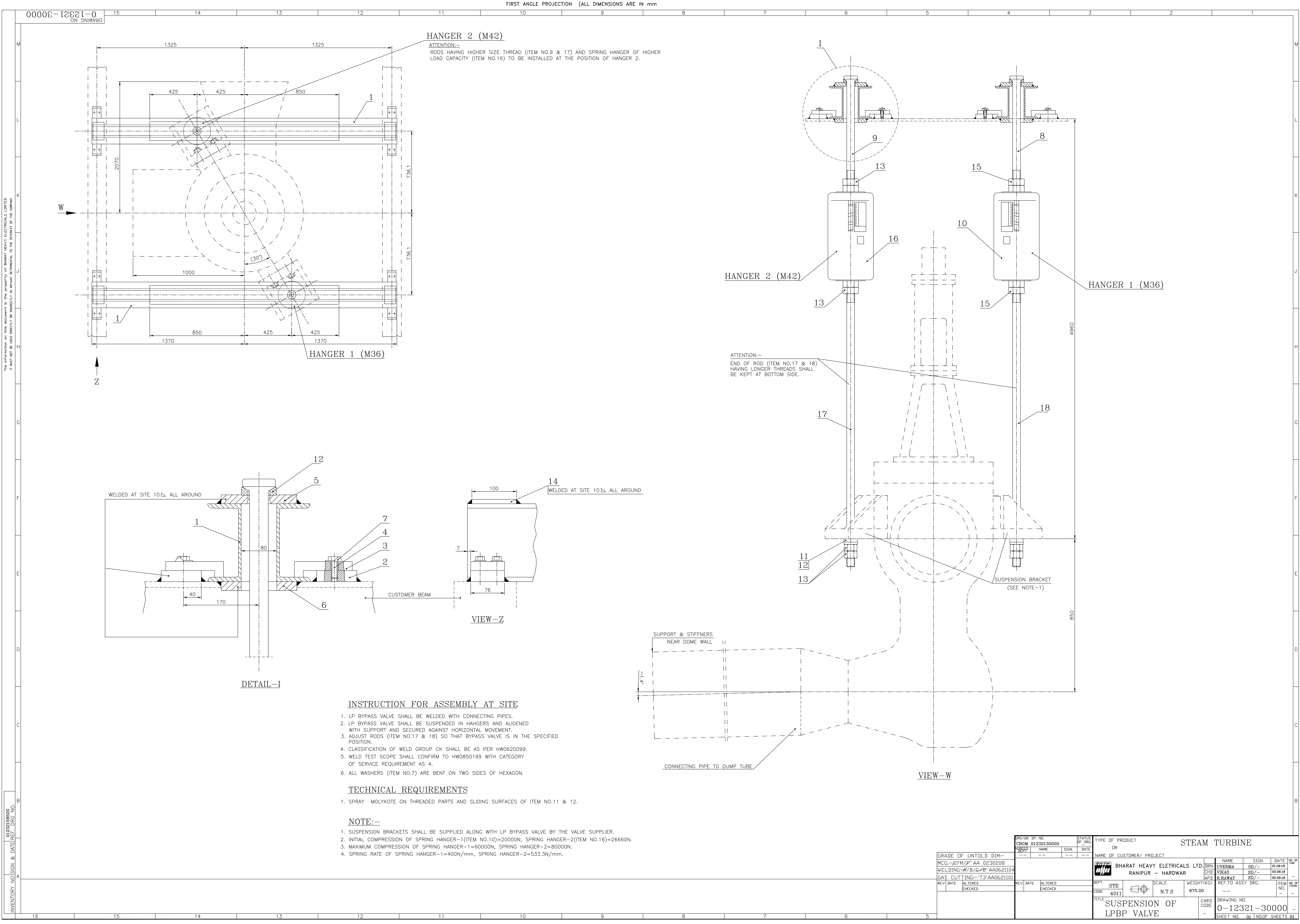




HANGER 2 (M42)

ATTENTION:-
RODS HAVING HIGHER SIZE THREAD (ITEM NO.9 & 17) AND SPRING HANGER OF HIGHER LOAD CAPACITY (ITEM NO.16) TO BE INSTALLED AT THE POSITION OF HANGER 2.

HANGER 2 (M42)

HANGER 1 (M36)

ATTENTION:-
END OF ROD (ITEM NO.17 & 18)
HAVING LONGER THREADS SHALL
BE KEPT AT BOTTOM SIDE.

SUSPENSION BRACKET
(SEE NOTE-1)

SUPPORT & STIFFNERS
NEAR DOME WALL

CONNECTING PIPE TO DUMP TUBE

INSTRUCTION FOR ASSEMBLY AT SITE

1. LP BYPASS VALVE SHALL BE WELDED WITH CONNECTING PIPES.
2. LP BYPASS VALVE SHALL BE SUSPENDED IN HANGERS AND ALIGNED WITH SUPPORT AND SECURED AGAINST HORIZONTAL MOVEMENT.
3. ADJUST RODS (ITEM NO.17 & 18) SO THAT BYPASS VALVE IS IN THE SPECIFIED POSITION.
4. CLASSIFICATION OF WELD GROUP CK SHALL BE AS PER HW0620099.
5. WELD TEST SCOPE SHALL CONFIRM TO HW0850199 WITH CATEGORY OF SERVICE REQUIREMENT AS 4.
6. ALL WASHERS (ITEM NO.7) ARE BENT ON TWO SIDES OF HEXAGON.

TECHNICAL REQUIREMENTS

1. SPRAY MOLYKOTE ON THREADED PARTS AND SLIDING SURFACES OF ITEM NO.11 & 12.

NOTE:-

1. SUSPENSION BRACKETS SHALL BE SUPPLIED ALONG WITH LP BYPASS VALVE BY THE VALVE SUPPLIER.
2. INITIAL COMPRESSION OF SPRING HANGER-1(ITEM NO.10)=20000N, SPRING HANGER-2(ITEM NO.16)=26660N.
3. MAXIMUM COMPRESSION OF SPRING HANGER-1=60000N, SPRING HANGER-2=80000N.
4. SPRING RATE OF SPRING HANGER-1=400N/mm, SPRING HANGER-2=533.3N/mm.

GRADE OF UNTOLD DIM:-	
MCG:-27M/P/AA	0230208
WELDING:-W/B/L/B/AA0621104	
GAS CUTTING:-T3/AA0621101	
REV DATE	ALTERED
4011	CHECKED

DWS/GR. SP. NO.		STATUS OF DRG		TYPE OF PRODUCT		STEAM TURBINE	
CBOM 01232130000		OR		NAME OF CUSTOMER/ PROJECT		RANIPUR - HARDWAR	
NAME		SIGN		DATE		NO. OF	
---		---		---		---	
Bharat Heavy Eletricals Ltd.		DRN		UVERMA		SD/-	
01.09.18		CHD		VIKAS		SD/-	
03.09.18		RPN		R. RAWAT		SD/-	
05.09.18		REV. TO ASSY. DRG.		ITEM NO.		NO. OF	
---		---		---		---	
DEPT.		STE		SCALE		WEIGHT(KG)	
4011		N.T.S		675.00		---	
TITLE		CARD CODE		DRAWING NO.		ITEM NO.	
SUSPENSION OF LPBP VALVE		---		0-12321-30000		---	
---		---		SHEET NO.		NO. OF SHEETS	
---		---		01		01	

TABLE-5 (SPARES OF WATER INJECTION VALVE):

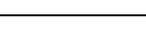
SL.NO.	QUANTITY	DESCRIPTION
1.	1 SET	SET OF ALL INTERNALS REQUIRED FOR ONE COMPLETE VALVE EXCEPT VALVE BODY & BONNET
2.	1 SET	STRAINER
3.	1 SET	VALVE PLUG & STEM ASSEMBLY
4.	1 NO.	VALVE SEAT
5.	1 SET	PACKING SET
6.	1 SET	GASKET SET
7.	1 SET	GLAND BUSH
8.	1 SET	HARDWARE ITEMS (ALL STUDS, BOLTS, NUTS & WASHERS)

TABLE-6 (SPARES OF WATER INJECTION VALVE ACTUATOR):

SL.NO.	QUANTITY	DESCRIPTION
1.	1 NO.	COMPLETE ACTUATOR
2.	1 SET	CONTROL UNIT
3.	1 SET	SEAL SET OF ACTUATOR
4.	1 NO.	SERVO VALVE
5.	1 NO.	SEAL SET OF SERVO VALVE
6.	1 NO.	FILTER FOR SERVO VALVE
7.	1 NO.	INTERLOCKING VALVE
8.	1 SET	OIL HOSES FOR PRESSURE & RETURN LINES
9.	1 NO.	FILTER FOR PRESSURE LINE
10.	1 NO.	PISTON OF ACTUATOR
11.	1 NO.	PISTON ROD OF ACTUATOR

NOTES:

1. SUPPLIER TO FURNISH PRICE AGAINST EACH OF THE OFFERED ITEM FOR REFERENCE & FUTURE ORDERING.
2. SUPPLIER TO FURNISH THE RELEVANT BILL OF MATERIAL & DRAWING OF MAIN EQUIPMENT ALONG WITH THE OFFER.
3. SUPPLIER TO FURNISH CO-ORELATION WITH MAIN EQUIPMENT (i.e. ITEM NO. & ASSEMBLY DRAWING NO.) FOR EACH OF THE OFFERED ITEMS.

CBOM NO.				STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				STEAM TURBINE									
AGREED DEPT.		NAME		SIGN		DATE													
GRADE OF UNTOL. DIM.:—						 BHARAT HEAVY ELECTRICALS LTD. HARDWAR				NAME		SIGN		DATE		NO OF VAR.			
M/GG —Y/C/M/F AA-0230208										DRN		U VERMA		—SD—		11.12.15		—	
WELDING —A/B/C/D—AA621104										CHD		VIKAS		—SD—		11.12.15		—	
GAS CUTTING —T3—AA621101										APD		P.BANSAL		—SD—		11.12.15		73, 74, 75	
REV.		DATE		ALTERED CHECKED		DEPT. STE				SCALE		WEIGHT(Kg.)		REF. TO ASSY. DRG.		ITEM NO.			
						CODE 4011		N.T.S		—		—		—		75, 77			
						TITLE		1		3		DRAWING NO.		—					
						RECOMMENDED SPARES FOR						1-12300-56008		—					
						LPBP SYSTEM (MECHANICAL)						7		22 23, 24					
5		4		3								SHEET NO.01		NO OF SHEETS 01					

80189-00521-2

21230058103

Ref: Drawing No

Sign & Date

Inventory No

7

6

5

4

3

2

1

8

7

6

5

4

3

2

1

2

4

5

3

1

6

SPACE REQUIRED FOR DISMANTLING

1900 Max.

SEAT DIA. = Øk

DN200

stroke=L

≈ 800

NOTE : - ALL DIMENSIONS AS MARKED (ØK, L, c, d) SHALL BE FURNISHED BY THE SUPPLIER

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM DG 44(B)

INPUT DATA FOR VALVE & ACTUATOR:

MAX. DESIGN WATER MASS FLOW : 115 KG/SEC

MIN. CONTROLLED WATER MASS FLOW : 11.5 KG/SEC

WIV DESIGN PRESSURE/TEMPERATURE : 47 BAR / 100°C

MAX. WATER PRESSURE ACROSS THE VALVE : 41 BAR

WATER PRESSURE AT VALVE INLET : 29 BAR

WATER INLET TEMPERATURE : 30 TO 60°C

NOISE REQUIREMENTS : < 85 dB(A)

INLET & OUTLET CONNECTIONS : SHALL BE FLANGED END (AS SHOWN)

VALVE SIZE : DN 200

ACTUATOR TYPE:

OPERATING MEDIUM : FIRE RESISTANT FLUID (FRF)

CONTROL FLUID NORMAL OPERATING PRESSURE : 160 BAR (*)

CONTROL FLUID MINIMUM OPERATING PRESSURE : 115 BAR (*)

NORMAL CONTROL FLUID TEMPERATURE : 50+5°C

MAXIMUM CONTROL FLUID TEMPERATURE : 75°C

CONTROL SIGNAL : ±30ma

OPENING TIME : ≤3 SEC. (MAX.)

ACTUATOR SPINDLE MOUNTING : VERTICAL

WATER FLOW TO BE REGULATED : AS PER TABLE-1

VALVE CHARACTERISTICS : EQUAL PERCENTAGE

FAILURE MODE : STAY PUT

SUPPLY LINE : 48.3X5.08

RETURN LINE : 48.3X3.68

(*) - HYDRAULIC OPERATING PRESSURE SHALL BE MADE AVAILABLE FROM THE CENTRALISED HYDRAULIC POWER SUPPLY UNIT (HPSU). MEANT FOR TURBINE BYPASS SYSTEM.

TECHNICAL REQUIREMENTS:-

1. VALVE TO BE SUPPLIED ALONG WITH INLET / OUTLET COUNTER FLANGES (WELD NECK, RAISED TYPE), ASSOCIATED FASTENERS AND SEALINGS.

2. SCOPE OF SUPPLY SHALL BE AS PER TABLE-2.

3. BODY MATERIAL : CAST STEEL GS-C25 (1.0619)/ A216 WCB.

4. VALVE SUPPLIER MUST SHOW THE WATER FLOW DIRECTION WITH AN ARROW EMBOSSED OVER THE VALVE BODY.

5. THE ACTUATOR SHALL BE CAPABLE OF MANUAL OPERATION & FURNISH RELEVANT TECHNICAL DETAILS ALONGWITH OFFER.

6. CONTROL BLOCK/MANIFOLD SHOULD BE MOUNTED ON THE POWER CYLINDER AND IT SHOULD CONSIST OF SERVO-VALVE, FILTER, SOLENOID VALVES, CARTRIDGES/CHECK VALVES ETC.

7. ELECTRONIC POSITION FEEDBACK TRANSMITTER SHALL BE NON-CONTACT TYPE REQUIRED FOR MEASURING THE POSITION OF THE CONTROL VALVE. OUTPUT OF THE POSITION TRANSMITTER SHALL BE 4mA (VALVE FULLY CLOSED) TO 20mA (VALVE FULLY OPENED).

8. STRENGTH & LEAK TIGHTNESS TEST : AS PER CLASS V ANSI B 16.104

9. VALVE BODY SHALL BE HYDRAULICALLY TESTED AT MIN. 1.5 TIMES DESIGN PRESSURE AS PER DIN 3230 PT III BA/BQ/ANSI B16.34.

10. WATER INJECTION VALVE (W.I.V.) IS TO BE DESIGNED FOR OPERATION WITH HYDRAULIC ACTUATOR. IN FAILURE MODE THE VALVE SHALL BE IN STAYPUT CONDITION.

11. VALVE CONFIGURATION SHALL BE "FLOW TO CLOSE".

12. SELECTED CV OF WATER INJECTION VALVE SHALL HAVE SUFFICIENT MARGIN (ATLEAST 10%) OVER THE MAXIMUM CV VALUE CALCULATED BASED ON MAXIMUM DESIGN WATER MASS FLOW AS SPECIFIED IN THE DRAWING.

13. THE VALVE SIZING SHALL BE SUITABLE FOR OBTAINING SPRAY WATER FLOW AS 87.5 KG/S WITHIN 80% OF TOTAL VALVE TRAVEL.

DOCUMENTS REQUIRED ALONG WITH THE OFFER ARE:-

1. DOCUMENTS REQUIRED ALONG WITH THE OFFER SHALL BE AS PER CL. 12.2.3 OF ST47050.

NOTES:-

1. VALVE INLET & OUTLET COUNTER FLANGE END CONNECTIONS: Ø219.1X6.35, MATERIAL AS PER ASTM A105.

2. PRESSURE DROP IN PIPE LINE FROM OUTLET OF WIV TO INLET OF DESUPERHEATER SHALL BE 0.5 BAR.

Table-1 (TO BE FURNISHED BY SUPPLIER)

FLOW PARAMETERS	CHARACTERITICS-EQUAL PERCENTAGE			
	40%	60%	80%	100%
WATER PRESSURE AT THE OUTLET OF W.I.V. (bar)				
TOTAL QTY. OF WATER MASS FLOW TO BE REGULATED THRU' W.I.V. (Kg/Sec)				

Table-2

IT.NOS.	ITEM DESCRIPTION
1.	CONTROL VALVE WITH HYDRAULIC ACTUATOR
2.	POSITION TRANSMITTER
3.	SCALE FOR LOCALISED DISPLAY
4.	CONTROL MANIFOLD
5.	COUPLING
6.	COUNTER FLANGES WITH FASTENERS
7.	COMMISSIONING SPARES

Table-3

GRADE OF UNTOL.DIM	AGREED DEPT	NAME	SIGN	DATE
M/CG.-C/M/F AA0230208	CIE	S.CHANDRA	SD/-	04.08.18
WELDING-A/B/C/D AA0621104				
GAS CUTTING-T3'AA0621101				

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

STEAM TURBINE

DEPT STE

CODE 4011

TITLE : WATER INJECTION CONTROL VALVE

SCALE NTS

WEIGHT (KG) -

CARD CODE

REF. TO ASSY. DRG. -

ITEM No. -

DRAWING NO. 2-12300-58108

NO. OF VAR -

NO. OF ITEMS 75 77

22 23 24

SHEET No. 01

No. OF SHEETS 01

SIZE A2

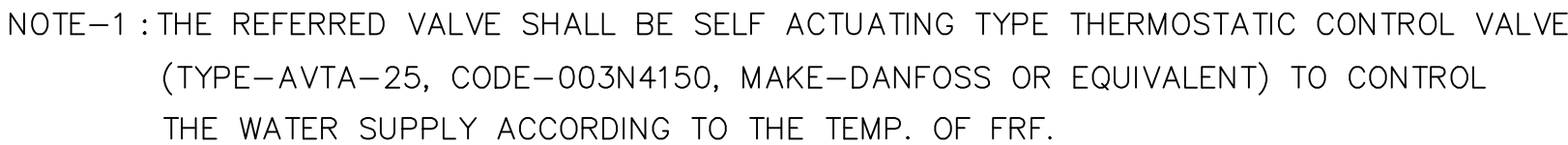
1

CS

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Inventory No.	
---------------	--

9. NOTE:-
9.1. DEVIATIONS, IF ANY , FROM THE REQUIREMENTS SPECIFIED IN BHEL DRGS / SPECIFICATIONS SHOULD BE CLEARLY IDENTIFIED IN THE OFFER & SHOULD BE SUBMITTED FOR BHEL REVIEW & APPROVAL.



MATERIAL CODE : W90312300506

CARD CODE	DRAWING NO.		
	2-12300-58300		
	7	22	23 24
	SHEET No. 02		No. OF SHEETS 02

SIZE A2

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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM DG 38(B)

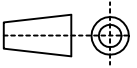
90099-00821-8

DRAWING No.

SL.NO.	QUANTITY	DESCRIPTION
A-HYDRAULIC POWER SUPPLY UNIT:		
1	2 NO. (EACH TYPE)	FILTER INSERT FOR EACH TYPE OF FILTER IN HPSU.
2	1 SET (EACH TYPE)	O-RINGS, GASKETS, SEALING & PACKING (EACH TYPE) IN HPSU.
3	1 NO.	BLADDER FOR ACCUMULATOR IN HPSU
B-ELECTRO HYDRAULIC ACTUATORS:		
1	2 NO. (EACH TYPE)	FILTER INSERT FOR EACH TYPE OF FILTER IN ELECTRO-HYDRAULIC ACTUATORS.
2	1 SET (EACH TYPE)	O-RINGS, GASKETS, SEALING & PACKING (EACH TYPE) IN ELECTRO-HYDRAULIC ACTUATORS.
3	1 SET (EACH TYPE)	RECEPTACLE CONNECTORS
C-LP BYPASS STOP VALVE & LP BYPASS CONTROL VALVE:		
1	2 SET (EACH TYPE)	O-RINGS, GASKETS, SEALING & PACKING (EACH TYPE) IN VALVES.
D-WATER INJECTION CONTROL VALVE:		
1	1 SET (EACH TYPE)	O-RINGS, GASKETS, SEALING & PACKING (EACH TYPE) IN VALVES.
E-C&I ITEMS.		
1	1 NO. (EACH TYPE)	POSITION TRANSMITTERS
F-OTHER ITEMS OFFERED BY THE VENDOR AS PER THEIR STANDARD PRACTICE.		

NOTES:

- SUPPLIER TO FURNISH THE RELEVANT BILL OF MATERIAL & EQUIPMENTS DRAWING ALONG WITH THE OFFER CORRELATING EACH OF ABOVE REFERRED ITEMS.
- THE VENDOR TO OFFER THE COMMISSIONING SPARES TAKING CARE OF UNINTERRUPTED OPERATION OF LP BYPASS SYSTEM FOR ONE YEAR.

Inventory No.	REV 03	DATE 26.03.19	ALTERED LOKESH CHECKED DINESH	REV 02	DATE 03.06.15	ALTERED UVERMA sd/- CHECKED ADARSH sd/-	REV 01	DATE 13.12.14	ALTERED KJSS CHECKED VIKAS	DEPT STE CODE 4011		SCALE N.T.S	WEIGHT (KG) -	REF. TO ASSY. DRG. -	ITEM No.	NO. OF ITEMS 75 77	CARD CODE 7	DRAWING NO. 3-12300-56005			-																																														
																		SHEET No. 1			No. OF SHEETS 1																																														
GRADE OF UNTOL. DIM																		-GMS No./- C B O M		STATUS OF DRG		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT STEAM TURBINE																																													
M/CG.- AA0230208 m																		AGREED DEPT	NAME	SIGN	DATE																																														
WELDING-CLASS 'B' OF AA0621104																		CIE	S.SINGH	-sd-	17.06.13																																														
GAS CUTTING-TABLE 3 OF AA0621101																																																																			
CHANGED AS PER C/A. NO. STE-19-F099.																		CHANGED AS PER C/A. NO. STE-15-F0198.																		THIS DRG. SUPERSEDES THE OLD DRG. UNDER THE SAME NO. WITH CHANGES AS PER CHANGE ADVICE NO. STE-14-F0384.																		TITLE : COMMISSIONING SPARE PARTS FOR LP BYPASS SYSTEM								CARD CODE					-

SIZE A3

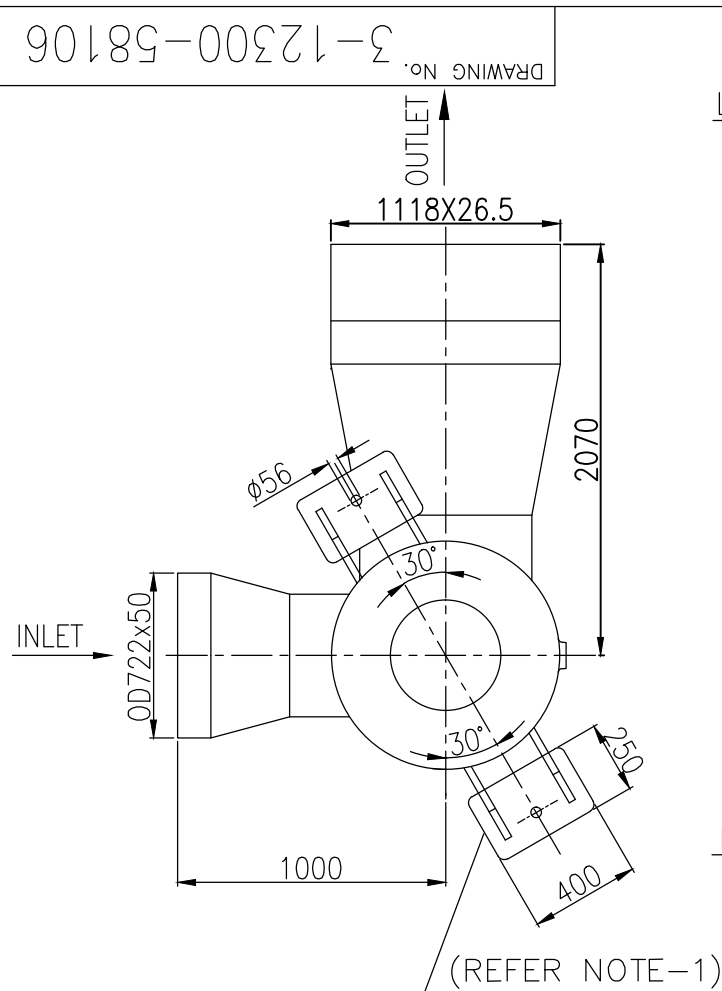
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3-12300-58105

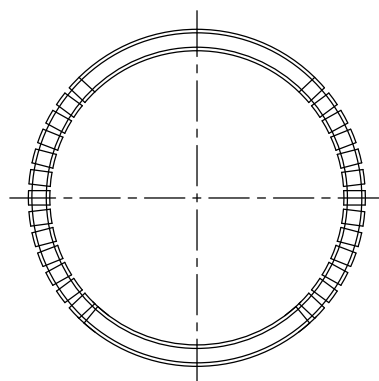
Ref.Drawing No&gt

Sign & Date

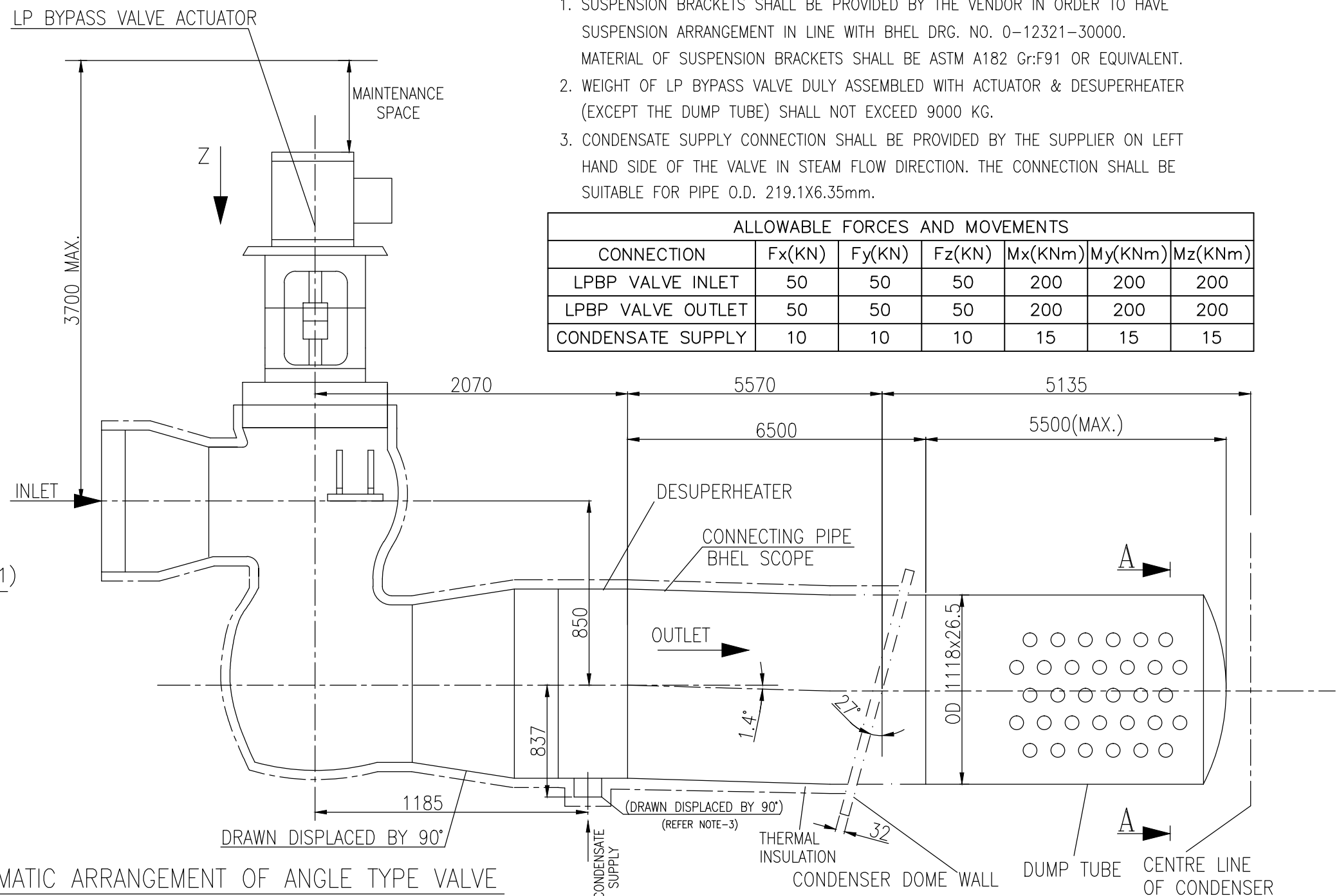
Inventory No.



VIEW-Z
(WITHOUT ACTUATOR)



SECTION-AA

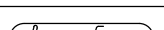


SCHEMATIC ARRANGEMENT OF ANGLE TYPE VALVE

GMS No. / _____ C B O M			STATUS OF _U DRG
AGREED DEPT	NAME	SIGN	DATE
PED	HIMANSHU	-SD-	31.07.18
HXE	DEEPAK	-SD-	31.07.18

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

STEAM TURBINE

 BHARAT HEAVY ELECTRICALS LTD. RANIPUR, HARDWAR			NAME	SIGN	DATE	NO. OF VAR — 73 74
		DRN	UVERMA	—SD—	30.07.18	
		CHD	VIKAS/DK	—SD—	31.07.18	
		APPD	R.RAWAT	—SD—	31.07.18	
DEPT STE		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS — 75 77
CODE 4011		NTS	— — — — —	—	—	

TITLE : ARRANGEMENT OF LPBP VALVE
ALONG WITH ASSOCIATED EQUIPMENT

CARD
CODE

DRAWING NO.	
3-12300-58106	—

SHEET No.	01	No. OF SHEETS	01
-----------	----	---------------	----

SIZE A3

DRAWING NO.

NOTE:-

1. ALL COMPONENTS OF LPBP CONTROL VALVE SHALL BE DESIGNED FOR OPERATION AT DESIGN PRESSURE 75 bar (a), TEMPERATURE 601°C & CORRESPONDING STEAM FLOW 364.61 KG/Sec.
2. THE LPBP VALVE SHALL ALSO BE SUITABLE FOR OPERATION AT MAX. SHORT TERM PRESSURE 78 bar(a) & MAX. SHORT TERM TEMPERATURE 617°C. MAX. SHORT TERM PRESSURE & TEMPERATURE ARE ONLY ALLOWED FOR BRIEF SWINGS OF 15 MINUTES OR LESS, PROVIDED THAT THE TOTAL OPERATING TIME DOES NOT EXCEED 80 HOURS DURING ANY 12 MONTHS OPERATING PERIOD.
3. THE SELECTED CV OF LP BYPASS VALVE SHALL HAVE SUFFICIENT MARGIN (AT LEAST 8%) OVER THE MAXIMUM CV VALUE CALCULATED AS PER THE OPERATING CONDITIONS MENTIONED IN THE DRAWING.

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SIZE A3

C1185-00621-C

NON GRINDING

LIST OF MANDATORY SPARES AS PER CLAUSE NO.11.2 OF ST47050:-

TABLE-1

MECHANICAL ITEMS

SL. NO.	CUSTOMER CLAUSE	ITEM DESCRIPTION	QTY.	UNIT
A 1	12.2.1	LP BYPASS VALVE		
A 1.1	12.2.1.1	VALVE PLUG AND STEM ASSEMBLY	2	SET
A 1.2	12.2.1.2	INLET CAGE	2	NO
A 1.3	12.2.1.4	VALVE SEAT RING	2	NO
A 1.5	12.2.1.6	PACKING SET	4	SET
A 1.6	12.2.1.7	GASKET SET	2	SET
A 1.7	12.2.1.8	GLAND BUSH	2	NO
A 1.8	12.2.1.9	HARDWARE ITEMS (SCREW, WASHER, COMPLETE OIL-HOSE FOR PRESSURE & RETURN LINE ETC)	4	SET
A 1.9	12.2.1.10	ACTUATOR SEAL SET	2	SET
A 1.10	12.2.1.11 12.2.1.18	SERVO VALVE FOR LP BYPASS CONTROL VALVE ACTUATOR	6	NO
A 1.11	12.2.1.18	BLOCKING ELEMENT FOR LP BYPASS CONTROL VALVE ACTUATOR	2	NO
A 2	12.2.2	WATER INJECTION VALVE		
A 2.1	12.2.2.1	VALVE PLUG AND STEM ASSEMBLY	2	SET
A 2.2	12.2.2.2	VALVE SEAT RING	2	NO
A 2.3	12.2.2.3	PACKING SET	4	SET
A 2.4	12.2.2.4	GASKET SET	2	SET
A 2.5	12.2.2.5	GLAND BUSH	2	NO
A 2.6	12.2.2.6	HARDWARE ITEMS (SCREW, WASHER, COMPLETE OIL-HOSE FOR PRESSURE & RETURN LINE ETC)	4	SET
A 2.7	12.2.2.7	ACTUATOR SEAL SET	2	SET
A 2.8	12.2.2.8	SERVO VALVE FOR WATER INJECTION VALVE ACTUATOR	4	NO
A 3	12.3	HPSU		
A 3.1	12.3.1	OIL PUMP FOR MAIN LINE (WITHOUT MOTOR)	2	NO
A 3.2	12.3.2	PUMP IN COOLING CUM FILTRATION CIRCUIT (WITHOUT MOTOR)	2	NO
A 3.3	12.3.3	FILTER ELEMENTS ALONG WITH GASKET & O-RINGS FOR MAIN LINE (160 BAR) FILTER	6	SET

TECHNICAL REQUIREMENTS:-

1. ALL THE SPARES MENTIONED ABOVE ARE FOR REPLACEMENT WITH THEIR PARTS IN THE MAIN EQUIPMENTS. INTERCHANGEABILITY OF THESE SPARES WITH THE ORIGINAL SUPPLY HAS TO BE ENSURED BY THE SUPPLIER.
2. ALL THE SPARES MUST BE PACKED IN SEALED TRANSPARENT PLASTIC BAGS AND CLEARLY MARKED OR LABELED ON THE OUTSIDE OF THE PACKING WITH ITS DESCRIPTION & ASSEMBLY PART NUMBERS.
3. QUALITY CHECKS & TESTING NORMS/REQUIREMENTS FOR SPARES SHALL BE AS PER APPROVED QUALITY PLAN (QP) APPLICABLE FOR THE MAIN EQUIPMENT.
4. ALL THE RELEVANT ASSEMBLY DRGS. SHALL BE FURNISHED BY THE VENDOR MARKING ALL THE OFFERED ITEMS.
5. OFFERED ITEMS SHALL BE CORRELATED WITH THE ITEMS MENTIONED IN THIS DRAWING & WITH RESPECTIVE BOM OF MAIN EQUIPMENT DRAWING.
6. ITEM WISE/UNIT WISE PRICE OF ALL MANDATORY SPARES ARE TO BE INCLUDED IN OFFER.

Inventory No.

Sign & Date

Ref.Drawing No

SL. NO.	CUSTOMER CLAUSE	ITEM DESCRIPTION	QTY.	UNIT
A 3.4	12.3.4	FILTER ELEMENTS ALONG WITH GASKET & O-RING FOR COOLING CUM FILTRATION CIRCUIT	4	SET
	12.3.4	FILTER ELEMENTS ALONG WITH GASKET & O-RINGS FOR REGENERATION UNIT	4	SET
A 3.5	12.3.5	RELIEF VALVE	2	NO
A 3.6	12.3.6	BLADDER	2	NO
A 3.7	12.3.7	SEAL KIT AND 'O' RING	6	SET
A 3.8	12.3.8	HOSES FOR HPSU	2	SET

TABLE-2

C&I ITEMS

SL. NO.	CUSTOMER CLAUSE	ITEM DESCRIPTION (C & I ITEMS)	QTY.	UNIT
1	A.1	PRESSURE TRANSMITTER	4	NO.
2	A.1	LEVEL TRANSMITTER	4	NO.
3	A.1	TEMPERATURE TRANSMITTER	4	NO.
4	A.1	PRESSURE SWITCH (TYPE-1)	4	NO.
5	A.1	PRESSURE SWITCH (TYPE-2)	4	NO.
6	A.1	DIFFERENTIAL PRESSURE SWITCH (TYPE-1) OF LPBP	4	NO.
7	A.1	DIFFERENTIAL PRESSURE SWITCH (TYPE-2) OF LPBP	4	NO.
8	A.1	DIFFERENTIAL PRESSURE SWITCH (TYPE-3) OF LPBP	4	NO.
9	A.1	DIFFERENTIAL PRESSURE SWITCH (TYPE-4) OF LPBP	4	NO.
10	A.1	PRESSURE GAUGE (TYPE-1) OF LPBP	4	NO.
11	A.1	PRESSURE GAUGE (TYPE-2) OF LPBP	4	NO.
12	A.1	PRESSURE GAUGE (TYPE-3) OF LPBP	4	NO.
13	A.1	LEVEL GAUGE OF LPBP	4	NO.
14	12.2.1.15	POSITION TRANSMITTER (TYPE-1)	4	NO.
15	&	POSITION TRANSMITTER (TYPE-2)	4	NO.
16	12.2.2.12	BEARING OF LPBP MOTOR (CF PUMP MAIN MOTOR)	6	SET
17	C.I-17	LIMIT SWITCH (LPBP SYSTEM)	2	NO.

TABLE-3

SL. NO.	CUSTOMER CLAUSE	ITEM DESCRIPTION	QTY.	UNIT
1	12.2.1.5	SPRAY NOZZLE FOR LPBP CONTROL VALVE DESUPERHEATER	2	NO.
2	12.2.1.12	FAST CLOSING DEVICE (CARTRIDGE VALVE) ALONGWITH SOLENOID VALVE FOR LPBP CONTROL VALVE	2	NO.
3	12.2.1.13	SEAL SET FOR SERVO VALVE OF LPBP CONTROL VALVE	4	SETS
4	12.2.1.14	SEAL SET FOR FOR FAST CLOSING DEVICE OF LPBP CONTROL VALVE	2	SET
5	12.2.2.10	SEAL SET FOR SERVO VALVE OF WATER INJECTION VALVE	4	SETS

MATERIAL CODE:W99312301632

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

STEAM TURBINE



BHARAT HEAVY ELECTRICALS LTD.
RANIPUR, HARDWAR

DRN	UVERMA	-SD-	25.11.17	NO. OF VAR
CHD	VIKAS	-SD-	25.11.17	-
APPD	P.K.BANSAL	-SD-	25.11.17	73 74

DEPT STE

CODE 4011

SCALE NTS

WEIGHT (KG) —

REF. TO ASSY. DRG. —

ITEM NO. —

NO. OF ITEMS 75 77

TITLE :
MANDATORY SPARES-LP BYPASS SYSTEM

CARD CODE —

DRAWING NO.
3-12300-58113

SHEET No. 1

No. OF SHEETS 1

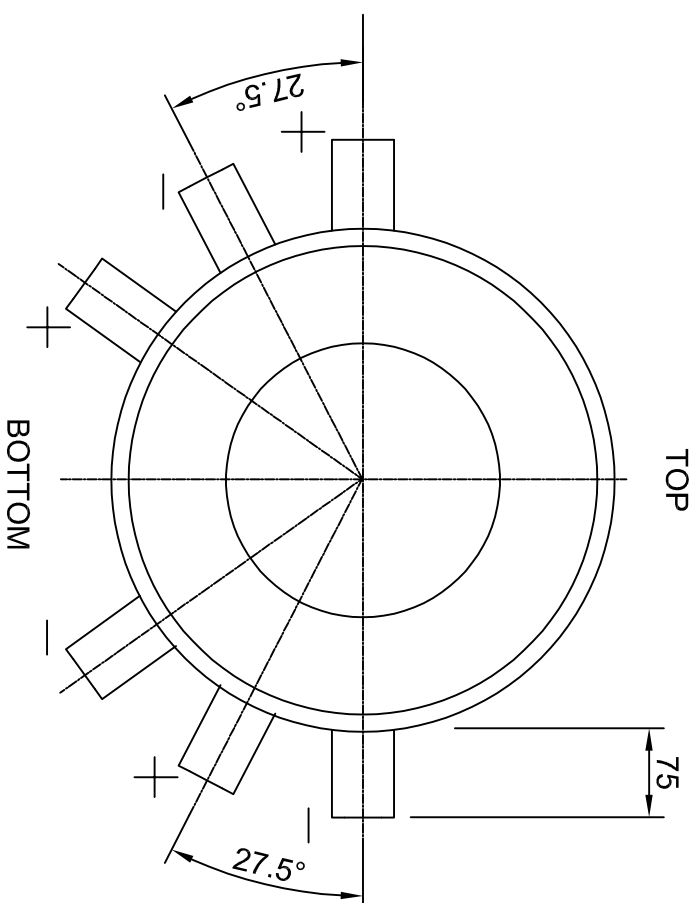
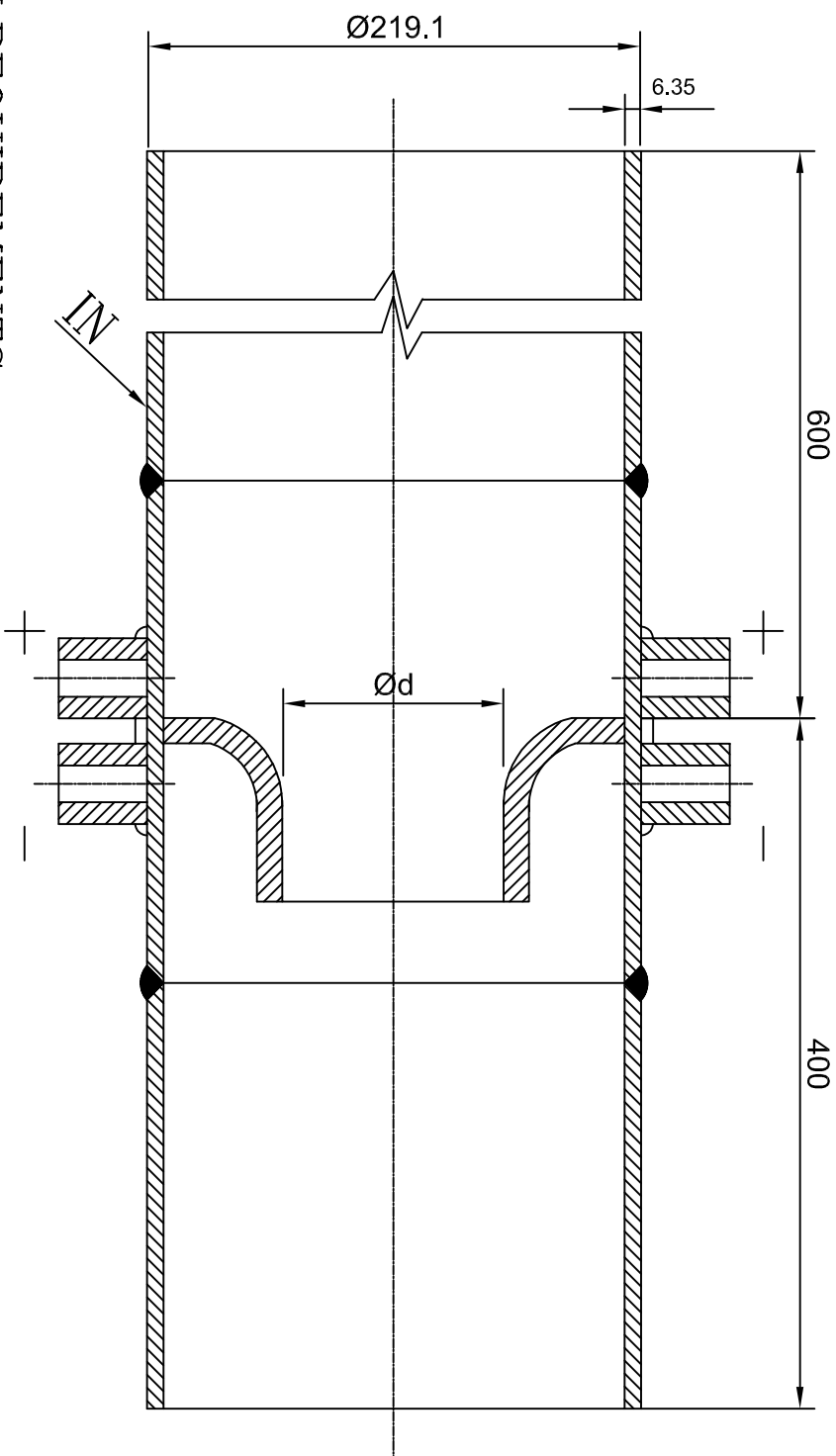
THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF
BHARAT HEAVY ELECTRICALS LIMITED . IT MUST NOT BE USED DIRECTLY
OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

DRAWING NO. 31336068501



TECH. REQUIREMENTS:—

TYPE	WELD IN TYPE WITH CORNER TAP AS PER ISA 1932.
MATERIAL OF NOZZLE	15 MO 3
PIPE MATERIAL	ASTM A106 Gr.B
PIPE SIZE.....	ø219.1x6.35
MEDIUM.....	CONDENSATE
MAXIMUM FLOW	120 Kg/Sec
OPERATING/DESIGN PRESS.....	30.5/47 BAR
OPERATING/DESIGN TEMP.....	30-60/100°C
DIFFERENTIAL PRESSURE	Approx. 1200m BAR
(AT MAX. FLOW)	
TAPS	3+3 CORNER TAPS SUITABLE FOR PIPE SIZE 13.5x2.6
TAP LENGTH	75 MM

GRADE OF UNTOL. DIM.:- M/CG - V/Σ/M/K AA 0230208 WELDING-A/B/Σ/D-AA0621104 GAS CUTTING-'T3'AA0621101	GMS NO.			STATUS OF DRG	
	21336060500				
	AGREED DEPT.	NAME	SIGN		DATE
	-----	-----	-----		-----
REV.	DATE	ALTERED CHECKED			

TYPE OF PRODUCT		STEAM TURBINE	
OR			
NAME OF CUSTOMER/ PROJECT		10836A11501	
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR			
DEPT.	STE	SCALE	WEIGHT(Kg.)
		NTS	30
		REF. TO ASSY. DRG.	21336060500
		ITEM NO.	NO. OF ITEMS
		APD	18/08/18
		CHD	18/08/18
		DRN	17/08/18
		NAME	SIGN
		BRJ LAL	-SD-
		ASHUTOSH	-SD-
		VINOD	-SD-
		DATE	NO. OF VAR.
		18/08/18	73, 74

MATERIAL CODE NO. W90313360537

DOCUMENTS WITH THE OFFER

1. DESIGN CALCULATIONS.
2. DRG. OF THE FLOW NOZZLE.
3. FLOW VERSUS DIFFERENTIAL OF PRESSURE CURVE.

INVENTORY NO.	SIGN & DATE	REF. DRG NO.
---------------	-------------	--------------

FLOW NOZZLE FOR WIV.

DRAWING NO.		
31336068501		
7		12 23 24
SHEET NO. 01	NO. OF SHEETS 01	

Purchase Indent No. 20182588 Rev.02

1. Total scope of supply against 5x800 MW Yadadri project shall be as per the details given below:

SL. No.	Description	Qty per TG Unit	Total Qty for 05 units
1.	LP Bypass Valve with EHA & Desuperheater	02 Set	10 Set
2.	Hydraulic Power Supply Unit (HPSU)	01 Set	05Set
3.	Water Injection Control Valve with Hydraulic Actuator	02 No.	10 No.
4.	Flow Nozzle for WIV	02 No.	10 No.
5.	Dump Tube	02 No.	10 No.
6.	Steam Blowing devices for LPBP valves (Refer Point No.5)	02 Set	04 Set
7.	Hydraulic test devices for LPBP valve	02 Set	04 Set
8.	Assembly & disassembly device	01 Set	02 Set
9.	Flushing Device for Control Fluid System	01 Set	02 Set
10.	Filling and gauging device for hydraulic accumulator	01 No.	02 No.
11.	Motorized control fluid pump for filling of fluid in CF Tank for HPSU	01 No.	02 No.
12.	Special tools & tackles as per clause-8.0 of ST47050 (Refer Point No.4)	01 set	02set
13.	Mandatory spares as per BHEL Drg No.3-12300-58113 (Refer Point No.-6)	01 Set	
14.	Commissioning Spares as BHEL Drg No.3-12300-56005	01 Set	05 Set
15.	Servo Valve (as spare)	01 No. each type	
16.	Solenoid Valve (as spare)	01 No. each type & module	
17.	Supervision and Training to customer during erection and commissioning at site for each TG set		

Refer Point No.3

2. Following BHEL Drawings/specification may be referred:

- Drg. No.2-12300-58300 Rev.01 (sh.01 &sh.02) for 'LP Bypass System'.
 - ST47050 Rev.02.
 - Drg. No.3-12300-58107 Rev.00 for 'Input/Process data for LPBP valve and actuators'.
 - Drg. No.3-12300-58106 Rev.00 for 'Arrangement of LPBP valve along with associated equipment'.
 - Drg. No.2-12300-58108 Rev.00 for 'Water Injection valve with Actuator'.
 - Drg. No.3-12300-56005 Rev.03 for 'Commissioning spare parts for LP Bypass System.'
 - Drg. No.3-13360-68501 Rev.00 for 'Flow Nozzle for W.I.V.'
 - Drg. No.3-12300-58113 Rev 02 for 'Mandatory spares'.
 - Drg. No.0-12321-30000 Rev.00 for 'Suspension of LP Bypass valve'.
 - Drg. No.1-12300-56008 Rev 00 for 'Recommended Spares'.
 - Annexure-II (Check list to be submitted along with the offer).
 - Annexure-III Rev.04 (Master list of documents).
- Two set of Tools & Tackles are required. One set is to be supplied against unit-1 & other set is to be supplied against unit-2.
 - In case special tools & tackles are not offered, these will have to be supplied free of cost, if required, at any stage of the project in future.
 - Additional 06 set of Packing/Gaskets applicable for Steam Blowing devices shall also be supplied by the vendor. The same shall be utilized against TG Unit-3, 4 & 5.
 - Mandatory spares shall be packed in a separate Box & shall be painted with Green colour for easy identification at site.

ANNEXURE-II A**LP Bypass System - List for Documents to be submitted by the vendor
along with Check list (Annexure-II B) during offer stage**

Sl.No.	Document details	Enclosed (Yes/No)
1	GA drawing and Datasheet of LP bypass valve	
2	Cross-sectional drawing along with BOM of LP bypass valve	
3	GA drawing and Datasheet of water injection valve	
4	Cross-sectional drawing along with BOM of Water injection valve	
5	GA drawing and Datasheet of Dump Tube (having information regarding total flow area, hole dia & Total No. of holes)	
6	GA drawing & Datasheet of HPSU	
7	Schematic diagram of HPSU and corresponing Bill of material	
8	Schematic diagrams of actuators and corresponing Bill of materials	
9	Flow Nozzle data sheet & drawing	
10	List of Mandatory spares duly correlated with the corresponding part no. of vendor's Bill of material of main equipment	
11	List of Commissioning spares duly correlated with the corresponding part no. of vendor's Bill of material of main equipment	
12	Priced list of recommended spares for future ordering.	

Sign & Date:**Name:****Designation:**

Check list for Technical Evaluation of vendor offers for LPBP system.

Project:800MW Yadadri

BHEL Enquiry No.....

SL. No.	BHEL REQUIREMENT	VENDOR'S CONFIRMATION/ RESPONSE
A)	<u>FOR LP BYPASS VALVES ALONG WITH ACTUATOR AND DESUPERHEATER</u>	
1	All components of LPBP control valve shall be designed for operation at design pressure 75 bar (a), temperature 601°C & corresponding steam flow 364.61 Kg/Sec as mentioned in BHEL drg. no. 3-12300-58107.	
2	LP bypass valve shall be suitable for operating conditions as mentioned in BHEL drg. no. 3-12300-58107.	
3	LP bypass valve shall also be suitable for operation at short term operating conditions (pressure & temperature) as per note 2 of BHEL drg. no. 3-12300-58107.	
4	Material for LP bypass valve body and internals shall be as per clause no. 1.1.3 (A) & (B) of BHEL drg. no. 2-12300-58300.	
5	Material of Suspension bracket of LP bypass valve shall be as per BHEL drg. no. 3-12300-58106.	
6	The selected Cv of LP bypass valve shall have sufficient margin (atleast 8%) over the maximum Cv value calculated as per operating conditons mentioned in BHEL drawing no. 3-12300-58107.	
7	The weld end details of LP bypass valve shall be as per BHEL drg. no. 3-12300-58106 and clause 1.1.5 of BHEL drg. nos. 2-12300-58300.	
8	Arrangement and all the dimensions of LP bypass valve shall be strictly as per BHEL drg. no. 3-12300-58106.	
9	Suspension arrangement of LP bypass valve shall be as per BHEL drg. no. 3-12300-58106 and 0-12321-30000.	
10	The valve characteristics of LP bypass valve should be linear as per BHEL drg. no. 3-12300-58107.	
11	Sizing of LP bypass valve actuator shall be done for normal working pressure of control fluid as 160 bar & min. working pressure of 115 bar.	
12	Actuator sizing calculation shall be submitted by the vendor in the event of ordering as per clause 1.1.7 (b) of BHEL drg. no. 2-12300-58300 and there shall be sufficient margin (atleast 15 %) in the actuator as mentioned in BHEL drg. no. 2-12300-58300.	
13	The control block of actuator should be mounted on actuator itself.	
14	The size & material of warm up & drain connection of LP bypass valve shall be as per clause 1.1.10 of BHEL drg. no. 2-12300-58300.	
15	The Steam blowing device shall be designed for design parameters mentioned as per clause 1.1.12 of BHEL drg. no. 2-12300-58300.	
16	In failure mode, LP bypass valve shall be in closed condition as per clause 1.1.14 of BHEL purchase specification drg. no. 2-12300-58300.	
17	All the components selected for actuator viz. Servo valve, Solenoid valve, position transmitter etc. shall be proven as per clause 1.1.15 of BHEL drg. no. 2-12300-58300.	
18	Steam strainer to be provided with the specified hole size as per clause 1.1.16 of BHEL drg. no. 2-12300-58300.	
19	The operating time (opening, closing & trip) of LP bypass valve shall be as per clause 6.2 of BHEL specification ST47050.	
20	The valve seat leakage class shall confirming to MSS SP61 as per clause 4.3 of BHEL specification ST47050.	
21	Weight of LP bypass valve duly assembled with actuator & desuperheater shall be as per note 2 of BHEL drg. no. 3-12300-58106.	
22	Size & orientation of Condensate supply connection at LP bypass valve outlet shall be as per BHEL drg. no. 3-12300-58106.	
23	The LP bypass valve shall be IBR certified as per clause 5 of BHEL specification ST47050.	

SL. No.	BHEL REQUIREMENT	VENDOR'S CONFIRMATION/ RESPONSE
24	The allowable forces & moments at LPBP Valve Inlet, LPBP Valve Outlet & Condensate supply connection shall be as mentioned in BHEL drg. no. 3-12300-58106.	
25	The operating philosophy of LP bypass actuator shall be "FRF PRESSURE TO OPEN AND SPRING FORCE TO CLOSE" as per clause 1.1.17 of BHEL drg. no. 2-12300-58300.	
B)	FOR WATER INJECTION VALVE	
1	Water injection valve shall be designed as per design parameters mentioned in BHEL drg no. 2-12300-58108.	
2	The overall dimensions of Water injection valve shall be as per BHEL drg no. 2-12300-58108.	
3	The size & material of weld ends of Water injection valve (inlet & outlet) shall be as per BHEL drg no. 2-12300-58108.	
4	Valve to be supplied along with Inlet/Outlet counter flanges (Weld neck, Raised type), associated fasteners and sealing as per T.R. 1 of BHEL drg no. 2-12300-58108.	
5	The body material of Water injection valve shall be cast steel (ASTM A216 WCB) as per BHEL drg no. 2-12300-58108.	
6	The selected Cv of Water injection valve shall have sufficient margin (atleast 10%) over the maximum Cv value calculated for design water mass flow i.e. 115 Kg/sec as per T.R. 12 of BHEL drg no. 2-12300-58108.	
7	The valve sizing shall be suitable for obtaining spray water flow as 87.5 Kg/sec. with in 80 % of total valve travel as per T.R. 13 of BHEL drg no. 2-12300-58108.	
8	The valve characteristics of Water injection valve should be equal % as per BHEL drg no. 2-12300-58108.	
9	Sizing of Water injection valve actuator shall be done for normal working pressure of control fluid as 160 bar & min. working pressure of 115 bar as per BHEL drg no. 2-12300-58108.	
10	The water injection valve shall be capable of manual operation as per T.R. 5 of BHEL drg no. 2-12300-58108.	
11	The control block of actuator shall be mounted on actuator itself as per T.R. 6 of BHEL drg no. 2-12300-58108.	
12	Actuator sizing calculation shall be submitted by the vendor as per BHEL specification requirements and there shall be sufficient margin (atleast 15 %) in the actuator as mentioned in BHEL purchase specification.	
13	All components of selected for actuator viz. Servo valve, Solenoid valve, position transmitter etc. shall be proven.	
14	The opening time of Water injection valve shall be 3 sec. (max.) as per BHEL drg no. 2-12300-58108.	
15	The strength & Leak tightness test shall be as per T.R. 8 of BHEL drg no. 2-12300-58108.	
16	Hydraulic testing of valve body shall be carried out as per T.R. 9 of BHEL drg no. 2-12300-58108.	
17	In failure mode, water injection valve shall be in stay-put condition as per T.R. 10 of BHEL drg no. 2-12300-58108.	
18	Valve configuration shall be "Flow to close" as per T.R. 11 of BHEL drg no. 2-12300-58108.	
C)	FOR HYDRAULIC POWER SUPPLY UNIT	
1	The hydraulic power supply unit shall be suitable for operation of all actuators of LP bypass valve & water injection valve.	
2	The hydraulic power supply unit shall be supplied with all the required items & instruments as per BHEL purchase specifications requirements.	

SL. No.	BHEL REQUIREMENT	VENDOR'S CONFIRMATION/ RESPONSE
3	All the components of hydraulic power supply unit viz. pumps, motors, coolers, accumulators, filters, instruments etc. shall be proven as per Cl. 1.2.3 of BHEL drg. no. 2-12300-58300. Further, sizing calculation of major components of HPSU such as Tank, Pumps, Coolers, Accumulators shall be provided for BHEL review after placement of order.	
4	The hydraulic power supply unit shall be supplied with protective cabinet as per Cl. 1.2.4 of BHEL drg. no. 2-12300-58300.	
5	The hydraulic power supply unit shall be supplied with proven Regeneration unit as per Cl. 1.2.6 of BHEL drg. no. 2-12300-58300.	
6	The sizing of HPSU cooler shall be done as per parameters given in Cl. 1.2.7 of BHEL drg. no. 2-12300-58300.	
7	The sizing of accumulators of HPSU shall be done as per Cl. 7.0 of BHEL specification ST47050.	
8	All the surface of cooler coming in contact of FRF shall be made from stainless steel.	
9	The cooler should be having sufficient margin in the provided surface area (atleast 15 %) viz-a-viz the calculated surface area.	
10	Water Regulating Valve applicable for cooling circuit arrangement of Cooler in HPSU shall be as per note-1 mentioned in Sheet-2 of BHEL drawing no. 2-12300-58300.	
11	The cooling circuit arrangement & connections of Cooler in HPSU shall be as per Sheet-2 of BHEL drawing no. 2-12300-58300.	
12	The vendor to provide 3 no. pressure & 3 no. return line connections in HPSU as per cl. 7.0 of BHEL specification ST47050.	
13	Fasteners and foundations Bolts for fastening of HPSU shall be in vendor's scope as per Cl. 1.1 Note-ii of BHEL specification ST47050.	
	D) FOR DUMP TUBE	
1	Design of Dump Tube shall be carried for the following parameters:- Steam flow- 400.42 Kg/sec, Outlet Steam Pressure & Temp.- 0.1 bar & 80.3 deg. C.	
2	The vendor to confirm to supply Dump tube meeting all the requirements of Cl. 1.5 of BHEL drawing no. 2-12300-58300.	
	E) C&I REQUIREMENTS	
1	Vendor to confirm that all the points mentioned in C&I addendum to ST47050 are acceptable. Note: - Any deviation shall be separately specified.	
2	Vendor to confirm Flow nozzle and its documents shall be in line with flow nozzle drawing no. 3-13360-68501.	
3	Vendor to confirm that all C&I interfaces with DCS shall be in line with previous supplied LPBP system (if any) to BHEL of similar rating except for project specific changes. Note:- Kindly mention project name (if applicable).	
4	Vendor to confirm that the signals from Junction box shall directly go into BHEL DCS. There shall be no controlling element (control box or so) in vendor scope. All the equipments shall be directly controlled from BHEL DCS.	
5	Vendor to indicate corresponding KKS tags/part no. of main supply in mandatory spare list.	
6	Vendor to confirm that in main supply BOM, if more type of instruments are found w.r.t mandatory spares offered by vendor, then supply of spares (i.e. PG, DPS, PS etc.) shall be as per BHEL specification.	
7	Vendor to confirm that C&I spares packing list shall be separate from the main supply and the same shall be approved by BHEL.	

SL. No.	BHEL REQUIREMENT	VENDOR'S CONFIRMATION/ RESPONSE
F)	GENERAL REQUIREMENTS	
1	The vendor to confirm that the vendor's offer is inline with BHEL specification requirements. Any deviation is to be separately specified by the vendor.	
2	The working fluid and functional/testing requirements of complete LP bypass system shall be as per clause 1.1.8, 1.1.9 of BHEL drawing no. 2-12300-58300 and clause 10 of BHEL specification ST47050.	
3	The size & material of terminal connections in actuators & HPSU shall be as per Cl. 3.2 of BHEL drawing no. 2-12300-58300.	
4	All the flanged end connection of HPSU, Actuators & equipments of LP bypass system shall be supplied with matching counter flanges, seal & fasteners by vendor for piping connection by BHEL.	
5	Applicable tightening torques for all the Bolts/Nuts shall be provided by the vendor in drawing of all the equipment as per Cl. 3.3 of BHEL drawing no. 2-12300-58300.	
7	Thermal expansion values at all terminal connections shall be provided by the vendor as per Cl. 3.5 of BHEL drawing no. 2-12300-58300.	
8	The equipment tolerances shall be as per Cl. 3.8 of BHEL drawing no. 2-12300-58300.	
9	Painting of equipment shall be as per Cl. 5.1 of BHEL drawing no. 2-12300-58300.	
10	Maximum noise level of LP bypass system shall be as per Cl. 4.6 of BHEL specification ST47050.	
11	The sizing calculation & selection of equipment of LPBP system shall be adequate w.r.t. BHEL specification requirements & any modification if required, at a later stage during detailed engineering, will be done by vendor without any price implication to BHEL.	
12	The vendor to confirm that quantity of FRF i.e. 800 liters is sufficient for Flushing, First fill & Top up for one year of operation as per Cl. No.-6.4(a) of ST47050. However, supply of FRF is in BHEL scope.	
13	The vendor to confirm that mandatory spares shall be supplied as per BHEL drawing no. 3-12301-58113 with proper correlation with corresponding part no. of vendor's BOM/Drawing of main equipment .	
14	The vendor to confirm that Commissioning spares shall be supplied as per BHEL drawing no. 3-12300-56005 with proper correlation with corresponding part no. of vendor's BOM/Drawing of main equipment .	
15	In the event of ordering, if it is found that any mandatory/commissioning spares as per BHEL specification has not been included in vendor's list, then the same shall be supplied by the vendor without any price implication. The vendor to confirm.	
16	The vendor to confirm that additional 06 set of Packing/Gaskets for Steam Blowing device shall also be supplied. The same shall be utilized during steam blowing operation of TG Unit-3, 4 & 5.	
17	In case of order, the vendor to supply 22 no. Hard copies & 4 no. CDs Of O&M manuals at BHEL Hardwar as per MDL (Annexure-iii). 3 no. Hard copies & 1 no. CD of O&M manual shall be supplied along with equipments at site.	
18	Storage & handling instructions of the equipments shall be furnished by the vendor separately and 2 copies of the same shall be supplied to site along With main equipment.	
19	Instructions for packing: A) All the equipment/items shall be supplied in closed steel boxes/closed wooden boxes with steel cover sheet. Packing boxes should be rain proof. B) Packaging of item should be done in such a way that it should not require any internal package inspection for at least one year. C) Packing box of mandatory spares shall be painted with green colour for easy identification at project sites.	

Annexure-III**MASTER LIST OF DOCUMENTS (MDL) OF LP BYPASS SYSTEM (STE-TG)****Rev.04 Dt.01.05.12**

Sl. No.	Document	Remarks
<u>A. Documents to be submitted for BHEL reference prior to manufacturing:</u>		
1.	LP bypass valve sizing calculations	STE-TG
2.	Water injection valve sizing calculations	STE-TG
3.	LP bypass valve actuator selection sheet/sizing calculations	STE-TG
4.	Water injection valve actuator selection sheet/sizing calculations	STE-TG
5.	HPSU & its major component sizing calculations	STE-TG
6.	Desuperheater sizing calculation	STE-TG
7.	Dump tube sizing calculation	STE-TG
8.	HPSU water cooler diagram/ detailed technical catalogues including type/size/material of end connections for water inlet/outlet.	STE-TG
9.	Feed forward philosophy (Enthalpy based control) for spray water	STE-TG/CIE
10.	Complete system write up for LPBP system	STE-TG
11.	CV test report	STE-TG
<u>B. Documents to be submitted for BHEL approval prior to manufacturing:</u>		
1.	LPBP valve cross sectional drawing, datasheet & bill of material	STE-TG
2.	GA drg. Of LPBP valve with Desuperheater & dump tube indicating overall & dismantelling dimension and weight	STE-TG
3.	WIV drawing, datasheet & bill of material	STE-TG
4.	HPSU GA drawing data sheet & bill of material	STE-TG
5.	HPSU schematics	STE-TG/CIE
6.	I & R Diagram system	STE-TG/CIE
7.	Steam blowing device & bill of material	STE-TG
8.	Details of Oil/FRF flushing device	STE-TG
9.	Flow nozzle datasheet as per ISO 5167	CIE
10.	Flow nozzle drawing	CIE
11.	Flow nozzle characteristic curve between differential pressure and flow (indicating calculation formula also)	CIE
<u>C. Other documents to be submitted for BHEL approval :-</u>		
1.	LPBP valve actuator drawing & bill of material	STE-TG
2.	WIV actuator drawing & bill of material	STE-TG
3.	O & M manual	STE-TG
4.	Shipping/dispatch plan of the offered equipments including details of each boxes & sub boxes	STE-TG
5.	WPS field piping for the system and recommendations	STE-TG/HXE
6.	Instructions for sequence of erection & commissioning along with supporting drawings/sketches	STE-TG
7.	List of special materials tools, equipments, facilities required for erection and commissioning.	STE-TG

Notes:

1. The vendor to submit the documents within 4 weeks from the data of placement of purchase order.
2. While submitting the documents the vendor to clearly mention the exceptions w.r.t. the documents already approved earlier by BHEL against similar projects.

C&I ADDENDUM TO ST47050 REV. 00
(Yadadri)

A. General:

1. Under Clause no. 6.1.1, Position transmitter of only Balluff Make is acceptable, which shall be available off the shelf from the market. For the LPBP control valve position Transmitter quantity in each actuator should be taken as 2 no. or one position transmitter with double outputs (which can be independently terminated to BHEL DCS)
2. Under Clause no. 7.1.1, Pressure switches are to be provided for changeover of Circulation Pump Units. Flow switches shall not be accepted.
3. Clause no. 7.1.1 (a) should be read as 'Three (3) no. Pressure Transmitters are to be provided in HPSU Heater. Pressure Transmitters at individual discharge line of each CFP shall not be accepted'.
4. Under Clause no. 7.1.1 (g), complete instrument list shall contain the range, model no., ordering code, set point, make and process connection for all the instruments.
5. Under Clause no. 7.1.2 and 12.2.2, for Interfacing with DCS only Servo valve should be considered. Wherever in the BHEL specification Proportional valve should be read as Servo valve.
6. Under Clause no. 7.1.2, (a) ± 7.5 mA signal should not be considered as it corresponds to Proportional valve. Only ± 30 mA shall be applicable for Servo Valve.
7. Under Clause no. 7.1.2, following additional points to be noted and considered:
 - a. 20% spare Terminals in the JB are to be provided
 - b. Cable Gland to be provided in JB for DCS end also.
8. Under Clause no. 7.1.3, following additional points should be considered:
 - a. All motors shall be efficiency class-IE2, confirming to IS-12615, or IEC: 60034-30.
 - b. Complete Load list including power, voltage supply, rated current, starting current and RPM values is to be furnished within 4 weeks from the date of placement of P.O.
 - c. Motor including fan shall be painted with corrosion proof paints battle ship grey shade 632 of IS-5.
 - d. Noise level for all the motors shall be limited to 85dB(A) in accordance with IS: 12065.
 - e. One weatherproof Junction Box (JB) with copper cable connection from JB to Motors shall be provided when motor terminal box is not adequate for terminating the aluminium power cable. Also flexible bimetallic connectors shall be used.
 - f. Motor shall have drain plugs so located that they shall drain the water, resulting from the condensation or other causes from all pockets of the motor casing.
9. Under Clause no. 6.1 (a),
 - Appendix 3&4 and Appendix 5 should be specially paid attention.All the instruments, equipments and their KKS tags should be as per the schemes only. Following points should be specially noted:
 - a. Filter and its Differential pressure switch should be provided in each oil supply line for each servo valve.
10. Under Clause no. 7.0, Appendix 2 should be read in conjunction with Annexure 2. All the instruments, equipments and their KKS tags should be as per this scheme (Annexure 2) only. Following points should be specially noted:
 - a. Two separate motors for regeneration and cooling unit should be provided.
 - b. Only one heater (if applicable) of suitable rating should be provided.
11. Under Clause no. 7.0, for Water Cooler (if applicable), mechanical thermostatic valves should be provided for control of oil flowing through the Water cooling circuit thus altogether maintaining the uniform oil temperature in the tank. This Thermostatic valve shall operate independently and no signal exchange from BHEL DCS shall take place.
12. Under Clause no. 11.2, List of Mandatory spares furnished by supplier shall duly mention all the KKS tags for which the corresponding item is applicable.
13. Junction Boxes for the Instruments shall be of Pyrotech, Rittal or equivalent Indian Make.

Devesh
28/12/2017
Devesh Tewari
E-2 CIE

Sushendra
28/12/17
(S. Chandra)
DGM-CIE

14. Process connection for the different type of instruments shall be as follows:

- a. Level Transmitter MAX05CL001/2/3: G ½ Threaded
- b. Temperature Transmitter MAX05 CT001/2: G ½
- c. Level Gauge MAX05 CL501: M10
- d. All Pressure Gauges : G ½
- e. Leakage sensor MAN52/54 CL011, MAN52/55CL011: M30
- f. All Pressure Switches: G ½
- g. All Differential Pressure Switches: G ½
- h. All Pressure Transmitters: ½ " NPT

B. Motors:

1. All motors shall conform to the latest applicable IS, IEC and CBIP Standards (IS-325/ IS-12615/ IEC-34)
 2. For LT motors, the applicable starting current shall be limited to 7.2 times of full load current including all tolerance.
 3. The motors shall be designed to withstand 120% of rated speed for 2 minutes without any mechanical damage.
 4. The motor may be subjected to sudden application of 150% rated voltage during bus transfer, due to the phase difference between the incoming voltage and motor residual voltage.
 5. All motor enclosures for outdoor, semi-outdoor & indoor application shall conform to the degree of protection IP-55 unless otherwise specified.
 6. All insulated winding shall be of copper.
 7. All motors shall have class F insulation but limited to class B temperature rise.
 8. Terminal box shall be capable of being turned 360 Deg. 90 Deg. for LT motors unless otherwise approved.
 9. Noise level for all the motors shall be limited to 85dB(A) in accordance with IS: 12065.
10. Rating Plate: In addition to the minimum information required by IS, the following information shall be shown on motor rating plate :
- a. Temperature rise in Deg.C under rated condition and method of measurement.
 - b. Degree of protection.
 - c. Bearing identification no. and recommended lubricant.
 - d. Location of insulated bearings.

C. Level Transmitter shall be co-axial guided wave radar type with following properties:

1. Principle: TDR (Time domain Reflectometry)
2. Enclosure Class: IP-65
3. Output Indicator: LCD
4. Accuracy: 5 mm or 0.1% probe length
5. Communication: 2 wire 4-20mA DC with HART
6. Process connection: External cage mounting Flanged/screwed
7. Power supply 24 V DC
8. Accessories:
 - a) Counter Flange, nuts, bolts, gaskets etc.
 - b) ½" NPT cable gland
 - c) SS Nameplate.

Dari
28/12/17

Srinivas
28/12/17

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											
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		SPEC.		AS PER PO												
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SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK		QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY			REMARKS
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11																

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

MANUFACTURER/SUB CONTRACTOR		LEGEND:	FOR CUSTOMER USE	
		! 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

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									
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		SPEC.	AS PER PO											
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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

3.5	DIMENSION& WALL-THICKNESS CHECK	WELDING+ MAIN DIMENSION	MAJOR	MEASUREMENT	ALLVALVES	AS PERDRAWING	TC	√	P	V		
3.6	NDE MACHINED	PT	MAJOR	PT	ALLVALVES	ASMESEC.V/VIII/HW0980829	TC	√	P	V		
3.7	FUNCTION / PERFORMANCE TEST NOISELEVEL	FUNCTIONALTEST AS PERAPPROVED TEST PROCEDURE CONFIRMATION FOR MEETING NOISE LEVEL	MAJOR MAJOR	PERFORMANCE NOISETEST	ALLVALVES	AS PERAPPROVED DATASHEET/ DRAWING	TC	√	P	W	V	ACTUATOR +VALVE
3.8	CV TEST		MAJOR	CV TEST	PERDESIGN	AS PERAPPROVED DATASHEET/ DRAWING	TC	√	P	V		
3.9	PAINTING,PACKI NG AND PRESERVATION		MAJOR	VISUAL	ALLVALVES	VENDOR'S STANDARD	-	√	P			

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

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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	10			

HPSU														
1	INCOMING MATERIAL CONTROL													
1.1	OILTANK	DAMAGE	MAJOR	VISUAL	100%	MANUFACTURERDRAWING	COC	√	P	V				
		DIMENSIONS	MINOR	MEASURMENT	100%	MANUFACTURERDRAWING	COC	√	P	V				
		VERIFICATION OF SUPPLIER CERTIFICATE, IDENTIFICATION& CORELATION TOTCs FORRAW MATERIAL PLATES	MAJOR	CERTIFICATE REVIEW	100%	MANUFACTURERDRAWING	COC	√	P	V				
1.2	BOUGHT OUT ITEMS													
	LEVEL TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		CALIBRATION	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
	PRESSURE TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		CALIBRATION	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
	TEMPERATURE TRANSMITTER	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				
		CALIBRATION	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V				

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SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK		QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY			REMARKS
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	THREEPHASE MOTORS	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		VERIFICATION OF SUPPLIER CERTIFICATE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	ACCUMUFATORS	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		PRESSURE TEST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	PRESSURE RELIEF VALVES	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		ADJUSTMENT	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	PRESSURE GUAGES	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		MODEL CODE	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
		CALIBRATION	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	THERMOMETER	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	CF AIR COOLER	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		
	COOLING CUM FILTERATION	DAMAGE, RUST	MAJOR	VISUAL	100%	DRG./DATASHEET	COC	√	P	V		

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BHEL	VENDOR'S NAME	ITEM	LP BYPASS SYSTEM		QP NO.	QA/BI/QP/114										
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SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK		QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY			REMARKS
											M	B	N			
1	2	3		4	5		6	7	8		9	D	10			11

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

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									M	B	N	
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WATER INJECTION VALVES												
1.0	RAWMATERIAL											
1.1	BODY & BONNET	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PER APPROVED DATA SHEET	TC	√	P	V		
		B. MECHANICAL PROPERTIES	-	MECH. TEST	PERHEAT	AS PER APPROVED DATA SHEET	TC	√	P	V		
		C. APPEARANCE	-	VISUAL INSPECTION	PERLOT	MSS SP-55	TC	√	P	V		
1.2	STUDS & NUTS	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	EN 10204 TYPE 3.1 ASTM A193 B7 ASTM A194 2H	TC	√	P	V		
		MECHANICAL PROPERTIES	-	MECH. TEST	PERHEAT	EN 10204 TYPE 3.1 ASTM A193 B7 ASTM A194 2H	TC	√	P	V		
2.0	ASSEMBLY											
2.1	STEM	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT	DRAWING	COC	√	P			
2.2	PLUG	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT	DRAWING	COC	√	P			
2.3	SEAT RING	DIMENSION / VISUAL	MAJOR	VISUAL & DIMENSIONAL INSPECTION	PERLOT	DRAWING	COC	√	P			
2.4	BODY ASSLY	A. HYDRO	MAJOR	HYDRO	ALL VALVES	AS PER APPROVED DATA SHEET / DRG.	TEST REPORT	√	P	W		
		B. SEAT LEAKAGE	MAJOR	LEAKAGE	ALL VALVES	AS PER APPROVED DATA SHEET / DRG.	TEST REPORT	√	P	W		
		C. FUNCTION	MAJOR	• FUNCTION • DIMENSION • PAINT	ALL VALVES	AS PER APPROVED DATA SHEET / DRG.	TEST REPORT	√	P	W		ASSEMBLED WITH ACTUATOR

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

FLOW NOZZLE FOR WIV													
1.0	RAWMATERIAL												
	BRANCH PIPE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERLOT	AS PERAPPROVED DATASHEET/ DRG.	TC	√	P	V			
		B.MECHANICAL PROPERTIES		-MECH.TEST		AS PERAPPROVED DATASHEET/ DRG.	TC	√	P	V			
		C.NDT		UT		AS PERAPPROVED DATASHEET/ DRG.	TC	√	P	V			
	FLOWNOZZLE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	-DO-	AS PERAPPROVED DATASHEET/ DRG.	TC	√	P	V			
		B.MECHANICAL PROPERTIES		-MECH.TEST		AS PERAPPROVED DATASHEET/ DRG.	TC	√	P	V			
2.0	MANUFACTURING												
2.1	MACHINING PARTS	VISUAL& DIMENSIONAL INSPECTION	MAJOR	VISUAL/ DIMENSIONAL	PERPIECE	SHOP TRAVELER		√	P				
2.2	WELDING &HEAT TREATMENT	SEEDRAWING	MAJOR		PERPIECE	EN288 /ASMEIX		√	P				
2.3	ASSEMBLY	SEEDRAWING	MAJOR	VISUAL	PERDESIGN	AS PERAPPROVED DATASHEET/ DRG.		√	P				
3.0	TESTING &INSPECTION							√	P				
3.1	NDEWELDING	RT ORUT	MAJOR	RT/UT	PERPIECE	ASMESECV/VIII/HW0980830	TC	√	P	V			
	NDE MACHINED WELD END	PT	MAJOR	PT	PERPIECE	ASMESECV/VIII/HW0980830	TC	√	P	V			
3.2	HYDROSTATIC PRESSURETEST	PRESSURETEST	MAJOR	HYDRO	PERPIECE	AS PERAPPROVED DATASHEET/ DRG./FollowHW0980829	TC	√	P	W			

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1	2	3		4	5		6	7	8		9	D	10			

3.3	DIMENSION CHECK	WELDEND + MAIN DIMENSION		MAJOR	DIMENSIONAL	PERPIECE	DRAWING	TC	√	P	W		
3.4	CALIBRATION REPORT			MAJOR	VISUAL	PERPIECE		COC	√	P	V		
4	FINAL INSPECTION PACK -&SHIPPING	VERIFICATION OF COMPLETION STAMPING PACKING		MAJOR	VISUAL	100%	AS PERAPPROVED DRAWING/ DATASHEET	COC	√	P	V		

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1	2	3		4	5		6	7	8		9	D	10			
11																

DUMP TUBE													
1.0	RAWMATERIAL												
1.1	DUMP TUBE	A. CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	PERHEAT	AS PERAPPROVED DATASHEET		TC	√	P	V		
		B.MECHANICAL PROPERTIES	MAJOR	-MECH.TEST	PERHEAT	AS PERAPPROVED DATASHEET		TC	√	P	V		
		C.NDT	MAJOR	UT	100	AS PERAPPROVED DATASHEET		TC	√	P	V		
2.0	IN PROCESS												
2.1	WELDING & HEAT TREATMENT	WPS	MAJOR	VISUAL TIME/TEMPERATUR E	PERPIECE	ASMEIX / EN288			√	P	-		
2.2	NDEWELDING	RT MPI/DPT	MAJOR	RT MPI/DPT	PERPIECE	ASMESEC.V/VIII/ HW0980830		TC	√	P	W		

MANUFACTURER/SUB CONTRACTOR		LEGEND:	FOR CUSTOMER USE	
		! 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

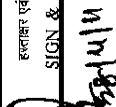
मसौदा संख्या SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 47050		
			पृष्ठ 28 का 1 Page 1 of 28		
समीचीन संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.	Based on own experience			
Purchase Specification For <u>Combined LP Bypass Stop & Control Valves</u> <u>With Electro-hydraulic Actuators (EHA)</u> & <u>Hydraulic Power Supply Unit (HPSU)</u> For <u>Steam Turbine</u>					
स्वतंत्राधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।		COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited it must not be used directly or indirectly in any way detrimental to the interest of the company			
हस्ताक्षर एवं दिनांक SIGN & DATE	दिनांक एवं हस्ताक्षर SIGN & DATE	दिनांक एवं हस्ताक्षर SIGNATURE & DATE			
मसौदा संख्या INVENTORY NO. P-6301	दिनांक एवं हस्ताक्षर SIGN & DATE 12/8/11	C.I.E MEMBER-PSC QAX TSX सहमत विभाग AGREED DEPTT.	S.K.DAS V.K. CHAUHAN N.K.MANWANI B. CHOUDHARY नाम NAME	अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY	- S.MITTAL R.C.AGARWAL R.C.AGARWAL
		दिनांक एवं हस्ताक्षर DATE & SIGNATURE	स्वीकृति APPROVED : G.C. MISRA - AGM (STE>E) निमाण : STE जारी : STE -TG		
		REV.NO. 02 (Supersedes) Dt. 16.04.11	PR.GP. 3.40 DATE : 16.4.11		

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		PRODUCT STANDARD		पृष्ठ 28 का 2 Page 2 of 28	
सामग्री सूची संख्या को अधिकृत करता है	I TABLE OF CONTENTS 1.0 INTENT OF SPECIFICATION 1.1 Scope Of Contract 1.2 Responsibility of Bidder 1.3 Reliability & Provenness 2.0 FUNCTION 3.0 SCOPE OF SUPPLY 4.0 COMBINED LP BYPASS STOP & CONTROL VALVE: 4.1 Valve Sizing 4.2 Valve Connections (For Piping) 4.3 Valve Seat tightness 4.4 Drain & Warm-up Connections 4.5 Steam Strainer 4.6 Noise Level 4.7 General Valve Mounting Arrangement 4.8 Steam Blowing blanking arrangement 4.9 Other Requirements 5.0 INDIAN BOILER REGULATION 6.0 LP BYPASS STOP & CONTROL VALVE ACTUATORS 6.1 LP Bypass Stop & Control Valve Actuators Schemes (Proposed) 6.1.1 Position Measurement of Valves 6.2 Operating Time 6.3 Mounting Arrangement of Actuators 6.3.1 Mounting Arrangement of Control Block for Actuators 6.3.2 Actuator Control Fluid Connections 6.4 Control Fluid (CF) Specification 6.5 CF Pressure & Temperature 6.6 Control Fluid Tray for LP Bypass Valve Actuator (Vertically mounted) 7.0 HYDRAULIC POWER SUPPLY UNIT (HPSU) 7.1 Electrical Wiring 7.1.1 Instruments in HPSU 7.1.2 Interface with BHEL's system. 7.1.3 Power Supply 7.2 Coating, Cleaning & Preservation				
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रचलन एवं अन्वयक रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।					
हस्ताक्षर एवं दिनांक SIGN & DATE 28/11/11	REV. NO. 02				
सामग्री सूची संख्या INVENTORY NO. P-6301	निर्माणकर्ता WORKED BY SHUBHAM MITTAL		16.4.11		जांचकर्ता CHECKED BY R.C. AGARWAL
				16.4.11	

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सामग्री सूची संख्या को अप्रतिबंधित करता है	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.				
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में स्वत्वाधिकार को न नुकसान जाए।	दिनांक SIGN & DATE 28/11/11				
सामग्री सूची संख्या INVENTORY NO. P-6301	REV. NO. 02				
निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	SHUBHAM MITTAL R.C. AGARWAL	16.4.11 16.4.11			

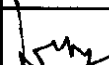
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सामग्री सूची संख्या INVENTORY NO.		SUPERSEDES INVENTORY NO.		II LIST OF APPENDICES TO THIS SPECIFICATION			
सामग्री सूची संख्या को अधिकारित करता		COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		- GENERAL ARRANGEMENT OF LP BYPASS VALVES - APPENDIX-1 - HYDRAULIC POWER SUPPLY UNIT FOR LP BYPASS - APPENDIX-2 (TYPICAL) - LP BYPASS STOP VALVE ACTUATOR SCHEME - APPENDIX-3 (TYPICAL) - LP BYPASS CONTROL VALVE ACTUATOR SCHEME - APPENDIX-4 (TYPICAL) - LP BYPASS VALVE (SINGLE STEM) ACTUATOR SCHEME - APPENDIX-5 (TYPICAL) - MANUFACTURING QUALITY PLAN - APPENDIX-6, FORMAT-1			
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हितकारक हो न किया जाए।		दिनांक SIGN & DATE 28/11/11					
सामग्री सूची संख्या INVENTORY NO. P-6301		REV. NO: 02		निर्माणकर्ता WORKED BY SHUBHAM MITTAL		16.4.11	
				जांचकर्ता CHECKED BY R.C. AGARWAL		16.4.11	

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सामग्री सूची संख्या INVENTORY NO.		1.0 INTENT OF SPECIFICATION 1.1 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 the specification. i. Detailed functional design, calculation, analysis & engineering of all equipment, systems, all type of spares, special tools for assembly & disassembly of various equipments & steam blowing devices. ii. Material Procurement. iii. Complete manufacturing including functional testing. iv. Providing engineering data, drawings for purchaser/owner's approval. v. Providing instruction manuals, as-built drawings, O & M manuals, safety instructions, waste disposal instructions of hydraulic medium etc. vi. Generation of quality/inspection reports indicating therein the complete test details and their acceptance norms i.e. test certificates indicating therein the chemical, physical & mechanical properties. These test certificates are to be provided as per mutually agreed Quality Plan. vii. Furnishing list of commissioning & recommended spares. viii. Seaworthy packing, preservation and transportation from the manufacturer's works to the nearest port for foreign supply; packing and supply ex-works basis for indigenous supply. ix. Supplier is to make provision that the equipments shall be capable for working continuously at an ambient temperature specified in the input data sheet.				
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स्वत्वधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है। इसका प्रयोग एवं प्रसारण बिना भारत भारती इलेक्ट्रिकल्स की लिखित अनुमति के बिना नहीं किया जा सकता।		Notes: i. No civil work relating to ground level is in bidder's scope. However, the foundation detail and necessary instructions, if any, in respect to locating of the centralized hydraulic supply unit from foundation point of view, has to be furnished by the bidder well in advance. This detail is required for finalization of the interface engineering activities. ii. Foundation bolts and fasteners for equipment fastening shall be in the bidder's scope. iii. Counter flanges along with fasteners & seals suiting to the end connections of actuators & HPSU shall be in bidder's scope. iv. In this bid specification, the company submitting the inquiry, namely ' BHARAT HEAVY ELECTRICALS LIMITED, HARDWAR, INDIA ' is herein after referred to as "Purchaser" or "BHEL", the manufacturer tendering the bid is referred to as "Bidder", the bidder to whom contract is awarded to as "Supplier".				
हस्ताक्षर एवं दिनांक SIGN & DATE	16/11/11	1.2 Responsibility of bidder: 1.2.1 The bidder shall be responsible for providing all material, equipment and services, specified or otherwise which are required to complete the system and fulfill the intent of ensuring the successful operation, maintainability and the reliability of the complete work covered under this specification. It is not the intent to specify completely here in, all aspects of design and construction of equipment. Nevertheless, the equipment shall conform in all respects to high standards of engineering, design & workmanship & shall be capable of performing in continuous commercial operation, in a manner acceptable to Purchaser/owner.				
सामग्री सूची संख्या INVENTORY	P-6301	REV. NO. 02		निर्माणकर्ता WORKED BY	SHUBHAM MITTAL	16.4.11
				जांचकर्ता CHECKED BY	R.C. AGARWAL	16.4.11

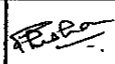
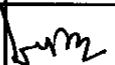
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सामग्री सूची संख्या को अतिरिक्तित्व करता	SUPERSEDES INVENTORY NO.	1.2.2 The bidder is requested to carefully examine and understand the specification prior to submitting the technical offer. Any deviation with respect to BHEL specifications shall be clearly identified in the offer & shall be submitted for BHEL review and approval. No deviation will be allowed after placement of order. 1.2.3 The bidder shall furnish the filled up checklist of documents to ensure completeness of their offer. 1.3 Reliability & Provenness: All equipments, components & accessories furnished against this specification shall be from the latest proven product range of the bidder. The satisfactory operation & high reliability of these equipments, components & accessories should have been fully established by a considerable record of successful operation. Purchased items shall be procured only from the proven suppliers & the list of all such items shall be furnished for BHEL review/ approval. The Major casting/ forging shall be procured from experienced vendors only. The vendor to submit list of vendors of major casting/ forgings incorporating their experience in last 5 years for the casting/ forgings of applicable material & weight (equal or higher) for BHEL review/approval. 2.0 FUNCTION: During startup, shutdown due to load shedding or turbine trip out, and also at operations below minimum boiler load, the LP turbine cannot accommodate the entire volume of steam. The LP Bypass control system enables to establish an alternative path for dumping the excess steam into the condenser after de-superheating. 3.0 SCOPE OF SUPPLY: 3.1 The requirement is for LP Bypass Valves comprising of combined Stop & Control valves mounted in a single valve body with respective Electro-hydraulic Actuators and a centralized Hydraulic Power Supply Unit (HPSU). Water injection valve(s) with actuator(s), flow nozzle(s) for measuring water injection quantity are also envisaged in the supplier's scope. The specifications for water injection valve(s) and flow nozzle(s) are separately envisaged. Accessories for valves e.g. hydraulic test device, steam blowing devices, accessories for hydraulic system e.g. flushing device, filling & gauging device for hydraulic accumulator and manually operated control fluid pump for filling of fluid in control fluid tank of HPSU shall also be in the supplier's scope. Desuperheating of downstream steam and Fire Resistant Fluid (FRF) may be or may not be in supplier's scope. Such requirements are clarified in input data sheet enclosed with the specification. Scope of supply with regard to other requirements e.g. special tools & tackles, commissioning spares, mandatory spares, supervision during erection and commissioning, connecting pipe, dump tube etc. shall be as per the input data sheet. 3.2 LP bypass valve with only one stem (single stem valve) is foreseen in some projects as per owner's requirements. In such cases, the valve is actuated for stop as well as control functions by its hydraulic actuator. This requirement is defined in the enclosed input data sheet.		
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सामग्री सूची संख्या INVENTORY NO. P-6301	दिनांक एवं हस्ताक्षर SIGN & DATE 	REV. NO.02	निर्माणकर्ता WORKED BY SHUBHAM MITTAL	16.4.11
			जांचकर्ता CHECKED BY R.C. AGARWAL	16.4.11

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सामग्री सूची संख्या INVENTORY NO.	4.0 COMBINED LP BYPASS STOP & CONTROL VALVE: Valves are to be designed to meet the requirements as stipulated in the input data sheet. The supplier shall ensure that LP bypass valve design shall be capable to withstand thermal shocks occurring during operations.				
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	4.2 Valve Connections (For Piping) : Valve manufacturer shall also indicate the steam inlet & outlet connection sizes, material & the type of weld edge preparation inline with input data sheet for BHEL review and approval.				
	4.3 Valve Seat Tightness : Seat tightness of LP bypass stop and control valves shall be equivalent to block valve tightness confirming to MSS-SP-61.				
	4.4 Drain & Warm-up Connections: Location for warm-up Connection : To be provided at the lowest position of Stop Valve Location for Drain Connection : To be provided at the lowest position of Control Valve Drain connection size : Ø60.3X3.91 Warm-up connection size : Ø60.3X3.91 The supplier shall furnish drain & warm-up connection Size, Material and Weld edge detail for BHEL review and approval.				
स्वतंत्र अधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं अथवा वितरण के बिना भी तदनुमति के बिना न किया जाए।	4.5 Steam Strainer: Steam strainer is to be provided on Stop valve side and it is not mandatory for Control Valve side. It should be installed inside the valve casing in such a way that it renders trouble free, reliable and safe service and is also easy to carryout maintenance. Valve manufacturer is to furnish the detailed sectional view drawing indicating therein the strainer material, fitting details and also specify the pressure drop across the strainer.				
हस्ताक्षर एवं दिनांक SIGN & DATE	4.6 Noise Level: Maximum Noise Level: 85dB (A) at a distance of 1 meter from the body.				
सामग्री सूची संख्या INVENTORY NO.	4.7 General Valve Mounting Arrangement: Type of valve arrangement shall be in accordance with the input data sheet. The valve may be suspended type or pipe mounted as specified in the input data sheet. A typical arrangement of				
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SUPERSEDES INVENTORY NO. समशी सूची संख्या को अधिकतम करने वाली		vertically suspended valve is shown in the Appendix-1.			
		Valve manufacturer shall provide the valve support paws/brackets, which may be welded or integrally cast or fastened to the valve body. Details of the valve support paws/bracket shall be furnished at the time of offer. <i>In case of suspended type valve, frame for valve suspension and valve suspension arrangement shall be in BHEL scope.</i> Valve manufacturer shall furnish the General Arrangement drawing duly indicating therein the overall assembly dimensions, actuators dismantling space, total weight & must show the location of actuator oil connection and C.G (Center of Gravity) of the complete assembly.			
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		4.9 Other Requirements: The supplier to furnish leakage flow quantity through glands of stop & control valve for which pressure of 0.5 bar may be considered at the downstream. Size & material of the weld end for leakage flow connections shall be furnished. In case no leakage from valve glands for stop and control valve are foreseen in the design, specific confirmation for this shall be given in the offer.			
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		6.0 LP BYPASS STOP & CONTROL VALVE ACTUATORS:			
हस्ताक्षर एवं दिनांक SIGN & DATE	28/11/11	6.1 LP Bypass Stop & Control Valve Actuators Schemes (Proposed):			
		a) Sizing of actuators and all other elements such as Filters, Cartridge valves, check valves and throttle orifices etc. mounted on the control manifold of the respective actuators is in the supplier's scope. Servo-valves for control valve actuators shall act as an interface between the actuators and BHEL's control system, which shall position the control valves as per system requirement. The vendor may offer Servo-valve/ proportional valve as per their standard practice. The design of the Control Valve Actuator shall be such that in case of interruption of CF supply or the electrical signal, the LP bypass control valve shall remain "IN PLACE" during failure mode. For quick closing of stop valves, 2 nos. solenoid operated Poppet valves (TSV's) shall be supplied. Solenoid shall be with single / double coils as per supplier's standard practice and operation of coil(s) (simultaneous operation on both coils in case of double coils) of any one			
सूची संख्या INVENTORY NO. P-6301	REV. NO. 02	निर्माणकर्ता WORKED BY		SHUBHAM MITTAL	16.4.11
		जांचकर्ता CHECKED BY		R.C. AGARWAL	16.4.11

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शीर्षक सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	TSV should affect trip. The Trip Solenoid valves shall be connected to protection system supplied by BHEL. All Solenoid Valves (Pilot Valves and TSVs) shall be rated for 25V±5V. All the valve actuators shall be capable of operating at 60°C control fluid temperature continuously. Refer proposed actuator schemes as per enclosed Appendix-3 & 4. However, Supplier will prepare their own schemes and submit the same for BHEL review and approval. b) In case of LP bypass valve with one actuator (Single stem valve), the applicable scheme as per Supplier's standard practice shall be submitted for BHEL review & approval. However a typical scheme is attached as per Appendix-5. c) All filters of actuators shall be equipped with differential pressure switches for alarm along with local indication for clogging. 6.1.1 Position Measurement of Valves: Each Stop Valve Actuator should be equipped with 4 Limit Switches (i.e. 2 for Open & 2 for Close position). Limit Switches shall be of mechanical type. Each Control Valve actuator should be equipped with non-contact type position transmitter for measuring the position of the Control valve. Details of the same shall be furnished along with the offer. The output of the Position Transmitter shall be 4 mA (valve fully closed) to 20mA (valve fully opened). 6.2 Operating Time: (a) For LP bypass stop & control valve (Double stem): (i) LP Bypass Stop Valve Actuator: Opening time : < 2 Seconds for full stroke (Against spring force) Closing time : = 1±10% Seconds for full stroke (With spring force) (ii) LP Bypass Control Valve Actuator: Opening time : < 2 Seconds for full stroke Closing time : < 2 Seconds for full stroke (b) For LP bypass valve (Single stem): In case of single stem valve actuator, the operating time shall be as follows: Opening time : < 2 Seconds for full stroke (Against spring force) Closing time : = 1±10% Seconds for full stroke (For emergency closure) Closing time : < 2 Seconds for full stroke (For modulating control) To adjust the opening and closing time of actuators, throttle orifices shall be provided wherever necessary.				
शीर्षक सूची संख्या INVENTORY NO.	REV. NO.02	निर्माणकर्ता WORKED BY	SHUBHAM MITTAL		16.4.11	
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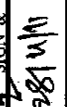
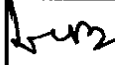
निम्नक एवं दिनांक SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 47050 पृष्ठ 28 का 10 Page 10 of 28		
सामग्री सूची संख्या INVENTORY NO	SUPERSEDES INVENTORY NO	6.3 Mounting Arrangement of Actuators: Type of arrangement required is specifically mentioned in the input data sheet. A typical arrangement of LP Bypass valve is shown in Appendix-1 for straight type of valves for which orientation of actuators shall be as follows: - Stop Valve Actuator : Vertical (Standing) - Control Valve Actuator : Vertical (Hanging) Incase of Angle type of valve arrangement , the Stop valve and Control Valve actuators shall be perpendicular to each other respectively. Supplier is to ensure & make provision for proper venting in the actuators for such angle type of valve arrangement. 6.3.1 Mounting Arrangement of Control Block for Actuators: The Control Block for each actuator shall be mounted on the Power Cylinder. EHA supplier shall ensure that supply and return line connections shall preferably be on the same side of the actuators as shown in the enclosed sketch (Appendix-1). 6.3.2 Actuator Control Fluid Connections: Supplier will ensure the flange end connections of supply & return pipelines as per sizes given below: - Supply Pipeline : Ø26.7X3.91, Material as per ASTM A312, GradeTP321 - Return Pipeline : Ø33.4X2.6, Material as per ASTM A312, GradeTP321 If the actuating medium used is MINERAL OIL of viscosity class as per ISOVG100 according to DIN51519 then supplier shall also make a provision for guarded pipeline connection as per size given below: - Guarded Pipeline : Ø88.9X5.49, Material Carbon Steel			
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में की गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आश्रय के बिना किसी भी तरह प्रयोग, उसे किसी अन्य व्यक्ति को देना या प्रकाशित करना गैर कानूनी है।	निम्नक एवं दिनांक SIGN & DATE 28/4/11				
सामग्री सूची संख्या INVENTORY NO P-6301	REV. NO.02		निर्माणकर्ता WORKED BY SHUBHAM MITTAL	जांचकर्ता CHECKED BY R.C. AGARWAL	16.4.11 16.4.11

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सामग्री सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	6.5 CF Pressure & Temperature: - Normal operating pressure - 160 bar - Minimum operating pressure - 115 bar - Normal Control Fluid temperature - 50+5°C - Maximum Control Fluid temperature - 75°C 6.6 Control Fluid Tray for LP Bypass Valve Actuator (Vertically mounted): CF tray shall be provided to prevent CF falling on valve body in case of leakage & CF sensor shall also be provided in the CF tray to detect leakage for indication in control room. 7.0 HYDRAULIC POWER SUPPLY UNIT (HPSU): (Refer Appendix-2, Proposed) The Hydraulic Power Supply Unit (HPSU) is required for actuation of LP Bypass Stop & Control Valve Actuators and water injection valve actuator(s) (if hydraulically actuated water injection valve(s) are envisaged in applicable specification). The EHA supplier, suiting to the control medium as specified in the input data sheet, shall do the design & sizing of HPSU. HPSU will consist of all necessary components like CF pumps, filters, hydraulic accumulators, check valves, pressure & temperature measuring instruments, Level measuring instruments, filtration-cum-cooling unit and regeneration unit for Control Fluid (CF) purification. Supplier to ensure that all the surfaces coming in contact with control fluid including control fluid tank shall be made of stainless steel. The Control fluid (CF) tank shall be adequately sized to accommodate total system quantity of fluid including fluid contained in pressure lines, return lines, actuators & hydraulic accumulators etc. Suitable provision for vapor extraction shall be provided by the supplier in the CF tank. Two nos. CF Pumps shall be provided in the CF tank with their pressure and flow control valves and shall be immersed into the CF medium in the CF tank. The electric motors of CF pumps and the pressure control valves for system pressure adjustment shall be mounted on the CF tank cover. Two CF pumps are required in the HPSU, one of that can be pre-selected for operation, whereas the other shall act as standby, operation of which shall be automatically switched over in case of any fault. Changeover of pumps shall take place depending on the CF pressure as well as outage of the working pump motor. Control of Pumps & cooling circuit will be realized in BHEL's control system. Pumps are to be designed by the HPSU supplier as pressure-controlled pumps, which shall maintain the constant pressure to a constant preset value i.e. 160bar and shall regulate the CF quantity according to the demand. Pressure surges/pulsations are required to be dampened by bladder type hydraulic accumulators, which will also ensure that the system pressure does not collapse. Accumulators shall ensure positive supply of oil to hydraulic actuators even when hydraulic oil pumps are not available. Accumulators shall be adequately sized to ensure supply for at least two complete stroking operations of all connected actuators. Sizing of the accumulators shall be done by the HPSU supplier and supplier shall decide the quantity & capacity of accumulators for reliable operation of the actuators.				
सामग्री सूची संख्या INVENTORY NO.	REV. NO. 02	निर्माणकर्ता WORKED BY	SHUBHAM MITTAL		16.4.11	
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सामग्री सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	Two nos. separate cooling-cum-filtration circuits (filtration rate of return line filters is 3μ absolute) shall be provided in order to maintain the cleanliness of the system and to ensure proper cooling. Separate AC driven circulation pumps with 2X100% capacity shall be provided to pump CF into these circuits. 2X100% coolers shall be provided for cooling of CF. The fans of the coolers shall cut in and out depending upon the CF temperature. The circulation pumps shall also pump CF into the regeneration circuit, which shall be equipped with filter (12μ) for continuous filtration of the CF. (Applicable if CF is used). Cooling by air shall be foreseen if the ambient temperature is up to 49°C. For ambient temperature more than 49°C, cooling with water shall be foreseen. Water quantity & quality requirements shall be furnished by the supplier along with the offer for arranging the same by the purchaser. Provision of heater for heating the control fluid shall be kept for projects where ambient temperature goes up to 5°C and below. The HPSU supplier shall mount a console containing local pressure gauges, pressure switches & nipples for commissioning measurements on the CF tank. Moreover, coarse filters with contamination indicator & pressure relief valves for pump protection are to be provided by the supplier. The complete HPSU shall be housed inside the cabinet and for emergency manual tripping, a switch shall be provided on the terminal box. HPSU Circuit diagrams drawn on either metallic or plastic sheet in color should be riveted inside the door panel. Supplier is to make an arrangement for mounting electric lamps inside the housing. The HPSU supplier shall provide 03 no. pressure line and 03 no. return line connections in HPSU as per the following details: 01 no. each of pressure and return line connections for LPBP stop & control valve no.-1. 01 no. each of pressure and return line connections for LPBP stop & control valve no.-2. 01 no. each of pressure and return line connections for water injection valve(s). In case the water injection valve(s) are with pneumatic actuators only 2 no. of pressure and 2 no. of return line connections shall be applicable as mentioned at sl. no. a) & b) above. 7.1 Electric Wiring: Electrical wiring of all the hydraulic assemblies is part of the supplier's scope of supply. It includes measuring & signal devices. All electric components must be wired up to junction box (JB) of the unit. The JB will have IP55 degree of protection. A separate JB meant for pump motors connection shall also be provided. No internal wiring shall be done by BHEL inside the HPSU housing cabinet. JB wiring diagram along with data of all the electrical equipment as mounted on HPSU & as well as on control block of Actuators, Position measuring instruments and cable termination details must be supplied along with the main equipment. Internal wiring to JB must be housed in protective channels of galvanized sheet metal with removable covers. Steel-clad hose/conduit must protect the connecting cable to individual components. The length of free cables (i.e. at plugs or connections) should not be longer than 500mm. Protective devices for wiring should also be supplied for equipment, which is not wired (i.e. motors, solenoid valves), ending at the appropriate location of the base frame.			
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स्वत्वधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।					
हस्ताक्षर एवं दिनांक SIGN & DATE 28/4/11					
सामग्री सूची संख्या INVENTORY NO. P-6301	REV. NO. 02		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	SHUBHAM MITTAL R.C. AGARWAL	16.4.11 16.4.11

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SUPERSEDES INVENTORY NO.	7.1.1 Instruments in HPSU: (a) Pressure transmitter is to be provided at the discharge of each CF pump and also in the CF header. All pressure transmitter to be 'SMART' type with HART protocol. (b) All filters to be equipped with differential pressure switches for alarm along with local indication for clogging. (c) Suitable pressure switches and gauges to be provided in HPSU. (d) Two (2) nos. Resistance temperature detectors along with temperature transmitters to be provided for measuring the temperature in the tank. (e) Suitable level gauges & three (3) no. level transmitters to be provided on the CF tank for level measuring. (f) Contact rating of all the switches to be furnished. (g) Number & type of instruments shall be subject to BHEL approval. Complete instrument list showing range, model no. and set point of various instruments shall be furnished for BHEL approval.				
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स्वतंत्रिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।		(a) For operation of Control Valves, BHEL shall supply ± 7.5 mA / ± 30 mA signal to servo-valves/ proportional valves from its DCS. (b) In case vendor system is not able to accept this signal, 4-20 mA demand signal can be furnished by BHEL. In such a case suitable positioner shall be supplied by the vendor for interfacing with servo-valve / proportional valve. In this case, final operation of all the components of actuators (stop valves, control valves and water injection valves), i.e. TSVs, Pilot valves and interlocking valves shall also be from vendor's system. Suitable signals shall be provided from BHEL's DCS for control of these elements. Necessary software for calibration / parameterization of the positioner shall also be supplied.			
दिनांक एवं स्थान SIGN & DATE 28/11/11		7.1.3 Power Supply: Power supply requirements for all 3 phase motors shall be 415V $\pm$ 10% AC. In case of different requirement the same shall be specified in the input data sheet.			
शीर्षक एवं संख्या INVENTORY NO. P-6301		7.2 Coating, Cleaning and Preservation: Supplier shall furnish the colour scheme for BHEL review and acceptance. Before preservation, the interior surface of the HPSU must be cleaned thoroughly. Before delivery of HPSU, the unit should be coated inside with hydraulic fluid containing a suitable inhibitor. Additives used must not degrade the quality of hydraulic medium. All external connections must be sealed with metal plugs. All items as listed in the supplier's part list have TAG nos. & must have nameplates, which shall be attached in such a way so that they can be seen & read easily. Nameplates must be designed 10X50 mm with 7-mm inscription height & mounted by notch spikes.			
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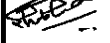
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सामग्री सूची संख्या INVENTORY NO.		8.0 TOOLS & TACKLES: The bidder shall submit with the equipment one complete set of all special tools & tackles & other instrument required for site erection & commissioning, assembly, disassembly & proper maintenance of the LP Bypass system. The bidder along with the offer shall submit a list of such tools and tackles. In case, new requirement of any special tool arises during installation of LP bypass system equipments the same shall be supplied by the supplier free of cost.				
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स्वतंत्राधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग को कि कम्पनी के हित में संश्लेषण न किया जाए।		9.3 Welding Materials & Consumables: The properties of welding materials and consumables to be employed (mechanical, chemical, thermal, long term performance etc.) shall be matched to the base metal. The supplier shall ensure that the welding materials and consumables have National/International approval for the intended application. For site erection purpose, the supplier shall submit to the purchaser the Field Welding Schedule (FWS) for field welding activities. The FWS shall be submitted to the Purchaser/Owner along with all supporting procedures, like welding procedures, heat treatment procedures, NDT procedures etc., at least 30 days before schedule start of erection work at site.				
दिनांक एवं हस्ताक्षर SIGN & DATE	28/11/11	9.4 Welder Qualifications: For the work to be performed only those welders shall be used who are qualified as per DIN EN287-1 or per any comparable Indian/International standard for metals to be welded and the welding procedure to be employed.				
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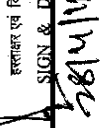
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सामग्री सूची संख्या INVENTORY NO. को अभिलिखित करना		10.0 FUNCTIONAL & TESTING REQUIREMENTS: (Refer Format-1, APPENDIX-6) Supplier shall furnish & specify the various functional & test requirements of LP Bypass valves, Actuators & HPSU in the prescribed format as enclosed and submit the same for BHEL approval. The supplier shall also furnish copies of the reference documents/their standards/acceptance norms/tests & inspection procedure etc. as specified in the format-1. Without approval of functional & testing requirements, the supplier will not start manufacturing. This document shall form a part of the contract. BHEL/Owner shall identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of the BHEL/Owner's Engineer or his authorized representative and beyond which the work will not proceed without consent of Purchaser/Owner/Authorized representative in writing. Following functional tests are to be carried out at supplier works: 1. HPSU testing as per suppliers approved test procedure 2. LP Stop & Control Valve Actuators testing without bypass valve as per supplier's approved procedure 3. Cv test (type test) of LP Bypass Valve without actuators: (i) Cv test will be carried out for LP Bypass valve as per ISA 75.02 and test report shall be submitted for BHEL approval. The Cv test can be carried out physically on the valve or through computer simulation. (ii) The Cv test shall be carried out in presence of the BHEL representative, for which minimum 30 days notice shall be given by the supplier. The supplier shall obtain the BHEL approval for the Cv test procedure before conducting the Cv test. The Cv test procedure shall clearly specify the test set-up, instruments to be used, procedure, acceptance norms, recording of different parameters, interval of recording, precautions to be taken etc. for the Cv test to be carried out. (iii) In case test report is already available on the same model/type/size/rating of the valve as proposed to be supplied under this contract and the Cv test have been either conducted at any independent laboratory or have been witnessed by a client, the same can be considered if Cv test have been carried out not more than 5 years from the date of bid opening. (iv) In case the offered valve is already in successful operation using the same valve body, seat and trim combination as of the offered valve, the vendor may furnish the name of project, data sheet, cross sectional drawing of that valve for review in lieu of the Cv test report. 4. NDT of castings/forgings: (a) The ultrasonic test shall be carried out as follows: I. Forgings conforming to quality level-4 as per EN 10228-3. II. Castings conforming to the following requirements as per EN 12680-2: (i) All the weld seams, high stress areas and sealing surfaces shall conform to quality level-I. (ii) Rest of the casting shall conform to quality level-II.					
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दिनांक एवं हस्ताक्षर SIGN & DATE 		सामग्री सूची संख्या INVENTORY NO. P-6301					
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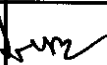
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सामग्री सूची संख्या INVENTORY NO.		SUPERSEDES INVENTORY NO.		(b) WPS & PQR shall be got approved by BHEL, before start of welding on weld seams. (c) Stress relieving shall be performed after welding. The vendor shall report the hardness survey of the heat affected zone (HAZ), weld and parent materials. (d) All the weld seams shall be radiographically tested conforming to quality level-I as per ASTM E446. 5. Hydrostatic body test of LP bypass valve in accordance with ANSI B-16.34 prior to seat leakage test. 6. Valve closure test and seat leakage test in accordance with ANSI B-16.34 and as per the leakage class MSS SP61. 7. LP Bypass valves testing along with actuators in assembled condition. 8. Functional test: The fully assembled valves including actuators control devices and accessories shall be functionally tested to demonstrate times from open to close position. Any additional requirement, if any, shall be separately specified in the purchase order. In general, highest quality of workmanship shall be ensured while manufacturing and assembly of LP Bypass valves, their actuators and HPSU. 10.1 TEST CERTIFICATES: Supplier has to furnish the Test Certificates, Material Certificates; certificates for weld examination, leakage test, hot tensile tests etc before delivery. 11.0 SPARES: 11.1 Commissioning & Startup Spares: Spare & wear parts are included in the scope of supply up to completion of trial operation. The supplier shall prepare lists of all probable spares and wear parts, which indicate the recommended quantities and clear parts identification. The parts shall be manufactured in accordance with the requirements of this specification. (1) It will be the responsibility of the supplier to provide all commissioning and startup spares required for initial operation till the satisfactory completion of the Trial Operation. The supplier to ensure that no hold ups shall occur at site during erection & commissioning due to non-availability of commissioning spares. The supplier shall furnish a list of all such spares within 60 days from the date of Letter of award & such list shall be reviewed by the purchaser/Owner & mutually agreed to. List of commissioning spares shall include 1 set each of all those items which may get damage during transportation/storage such as receptical connectors & other items e.g. gaskets, packing rings, filters etc. (2) These spares will be received & stored by the purchaser at least 3 months prior to the date of commencement of trial operation & utilized as and when required.			
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निम्नक एवं दिनांक SIGN & DATE 28/11/11		सामग्री सूची संख्या INVENTORY NO. P-6301		REV. NO. 02			
निर्माणकर्ता WORKED BY SHUBHAM MITTAL		जांचकर्ता CHECKED BY R.C. AGARWAL		16.4.11		16.4.11	

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समीची सूची संख्या को SUPERSEDES INVENTORY	11.2 Mandatory Spares: The bidder shall submit their commercial offer separately for the mandatory spares as per the list furnished by the Purchaser/Owner. List of mandatory spares furnished by the bidder shall be duly correlated with their bill of material. 11.3 Recommended Spares: In addition to the mandatory spares, the bidder is required to submit as part of the contract, a complete list of recommended spare parts, for the equipment supplied based on his experience, which are essential for a plant operation of ten (10) years. In the offer, the bidder is required to furnish item wise price and total lump sum price. The purchaser is free to order these recommended spare parts at any time. The bidder shall also indicate the service expectancy period for the spare parts under normal operating condition before the replacement is necessary. All categories of spares to be supplied under this contract shall be strictly interchangeable with the parts for which they are intended for replacement. The spares shall be treated and packed for long storage under the climate conditions prevailing at the site e.g. small items shall be packed in sealed transparent plastic bags with desiccators packs as necessary. Each spare shall be clearly marked or labeled on the outside of the packing with its description and assembly parts number. 11.4 General Technical requirements for Spares: (i) All the mandatory spares covered under the contract shall be manufactured along with the main equipment as a continuous operation and the delivery of the spares will be affected along with the main equipment. In case of recommended spares the above will be applicable provided the order for the recommended spares have been placed with the supplier prior to commencement of manufacture of the main equipment. (ii) The quality plan and the inspection requirement finalized for the main equipment will also be applicable to the corresponding spares. (iii) The bidder will submit along with the offer the manufacturing drawings, catalogues, assembly drawings and any other document to identify the recommended spares. (iv) The supplier will provide the purchaser with all the addresses and particulars of his sub-vendors while placing the order on them for items/components/equipment covered under the contract. He will further ensure that the purchaser/Owner if so desires will have the right to place order for spares directly on his sub-suppliers on mutually agreed terms based on their offers.			
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में कोई भी सूचना भारत डीसी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of this company			
हस्ताक्षर एवं दिनांक SIGN & DATE 28/11/11				
समीची सूची संख्या INVENTORY NO. P-6301	REV. NO. 02	निर्माणकर्ता WORKED BY SHUBHAM MITTAL		16.4.11
		जांचकर्ता CHECKED BY R.C. AGARWAL		16.4.11

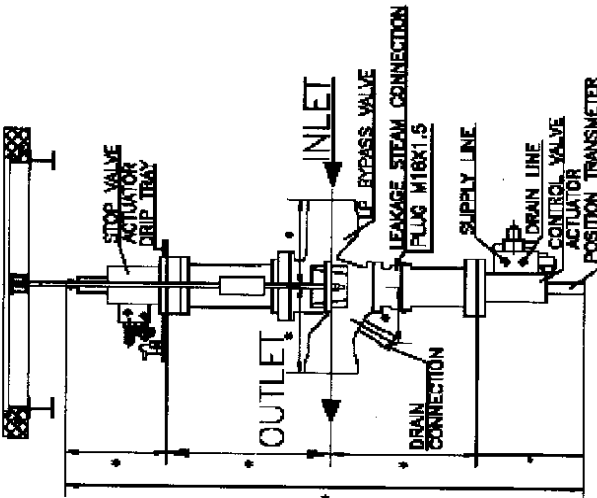
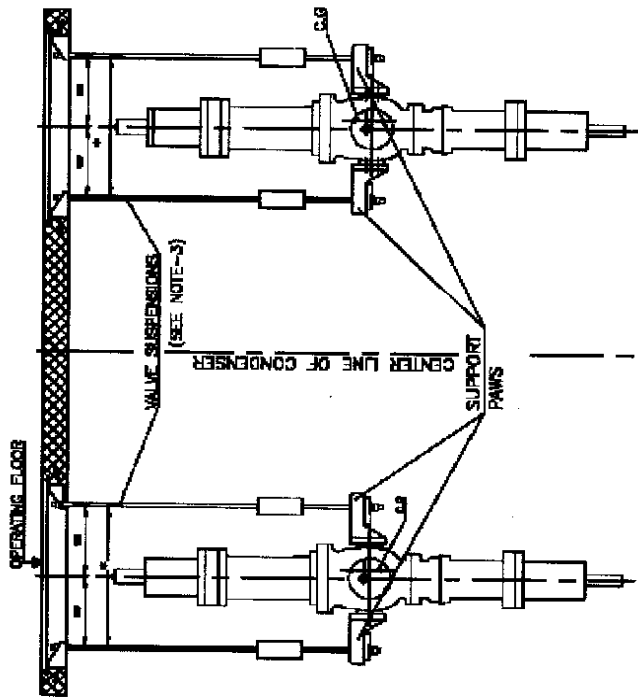
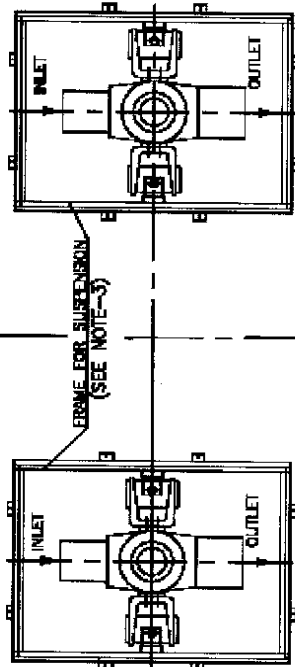
दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 47050	
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SUPERSEDES INVENTORY	सामग्री सूची संख्या को	12.0 PROCESSING & DOCUMENTATION: It is the duty of the system supplier to clarify interfaces and good cooperation with their sub-suppliers of products that interface with his scope of supply, both in the planning phase as well as on site. The supplier will be notified in writing in the event of any changes (additions or deletions) in the scope of supply and services, with written confirmation to follow on the part of the purchaser. The written confirmation does not constitute acceptance of the indicated additional or reduced costs. All major functional and mechanical design decisions shall be made together with the purchaser as per mutually agreed meeting schedules. 12.1 Processing Documents: All verification analysis, which demonstrates compliance with design warranted & specified data and which include information on interface to adjacent systems shall subsequently be designated processing, documents and shall be submitted to the purchaser for review. Verification analysis required by legislative bodies, regulatory authorities or similar entities of this nature should also be treated as processing documents. The documents to be reviewed by the purchaser or his authorized representative are listed in Section 14.2 & 14.3 below. The purchaser or designated authorized inspectors can also demand to see the documents or verification analysis to be submitted for preliminary review. All documents shall be reviewed by the supplier before being submitted unsolicited to the purchaser /authorized representative. Fabrication/Manufacturing may begin only after the submission of approved documents by the purchaser. The supplier shall check the drawings provided for parts from outside vendors for any interface with his own parts at his own end. The supplier shall also finalize all type of interface activities with their own sub-vendors. The supplier shall be held responsible for any mistake done during detailed engineering or manufacturing by their sub-vendor. The extra cost incurred due to this interface shall be borne by the supplier. The lists and schematic diagrams for instrumentation and open- and closed loop controls if prepared by the supplier shall be thoroughly checked by the supplier for completeness and correctness. All necessary drawings, detailed drawings and spare parts drawings shall be prepared using computer- based drawing programs. These must be deposited finally to the purchaser on disk and must be "AutoCAD" compatible. The required scope of documentation is established in the scope of supply. All documents shall be prepared in the project-specific language stipulated. In all instances, project-specific requirements must be duly noted and complied with when preparing & identifying the documents. The purchaser shall be made aware of all changes in the supplier's drawings by pointing out the revision remarks and indices on them is not sufficient. Physical parameters and drawing dimensions shall be given in metric units in accordance with Indian Standards.		
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दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	REV. NO. 02		
सामग्री सूची संख्या INVENTORY NO.	P-6301	निर्माणकर्ता WORKED BY	SHUBHAM MITTAL	16.4.11
सामग्री सूची संख्या INVENTORY NO.	P-6301	जांचकर्ता CHECKED BY	R.C. AGARWAL	16.4.11

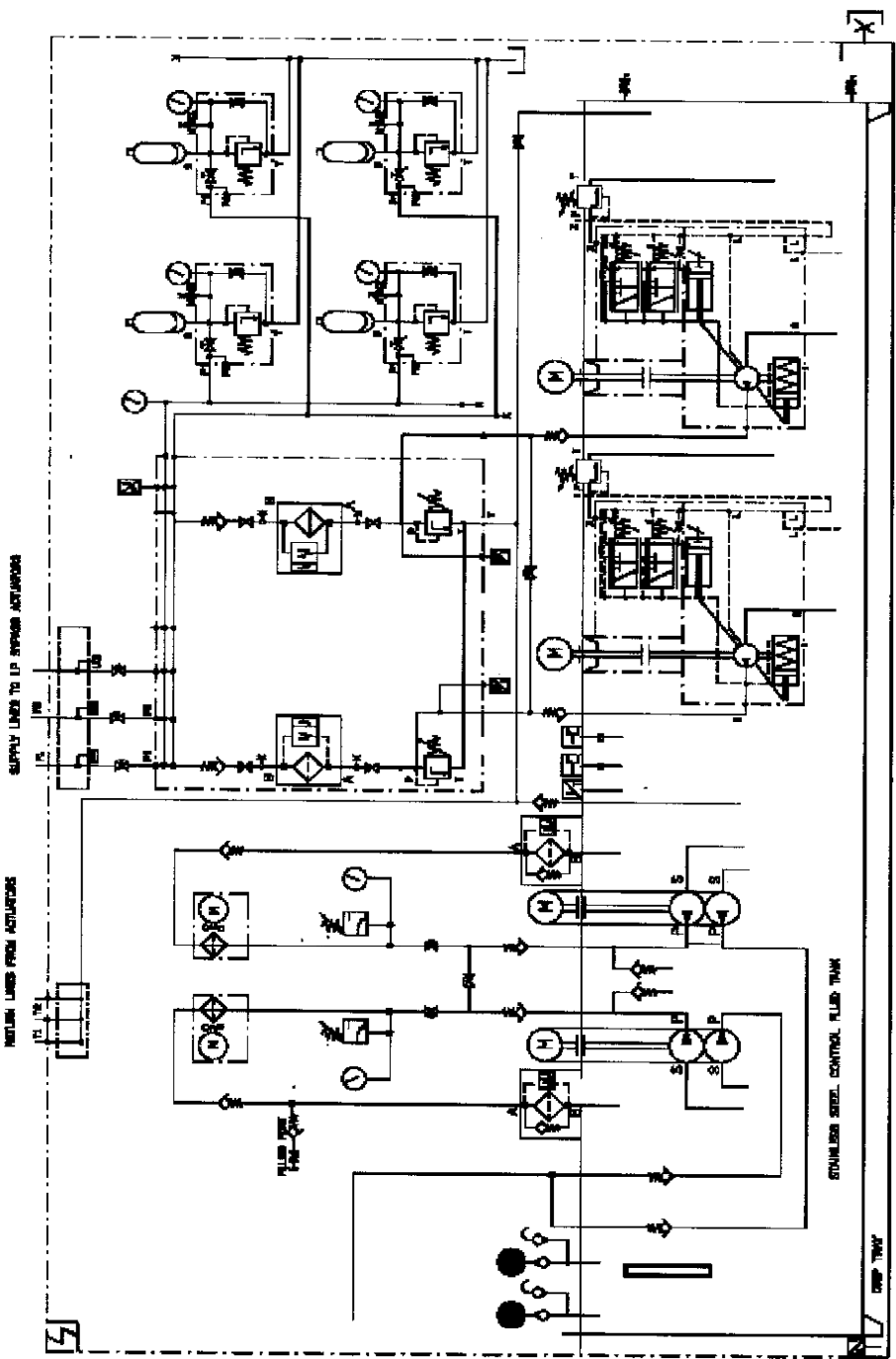
नाम एवं दिनांक SIGN & DATE		उत्पाद मानक PRODUCT STANDARD		ST 47050	
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सामग्री सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	12.2 Review Documents: Following drawings and data are to be furnished along with the technical offers in triplicate . 12.2.1 Documents related to HPSU: 1. Schematic circuit diagram showing connection of HPSU with respective bypass actuators & Sizing calculation of HPSU & its main components. 2. General arrangement drawing of HPSU indicating therein the total assembly weight, overall major layout dimensions, foundation detail, space requirement for maintenance, Flanges end connection detail and their material. 3. Schematic diagram duly indicated with all item nos., Tag Nos. and legends. In this diagram, tank capacity, pump capacity of each CF Pumps, Circulation Pumps, rated power consumption of each pump motor, filtration rating of each filter and capacity of each Hydraulic Accumulators has to be specified. 4. Part list duly indicated with item no/Position No., quantity, catalogued / Drg. reference no. & source of procurement etc. BHEL will indicate their TAG nos. against each item for identification purpose and submit the same to the supplier for necessary updation. 5.* HPSU Test procedure duly indicating therein the test detail & their acceptance norms. 6. Data sheets & *functional description of all individual items. Electrical wiring diagram. 7.* Operation, Maintenance & Erection manual. 8.* Field Weld Schedule and erection instruction for site engineers. 9.* List of Bought out items, the source of procurement has to be specified for each item. 10. List of recommended and commissioning spares. 11. Detailed 'Quality Plan' for HPSU. (See Clause no. 10.0) 12.2.2 Documents related to LP Bypass Valves & Actuators: 1. Overall General arrangement cross-sectional assembly drawing with all major dimensions required from layout point of view. Steam Inlet & Outlet weld edge sizes, bracket for Valve suspension arrangement, and location of center of gravity and also total assembly weight has to be specified in the drawings. Bill of material (BOM) of the valve with actuator assembly has to be tabulated. Assembly & disassembly maintenance space dimensions should be indicated in the drawings. 2. Separate Stop & Control Valve actuator drawings indicating therein the flange end connection detail, total actuator weight, overall dimension & dismantling space requirement. All items should be marked and listed in the BOM on the drawing itself. On the actuator drawings, schemes for Stop & Control valve actuator should also to be shown schematically. 3.* Catalogs and technical literature of Solenoid valves, Servo-valves, proportional valves, Position transducer, Positioners, Limit Switches, Relief Valves etc. 4. Sizing Calculation for Bypass valves & actuators. 5. Valve Data Sheets for LP Bypass Valve 6. List of special tools (if any)			
सामग्री सूची संख्या INVENTORY NO.	REV. NO. 02	निर्माणकर्ता WORKED BY	SHUBHAM MITTAL		16.4.11
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निर्माक एवं दिनांक SIGN & DATE				उत्पाद मानक PRODUCT STANDARD		ST 47050 पृष्ठ 28 का 20 Page 20 of 28	
सामग्री सूची संख्या INVENTORY NO		7. Valve characteristics - Lift vs Area ; Lift vs Flow - Pressure vs flow (upstream side/ down stream side) 8.* Part list of Valves, Actuators. BHEL will indicate their Tag nos. against each item and the same shall be submitted to the supplier for necessary updation. This is required for identification purpose. 9. List of Recommended & Commissioning spares. The supplier along with the main equipment shall supply commissioning spares for Valves, Actuators & HPSU. 10.* Valve & actuator test procedure. Test log sheets for valves and actuators. 11. Detailed QP for combined LP Bypass Stop & Control valves and their actuators. 12.* List of Instruments duly indicated with BHEL Tag Nos., service, set points, range & make etc. to be furnished. 12.2.3 Documents related to Water Injection Valves & Actuators: 1. Data sheets of valve & actuator indicating therein all parameters & material details. 2. General arrangement drawing of valve with actuator indicating therein major dimensions, dismantling dimensions & assembly weight. Bill of material must be tabulated on the assembly drawing. 3. Pneumatic/ Hydraulic actuator scheme (as applicable) indicating therein part numbers. 4. Part List of valve actuator. 5. Drawing for valve & actuator coupling arrangement. 6. Sizing calculation for valve & actuator. 7. Curve for water mass flow vs. % lift (indicating % lift at max. design water mass flow & min. controlled water mass flow). 8. Data sheets for all the items mounted on the control manifold. 9. Wiring diagram for electrical items. 12.2.4 Other Documents related to C & I: 1. Flow Nozzle data sheet as per ISO 5167. 2. Flow Nozzle drawing. 3. Flow Nozzle characteristic curve between differential pressure and flow (indicating calculation formula also). 4. List of Instruments (HPSU and Actuators) duly indicated with KKS Tag Nos., type, service, set points, range & make etc. 5.* Consumer list, Drive list, Signal I/O List. 6.* Recommended system logics/write-up. 7.* Electrical Terminal Wiring Details (HPSU Junction Boxes/Positioners and other components) 8.* Cabling Layout Diagram. 9.* Electro-pneumatic positioner catalogue (If applicable). 10.* Instruments Catalogues and data sheets of all electrical components. 11.* Separate feeder load list to be furnished, giving details of Power Supply, KW rating, Current drawn etc. for various motors, fans and other electrical drives. Note: “*”- These documents are required separately after placement of order.					
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निर्माक एवं दिनांक SIGN & DATE 		REV. NO. 02					
सामग्री सूची संख्या INVENTORY P-6301		निर्माणकर्ता WORKED BY SHUBHAM MITTAL		16.4.11		जांचकर्ता CHECKED BY R.C. AGARWAL	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD		ST 47050	
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SUPERSEDES INVENTORY NO.	श्रमजी पूरवी संख्या (जो अधिकतमि उत्तरा)	Documents as sent along with the technical offer shall be scrutinized and finalized at BHEL end and the same shall be sent to the supplier for furnishing the final copy in triplicate after incorporating all comments, if any, in their drawings/documents for final approval. One copy of the final document shall be sent to the suppliers for their own record and reference. Order shall be placed on the supplier only after freezing all the technical points mutually. 25 hard copies & 3 soft copies on CD of the O&M manual and all other relevant documents shall be furnished by the vendor in the event of ordering. Out of 25 hard copies of O&M manual, 3 copies shall be kept with the equipments for ready reference & use at site and remaining 22 copies along with 3 soft copies on CD shall be sent to BHEL, Hardwar 10 weeks in advance prior to dispatch of equipment. 13.0 MARKING: - All items shall be attached / fixed with a metal identification plate indicating thereon the tag number as per schemes, equipment title & main parameters of the equipment. - All the final documents shall bear the following identification markings: - Component manufacturer's name - Name of Power Plant - Item Description - Purchaser Name - BHEL P.O. No. - Revision index for documents 14.0 PACKING & TRANSPORTATION: (a) All the equipment shall be suitably protected, coated or boxed (sea worthy packing) and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. The bidder shall provide the site storage instruction applicable for the equipment after it arrives at the site. Lifting points & lugs shall be clearly identified. (b) Painting scheme along with relevant technical details for all the offered equipments shall be furnished by the supplier with the offer for review and approval by BHEL. (c) Supplier shall intimate shipping/dispatch plan of the offered equipment including details of each boxes & sub boxes to the purchaser at least 2 months prior to dispatch. One complete set of packing list duly indicating therein the detail of all items, should be placed inside the packing box for material verification at site and three copies of the same should be forwarded to the purchaser for their advance information & record. In case, there is any change in the shipping plan the same shall be informed to the purchaser well in advance.			
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शीर्षक सूची संख्या INVENTORY NO	SUPERSEDES INVENTORY NO	15.0 SUPERVISION DURING ERECTION-COMMISSIONING & TRAINING AT SITE: The supplier shall depute their representative at project site for erection & commissioning supervision. The lump sum charges for site supervision shall be included in the main offer for which the supplier has to provide the justification in the offer. The supplier shall conduct minimum 2 days training program at site regarding design/construction features, operation & maintenance of the supplied equipments (including C&I) for customer engineers and BHEL engineers during erection and commissioning. Schedule of the program shall be mutually agreed between supplier and customer/ BHEL engineers. The vendor to clearly indicate the extent of association of their service engineer during erection and commissioning of the supplied equipments at site in their offer. Further special instructions which are required to be followed at site during erection and commissioning shall be furnished by the vendor as per the schedule mentioned in the enclosed MDL. 16.0 GUARANTEE: The complete unit shall be guaranteed for 24 months of trouble free performance from the date of shipment or 18 months from commissioning date whichever is earlier. Incase of any failure or trouble reported from site, the supplier would depute their representative immediately to attend the problem and replace the defective component/parts if required. 17.0 PRICE: The supplier is to furnish the price against each assembly separately for the scope of supply as indicated in the input data sheet. 18.0 LIST OF CROSS REFERRED DOCUMENTS: - ASTM A312; DIN51519; EN10204; DIN EN287-1, EN 10228-3, EN 12680-2, ASTM E446.					
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स्वत्वधिकार एवं गोपनीय दृष्टांत प्रत्यक्ष में ही मंडल सुचना भारत भारती इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।							
उत्तराक्षर एवं दिनांक SIGN & DATE	28/4/11						
शीर्षक सूची संख्या INVENTORY NO	P-6301	REV. NO. 02		निर्माणकर्ता WORKED BY	SHUBHAM MITTAL		16.4.11
				जांचकर्ता CHECKED BY	R.C. AGARWAL		16.4.11

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				उत्पाद मानक PRODUCT STANDARD	ST 47050 पृष्ठ 28 का 23 Page 23 of 28
निर्माणकर्ता WORKED BY SHUBHAM MITTAL	जांचकर्ता CHECKED BY R.C. AGARWAL	NOTE : 1. SUPPORT PAWS AS SHOWN SHALL BE AN INTERNAL PART OF VALVE AND THESE SHALL BE IN SCOPE OF VALVE MANUFACTURER 2. DIMENSIONS AS MARKED "A" SHALL BE FURNISHED BY VALVE MANUFACTURER ALONGWITH THE TECHNICAL OFFER. 3. FRAME FOR VALVE SUSPENSION AND BYPASS VALVE SUSPENSION SHALL BE IN THE PURCHASER SCOPE I.E. IN BHEL SCOPE. 4. VALVE MANUFACTURER HAS TO FURNISH THE TOTAL ASSEMBLY WEIGHT AND ALL MAJOR DIMENSIONS AND ALSO THE CO-ORDINATES OF C.G. 5. STEAM OUTLET CONNECTION OF BYPASS VALVE SHALL BE CONNECTED WITH PIPE CONNECTED FURTHER WITH CONDENSER WITH 1° SLOPE		APPENDIX-1 GENERAL ARRANGEMENT OF LP BYPASS VALVES (TYPICAL)	
16.4.11	16.4.11				

शारीरी सूची संख्या INVENTORY NO. P-6301	हस्ताक्षर एवं दिनांक SIGN & DATE 28/11/11	स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भर्तृ के अतिरिक्त अन्य को समर्पित है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाय ।	COPYRIGHT AND CONFIDENTIAL. The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	शारीरी सूची संख्या ओ अधिकारित जावरी SUPERSEDES INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 02	 उत्पाद मानक PRODUCT STANDARD ST 47050 पृष्ठ 28 का 24 Page 24 of 28 APPENDIX-2 HYDRAULIC POWER SUPPLY UNIT FOR LP BYPASS SYSTEM (TYPICAL) 			
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जांचकर्ता CHECKED BY	R.C. AGARWAL		16.4.11							

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उत्पाद मानक		PRODUCT STANDARD	
निर्माण एवं मर्यादा		SIGN & DATE	
SUPERSEDES INVENTORY NO.		रामजी चौकी संख्या की अभिलेखित प्रतिलिपि	
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हस्ताक्षर एवं दिनांक		SIGN & DATE	
INVENTORY		P-6301	
REV. NO. 02		निर्माणकर्ता	
WORKED BY		SHUBHAM MITTAL	
जांचकर्ता		R.C. AGARWAL	
CHECKED BY		16.4.11	
16.4.11		16.4.11	