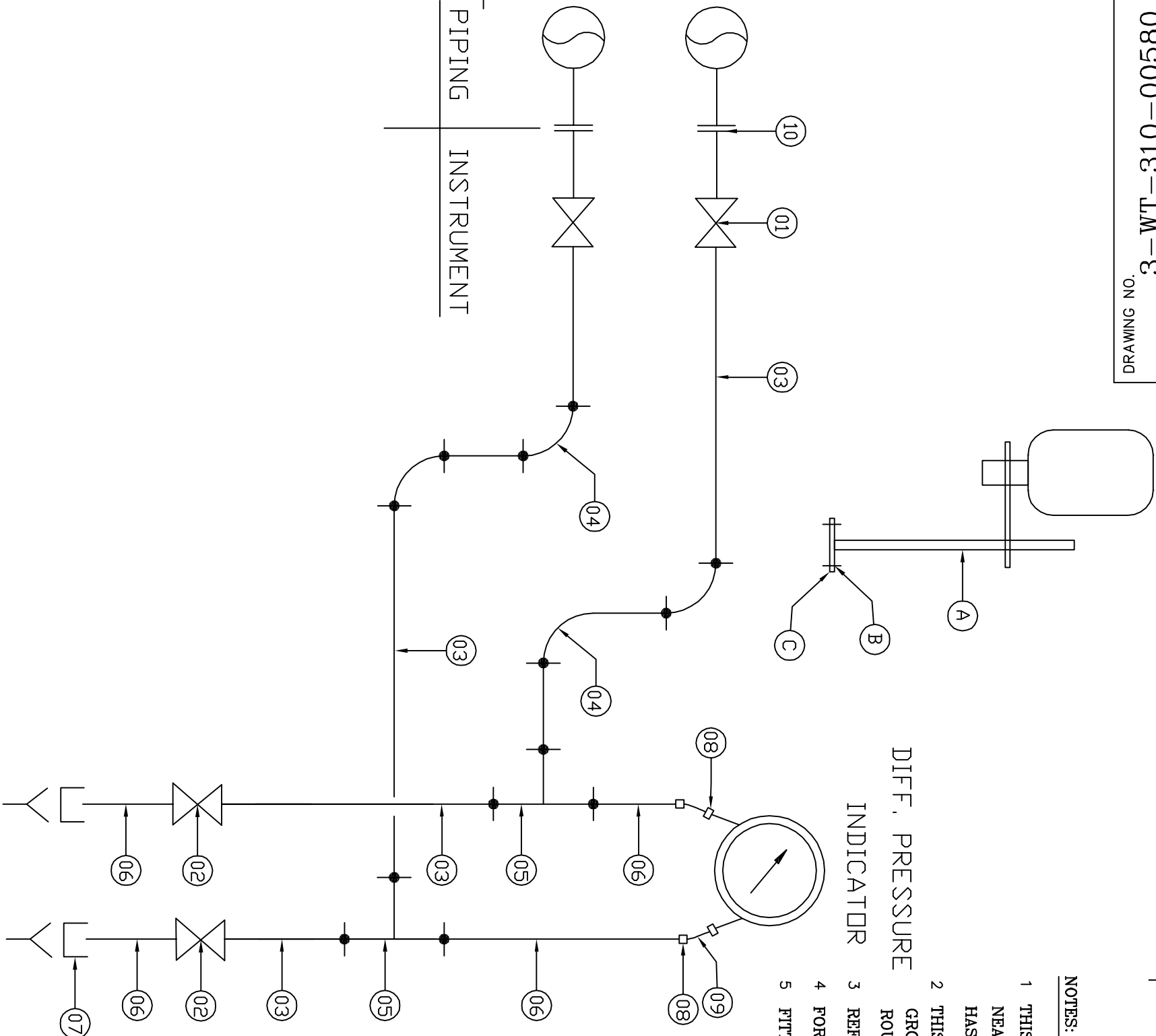


FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GWS FOR MATCODE&SPEC.

NOTES:

- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUTED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
- 2 THIS INSTRUMENT SHALL BE LOCATED AT A SUITABLE LOCATION ON THE GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY ROUTED TO THE INSTRUMENT.
- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 FITTING SHALL SUIT THE END/PROCESS CONNECTION

DIFF. PRESSURE INDICATOR



DIFFERENTIAL PRESSURE INDICATOR/SWITCH/TRANSMITTER					
S/NO	ITEM NO	QTY.	UNIT	SIZE	SPECIFICATION
1	1	2	Nos	½"	½" ISOLATION BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)
2	2	2	Nos	½"	½" DRAIN BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)
3	3	10	Mtr	½"	½" PIPE, CPVC ASTM D 1784, DIM F441, .SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80
4	4	6	Nos	½"	½" 90 Deg. ELBOW (SOCK&SOC), CPVC ASTM D 1784, DIM F441, .SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80
5	5	2	Nos	½"	½" TEE (SOCK&SOCK&SOC), CPVC ASTM D 1784, DIM F441, .SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80
6	6	4	Nos	½"	½" NIPPLE 4" LONG (ONE SIDE ½" NPT (M) x OTHER PLAIN END), CL-150#, CPVC ASTM D 1784, DIM F441, .SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80
7	7	2	Nos	½"	½" NPT(F) END CAP, CPVC ASTM D 1784, DIM F441, .SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80
8	8	4	Nos	½"	½" OD TUBE x ½" NPT(F) FEMALE CONNECTOR
9	9	2	Nos	½"	½" OD SEAMLESS IMPULSE TUBE
10	A	1.5	Mtr	2"	2" NB PIPE
11	B	1	Nos	-	ANCHOR PLATE (200mmx200mm)
12	C	4	Nos	M12x70	ANCHOR FASTENER
13	10	1	Set	½"	(i) ½" COUNTER FLANGE (SOCKET TYPE) (ii) NEOPRENE GASKET 3MM TK (iii) M12x50MM 4 SET OF HEX SCREW WITH NUT AND PLAIN WASHER
					CPVC
					INST.

BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

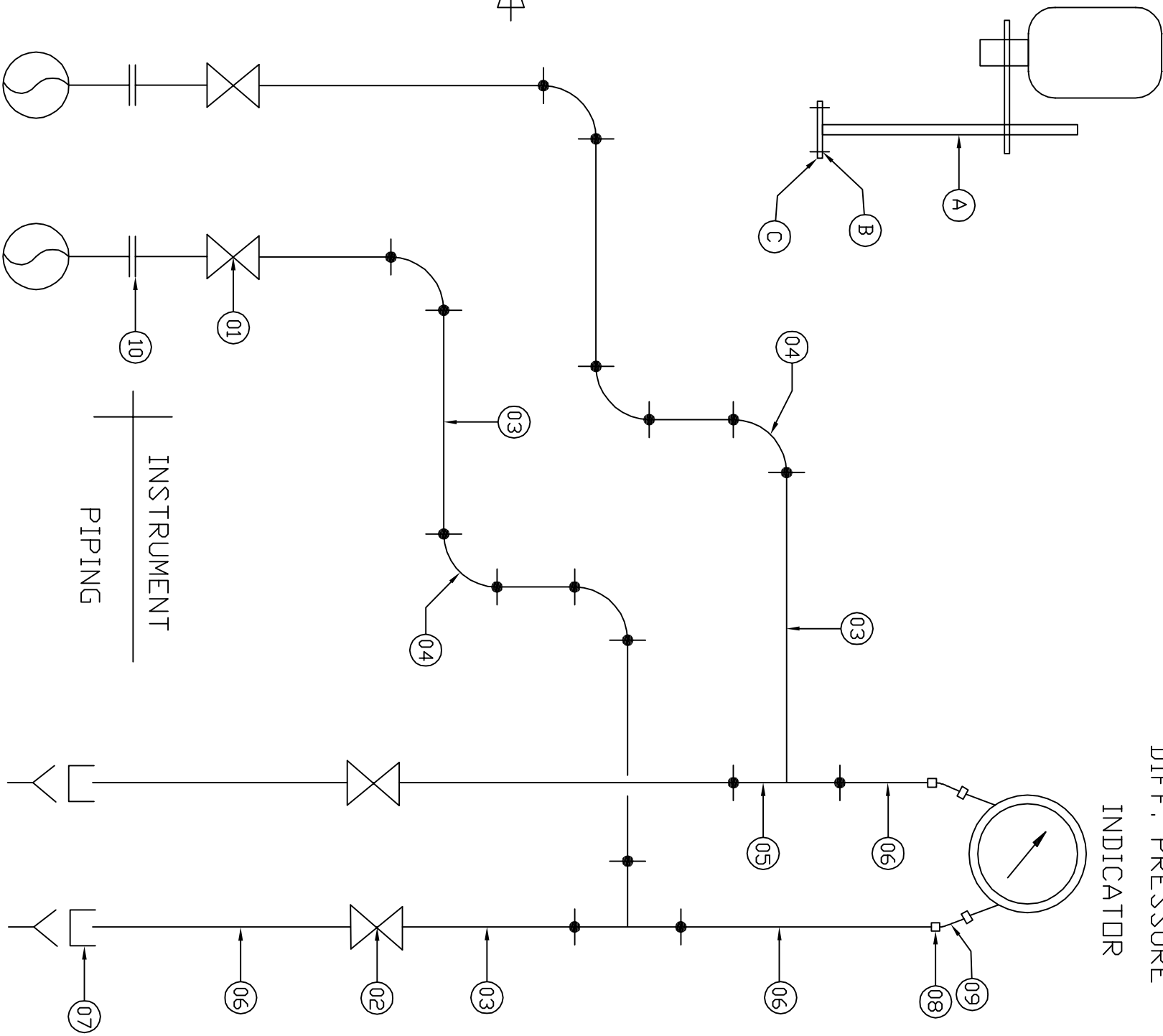
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DEPT	NAME	SIGN	DATE
CODE	DESIGN	PVS	
CHD	AT/AUV		
APPD	VNS		

TITLE
DIFFERENTIAL PRESSURE INDICATOR/SWITCH/TRANSMITTER
INSTALLATION IN GRP LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.
SIGN			3-WT-310-00580
DATE			SHEET 1 OF 1 REV. 0



DIFF. PRESSURE
INDICATOR



NOTES:

- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUDED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
- 2 THIS INSTRUMENT SHALL BE LOCATED AT A SUITABLE LOCATION ON THE GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY ROUTED TO THE INSTRUMENT.
- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 FITTING SHALL SUIT THE END/PROCESS CONNECTION

DIFFERENTIAL PRESSURE INDICATOR/ SWITCH/ TRANSMITTER						MATERIAL		REMARK
S.NO	ITEM NO	QTY.	UNIT	SIZE	SPECIFICATION			
1	1	2	Nos	½"	½" ISOLATION BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC		INST.
2	2	2	Nos	½"	½" DRAIN BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC		INST.
3	3	10	Mtr	½"	½" PIPE, CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC		INST.
4	4	6	Nos	½"	½" 90 Deg. ELBOW (SOC&SOC), CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC		INST.
5	5	2	Nos	½"	½" TEE (SOC&SOC&SOC), CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC		INST.
6	6	4	Nos	½"	½" NIPPLE 4" LONG (ONE SIDE ½" NPT (M) x OTHER PLAIN END), CL-150#, CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC		INST.
7	7	2	Nos	½"	½" NPT(F) END CAP, CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC		INST.
8	8	4	Nos	½"	½" OD TUBE x ½" NPT(F) FEMALE CONNECTOR	DUPLEX SS		INST.
9	9	2	Nos	½"	½" OD SEAMLESS IMPULSE TUBE	DUPLEX SS		INST.
10	A	1.5	Mtr	2"	2" NB PIPE	MS PAINTED		INST.
11	B	1	Nos	-	ANCHOR PLATE (200mmx200mm)	MS PAINTED		INST.
12	C	4	Nos	M12x70	ANCHOR FASTENER	GI		INST.
13	10	1	Set	½"	(i) ½" COUNTER FLANGE (SOCKET TYPE) (ii) NEOPRENE GASKET 3MM TK (iii) M12x50MM 4 SET OF HEX SCREW WITH NUT AND PLAIN WASHER	CPVC		INST.



BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

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				9776	CHD	AT/AUV	
					APPD	VNS	

TITLE DIFFERENTIAL PRESSURE INDICATOR INSTALLATION IN
GRP LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.
SIGN			3-WT-310-00581
DATE			

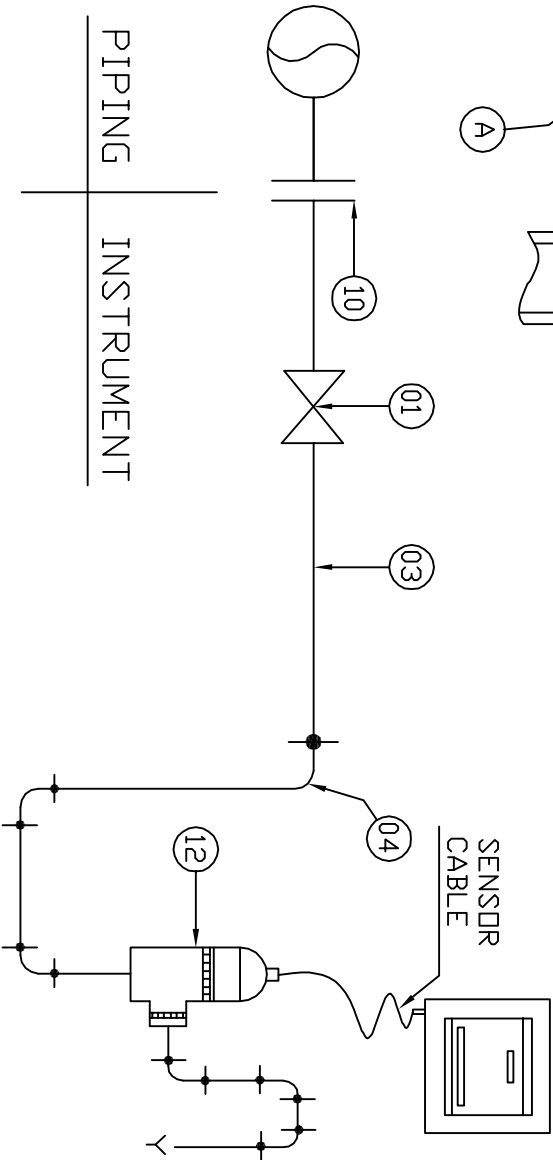
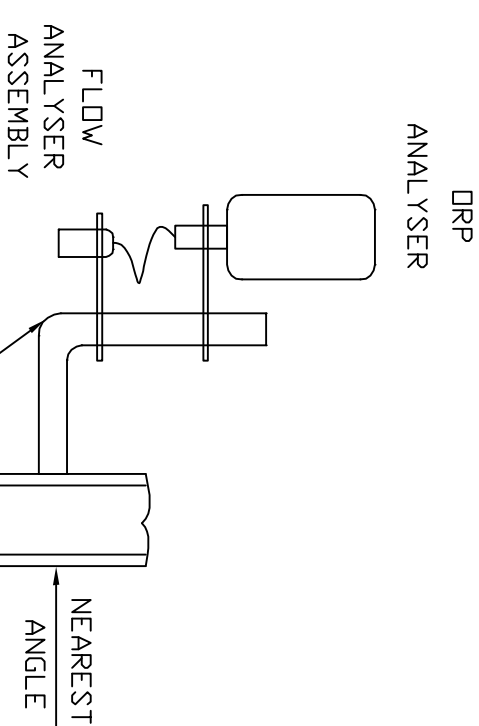
SHEET 1 OF 1 REV. 0



NOTES:

- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUDED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
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- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 FITTING SHALL SUIT THE END /PROCESS CONNECTION

ALL DIMENSIONS ARE IN MILLIMETRES
FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GWS FOR MATCODE&SPEC.



ORP/pH/CONDUCTIVITY/TURB ANALYSER						SPECIFICATION		MATERIAL	REMARK
SI. NO	ITEM. NO	QTY.	UNIT	SIZE					
1	1	1	Nos	½"	½" ISOLATION BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)			CPVC	INST.
2	3	3	Mtr	½"	½" PIPE, CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80			CPVC	INST.
3	4	6	Nos	½"	½" NIPPLE 4" LONG (ONESIDE ½" NPT (M)) x OTHER PLAIN END), CL-150#, CPVC ASTM D 1784, DIM F441, SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80			CPVC	INST.
4	12	1	Nos	½"	½" (SCOKET END) FLOW THROUGH ASSEMBLY			CPVC	INST.
5	A	0.5	Mtr	2"	2" NB PIPE			CPVC	INST.
6	10	1	Set	½"	(i) ½" COUNTER FLANGE (SOCKET TYPE) (ii) NEOPRENE GASKET 3MM TK (iii) M12X50MM 4 SET OF HEX SCREW WITH NUT AND PLAIN WASHER			CPVC	INST.



BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

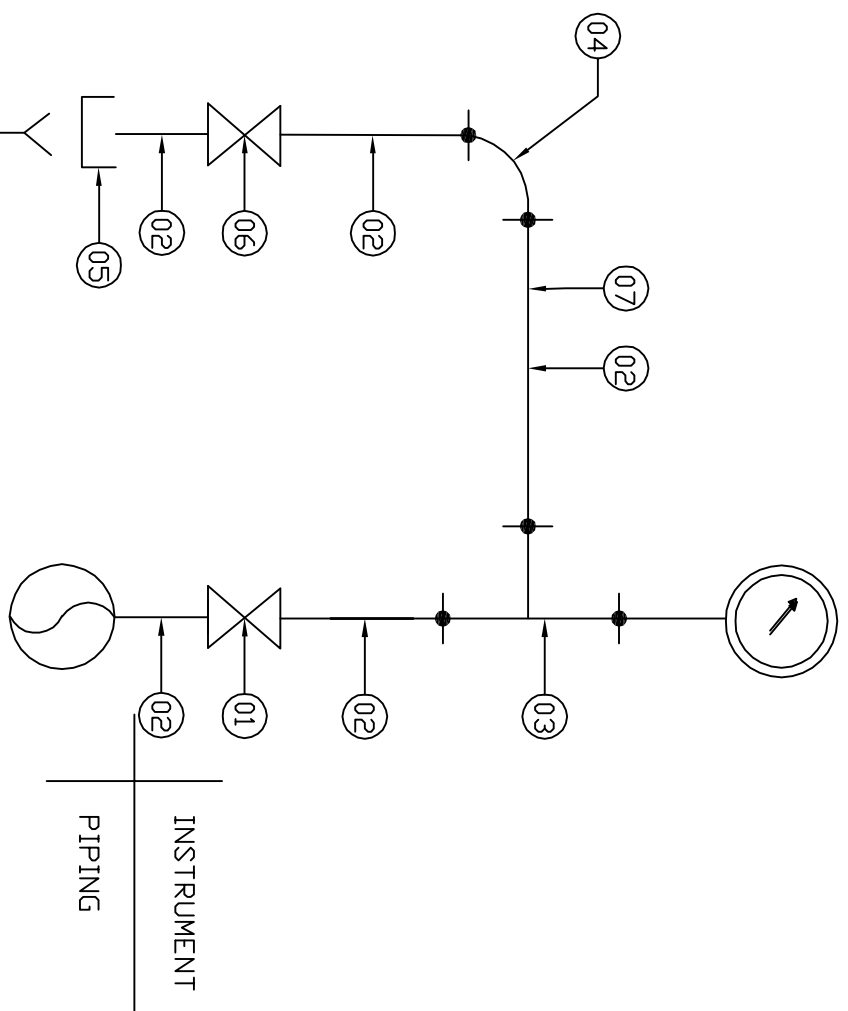
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				CODE	DESIGN	RT	
				CHD	AT/AVV		
				9776	APPD	VNS	

TITLE ORP/pH/CONDUCTIVITY ANALYSER INSTALLATION IN
GRP LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.
SIGN			3-WT-310-00582
DATE			SHEET 1 OF 1 REV. 0

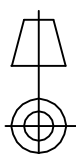


PRESSURE GAUGE/PRESSURE TRANSMITTER/
PRESSURE SWITCH



- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A
NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUTED TO THE FLOOR. THE FRAME
HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
- 2 THIS INSTRUMENT SHALL BE LOCATED AT A SUITABLE LOCATION ON THE
GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY
ROUTED TO THE INSTRUMENT.
- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 FITTING SHALL SUIT THE END/PROCESS CONNECTION

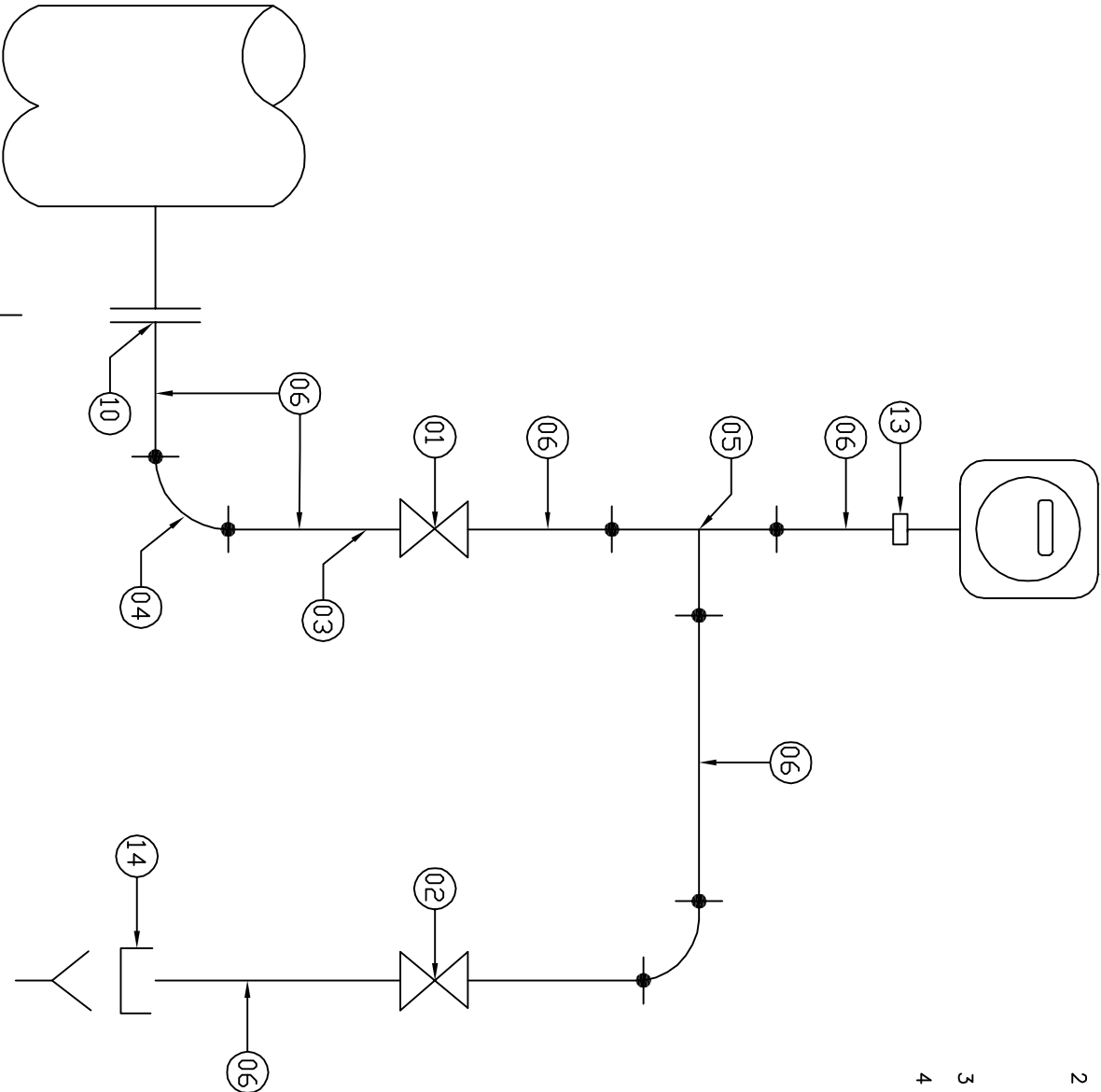
Sl.NO	QTY.	UNIT	SIZE	SPECIFICATION	MATERIAL	REMARK
1	1	Nos	½"	NPT ISOLATION BALL VALVE	DUPLEX SS	INST.
2	4	Nos	½"	½" NPT(M) NIPPLE 4" LONG	DUPLEX SS	INST.
3	1	Nos	½"	½" NPT(F) TEE	DUPLEX SS	INST.
4	1	Nos	½"	½" NPT(F) 90 DEG. ELBOW	DUPLEX SS	INST.
5	1	Nos	½"	½" NPT(F) END CAP	DUPLEX SS	INST.
6	1	Nos	½"	½" NPT(F) DRAIN BALL VALVE	DUPLEX SS	INST.
7	1	Nos	½"	½" DUPLEX SS TUBE -10 MTRS	DUPLEX SS	INST.

 BHARAT HEAVY ELECTRICALS LTD UNIT : BOILER AUXILIARIES PLANT RANIPET-632 406							
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				CODE			
TITLE PRESSURE GAUGE/PRESSURE TRANSMITTER /PRESSURE SWITCH INSTALLATION IN SS316/SS DUPLEX/GI LINE				9776	CHD	RT	
					AT/AJV		
					VNS		
			DEPT.	SCALE	NTS	DRAWING NO. 3-WT-310-00583	
			SIGN				
			DATE			SHEET 1 OF 1 REV. 0	

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GWS FOR MATCODE&SPEC.

PRESSURE TRANSMITTER
BOURDON TYPE

- NOTES:
- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GRROUTED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
 - 2 THIS INSTRUMENT & 3 VALVE MANIFOLD SHALL BE LOCATED AT A SUITABLE LOCATION ON THE GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY ROUTED TO THE INSTRUMENT.
 - 3 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
 - 4 FITTING SHALL SUIT THE INSTRUMENT END/ PROCESS CONNECTION



S.NO	ITEM.NO	QTY.	UNIT	SIZE	SPECIFICATION	MATERIAL	REMARK
1	1	2	Nos	1/2"	1/2" ISOLATION BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC	INST.
2	6	4	Nos	1/2"	1/2" NIPPLE 4" LONG (ONE SIDE 1/2" NPT (M) x OTHER PLAIN END), CL-150#, CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
3	5	2	Nos	1/2"	1/2" TEE (SOCK&SOCK), CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
4	13	1	Nos	1/2"	1/2" MALE ADAPTER (SOCK&NPT(M)), CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
5	4	6	Nos	1/2"	1/2" 90 Deg.ELBOW (SOCK&SOC), CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
6	6	4	Nos	1/2"	1/2" NIPPLE 4" LONG (ONE SIDE 1/2" NPT (M) x OTHER PLAIN END), CL-150#, CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
7	14	1	Nos	1/2"	1/2" NPT(F) END CAP,CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
8	2	2	Nos	1/2"	1/2" DRAIN BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC	INST.
9	3	10	Mtr	1/2"	1/2" PIPE, CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
10	10	1	Set	1/2"	(i) 1/2" COUNTER FLANGE (SOCKET TYPE) (ii) NEOPRENE GASKET 3MM TK (iii) M12X50MM 4 SET OF HEX SCREW WITH NUT AND PLAIN WASHER	CPVC	INST.



BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

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DEPT	NAME	SIGN	DATE
CODC			
CHD	AT/AUV		
APPD	VNS		

TITLE PRESSURE TRANSMITTER/SWITCH/INDICATOR BOURDON TYPE
INSTALLATION IN GRP LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.
SIGN			3-WT-310-00584
DATE			SHEET 1 OF 1 REV. 0



- NOTES:
- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUTED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.

FOR PRODUCTION

REF. PR:QA:590 FOR PAINTING

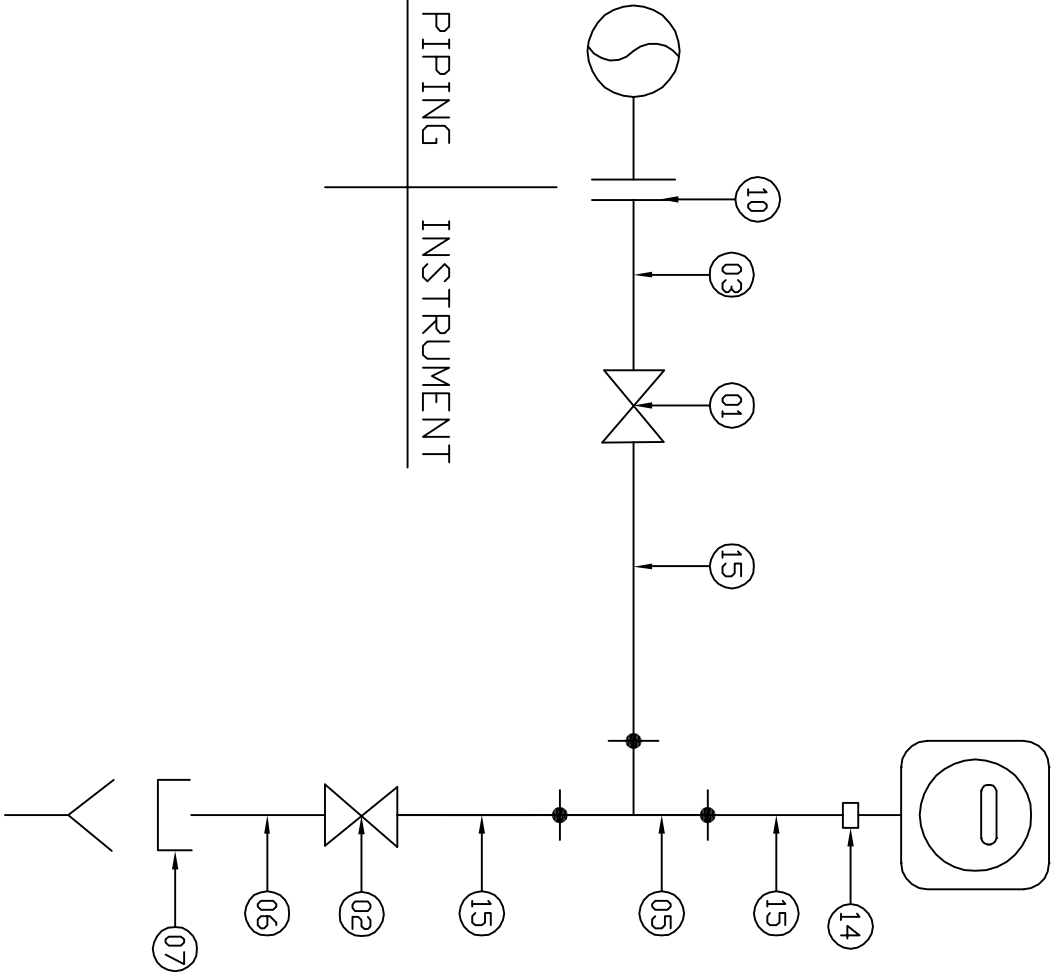
REF. PR:QA:500 FOR UNTO. DIMNS.

REF. APPLICABLE GWS FOR MATCODE&SPEC.

PRESSURE TRANSMITTER

2 THIS INSTRUMENT & 3 VALVE MANIFOLD SHALL BE LOCATED AT A SUITABLE LOCATION ON THE GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY ROUTED TO THE INSTRUMENT.

- 3 REFER TO INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 FITTING SHALL SUIT THE END/ PROCESS CONNECTION



S.NO	ITEM. NO	QTY.	UNIT	SIZE	SPECIFICATION	MTRL	REMARK
1	1	2	Nos	½"	½" ISOLATION BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC	INST.
2	15	3	Nos	½"	½" NIPPLE 4" LONG, CPVC ASTM D 1784, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
3	5	2	Nos	½"	½" TEE (SOCK&SOCK), CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1- Class 23447B, SCH.80	CPVC	INST.
4	14	1	Nos	½"	½" FEMALE ADAPTER (SOCK&NPT (F)), CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
5	6	4	Nos	½"	½" NIPPLE 4" LONG (ONE SIDE ½" NPT (M) X OTHER PLAIN END), CL-150H, CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1- Class 23447B, SCH.80	CPVC	INST.
6	7	2	Nos	½"	½" NPT(F) END CAP, CPVC ASTM D 1784,DIM F441 , SOC A439, TYPE IV, Gr. 1- Class 23447B, SCH.80	CPVC	INST.
7	2	2	Nos	½"	½" DRAIN BALL VALVE (TRUE UNION SOLVENT CEMENT SOCKET)	CPVC	INST.
8	3	10	Mtr	½"	½" PIPE, CPVC ASTM D 1784,DIM F441 , SOC CPVC A439, TYPE IV, Gr. 1-Class 23447B, SCH.80	CPVC	INST.
9	10	1	Set	½"	(i) ½" COUNTER FLANGE (SOCKET TYPE) (ii) NEOPRENE GASKET.3MM TK (iii) M12X50MM 4 SET OF HEX SCREW WITH NUT AND PLAIN WASHER	CPVC	INST.



BHARAT HEAVY ELECTRICALS LTD

UNIT : BOILER AUXILIARIES PLANT

RANIPET-632 406

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DEPT	CODE	NAME		SIGN	DATE	
		DESN	PVS			
9776	CHD	AT/AUV				
	APPD	VNS				

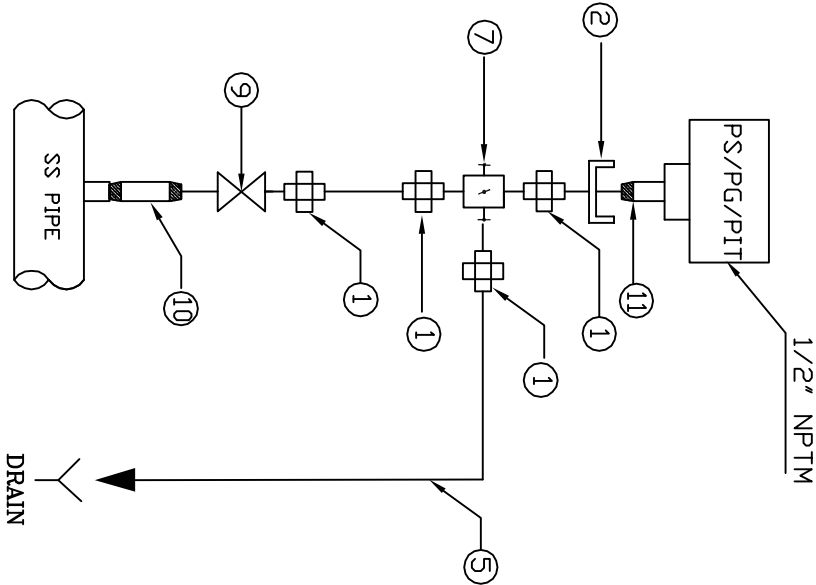
TITLE PRESSURE TRANSMITTER/SWITCH/INDICATOR INSTALLATION IN GRP LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.			
SIGN	DATE		3-WT-310-00586			
			SHEET 1	OF 1	REV. 0	



ALL DIMENSIONS ARE IN MILLIMETRES

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GWS FOR MATCODE&SPEC.



NOTE:

- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GROUDED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
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- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 EQUIPMENT & MOC OF FITTINGS SHALL BE AS PER ROS. (SUBJECT TO CUSTOMER APPROVAL)

S. N	ITEM .NO	ITEM DESCRIPTION	QTY
	1	(1/2")12.7 mm NPT Male Connector SUPER DUPLEX / DUPLEX SS/ SS316 : (1/2")12.7 mm NPT Male connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule com	4
	2	(1/2")12.7 mm NPT Female Connector SUPER DUPLEX / DUPLEX SS/ SS316: (1/2")12.7 mm NPT Female connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule	1
	3	(1/2")12.7 mm NPT Male Union SUPER DUPLEX / DUPLEX SS/ SS316 : suitable to connect (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule compression type)	1
	4	SUPER DUPLEX / DUPLEX SS/ SS316 Tube: (1/2")12.7 mmOD x 1.65 mm Thickness (Operating pressure 25 kg/sq.cm) -10 MTRS	1
	5	(1/2")12.7 mm SUPER DUPLEX / DUPLEX SS/ SS316 - 3 Way Manifold Valve:	1
	7	(1/2")12.7 mm NPT Female Connection in all sides.	1
	9	(1/2")12.7 mm SUPER DUPLEX / DUPLEX SS/ SS316 - 2 Way Ball Valve :with (1/2")12.7 mm NPT INTERNAL THREADS AT BOTH ENDS (Female Connection in all sides.)	1
	10	(1/2")12.7 mm NB pipe nipple ((1/2")12.7 mm NPT SUPER DUPLEX / DUPLEX SS/ SS316 male threads at both ends. 75 mm long)	1
	11	(1/2")12.7 mm female NPT to male NPT adaptor	1



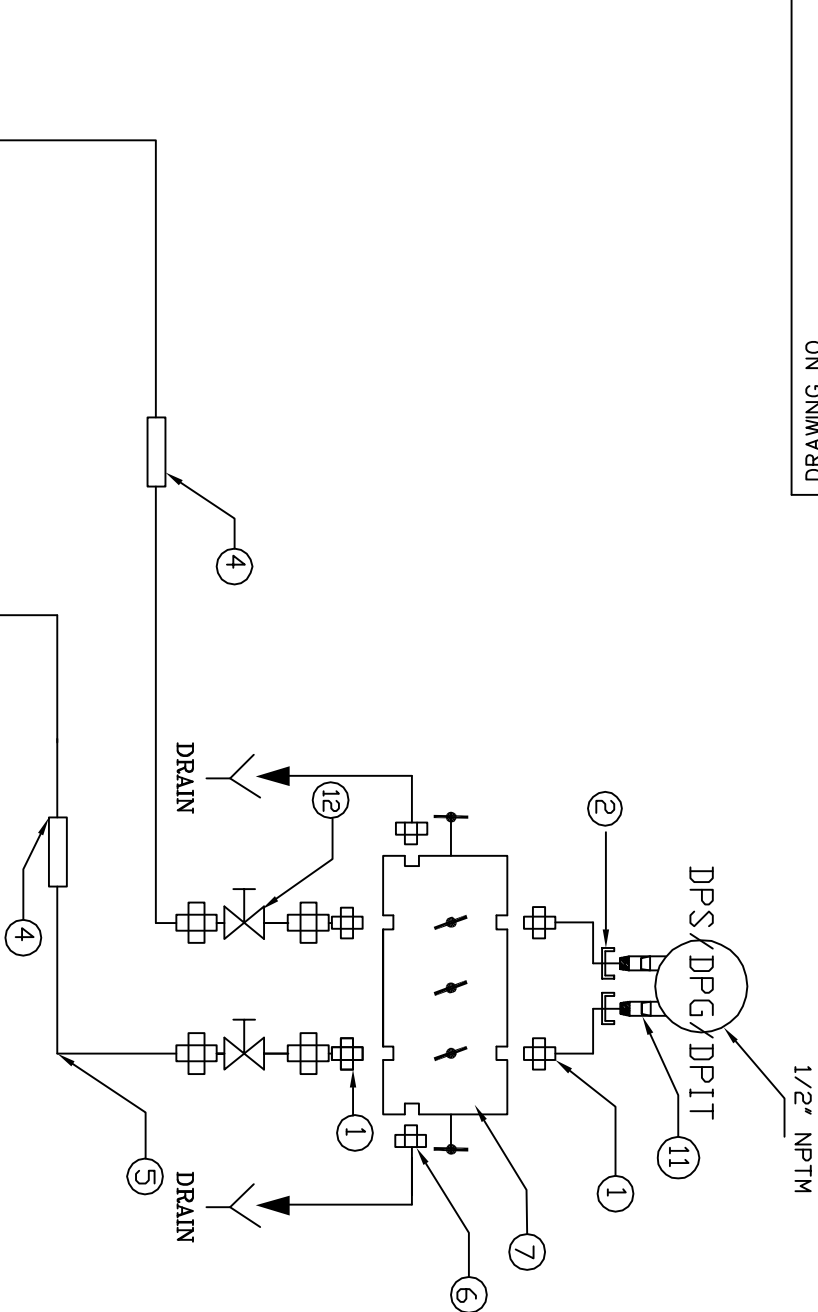
BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

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BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.				876		VNS					
				APPD		VNS					

TITLE PRESSURE INDICATING TRANSMITTER / PRESSURE SWITCH
INSTALLATION IN SS PIPE LINE (TYPICAL)

				DEPT.	SCALE	NTS	DRAWING NO.	
				SIGN			3-WT-310-00587	
				DATE			SHEET 1	DF 1
								REV. 00

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GWS FOR MATCODE&SPEC.



- NOTE:
- THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GRDUTED TO THE FLOOR. THE FRAME HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
 - THIS INSTRUMENT SHALL BE LOCATED AT A SUITABLE LOCATION ON THE GROUND TO ENABLE EASY ACCESS TO THE OPERATORFOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY ROUTED TO THE INSTRUMENT.
 - REFER OEM INSTALLATION INSTRUCTIONS
 - FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
 - EQUIPMENT & MOC OF FITTINGS SHALL BE AS PER ROS. (SUBJECT TO CUSTOMER APPROVAL)

S.N	ITEM	ITEM DESCRIPTION	QTY
1	1	(1/2")12.7 mm NPT Male Connector SUPER DUPLEX / DUPLEX SS/ SS316 : (1/2")12.7 mm NPT Male connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule com	10
2	2	(1/2")12.7 mm NPT Female Connector SUPER DUPLEX / DUPLEX SS/ SS316: (1/2")12.7 mm NPT Female connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule	2
3	4	(1/2")12.7 mm NPT Male Union SUPER DUPLEX / DUPLEX SS/ SS316 : suitable to connect (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule compression type)	2
4	5	SUPER DUPLEX / DUPLEX SS/ SS316 Tube: (1/2")12.7 mm OD x 1.65 mm Thickness (Operating pressure 25 kgf/cm ²) 20 MTRS	1
5	7	(1/2")12.7 mm SUPERDUPLEX / DUPLEX SS/ SS316 - 5 Way Manifold Valve : (1/2")12.7 mm NPT Female Connection in all sides. (For DPT, DP type FIT, DP type LIT, Rotameter)	1
6	12	Valve with (1/2")12.7 mm SUPERDUPLEX / DUPLEX SS/ SS316 - 2 Way Ball (Female Connection in all sides)	4
7	10	(1/2")12.7 mm NB pipe n/ppl ((1/2")12.7 mm NPT SUPER DUPLEX / DUPLEX SS/ SS316 male threads at both ends, 75 mm long)	2
8	6	1/4" NPT Male Connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule compression Fitting)	2
9	11	(1/2")12.7 mm female NPT to male NPT adaptor	2



BHARAT HEAVY ELECTRICALS LTD
UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

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DEPT CODE	DRN	ST	NAME
876	CHD	VNS	VNS

TITLE
DIFFERENT PRESSURE INSTRUMENT INSTALLATION
IN SS LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.	
SIGN			3-WT-310-00588	
DATE			SHEET 1	OF 1
				REV. 00



SUFFICIENT HEIGHT TO MAINTAIN
SENSOR IN WET STATE.

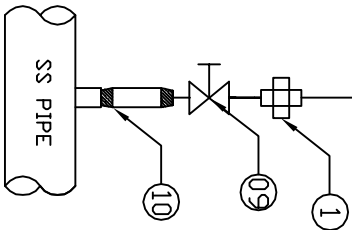
pH/ORP/CONDUCTIVITY/TURBIDITY
/CHLORINE ANALYSER

SUFFICIENT HEIGHT TO MAINTAIN
SENSOR IN WET STATE.

SENSOR WITH INTEGRAL CABLE

SENSOR WITH
INTEGRAL CABLE

- 1 THIS INSTRUMENT SHALL BE MOUNTED ON A FRAME WHICH SHALL BE WELDED TO A
NEAR BY STRUCTURE OR FIXED ON AN ANGLE IRON FRAME WORK GRDUTED TO THE FLOOR. THE FRAME
HAS TO BE EPOXY PAINTED IN LIGHT GREY COLOUR.
- 2 THIS INSTRUMENT SHALL BE LOCATED AT A SUITABLE LOCATION ON THE
GROUND TO ENABLE EASY ACCESS TO THE OPERATOR FOR TAKING READINGS. THE TUBING IS TO BE SUITABLY
ROUTED TO THE INSTRUMENT.
- 3 REFER OEM INSTALLATION INSTRUCTIONS
- 4 FOR LINE PRESSURE ABOVE 40 BAR 2 NUMBER OF ROOT VALVES SHALL BE PROVIDED.
- 5 THIS pH/ORP/CONDUCTIVITY/TURBIDITY/CHLORINE SENSOR MOUNTING SHALL BE SUCH THAT SENSOR
ALWAYS REMAINS IN WET CONDITION.
- 6 MOC OF FITTINGS SHALL BE AS PER ROS.(SUBJECT TO CUSTOMER APPROVAL)



DRAIN

S. N	ITEM .NO	ITEM DESCRIPTION	QTY
1	1	(1/2")12.7 mm NPT Male Connector SUPER DUPLEX / DUPLEX SS/SS316 : (1/2")12.7 mm NPT Male connector (SUPER DUPLEX / DUPLEX SS/ SS316) one end & other end suitable for (1/2")12.7 mm OD x 1.65 mm Thk SUPER DUPLEX / DUPLEX SS/ SS316 tube (Double Ferrule com	1
2	12	SUPER DUPLEX / DUPLEX SS/ SS316 Double Compression ferrule type male connector suitable to flow through chamber and sensor.	2
3	9	(1/2")12.7 mm SUPER DUPLEX / DUPLEX SS/ SS316 - 2 Way Ball Valve :with (1/2")12.7 mm NPT INTERNAL THREADS AT BOTH ENDS (Female Connection in all sides.)	1
4	10	(1/2")12.7 mm NB pipe nipple ((1/2")12.7 mm NPT SUPER DUPLEX / DUPLEX SS/SS316 male threads at both ends, 75 mm long)	1
5	5	SUPER DUPLEX / DUPLEX SS/ SS316 Tube: (1/2")12.7 mmOD x 1.65 mm Thickness (Operating pressure 25 kg/sq.cm) -10 MTRS	1



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UNIT : BOILER AUXILIARIES PLANT
RANIPET-632 406

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DEPT	NAME	SIGN	DATE
CODC	DESIGN	ST	
9776	CHD	ST	
APPD	VNS		

TITLE
pH/CONDUCTIVITY/ ORP /TURBIDITY/ CHLORINE ANALYSER
INSTALLATION IN SS LINE (TYPICAL)

DEPT.	SCALE	NTS	DRAWING NO.
SIGN			3-WT-310-00589
DATE			

SHEET 1 OF 1 REV. 00

CHAPTER - 6

PAINTING

(11 pages)

1.0 SCOPE

This section defines the technical requirements for surface preparation, selection and application of paints on equipment, vessels, machinery, piping, ducts etc. However, manufacturers shall follow their standard procedures for painting their equipment. The bidder shall submit a detailed painting procedure for approval of owner/ owner's representative after the award of contract.

The following surface and material shall require painting:

- a. All un-insulated carbon steel and alloy steel equipment like columns, vessels, storage tanks, pumps, heat exchangers etc.
- b. All un-insulated carbon steel and low alloy piping, fitting and valves (including painting of identification marks).
- c. All pipe structural steel supports, walkways, platforms, handrails, ladders etc.

The following surfaces and materials shall not require painting :

- a. Non-ferrous materials
- b. Austenitic stainless steel
- c. Plastic and / or plastic coated materials
- d. Insulated surface of equipment and pipes except color coating wherever required.
- e. Painted equipment like blowers, pumps, valves etc. with finishing coats in good condition and with matching color code.

2.0 CODES AND STANDARDS

Painting of equipment shall be carried out as per the specifications indicated below and shall conform to the relevant IS specification for the material and workmanship.

The following Indian Standards may be referred to for carrying out the painting job :

IS:5	:	Colours for ready mixed paints and enamels
IS:1303	:	Glossary of terms relating to paints
IS:2379	:	Colour code for identification of pipelines
IS:1477	:	Code of practice for painting of ferrous metals in buildings (Parts I & II)
IS:2524	:	Code of practice for painting of non-ferrous metals in buildings (Parts I & II)
IS:2395	:	Code of practice for painting of concrete, masonry and plaster surfaces (Parts I & II)



IS:2338	:	Code of practice for finishing of wood and wood based materials (Parts I & II)
IS:158	:	Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and heat resisting.
IS:2074	:	Ready mixed paint, air drying, red Oxide Zinc Chrome, priming
IS:104	:	Ready mixed paint, brushing, Zinc Chrome, priming
IS:2932	:	Enamel Synthetic exterior (a) Undercoating (b) finishing
IS:4682	:	Code of practice for lining of vessels & equipment
SIS 559000	:	Swedish standard for blasting
ISO 8504-2	:	Preparation of steel substrates before application of paints and related products. Surface preparation methods Part 2 Abrasive blast cleaning
ISO 8501-1	:	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Part 1 : Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings.
SIS 05 5800	:	Surface preparation by acid pickling
SSPC SP08	:	Surface preparation by acid pickling
IS 2629	:	Recommended practice for hot dip galvanizing of iron and steel
ASTM A780	:	Standard practice for repair of damaged galvanized coatings
SSPC	:	Steel structures painting council
NACE	:	National association of Corrosion Engineers
DIN	:	Deutsehes Institute for Normung
BS	:	British Standard
ASTM	:	American Society for Testing material
AWWA	:	American Water works association

3.0 SURFACE PREPARATION

The surface shall be prepared in a manner suitable for coatings. Chemical derusters or rust converters shall not be applied. Acid cleaning is subject to approval of Purchaser/ Purchaser's representative.

3.1 BLASTING

The surface of the part/ component shall be blasted before the coating material is applied.

Compressed air supply for blast cleaning shall be free of water and oil. Air compressors shall not be allowed to deliver air above 1100C. Blasting activity shall be performed at temperatures 30C above dew point and substrata temperature between 50C & 500C and relative humidity not exceeding 85% shall be maintained during painting. Necessary safety precautions for equipment and operator shall be adhered to and shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertains to the work.



Abrasive used for blast cleaning carbon steel and alloy steel shall be as per ISO 8504-2 and SSPC painting manual. Suggested abrasives are chilled iron grit, shot steel, malleable iron grit and shots of non metallic abrasive (aluminum oxide, copper slag, garnet etc.).

The grade of blasting shall be performed in line with the approved painting scheme.

The nature, quality and grain size of abrasives and the parameter of their use are to be chosen to obtain the required surface profile depth and cleanliness.

Surfaces prepared for coating shall be coated the same day and before any visible rusting occurs (the time elapsed between blast cleaning and commencement of painting shall under no circumstances exceed 4 hours, but in any case must commence before signs of degradation occur).

The grades of surface finish

	ISO 8501-1	SIS 055900	SSPC	NACE
White metal	Sa3	Sa3	SP5	1
Near White metal	Sa 2½	Sa 2½	SP10	2
Commercial Blast	Sa2	Sa2	SP6	3
Brush off blast	Sa1	Sa1	SP7	4

Unless otherwise specified in the documents, the surface shall satisfy the following requirements after blasting

(a) Blasting according to SIS 055900, Grade Sa 2½

Primer paint shall be Zinc Silicate of approved brand. Dry film thickness of each primer coat shall be 15-25 µm.

3.2 Manual Rust Removal

Manual rust removal shall be allowed for welded zones and for touching up installed components.

3.3 Cleaning

Removal of impurity

	Impurity	Removal
a)	Dust, Loose deposits	Vacuum cleaning, brushing
b)	Adhesive deposits	Power brushing
c)	Oils, greasy impurities	Wet Blasting, Use of Detergent Additives by agreement
d)	Salt deposits	Rinsing
e)	Markings (eg felt up pen)	Organic solvents to manufacturer's specifications eg Trichloro trifluoro ethane and solvents containing acetone (renew solvent and rag frequently)

3.4 Acid Pickling

Prior to galvanizing the surface preparation shall be done by acid pickling as per SSPC-SP-08.



4.0 PROCESSING

4.1 General Application Conditions

The primer shall be applied to properly prepared surfaces only. The specifications of the coating material manufacturers shall be observed. The minimum temperature shall be + 5°C and the relative humidity shall not exceed 80%. The temperature of the work piece shall be at least 3°C above dew point.

4.2 Application Procedure

The primer shall be applied by means of brush or by spary. The top coats shall be applied by means of brush, roller or spray.

At points where coating application is interrupted, the individual layers shall be adequately stepped to ensure proper layer sequence when coating operations are resumed.

4.3 Touching Up

Before each layer is applied, previous coating shall be touched up where necessary by way of rust removal and cleaning according coating manufacturers specification. The final top shall be reapplies completely.

4.4 Uncoated Surfaces

Moving parts of machines (e.g stems, shafts, sliding and locating bearings), nameplates, instruments and sealing surface shall not be coated. Welds shall be left free of coating upto a distance of 30 mm on each side of the weld edge until erection and weld examinations, if any, have been completed.

4.5 Bond Strength

The pill off stress determined using the pull off test method for adhesion shall not be less than 1.5 N/mm², according to ISO 4624.

5.0 SURFACE CONDITIONS OF COATING SURFACES

The coating surface shall have a uniform film thickness, shade and gloss and shall be free from inclusions, sags and wrinkles.

6.0 COATING SYSTEMS

6.1 General Requirements for Coating Systems

Coating materials according to SSPC, BS 5493 or DIN 55 928 shall be used. Intermediate coats are to be pigmented with micaceous iron oxide. The materials shall be matched with each other so that they are compatible. Coatings deviating this



specification shall be subject to approval. Standards of surface preparation and painting shall give a time to first maintenance of 10 years.

The colour and gloss of top coats shall be in accordance with sub clause suggested colour codes for painting (Sub Clause 6.8)

6.2 Standard Coating System (External Coatings)

(a) Steel Surfaces

- (i) All steel structures shall receive two primer coats and two sandwich coat of MIO Epoxy paint and one finish coat of painting. First coat of primer shall be given in shop after fabrication before dispatch to erection site after surface preparation as described below. The second coat of primer shall be applied after erection and final alignment of the erected structures. Two intermediate coats and one finished coat shall also be applied after erection.
- (ii) Steel surface which is to be painted shall be cleaned of dust and grease and the heavier layers of rust shall be removed by chipping prior to actual surface preparation. The surface shall be abrasive blasted as explained in clause 3.1 to Sa 2½ finish as per SIS05-5900. Primer paint shall be Zinc Silicate of approved brand. Dry film thickness of each primer shall be 60 microns.
- (iii) Two intermediate MIO Epoxy paint, and one top polyurethane coating of approved brand shall be applied. Dry film thickness of each intermediate coat shall be 90 microns and top polyurethane coating shall be 30 microns. The under coat and finish coat shall be of different tint to distinguish the same from finish paint. The total dry film thickness shall be 330 microns. All paints shall be of approved brand and shade as per owner's requirement.
- (iv) Joints to be site welded shall have weldable primer applied within 100 mm of welding zone. Similarly where friction grip fasteners are to be used removable anti corrosive coating shall be provided. On completion of the joint the surfaces shall receive the paint as specified.
- (v) Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly. Surfaces inaccessible after erection including top surfaces of floor beams, supporting gratings or chequered plate shall receive one additional coat of finish paint over the above number of coats specified before erection. Portion of steel member embedded/ to be encased in concrete shall not be painted.

(b) Gratings and Step Threads

(i) Surface Preparation

Gratings and step threads shall be cleared by acid pickling as per SSPC-SP-08

(ii) Hot Dip galvanizing

The hot dip galvanizing shall be done as per IS 2629. The average mass of coating shall be 610 gm/m².



(iii) Post Treatment

Immediately after galvanizing post treatment such as chromating shall be applied to retard white rust attack.

(iv) Touch up mechanical damages

The repair of damages coatings shall be done as per the recommended practice ASTM A780.

6.3 Painting of Indoor components such as valves, pumps, motors, electrical parts, tanks etc.**At Works****Surface Preparation**

Blasting according to SIS 055900 grade Sa 2½. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer of minimum dry film thickness 25 µm may be used.

Prime Coat

Two (2) layers of Zinc phosphate epoxy, total dry film thickness 75µm.

At Site

Thorough cleaning to remove oil, grease, dirt and any other contaminants. Derusting of all mechanical damages according to SIS 055900 Grade ST3. Touch up with dry film thickness 50 µm.

Finish Coat

Application of two (2) finishing coats of chlorinated rubber paint in approved shades at 30-40 microns DFT each coat in approved shades.

Remarks

Equipment coated with a standard application system can be accepted if the quality of this application system is corresponding with the quality of the above mentioned system.

6.4 Painting of Outdoor equipment (external surfaces) such as piping, valves, pumps, motors, electrical parts, tanks etc.

Weather exposure, weather resistance, temperature upto 120°C as per clause 6.1 & 6.3. However

Surface Preparation

Blasting according to SIS 055900 grade Sa 2½. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer of minimum dry film thickness 15-25 µm may be used.

Prime Coat

Two (2) layers of Zinc phosphate epoxy, total dry film thickness 75µm.

Intermediate Coat

One (1) layer 2 pack high build epoxy polyamide MIO, DFT 100µm.

Finish Coat

Application of two (2) finishing coats of chlorinated rubber paint in approved shades at 50 microns DFT each coat in approved shades.



6.7 Painting for Electrical items

- 6.7.1 All the steel work shall be thoroughly cleaned of rust, scale, oil, grease, dirt and swarf by pickling, emulsion cleaning etc. The sheet steel shall be phosphate/ oven dried and then painted with two coats of zinc rich primer paint. After application of the primer, two coats of finishing epoxy paint shall be applied. The colour of the finishing coats inside shall be glossy white and exterior of the treated sheet steel shall be shade 631 of IS-5/ RAL 7032 for all switchboard/ MCC/ Distribution boards, control panels etc.
- 6.7.2 All electrical equipment shall be given tropical and fungicidal treatment and outdoor equipment shall be provided with rain hood to prevent entry of rain water into the equipment.
- 6.7.3 Painting of I & C equipment : Epoxy coating required for all I & C equipment.

6.8 SUGGESTED COLOUR CODES FOR PAINTING

SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
1.	Structures, platforms, galleries, ladders and handrails	Dark Admiralty Grey	632	-	-
2.	Boiler casing, ducting	Nut Brown	413	-	-



SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
3.	Crane				
3.1	Crane structure	Golden Yellow	356	Black	-
3.2	Trolley & hook	Crimson	540	-	-
4.	Fans, pumps, motors, compressors	Light Grey	631	-	-
5.	Tanks (without insulation and cladding)				
5.1	Outdoor	Aluminium	-	-	-
5.2	Indoor	Light grey	631	-	-
6.	Vessels & all other proprietary equipment (without insulation & cladding)	Light grey	631	-	-
7.	Switchgear	Light grey (Powder coated)		-	-
8.	Control & relay panels	Light grey (Powder coated)	631/70 78 of IS 1650	-	-
9.	Turbines	Light Grey	631	-	-
10.	Generators & Exciter	Light Grey	631	-	-
11.	Transformers	Aluminum	-	-	-
12.	Machinery guards	Signal red	537	-	-
13.	Piping (without insulation and cladding)				
13.1	Water System				
a	Boiler feed	Sea Green	217	-	-



SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
b	Condensate	Sea Green	217	Light Brown	410
c	DM Water	Sea Green	217	Light Orange	557
d	Soft Water	Sea Green	217	French Blue	166
e	Bearing Cooling Water	Sea Green	217	French Blue	166
f	Potable & filtered Water	Sea Green	217	French Blue	166
g	Service and clarified water	Sea Green	217	French Blue	166
h	Cooling water	Sea Green	217	French Blue	166
I	Sea Water	Sea Green	217	White	-
14.	Ash Transmitting Vessels and pipe lines	Aluminium	-	-	
15.	Air System				
15.1	Station air	Sky blue	101	-	-
15.2	Control air	Sky blue	101	White	-
16.	Oil system				
16.1	Fuel oil	Light brown	410	French	166
16.2	Light oil (HSD)	Light Brown	410	Brilliant green	221
16.3	Lubricating oil	Light brown	410	Light grey	631
16.4	Transformer oil	Light brown	410	Light orange	557
17.	Gas System				
17.1	Carbon dioxide	Canary yellow	309	Light grey	631
17.2	Hydrogen	Canary yellow	309	Signal red	537
18.	Fire services	Fire red	536	-	-
19.	Effluent pipes	Black	-	-	-
20.	Vacuum pipes	Sky blue	101	Black	-

Notes :

1. This colour code basically refers to IS:2379 for piping with necessary modifications



2. Where band colour is specified, same shall be provided at 30 meter intervals on long uninterrupted lines and also adjacent to valves and junctions.

Bidder shall furnish his painting specification to suit corrosive atmosphere of coastal area along with the bid. The specification shall in general be in line with the above requirements.



BHEL-BAP Ranipet- New Products Department

Annexure-B

Date: 17.06.17

A)Mechanical Vendor list

S.No	Product Description	Supplier Name	Place
1	LP PUMPS	FLOWSERVE INDIA CONTROLS (P) .LTD	COIMBATORE
		KIRLOSKAR BROTHERS LIMITED	CHENNAI
		MATHER AND PLATT PUMPS LTD.,	CHENNAI
		SULZER PUMPS INDIA LIMITED	CHENNAI
		KSB PUMPS LTD.,	CHENNAI
		BEST & CROMTON ENGG LIMITED	CHENNAI
		GRUNDFOS PUMPS INDIA PVT LTD	CHENNAI
		FLOWMORE LIMITED	GURGAON
		WPIL LTD	CHENNAI
		S.J.INDUSTRIES	CHENNAI
2	FRP/ GRP TANK	COSMO PLAST	MADURAI
		MODERN ENGINEERING PLASTICS PV	SALEM
		DAKLE REINFORCED PLASTICS PVT LTD	VAPI
		SHRIRAM SEPL COMPOSITES P LTD	MARSHALL
		CREATIVE COMPOSITES	CHENNAI
		BALAJI FIBER REINFORCE PVT LTD	VADODARA
		EPP COMPOSITES PRIVATE LIMITED	RAJKOT
		REINHOLD POLY GLASS	HOSUR
		CHEMICAL PROCESS PIPING PVT LIMITED	MUMBAI
3	GRP PIPES & PIPE FITTINGS	MODERN ENGINEERING PLASTICS PV	SALEM
		SHRIRAM SEPL COMPOSITES P LTD	MARSHALL
		BALAJI FIBER REINFORCE PVT LTD	VADODARA
		EPP COMPOSITES PRIVATE LIMITED	RAJKOT
		REINHOLD POLY GLASS	HOSUR
		CHEMICAL PROCESS PIPING PVT LIMITED	MUMBAI
4	UPVC &CPVC PIPES & FITTINGS /Ball valves (PN10&ABOVE)	MODERN FABRICATORS	CHENNAI
		SEWVAC INDIA	CHENNAI
		GLYNWED PIPE SYSTEMS INDIA PVT LTD	MUMBAI / GOA
		ASTRAL INDIA PVT LTD.	CHENNAI
		GEORG FISCHER PIPING SYSTEMS PVT LTD	CHENNAI / SWITZERLAND
6	Diaphragm valves	Weir BDK/Procon/Sigma industries	

S.No	Product Description	Supplier Name	Place
B)E,C&I Vendor list			
17	CONTROL CABLE	KEC INTERNATIONAL LTD	MUMBAI
		C M I LTD	FARIDABAD
		DELTON CABLES LIMITED	NEW DELHI
		KEI INDUSTRIES LIMITED	NEW DELHI
		PARAMOUNT COMMUNICATION LTD	NEW DELHI
		POLYCAB WIRES PVT LTD	MUMBAI
		CORDS CABLE INDUSTRIES LIMITED	NEW DELHI
		ELKAY TELELINKS LTD	FARIDABAD
		GOYOLENE FIBRE (I) PVT LTD	MUMBAI 40
		KRISHNA ELECTRICAL INDUSTRIES LIMITED	GWALIOR
		TORRENT CABLES LTD	AHMEDABAD
		ASSOCIATED CABLES PVT LTD	MUMBAI
		SUYOG ELECTRICALS LTD	BARODA
		RAVIN CABLES LTD	MUMBAI
		THERMO CABLES LIMITED	HYDERABAD
		GLOSTER CABLES LIMITED	SECUNDERABAD
		FINOLEX CABLES LIMITED	PUNE
		ADVANCE CABLE TECHNOLOGIES (P) LTD	BENGALURU
		STEP INDUSTRIES PRIVATE LIMITED	DELHI
		IMT CABLES PVT LTD	NEW DELHI
		GUPTA POWER INFRASTRUCTURE LTD	BHUBANESWAR
		GEMSCAB INDUSTRIES LIMITED	DELHI
		EPSILON CABLES PVT LTD	NAGPUR
		SPECIAL CABLES PVT LTD	NEW DELHI
		GOVIND CABLE INDUSTRIES	KOLKATA
		APAR INDUSTRIES LTD	BENGALURU
		SPM POWER & TELECOM PVT LTD	HYDERABAD
		T C COMMUNICATION PVT LTD	GHAZIABAD
		FORTUNEART WIRES & CABLES PVT LTD	SECUNDERABAD
		PRIME CABLE INDUSTRIES	DELHI
		INDO ALUSYS INDUSTRIES LTD	NEW DELHI
		ICON CABLES LTD	NEW DELHI
		SHYAM CABLE INDUSTRIES	NOIDA
		N.C.CABLES LIMITED	NEW DELHI
		STEP INDUSTRIES PVT LTD	ALWAR DISTRICT
		RPG CABLES	CHENNAI
		UNIVERSAL CABLES	SATNA
		RELIANCE ENGINEERS	
		INCAB	PUNE
		FORT GLASTER INDUSTRIES LTD	KOLKATA
		NICCO CABLE	KOLKATA
		INDUSTRIAL CABLES LTD	RAJPURA
		RADIANT CABLES	HYDERABAD
		TECHNO CABLES	BANGALURU
18	INSTRUMENT CABLE	KEC INTERNATIONAL LTD	MUMBAI
		C M I LTD	FARIDABAD
		DELTON CABLES LIMITED	NEW DELHI
		KEI INDUSTRIES LIMITED	NEW DELHI
		PARAMOUNT COMMUNICATION LTD	NEW DELHI
		POLYCAB WIRES PVT LTD	MUMBAI
		CORDS CABLE INDUSTRIES LIMITED	NEW DELHI
		ELKAY TELELINKS LTD	FARIDABAD
		TORRENT CABLES LTD	AHMEDABAD
		SUYOG ELECTRICALS LTD	BARODA
		THERMO CABLES LIMITED	HYDERABAD
		ADVANCE CABLE TECHNOLOGIES (P) LTD	BENGALURU
		IMT CABLES PVT LTD	NEW DELHI
		GUPTA POWER INFRASTRUCTURE LTD	BHUBANESWAR
		SPECIAL CABLES PVT LTD	NEW DELHI
		T C COMMUNICATION PVT LTD	GHAZIABAD
		SHYAM CABLE INDUSTRIES	NOIDA
		N.C.CABLES LIMITED	NEW DELHI
		UNIVERSAL CABLES	SATNA
		RELIANCE ENGINEERS	
		KERPEN CABLES	GERMANY
		LAPP CABLE	GERMANY
		THERMO ELECTRIC	NETHERLAND/USA
		HABIA CABLE	SWEEDEN
		HEAVELS	BANGALURU
		TOSHNIWAL	JAIPUR
		NICCO CABLE	KOLKATA
		GOYOLENE FIBRES	MUMBAI

S.No	Product Description	Supplier Name	Place
19	GALVANIZED JUNCTION BOXES (POWER & CONTROL)	PRAMMEN INDUSTRIES	PUDUKOTTAI
		SAJAS ELECTRICALS	TIRUCHIRAPPALLI
		SHIBSHA INSTRUMENT INDIA P LTD	CHENNAI
		WIN POWER	KOLKATA
		CHEMIN CONTROLS AND INSTRUMENTATION PVT LTD	PONIDICHERY
		TECH UP ENGINEERING PVT LTD	TIRUCHIRAPPALLI
		SAHYADRI ELECTRO CONTROLS (INDIA) PRIVATE LTD	BANGALURU
		PYROTECH ELECTRONICS PVT LTD	UDAIPUR
		SRI VISHNU INDUSTRIES	HOSUR
		KEAS CONTROL SYSTEMS INDIA PRIVATE LIMITED	COIMBATORE
		BALAJI ELECTROCONTROLS PVT LTD	BENGALURU
		HAROLD INDUSTRIES PVT LTD	CHENNAI
		AXON TECHNOLOGIES	KANCHEPURAM DIST
		PANAM CONTROLS	SECUNDERABAD
		ACE ELECTRICAL EQUIPMENTS (I) PVT LTD	HOSUR
		MAIKA METALS PVT LTD	CHENNAI
20	LOCAL START/STOP PUSH BUTTON STATIONS	VASANTHA ADVANCED SYSTEMS	COIMBATORE
		BALIGA LIGHTING EQPTS (P)LTD	CHENNAI
		SOUTH INDIA SWITCH GEAR CO	VELLORE
		PRAMMEN INDUSTRIES	PUDUKOTTAI
		SAJAS ELECTRICALS	TIRUCHIRAPPALLI
		CANDS ELECTRICALS PVT LTD	MUMBAI
		ESSEN INSTRUMENTATION & ELECTRICALS	TIRUCHIRAPPALLI
		SAHYADRI ELECTRO CONTROLS (INDIA) PRIVATE LTD	BANGALURU
		KEAS CONTROL SYSTEMS INDIA PRIVATE LIMITED	COIMBATORE
		AXON TECHNOLOGIES	KANCHEPURAM DIST
		MAIKA METALS PVT LTD	CHENNAI
		SHRENIK & COMPANY	AHMEDABAD
		ACE ELECTRICAL EQUIPMENTS (I) PVT LTD	HOSUR
21	LT MOTORS	KIRLOSKAR ELECTRIC CO LTD	BENGALURU/CHENNAI
		NGEF (HUBLI) LTD	BENGALURU
		SIEMENS INDIA LTD	JOKA
		BHARAT BIJLEE LTD	MUMBAI
		CROMPTON GREAVES LIMITED	CHENNAI
		LAXMI HYDRAULICS PVT LTD	SOLAPUR
		JYOTI LIMITED	VADODARA
		BHEL ELECTRICAL MACHINES LTD	KASARAGOD
		BHARAT BIJLEE LIMITED	CHENNAI
		ABB LIMITED	CHENNAI

S.No	Product Description	Supplier Name	Place
22	POWER CABLE	KEC INTERNATIONAL LTD	MUMBAI
		C M I LTD	FARIDABAD
		DELTON CABLES LIMITED	NEW DELHI
		KEI INDUSTRIES LIMITED	NEW DELHI
		PARAMOUNT COMMUNICATION LTD	NEW DELHI
		POLYCAB WIRES PVT LTD	MUMBAI
		POLYCAB WIRES PVT LTD	CHENNAI
		CORDS CABLE INDUSTRIES LIMITED	NEW DELHI
		ELKAY TELELINKS LTD	FARIDABAD
		GOYOLENE FIBRE (I) PVT LTD	MUMBAI
		KRISHNA ELECTRICAL INDUSTRIES LIMITED	GWALIOR
		TORRENT CABLES LTD	AHMEDABAD
		ASSOCIATED CABLES PVT LTD	MUMBAI
		RAVIN CABLES LTD	MUMBAI
		THERMO CABLES LIMITED	HYDERABAD
		GLOSTER CABLES LIMITED	SECUNDERABAD
		FINOLEX CABLES LIMITED	PUNE
		ADVANCE CABLE TECHNOLOGIES (P) LTD	BENGALURU
		STEP INDUSTRIES PRIVATE LIMITED	DELHI
		IMT CABLES PVT LTD	NEW DELHI
		GUPTA POWER INFRASTRUCTURE LTD	BHUBANESWAR
		GEMSCAB INDUSTRIES LIMITED	DELHI
		EPSILLON CABLES PVT LTD	NAGPUR
		SPECIAL CABLES PVT LTD	NEW DELHI
		GOVIND CABLE INDUSTRIES	KOLKATA
		APAR INDUSTRIES LTD	BENGALURU
		T C COMMUNICATION PVT LTD	GHAZIABAD
		FORTUNEART WIRES & CABLES PVT LTD	SECUNDERABAD
		PRIME CABLE INDUSTRIES	DELHI
		INDO ALUSYS INDUSTRIES LTD	NEW DELHI
		ICON CABLES LTD	NEW DELHI
		ICON CABLES LTD	ALWAR
		SHYAM CABLE INDUSTRIES	NOIDA
		N.C.CABLES LIMITED	NEW DELHI
		STEP INDUSTRIES PVT LTD	ALWAR DISTRICT
		BEST & CROMTON ENGG LIMITED	CHENNAI
		GRUNDFOS PUMPS INDIA PVT LTD	CHENNAI
		FLOWMORE LIMITED	GURGAON
		WPIL LTD	CHENNAI
		S J INDUSTRIES	CHENNAI
		UNIVERSLA CABLES	SATNA
		NICCO CABLE	KOLKATA
		REDIANT CABLES	HYDERABAD
		TORRENT	NADIAD
		INDUSTRIAL CABLES LTD	RAJPURA
		FORT GLASTER INDUSTRIES LTD	KOLKATA
		INCAB	PUNE
		CCIL	BANGALURU
		RPG CABLES	CHENNAI
		RELIANCE ENGINEERS	
		RADIANT CABLES	HYDERABAD
		TECHNO CABLES	BANGALURU
23	VARIABLE FREQUENCY DRIVE WITH PANEL	ABB LIMITED	CHENNAI
		SIEMENS INDIA LTD	CHENNAI
		SCHNEIDER ELECTRIC INDIA PVT LTD	NASIK
		BHEL EDN	BANGALORE
		SUN INDUSTRIAL AUTOMATION & SOLUTIONS	CHENNAI
		ROCKWELL AUTOMATION INDIA PVT LTD	CHENNAI
		EURO PROCESS AUTOMATIK	CHENNAI
		TREND ELECTRIC CO PVT LTD	CHENNAI
24	FRP JUNCTION BOX	BALIGA LIGHTING EQPTS (P)LTD	CHENNAI
		SOUTH INDIA SWITCH GEAR CO	VELLORE
		VETRIVEL ENGINEERING ENTERPRISES	TIRUCHIRAPPALLI
		PYROTECH ELECTRONICS PVT LTD	UDAIPUR
		MANISHA ENTERPRISES	PUNE
		SUCHITRA INDUSTRIES	BENGALURU
		DEVI POLYMERS PRIVATE LIMITED	CHENNAI
		K S INSTRUMENTS PVT LTD	BENGALURU
		FICOM ENGINEERING PVT LTD	BANGALORE
		SHRENIK & COMPANY	AHMEDABAD
		ALLIED MOULDED ENCLOSURE PRODUCTS(INDIA)PVT L	BANGALORE
		BCH ELECTRIC LIMITED	FARIDABAD

S.No	Product Description	Supplier Name	Place
25	FRP LOCAL START/STOP PUSH BUTTON STATIONS	BALIGA LIGHTING EQPTS (P)LTD	CHENNAI
		SOUTH INDIA SWITCH GEAR CO	VELLORE
		VETRIVEL ENGINEERING ENTERPRISES	TIRUCHIRAPPALLI
		PYROTECH ELECTRONICS PVT LTD	UDAIPUR
		MANISHA ENTERPRISES	PUNE
		SUCHITRA INDUSTRIES	BENGALURU
		DEVI POLYMERS PRIVATE LIMITED	CHENNAI
		K S INSTRUMENTS PVT LTD	BENGALURU
		FICOM ENGINEERING PVT LTD	BANGALORE
		SHRENIK & COMPANY	AHMEDABAD
		ALLIED MOULDED ENCLOSURE PRODUCTS(INDIA)PVT L	BANGALORE
		BCH ELECTRIC LIMITED	FARIDABAD
26	FRP CABLE TRAYS AND ACCESSORIES	PATNY SYSTEMS PVT. LTD	SECUNDERABAD
		SUMIP COMPOSITES PVT. LTD.	AHMEDABAD
		GENERAL COMPOSITES PVT. LTD.	MUMBAI
		ERCON COMPOSITES	JODHPUR
27	CONDUCTIVITY ANALYSER	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI/GURGOAN
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		YOKOGAWA INDIA LIMITED	CHENNAI
28	PH INSTRUMENTS / ORP INSTRUMENTS	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI
		HACH COMPANY	BENGALURU
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		YOKOGAWA INDIA LIMITED	CHENNAI
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		FORBES MARSHALL	CHENNAI /PUNE
29	LEVEL SWITCHES (FLOAT/DISPLACER TYPE)	BAUMER TECHNOLOGIES INDIA PVT LTD	CHENNAI
		LEVCON INSTRUMENTS PVT LTD	KOLKATA
		SBEM PVT LTD	CHENNAI
		PUNE TECHTROL PVT LTD	PUNE
		V AUTOMAT AND INSTRUMENTS (P) LTD	CHENNAI
		MAGNETROL INSTRUMENTS N V	
		CHEMTROLS SAMIL	MUMBAI
		SIGMA INSTRUMENTS COMPANY	MUMBAI
		DK INSTRUMENTS	KOLKATA
30	LEVEL GAUGES (FLOAT & BOARD)	BAUMER TECHNOLOGIES INDIA PVT LTD	CHENNAI
		SBEM PVT LTD	CHENNAI
		PUNE TECHTROL PVT LTD	PUNE
		V AUTOMAT AND INSTRUMENTS (P) LTD	CHENNAI
		D K INSTRUMENTS PRIVATE LIMITED	KOLKATA
		LEVCON INSTRUMENTS PVT LTD	KOLKATA
		SIGMA INSTRUMENTS COMPANY	MUMBAI
		CHEMTROLS INDUSTRIES LTD	MUMBAI
31	PADDLE WHEEL FLOW TRANSMITTER	BURKERT CONTROMATIC PVT LTD	CHENNAI
		GEORG FISCHER PIPING SYSTEMS PVT LTD	CHENNAI
		ARYA CRAFTS & ENGINEERING PVT LTD	THANE
32	LEVEL TRANSMITTER(ULTRAS ONIC/RADAR TYPE)	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		PEPPERL +FUCHS (INDIA) PVT LTD	CHENNAI
		SIEMENS INDIA LTD	BENGALURU
		VEGA	GERMANY
33	DIFFEREN PRESSURE TRANSMITTER	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		YOKOGAWA INDIA LIMITED	CHENNAI
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		SIEMENS INDIA LTD	BENGALURU
		FUJI	JAPAN
34	TEMPERATURE GUAGES WITH THERMOWELL	A N INSTRUMENTS PVT LTD	KOLKATA
		GENERAL INSTRUMENTS CONSORTIUM	CHENNAI
		H GURU INSTRUMENTS (S I) P LTD	BENGALURU
		ASHCROFT INDIA PVT LTD	CHHATRAL
		FORBES MARSHALL (HYD) PVT LTD	HYDERABAD
		WIKA INSTRUMENTS INDIA PVT LTD	CHENNAI
		GOA THERMOSTATIC INSTRUMENTS	GOA
		WAREE	DADRA/MUMBAI

S.No	Product Description	Supplier Name	Place
35	PRESSURE TRANSMITTERS	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		YOKOGAWA INDIA LIMITED	CHENNAI
		FUJI ELECTRICS	MUMBAI
		VEGA INDIA LEVEL AND PRESSURE MEASUREMENT PVT LTD	PUNE
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		SIEMENS INDIA LTD	BENGALURU
36	LEVEL TRANSMITTERS	DRESSER VALVE INDIA PRIVATE LIMITED	COIMBATORE
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		LEVCON INSTRUMENTS PVT LTD	KOLKATA
		VEGA INDIA LEVEL AND PRESSURE MEASUREMENT PVT LTD	PUNE
		INVENSYS INDIA PVT LTD	CHENNAI
		AZBIL INDIA PVT LTD	CHENNAI
		CHEMTROLS INDUSTRIES LTD	MUMBAI
		V AUTOMAT & INSTRUMENTS (P)LTD	NEW DELHI
		KROHNE MARSHALL LTD	PUNE
37	TEMPERATURE TRANSMITTERS	ABB LIMITED	CHENNAI
		EMERSON PROCESS MANAGEMENT(INDIA) PVT LTD	CHENNAI
		HONEYWELL AUTOMATION INDIA LIMITED	CHENNAI
		YOKOGAWA INDIA LIMITED	CHENNAI
		ENDRESS HAUSER (I) PVT LTD	CHENNAI
		FUJI ELECTRICS	CHENNAI
		CHEMTROLS INDUSTRIES LTD	MUMBAI
		MAGNETROL INSTRUMENTS N V	
		KROHNE MARSHALL LTD	PUNE
		FLOW STAR ENGINEERING PVT LTD	FARIDABAD
		NIVO CONTROLS PVT LTD	INDORE
38	SOLENOID VALVE	ASCO NUMATICS (INDIA) PRIVATE LIMITED	CHENNAI
		AVCON CONTROLS (P) LTD	MUMBAI
		ROTEX AUTOMATION LIMITED	VADODARA
		NUCON	HYDERABAD
		INSTRUMENTATION & CONTROL SYS	CHENNAI
39	ROTOMETER	IEPL	HYDERABAD
		PLACKA INSTRUMENT INDIA PVT LTD	CHENNAI
		TRAC	HYDERABAD
		EUREKA	PUNE
		FLUIDYNE INSTRUMENTS	MUMBAI
40	PRESSURE GAUGE	A N INSTRUMENTS PVT LTD	KOLKATA/CHENNAI
		BELLS CONTROLS LTD	KOLKATA
		PREMIER INSTRUMENTS & CONTROLS	COIMBATORE
		MANOMETER(INDIA) PVT LTD	CHENNAI
		H GURU INSTRUMENTS (S I) P LTD	BENGALURU
		PYRO ELECTRIC INSTRUEMNTS (GOA) PVT LTD	GOA
		NEW SCIENTIFIC REPAIRS & TRADING CO	KOLKATA
		GOA INSTRUMENTS INDUSTRIES PVT LTD	GOA
		BAUMER TECHNOLOGIES INDIA PVT LTD	CHENNAI/VAPI
		GENERAL INSTRUMENTS CONSORTIUM	GOA/MUMBAI
		GOA THERMOSTATIC INSTRUMENTS	GOA
		FORBES MARSHALL (HYD) PVT LTD	HYDERABAD
		PRECISION INDUSTRIES	AHMADABAD
		WALCHAND NAGAR INDUSTRIES LTD	DHARWAD
		ODIN	AHMEDABAD/ CHENNAI
		GLUCK	MUMBAI
		WIKA INDIA	CHENNAI
41	PNEUMATIC ACTUATOR (ON/OFF) FOR VALVES	E LO MATIC	
		FISCHER XOMOX	
		CRANE PROCESS FLOW TECHNOLOGIES (REVO MAKE)	UK
		VIRGO ENGINEERS LTD	CHENNAI
		MIL (MASOLINE INDIA LTD)	THRISSUR
		WEIR BDK	HUBLI
		INSTRUMENTATION LIMITED,	PALAKAD
		KERALA STATE ELECTRONICS DEVELOPMENT CORPOR	AROOR

S.No	Product Description	Supplier Name	Place
42	AIR FILTER CUM REGULATOR (AFR)	SHAVO NORGEN	MUMBAI
		PLACKA	CHENNAI
		NUCON	HYDERABAD
43	FLOW SWITCH	UNIVERSAL FLOW MONITORS INC	
		ROJARAM CONSULTANTS	CHENNAI
		D K INSTRUMENTS PRIVATE LIMITED	KOLKATA
		GENERAL INSTRUMENTS CONSORTIUM	GOA/MUMBAI
		KROHNE MARSHALL LTD	PUNE
		SWITZER INSTRUMENTS CO	KOLKATA
44	PRESSURE SWITCH	INDFOS INDUSTRIES LIMITED	CHENNAI
		TRAFAG CONTROLS INDIA PVT LTD	GURAGAON
		INDFOS INDUSTRIES PRIVATE LTD	GHAZIABAD
		SWITZER PNEUMATICS PVT LIMITED	PUDUCHERRY
		BAUMER TECHNOLOGIES INDIA PVT LTD	CHENNAI
		BAUMER TECHNOLOGIES INDIA PVT LTD	VAPI
		SWITZER PROCESS INSTRUMENT PVT LIMITED	CHENNAI/GHAZIABAD
		SOR INC	USA
		PRECISION INDUSTRIES	AHMADABAD
		GIC	MUMBAI
45	TEMERATURE SWITCH	SWITZER INSTRUMENT CO	CHENNAI
		INDFOS INDUSTRIES LTD	GAZIABAD
		GENERAL INSTRUMENTS CONSORTIUM	GOA/MUBAI
46	THERMOCOUPLE / RTD	A.N.INSTRUMENTS (P) LTD.,	CHENNAI
		TOSHNIWAL INDUSTRIES PVT LTD	AJMER
		TOSHNIWAL BROS (SR) PVT. LTD.	CHENNAI
		AAVAD INSTRUMENT	AHMEDABAD
		BAUMER TECHNOLOGIES INDIA PVT LTD.,	CHENNAI
		BAUMER TECHNOLOGIES INDIA PVT. LTD.,	VAPI
		THERMAL INSTRUMENT INDIA PVT LTD	MUMBAI
		TEMPSENS INSTRUMENTS (I) PVT. LTD.,	UDAIPUR
		EXOTHERM INSTRUMENTS	THANE
		DETRIV INSTN. & ELEC. LTD.,	MUMBAI
		PYRO ELECTRIC INSTRUEMNTS (GOA) PVT. LTD	GOA
		GOA INSTRUMENTS INDUSTRIES PVT LTD	GOA
		HEATCON SENSORS PVT. LTD	BENGALURU
		TELEVISION & ELECTRONIC SERVIC	CHENNAI
		SERTEL ELECTRONICS (P) LTD	CHENNAI
		TECHNO INSTRUMENTS	AHMEDABAD
		GENERAL INSTRUMENTS CONSORTIUM	GOA/MUMBAI
47	DIFFERENTIAL PRESSURE SWITCH	TRAFAG CONTROLS INDIA PVT LTD	GURAGAON
		SWITZER PROCESS INSTRUMENTS PVT LTD	CHENNAI / GHAZIABAD
		BAUMER TECHNOLOGIES INDIA PVT LTD	CHENNAI
48	LIMIT SWITCH	BCH ELECTRIC LIMITED	FARIDABAD
		SOUTH INDIA SWITCH GEAR CO	VELLORE
		JAI BALAJI CONTROLGEARS PVT LTD	CHENNAI
		BOHMEN INDUSTRIES	THANE
		HONEYWELL	UNITED KINGDOM

Apart from the above any other make shall be subject to BHEL's approval.



BHEL : BAP : RANIPET Water Business

QUALIFICATION REQUIREMENT FOR WORKING MIXED BED (MB) SYSTEM / DEMINERALIZATION (DM) PLANT

The Qualification requirements for working Mixed Bed (MB) System / Demineralization Plant are listed below and Vendors should meet the same:

1. Should have experience in design, manufacture, supply, erection, commissioning & successful operation of either one of the following system (working MB or DM System consisting of SAC, SBA & MB) with consistent output parameters meeting the quality requirement of DM water:

Sl. No.	Description	In case of Working MB	In case of DM (SAC, SBA & MB)
i	Minimum Net capacity per stream	30 m ³ /hr.	30 m ³ /hr.
ii	Minimum TDS of input water	10 mg/lit	25 mg/lit

2. MB / DM unit (referred by the vendor under Sl. No. 1) shall be capable of producing DM water to be used as make-up feed water to Boiler /Steam generator. The minimum output between regeneration (OBR) for working MB shall be 1440 m³. The minimum output between regeneration (OBR) for DM shall be 720 m³.
3. Mixed Bed / DM plant outlet water quality should fulfill the following requirements:

Sl. No.	Description	Unit	Values
i	Conductivity at 25 deg. c	μS/cm	0.15 max
ii	Silica as SiO ₂	ppm	0.02 max
iii	pH		6.8 to 7.2

4. Plant (referred by the vendor under Sl. No. 1) should have been in successful operation for a period of minimum one year after commissioning as on techno-commercial bid opening date.
5. Plant should have been in auto mode operation & regeneration through PLC or DCS system.
6. Vendor shall furnish necessary documentary evidence in original / attested copy obtained from the customer as a proof of meeting the qualifying criteria for review by BHEL. The certificate shall contain all required information for the satisfactory performance, such as plant capacity, location of the plant with postal address, date of supply & commissioning, design and actual performance parameters, etc., as per **Annexure-E**. Original certificate shall be provided to BHEL for verification, whenever required by BHEL.
7. Vendor shall fill up all relevant information of the plant already executed by them (refer to Sl. No. 1) in the enclosed format (**Annexure I & II**) and submit the signed format.

8. Vendors who defaulted, in any of the previous tenders floated by BHEL are not permitted to respond.
9. Final acceptance of offer is subject to the approval of end customer.
10. After receipt of offers, during scrutiny any vendor found to be banned by BHEL, then their offer will be summarily rejected at any stage.

Annexure - I
QUALIFICATION DATA SHEET - WORKING MB

A. Customer details:-

- a. Name :
- b. Designation :
- c. Mobile :
- d. Land line :
- e. Fax :
- f. Email id :
- g. Postal address :

B. Plant Details:-

Date of Supply :

Date of commissioning:

Sl. No.	Parameters	Unit	Design	Actual
01	Mixed Bed capacity	m ³ /hr.		
02	Output between regeneration (OBR)	m ³		
03	Type of operation	Automatic through PLC or DCS		
04	Feed water quality a. pH b. Conductivity c. SiO ₂	μS/cm ppm		
05	Output water quality a. pH b. Conductivity c. TDS d. SiO ₂	μS/cm ppm ppm		
06	MB Vessel size Diameter x Height per stream	m		
07	Cation Resin used a. Make b. Type c. Quantity	Litres		
08	Anion Resin used a. Make b. Type c. Quantity	Litres		
09	Chemical consumption per regeneration as 100% basis a. Hydrochloric acid for Cation regeneration b. Sodium Hydroxide for Anion generation	Kg kg		
10	Duration of regeneration a. Cation b. Anion	Hrs. Hrs.		

Signature of the Vendor

Annexure - II
QUALIFICATION DATA SHEET
DM (SAC, DG, SBA & MB) SYSTEM

A. Customer details:-

- a. Name :
b. Designation :
c. Mobile :
d. Land line :
e. Fax :
f. Email id :
g. Postal address :

B. Plant Details:-

Date of Supply :

Date of commissioning:

Sl. No.	Parameters	Unit	Design	Actual
01	DM Plant Capacity	m ³ /hr.		
02	Output between regeneration (OBR)	m ³		
03	Type of operation	Automatic through PLC or DCS		
04	Feed water quality a. pH b. Conductivity c. SiO ₂	μS/cm ppm		
05	Output water quality a. pH b. Conductivity c. TDS d. SiO ₂	μS/cm ppm ppm		
06	SAC Vessel Size Diameter x Height per stream	m		
	DGT Vessel size Diameter x Height per stream	m		
	SBA Vessel size Diameter x Height per stream	m		
	MB Vessel Size Diameter x Height per stream	m		
07	Cation Resin used in SAC a. Make b. Type c. Quantity	Litres		
08	Anion Resin used in SBA a. Make b. Type c. Quantity	Litres		
09	Cation Resin used in MBC d. Make e. Type f. Quantity	Litres		

Annexure - II
QUALIFICATION DATA SHEET
DM (SAC, DG, SBA & MB) SYSTEM

Sl. No.	Parameters	Unit	Design	Actual
10	Anion Resin used in MB d. Make e. Type f. Quantity	Litres		
11	Chemical consumption for SAC per regeneration as 100% basis a. Hydrochloric acid	Kg		
12	Duration of regeneration	Hrs.		
13	Chemical consumption for SBA per regeneration as 100% basis b. Sodium Hydroxide			
14	Duration of regeneration	Hrs.		
15	Chemical consumption for MB per regeneration as 100% basis c. Hydrochloric acid for Cation regeneration d. Sodium Hydroxide for Anion generation	Kg kg		
16	Duration of regeneration a. Cation b. Anion	Hrs. Hrs.		

Signature of the Vendor

Annexure-E

Ref:

Dt:

To:

M/s Bharat Heavy Electricals Limited

Boiler Auxiliaries Project

Ranipet-632406

Sir,

Sub: Performance certificate.

This is to certify that M/s (Name of the Company) having their Registered Office at (Address of the Company), have supplied/executed the following item(s)/works.

Sl.No	Details of item/ materials supplied or work executed	Scope	Period of work execution/ supply	Performance		Any other remarks
				Equipment	Delivery	
1				Satisfactory/ Unsatisfactory	Satisfactory/ Unsatisfactory	
2				Satisfactory/ Unsatisfactory	Satisfactory/ Unsatisfactory	
3				Satisfactory/ Unsatisfactory	Satisfactory/ Unsatisfactory	
4				Satisfactory/ Unsatisfactory	Satisfactory/ Unsatisfactory	

This Certificate is issued at the request of M/s (Name of the Company) to enable them to participate in the tender ref. dt. of Bharat Heavy Electricals Limited, Ranipet.

(Signature of the Competent Authority)
(SEAL)