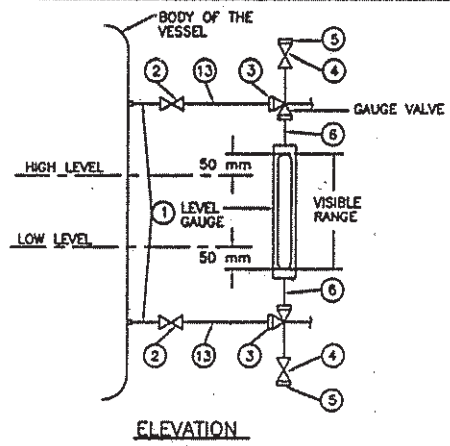
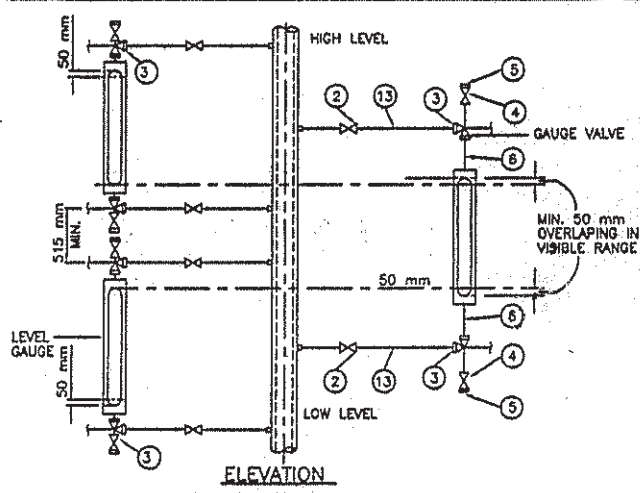


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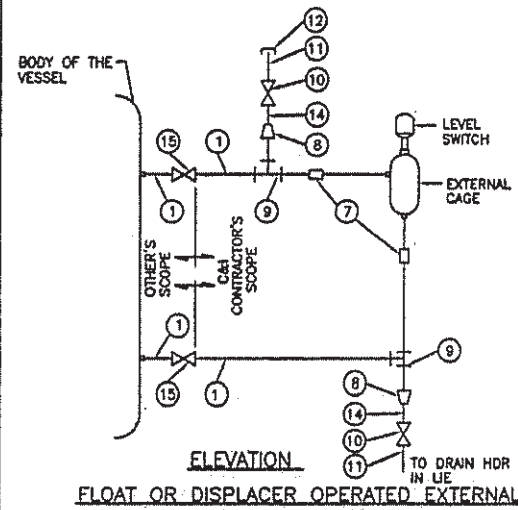


ELEVATION
LOCAL LEVEL INDICATION USING GAUGE GLASS

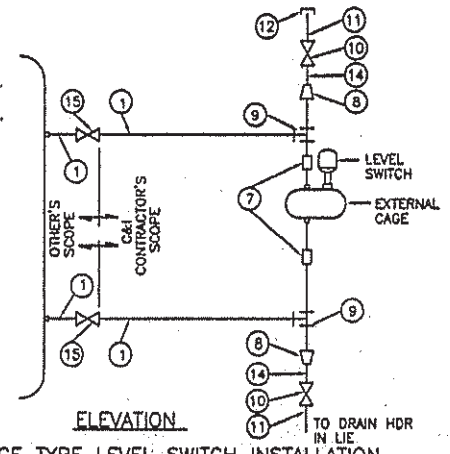


ELEVATION
LOCAL LEVEL INDICATION USING MULTIPLE GAUGES FOR INCREASED RANGE NOT COVERED IN A SINGLE UNIT

LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	3/4" x 1" NPS SCH.40/80/160/P91 (AS PER PROCESS REQUIREMENT) CARBON /ALLOY STEEL PIPE.
2.	3/4" SW GLOBE VALVE.
3.	3/4" SW UNION.
4.	3/4" NPT GLOBE VALVE.
5.	3/4" NPT (M) CAP.
6.	3/4" NPT (F) UNION CONNECTION.
7.	1" SW EQUAL UNION.
8.	1" x 1/2" SW REDUCING INSERT.
9.	1" SW EQUAL TEE.
10.	1/2" SW GLOBE VALVE.
11.	1/2" NPS SWx1/2" NPT(M) CS/AS NIPPLE.
12.	1/2" NPT (F) CS CAP.
13.	3/4"x1/2" NPS SCH.40/80 CS/AS PIPE.
14.	1/2" NPS SCH.80/160 CS/AS NIPPLE.
15.	1" SW GLOBE VALVE.



ELEVATION
FLOAT OR DISPLACER OPERATED EXTERNAL CAGE TYPE LEVEL SWITCH INSTALLATION



NOTES:-

1. FOR LEVEL GAUGE 3/4" AND FOR LEVEL SWITCH 1" PROCESS CONNECTION SHALL BE PROVIDED.
2. NOTES UNDER DRG. NO. 0000-405-POI-A-023 (WHICHEVER ARE RELEVANT).

FOR TENDER PURPOSE ONLY

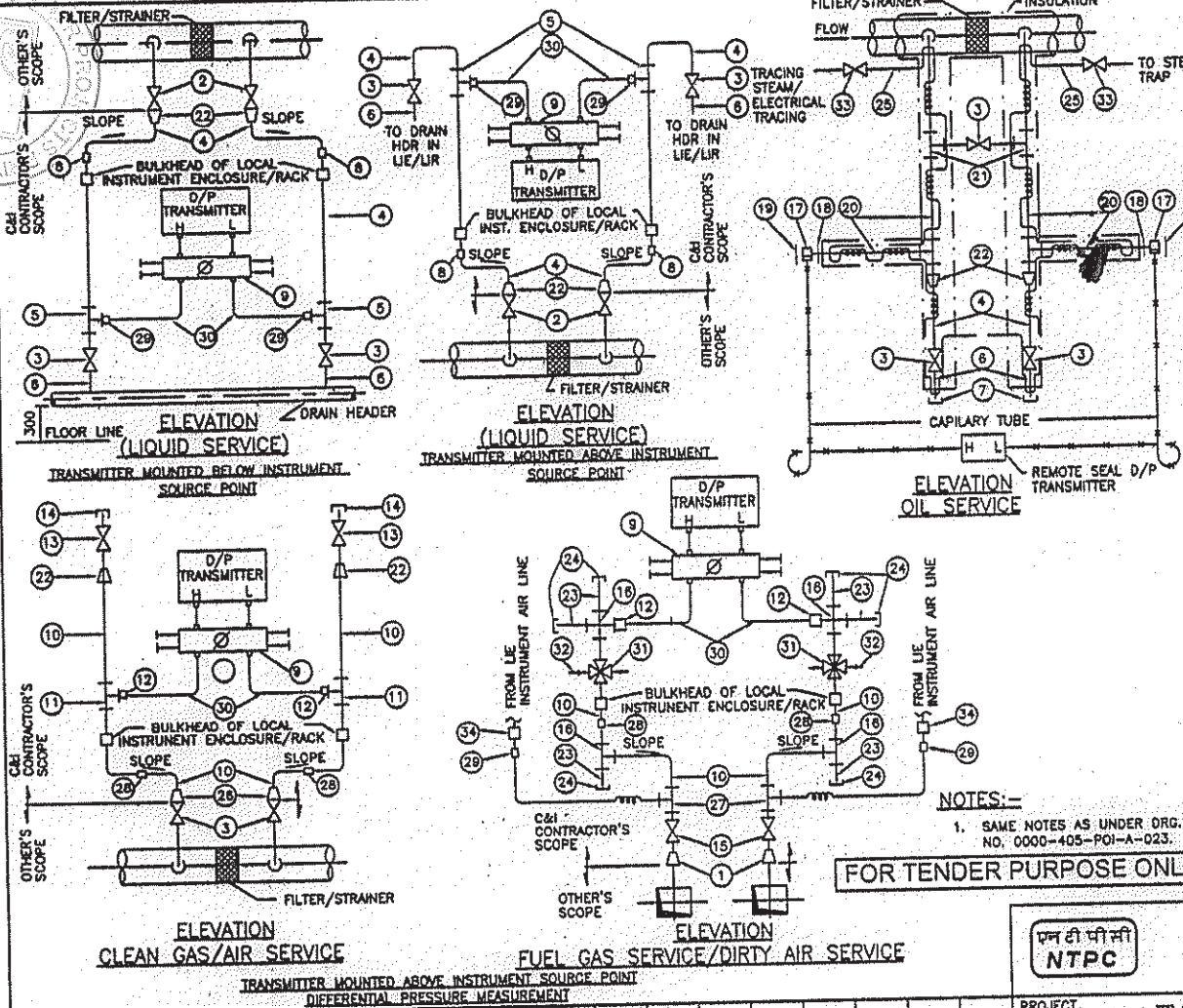
एन टी पी सी लिमिटेड
NTPC LIMITED
 (A GOVERNMENT OF INDIA ENTERPRISE)
 ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM (LEVEL GAUGE & SWITCHES)		
REV. NO.	DESCRIPTION	DATE	26.04.06
A	FIRST ISSUE		
SIZE	SCALE	DRG. NO.	REV. NO.
A3	N.T.S.	0000-405-POI-A-031	A

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE
CLEARED BY											

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LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	42x2 TO 3/4" SW REDUCING INSERT.
2.	3/4" SW GLOBE VALVE.
3.	1/4" SW GLOBE VALVE FOR LIQUID APPLICATION & 3/4"/1" IN GAS/AIR APPLICATION.
4.	1/2" NPS 40/80/180 (AS PER PROCESS REQUIREMENT) CARBON/ALLOY STEEL PIPE.
5.	1/2" SW EQUAL TEE.
6.	1/2" NPS SW x 1/2" NPT (M) CS NIPPLE.
7.	1/2" NPT (F) CS CAP.
8.	1/2" PIPE x 1/2" PIPE UNION.
9.	5 VALVE MANIFOLD (FOR DETAIL REFER DRAWING NO.0000-405-POI-A-025).
10.	3/4" SCH 80 CARBON/ALLOY STEEL PIPE.
11.	3/4"/1/2" SW EQUAL TEE.
12.	3/4"x1/2" TUBE UNION.
13.	1/2" SCREWED GLOBE VALVE.
14.	1/2" NPT (M) PLUG.
15.	3/4" SW GATE VALVE.
16.	3/4" SW EQUAL CROSS.
17.	WAFER ELEMENT FOR USE WITH 3"ANSI R.F. VALVE.
18.	3"BLIND 300lb R.F. WELD NECK FLANGE DRILLED FOR 1" SCH. 40/80 PIPE.
19.	3" BLIND FLANGE.
20.	1"NPS SCH. 40/80 (AS PER PROCESS REQUIREMENT) CS PIPE.
21.	1" SW EQUAL TEE.
22.	3/4" x 1/2"SW REDUCING INSERT.
23.	3/4" SW x 3/4" NPT (M) CS/AS NIPPLE
24.	3/4" NPT (F) CS/AS CAP.
25.	1/4" NPS ALLOY STEEL PIPE.
26.	1" x 3/4" SW REDUCING INSERT.
27.	3/4" SW x 1/2" PSW BRANCH TEE.
28.	3/4" PIPE UNION
29.	1/2" CLAMP UNION (THREADED) SUITABLE FOR FLEXIBLE CONNECTION OF NYLON REINFORCED PVC TUBE.
30.	SS TUBE
31.	3/4" SW 4 WAY VALVE.
32.	QUICK DISCONNECT-FITTINGS.
33.	1/4" SW ISOLATION VALVE 316SS
34.	1/2" x 1/2" SS PIPE UNION.

NOTES:-
1. SAME NOTES AS UNDER DRG. NO. 0000-405-POI-A-023.

FOR TENDER PURPOSE ONLY

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NTPC LIMITED
 (A GOVERNMENT OF INDIA ENTERPRISE)
 ENGINEERING DIVISION

PROJECT **TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)**

TITLE **INSTRUMENT INSTALLATION DIAGRAM**

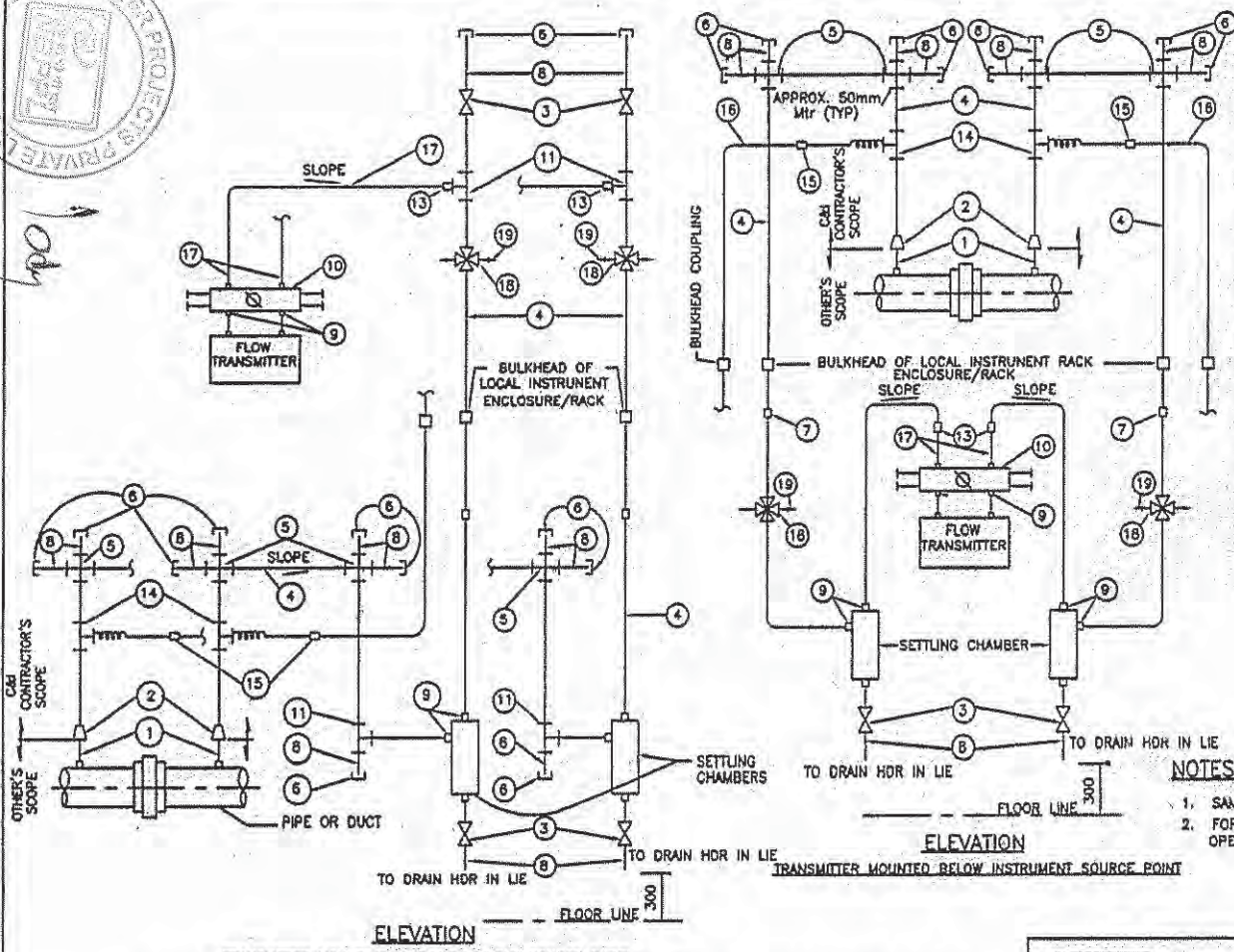
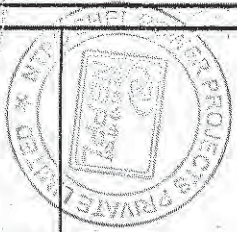
DIFF. PRESS. MEASUREMENT (LIQUID, OIL, AIR/GAS SERVICE)

A	FIRST ISSUE	DATE	26.04.06
REV. NO.	DESCRIPTION	DRAWN	DESIGN CHKO.
		M	E C C&I ARCH.
		CLEARED BY	

SIZE	SCALE	DRG. NO.	REV. NO.
A3	N.T.S.	0000-405-POI-A-030	A

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LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	42x4.05mm M.S. BLACK PIPE.
2.	M 42x2 TO 3/4"SW REDUCING INSERT.
3.	3/4" SW GLOBE VALVE.
4.	3/4" NPS PIPE.
5.	3/4" SW EQUAL CROSS.
6.	3/4" NPT (F) CS/AS CAP.
7.	3/4" PIPE UNION.
8.	3/4" NPS SWx3/4" NPT (M) CS/AS NIPPLE
9.	SUITABLE ADAPTER
10.	5 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO.0000-405-POI-A-029
11.	3/4" SW EQUAL TEE.
12.	3/4" SW GATE VALVE.
13.	3/4" PIPE x 1/2" TUBE UNION
14.	3/4" SW x 1/2" SW BRANCH TEE.
15.	1/2" GI FITTING
16.	1/2" NB GI PIPE.
17.	SS TUBE
18.	3/4" SW 4 WAY VALVE.
19.	QUICK DISCONNECT FITTINGS.

NOTES:-

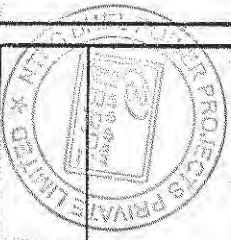
1. SAME NOTES UNDER DRG. NO. 0000-405-POI-A-023.
2. FOR VACUUM APPLICATION OTHER PORT OF TRANSMITTER SHALL BE KEPT OPEN TO ATMOSPHERE.

DIRTY AIR/FLUE GAS FLOW MEASUREMENT USING HEAD TYPE PRIMARY ELEMENT

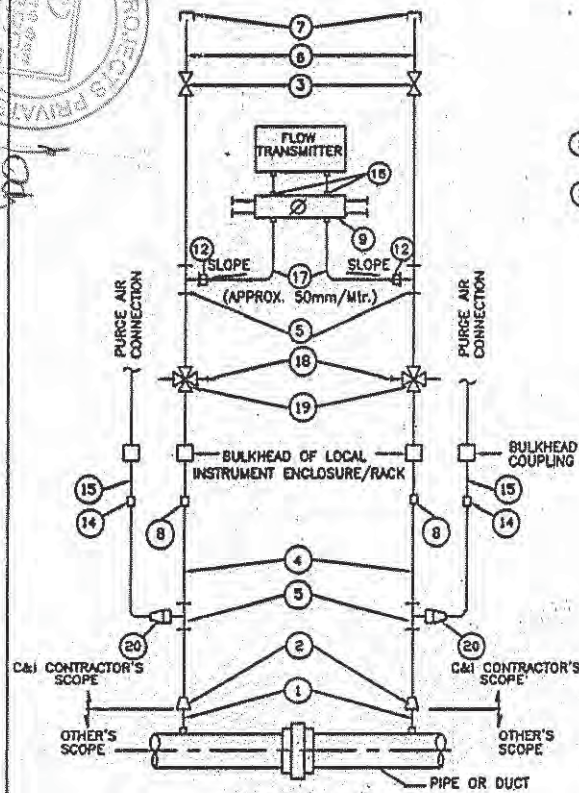
FOR TENDER PURPOSE ONLY

		एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT		TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (FLOW MEASUREMENT DIRTY AIR/ FLUE GAS)	
REV. NO.	DESCRIPTION	DATE	DRG. NO.
A	FIRST ISSUE	26.04.09	0000-405-POI-A-029
DRAWN DESIGN CHKD.		SIZE	REV. NO.
CLEARED BY		A3	A
		SCALE	
		N.T.S.	

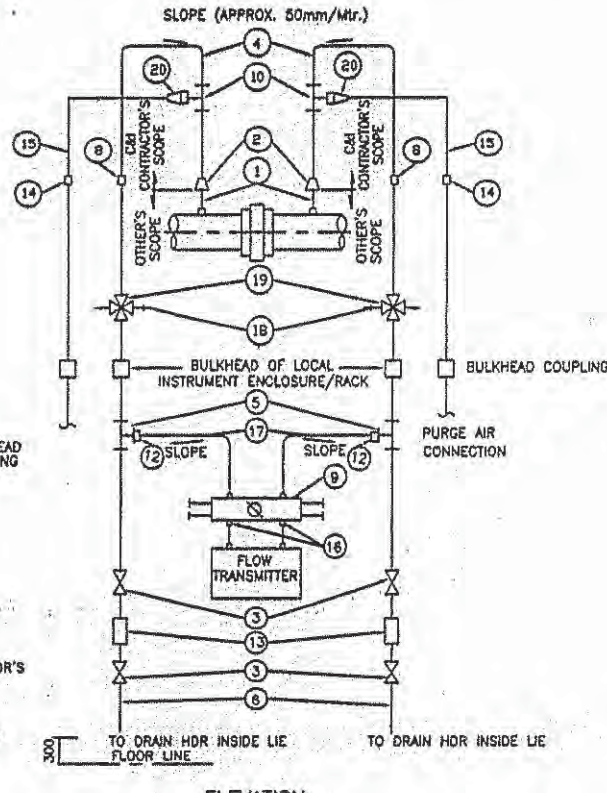
09935



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ELEVATION
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT



ELEVATION
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

DIRTY AIR/FLUE GAS FLOW MEASUREMENT USING HEAD TYPE PRIMARY ELEMENT

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	42x4.05mm M.S. BLACK PIPE.
2.	M 42x2 TO 3/4" SW REDUCING INSERT.
3.	3/4" SW GLOBE VALVE.
4.	3/4" PIPE.
5.	3/4" SW EQUAL TEE.
6.	3/4" SCH. 80 SW 3/4" NPT (M) CS/AS NIPPLE
7.	3/4" NPT (F) CS CAP.
8.	3/4" PIPE UNION.
9.	5 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO.0000-405-POI-A-028.
10.	3/4" SW EQUAL TEE.
11.	3/4" SW GATE VALVE.
12.	3/4" PIPE x 1/2" TUBE UNION
13.	DRAIN POT. OF CS.
14.	1/2" GI FITTING
15.	1/2" NB GI PIPE
16.	SUITABLE ADAPTER
17.	SS TUBE
18.	QUICK DISCONNECT FITTINGS.
19.	3/4" SW 4 WAY VALVE.
20.	3/4" x 1/2" REDUCER.

NOTES:-

1. SAME NOTES AS UNDER DRG. NO. 0000-405-POI-A-028.

FOR TENDER PURPOSE ONLY

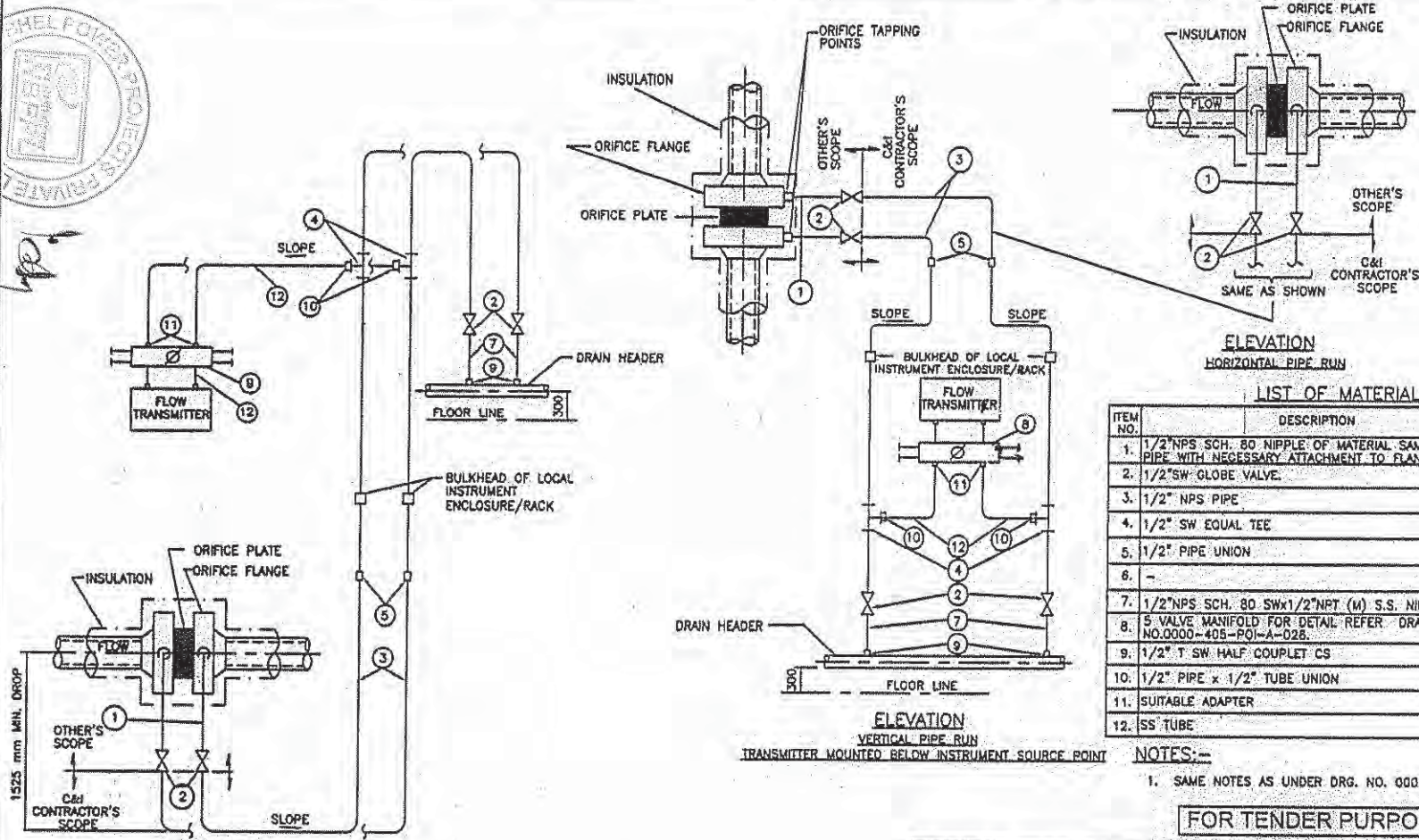
<p>एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION</p>	PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)	
	TITLE	INSTRUMENT INSTALLATION DIAGRAM (FLOW MEASUREMENT AIR/GAS)	
REV. NO.	A	DATE	28.04.06
DESCRIPTION		DRG. NO.	0000-405-POI-A-028
		SCALE	N.T.S.
		REV. NO.	A

REV. NO.	A	DESCRIPTION	FIRST ISSUE	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
														A3	N.T.S.	0000-405-POI-A-028	A

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ITEM NO.	DESCRIPTION
1.	1/2" NPS SCH. 80 NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE WITH NECESSARY ATTACHMENT TO FLANGE OF ORIFICE
2.	1/2" SW GLOBE VALVE
3.	1/2" NPS PIPE
4.	1/2" SW EQUAL TEE
5.	1/2" PIPE UNION
6.	-
7.	1/2" NPS SCH. 80 SW x 1/2" NPT (W) S.S. NIPPLE
8.	5 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO.0000-405-POI-A-028.
9.	1/2" T SW HALF COUPLER CS
10.	1/2" PIPE x 1/2" TUBE UNION
11.	SUITABLE ADAPTER
12.	SS TUBE

NOTES:-
1. SAME NOTES AS UNDER DRG. NO. 0000-405-POI-A-023.

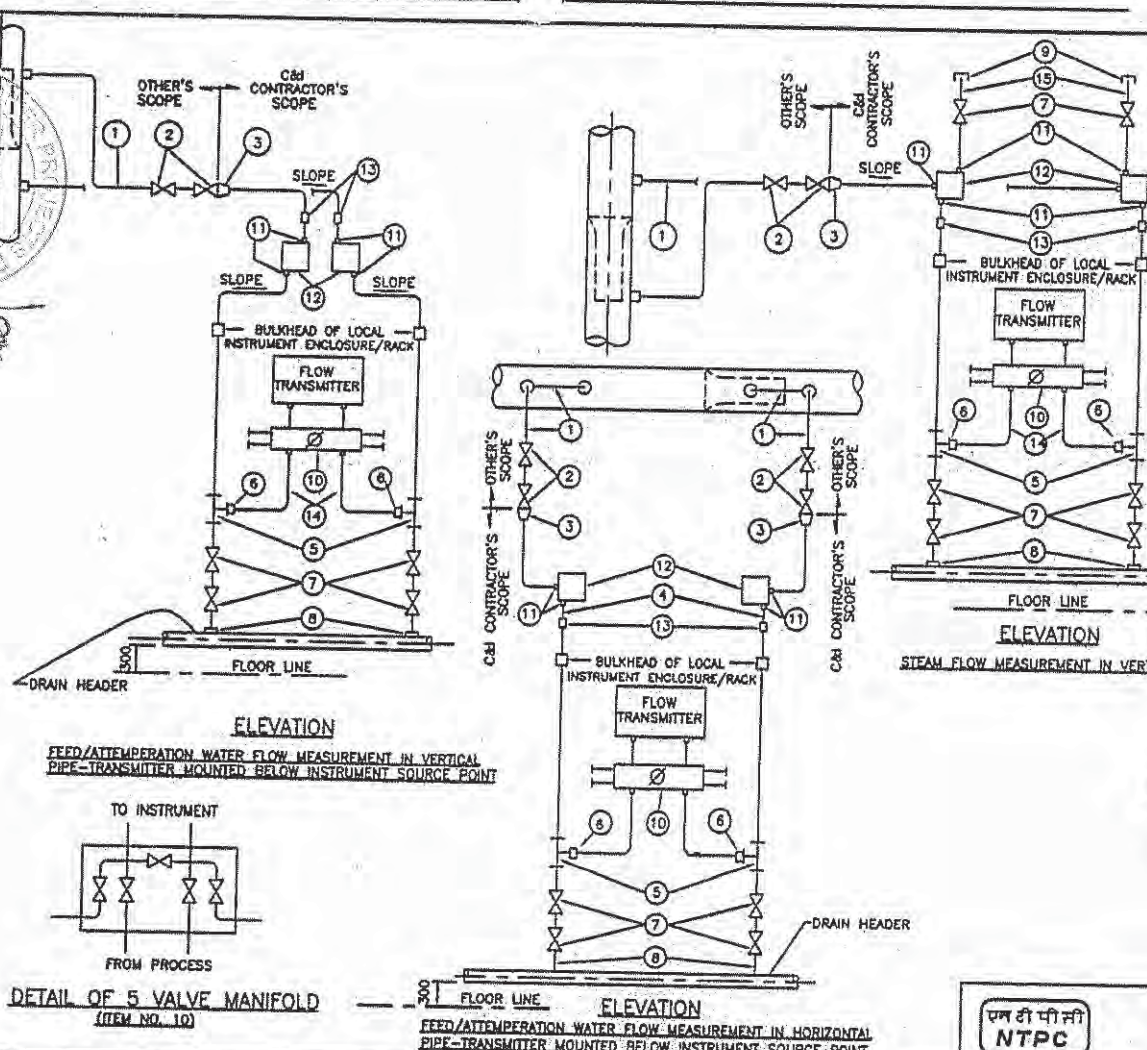
FOR TENDER PURPOSE ONLY

 एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)
TITLE	INSTRUMENT INSTALLATION DIAGRAM FLOW MEASUREMENT (USING ORIFICE PLATES) CONDENSATE & SERVICE WATER
SIZE	A3
SCALE	N.T.S.
DRG. NO.	0000-405-POI-A-027
REV. NO.	A

REV. NO.	A	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	28.04.06
CLEARED BY													

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ITEM NO.	DESCRIPTION
1.	3/4" / 1" NPS SCH. 80/180/XXS/P91 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE.
2.	3/4" / 1" SW GLOBE VALVE.
3.	3/4" / 1" TO 1/2" REDUCING INSERT
4.	1/2" NPS PIPE
5.	1/2" SW EQUAL TEE
6.	1/2" PIPE x 1/2" TUBE UNION
7.	1/2" SW GLOBE VALVE.
8.	1/2" NPS SCH. 80/160 SWx1/2" SW CS/AS COUPLER
9.	1/2" NPT (F) CS CAP
10.	5 VALVE MANIFOLD
11.	SUITABLE ADAPTER
12.	CONDENSATE POT (RESERVOIR)
13.	1/2" PIPE UNION
14.	SS TUBE
15.	1/2" NPS SCH. 80/160 SWx1/2" NPT (M) CS/AS NIPPLE

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-405-POI-A-023.
2. CONDENSATE POTS SHALL BE PROVIDED FOR ALL STEAM SERVICES.
3. FOR WATER SERVICES CONDENSATE POTS SHALL BE PROVIDED ONLY IN THOSE CASES WHERE TEMP. > 120°C

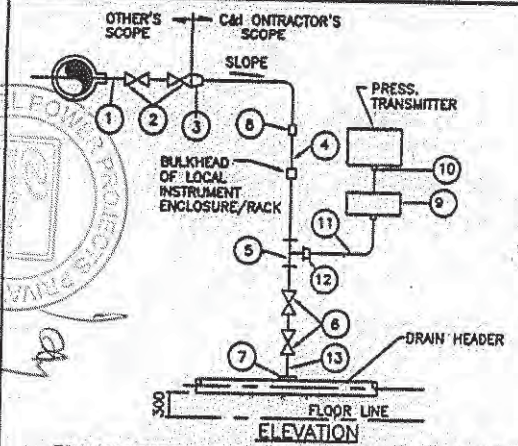
		एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT		TYPICAL THERMAL POWER PROJECT (STATION C & I PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM FLOW MEASUREMENT (USING FLOW NOZZLES) STEAM & FEEDWATER	
REV. NO.	DESCRIPTION	SIZE	SCALE
A	FIRST ISSUE	A3	N.T.S.
REV. NO.	DESCRIPTION	DRG. NO.	REV. NO.
		0000-405-POI-A-026	A

DATE	28.04.06
APPD	
ARCH.	
C&I	
MEC	
DESIGN	
CHKD.	
DRAWN	
DESCRIPTION	

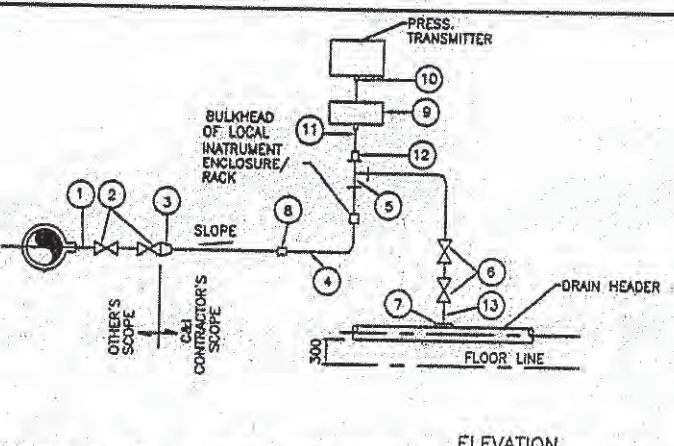
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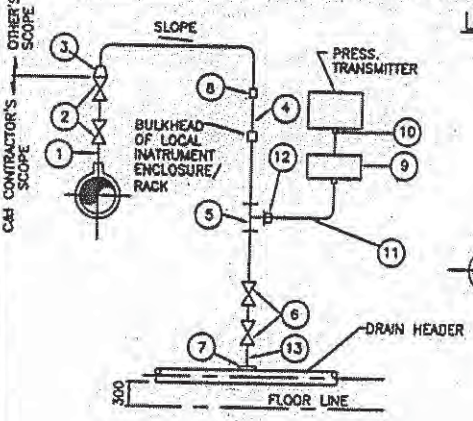


TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

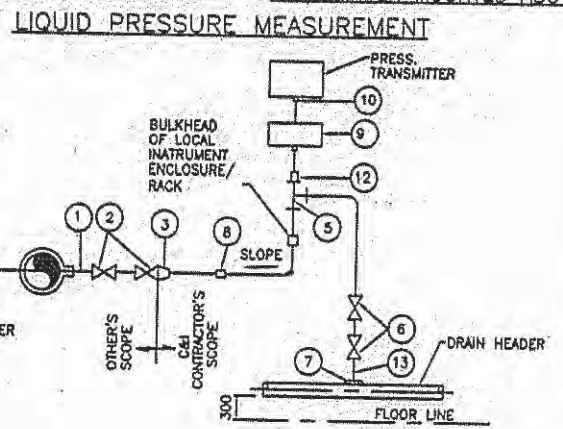


TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT

LIQUID PRESSURE MEASUREMENT

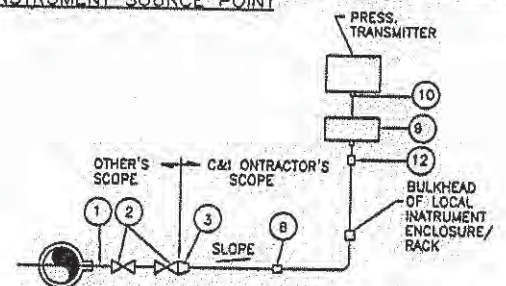


TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT

STEAM PRESSURE MEASUREMENT



VACUUM PRESSURE MEASUREMENT

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-405-POI-A-023.
2. FOR VACUUM APPLICATION OTHER PORT OF TRANSMITTER SHALL BE KEPT OPEN TO ATMOSPHERE.

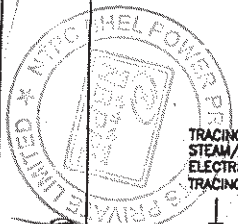
LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	1/2" / 3/4" / 1" NPS SCH. 80/160/XXS/P91 NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE.
2.	3/4" / 1" SW GLOBE VALVE.
3.	3/4" / 1" TO 1/2" REDUCING INSERT
4.	1/2" NPS PIPE
5.	1/2" SW EQUAL TEE
6.	1/2" SW GLOBE VALVE
7.	1/2" NPS SCH. 80/160 SWx1/2" CS/AS COUPLER
8.	1/2" PIPE UNION
9.	2/3 VALVE MANIFOLD (FOR DETAIL SEE DRAWING NO.0000-405-POI-A-023)
10.	SUITABLE ADAPTER
11.	SS. TUBE
12.	1/2" PIPE x 1/2" TUBE UNION
13.	1/2" NPS SCH. 80/160 SWx1/2" NPT(M) CS/AS NIPPLE

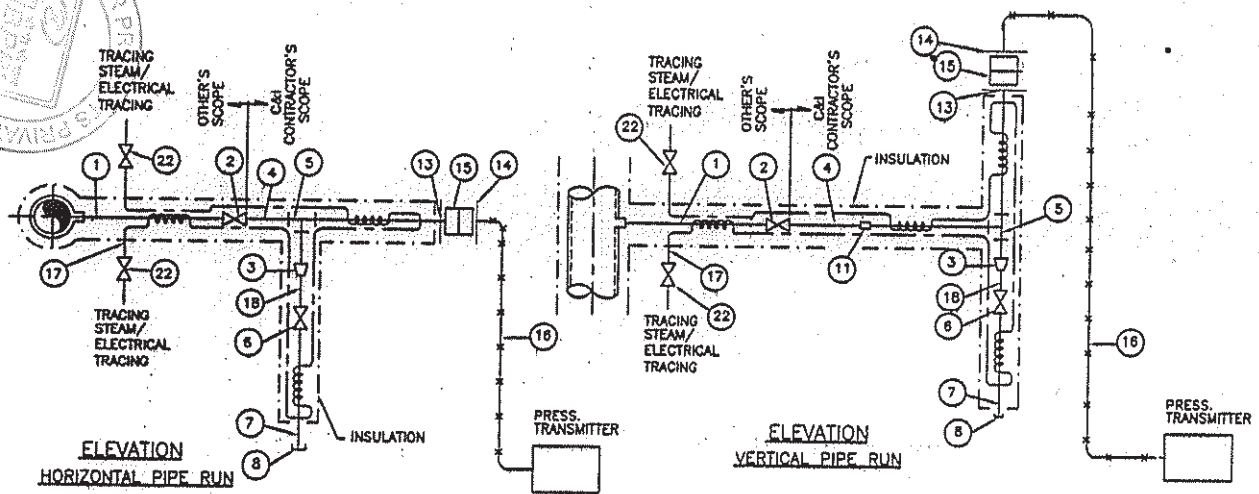
FOR TENDER PURPOSE ONLY

		<p>एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION</p>	
PROJECT		TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (PRESSURE MEASUREMENT USING PRESS /DP TRANSMITTERS STEAM/LIQUID VACUUM)	
REV. NO.	DESCRIPTION	SIZE	SCALE
A	FIRST ISSUE	A3	N.T.S.
DATE	28.04.06	DRG. NO.	0000-405-POI-A-025
APPROVED BY		REV. NO.	A

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HEAVY FUEL PRESS. MEASUREMENT USING WAFER TYPE TRANSMITTER WITH REMOTE SEAL

- NOTES:-**
1. SAME NOTES AS UNDER DRG. NO.0000-405-POI-A-023.
 1. FOR LFO STEAM TRACING NOT APPLICABLE.

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	1" NPS SCH 40/80 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE
2.	1" SW GLOBE VALVE
3.	1" x 1/2" SW REDUCING INSERT
4.	1" NPS SCH 40/80 CS PIPE
5.	1" SW EQUAL TEE
6.	1/2" SW GLOBE VALVE
7.	1/2" NPS SCH 40/80 SW x 1/2"NPT (M) CS NIPPLE
8.	1/2" NPT (F) CS CAP.
9.	-
10.	-
11.	1/2" PIPE UNION
12.	-
13.	2 1/2" BLIND 300lb _R RF ANSI FLANGE DRILLED & TAPPED FOR 1" NPT PIPE
14.	2 1/2" MATCHING BLIND FLANGE
15.	WAFER ELEMENT FOR USE WITH 2 1/2" ANSI RF FLANGE
16.	SPECIAL LIQUID FILLED 300 SS POLYTHINE JACKETED CAPILLARY TUBE OF PRESSURE TRANSMITTER.
17.	1/4" CHROME MOLY STEEL PIPE.
18.	1/2" NPS SCH. 40/80 CS PIPE.
19.	-
20.	-
21.	-
22.	1/4" SW 316 SS ISOLATION VALVE.

FOR TENDER PURPOSE ONLY

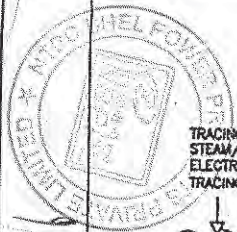
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NTPC LIMITED
 (A GOVERNMENT OF INDIA ENTERPRISE)
 ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)
TITLE	INSTRUMENT INSTALLATION DIAGRAM (PRESSURE TRANSMITTER FUEL OIL)

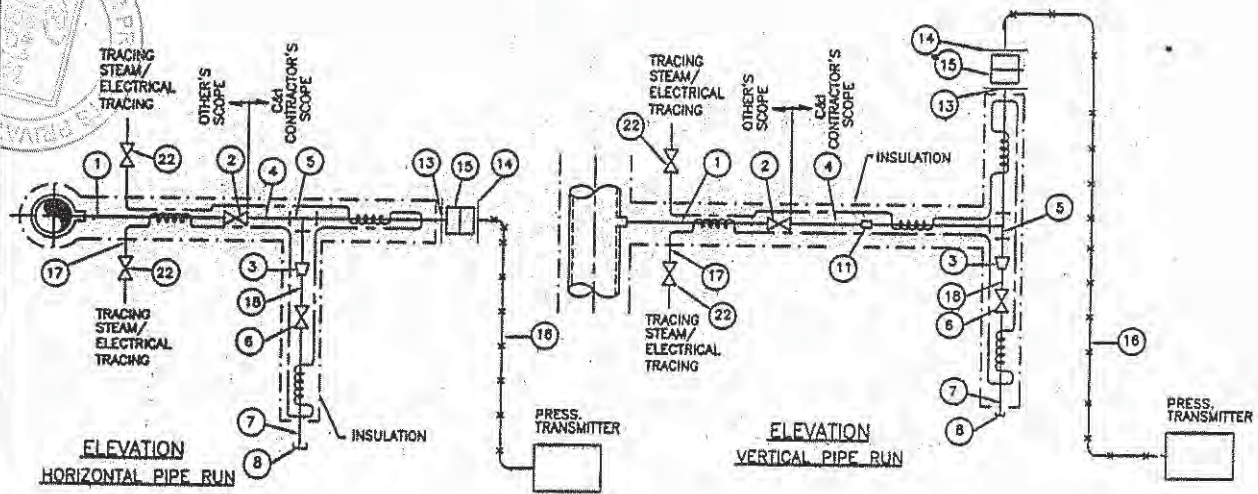
REV.NO.	A	DESCRIPTION	FIRST ISSUE	DATE	28.04.06
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REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
												A3	N.T.S.	0000-405-POI-A-024	A

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HEAVY FUEL PRESS. MEASUREMENT USING WAFER TYPE TRANSMITTER WITH REMOTE SEAL

NOTES:-

1. SAME NOTES AS UNDER DRG. NO.0000-405-POI-A-023.
1. FOR LFO STEAM TRACING NOT APPLICABLE.

LIST OF MATERIALS

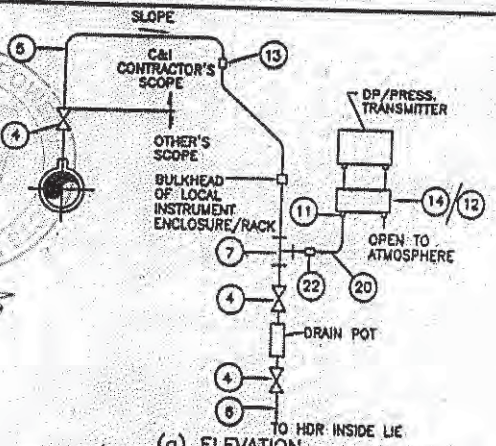
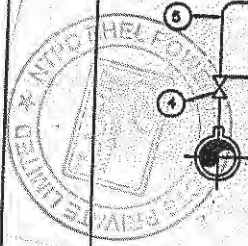
ITEM NO.	DESCRIPTION
1.	1" NPS SCH 40/80 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE
2.	1" SW GLOBE VALVE
3.	1" x 1/2" SW REDUCING INSERT
4.	1" NPS SCH 40/80 CS PIPE
5.	1" SW EQUAL TEE
6.	1/2" SW GLOBE VALVE
7.	1/2" NPS SCH 40/80 SW x 1/2" NPT (M) CS NIPPLE
8.	1/2" NPT (F) CS CAP.
9.	-
10.	-
11.	1/2" PIPE UNION
12.	-
13.	2 1/2" BLIND 300lbs RF ANSI FLANGE DRILLED & TAPPED FOR 1" NPT PIPE
14.	2 1/2" MATCHING BLIND FLANGE
15.	WAFER ELEMENT FOR USE WITH 2 1/2" ANSI RF FLANGE
16.	SPECIAL LIQUID FILLED 300 SS POLYTHINE JACKETED CAPILLARY TUBE OF PRESSURE TRANSMITTER.
17.	1/4" CHROME MOLY STEEL PIPE.
18.	1/2" NPS SCH. 40/80 CS PIPE.
19.	-
20.	-
21.	-
22.	1/4" SW 316 SS ISOLATION VALVE.

FOR TENDER PURPOSE ONLY

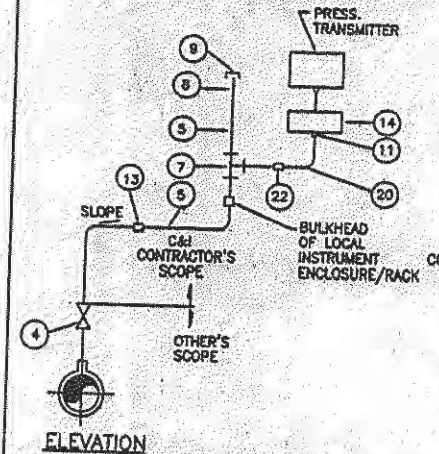
एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)
TITLE	INSTRUMENT INSTALLATION DIAGRAM (PRESSURE TRANSMITTER FUEL OIL)
REV. NO.	A
DESCRIPTION	
DRAWN	
DESIGN	
CHKD.	
M	
E	
C	
C&I	
ARCH.	
APPD	
DATE	25.04.08
SIZE	A3
SCALE	N.T.S.
DRG. NO.	0000-405-POI-A-024
REV. NO.	A

09930

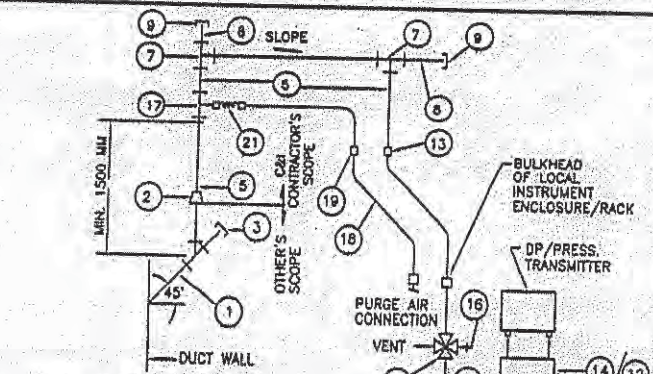
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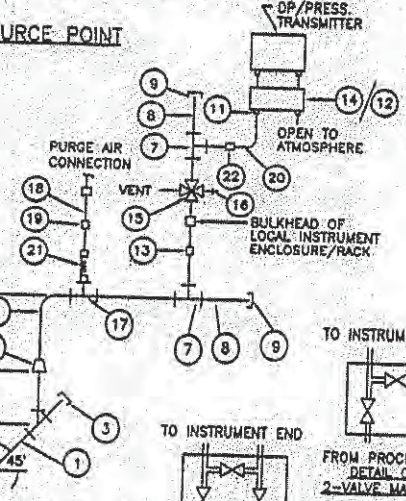
(a) ELEVATION
INST./SERVICE AIR PRESSURE MEASUREMENT
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



ELEVATION
INST./SERVICE AIR PRESSURE MEASUREMENT
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT



(b) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT



ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT

LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	42 X 405 MM M.S. BLACK PIPE
2.	M42X2 TO 3/4" REDUCING INSERT
3.	M42X2(F) M.S. CAP
4.	3/4" SW GLOBE VALVE/GATE VALVE
5.	3/4" NPS PIPE
6.	3/4" NPS SW 3/4" NPT(M) CS/AS NIPPLE
7.	3/4" SW EQUAL TEE
8.	3/4" NPS SCH 80 CARBON/ALLOY STEEL NIPPLE
9.	3/4" NPT(F) CS/AS CAP
10.	3/4" SW CS/AS EQUAL CROSS
11.	1/2" TUBE ADAPTER
12.	3 VALVE MANIFOLD
13.	3/4" PIPE UNION
14.	2 VALVE MANIFOLD
15.	3/4" SW 4 WAY VALVE
16.	QUICK DISCONNECT FITTING
17.	3/4" SW X 1/2" SW BRANCH TEE
18.	1/2" NB SEAMLESS GI PIPE
19.	1/2" NPT (F) OI FITTING
20.	SS TUBE
21.	FLEXIBLE HOSE WITH ONE END SOCKET WELDED (PIPE SIDE) & OTHER END WITH SUITABLE FITTINGS.
22.	3/4" X 1/2" S.S. TUBE UNION

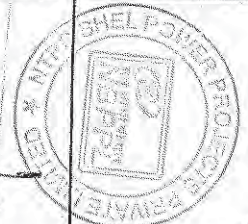
NOTES:-

- SEE NOTES UNDER DRG. NO.0000-405-POI-A-022.
- IMPULSE LINE DRAIN CONNECTIONS SHALL BE DONE AS PER TECHNICAL SPECIFICATIONS
- THE SLOPE IN THE HORIZONTAL OF THE IMPULSE PIPE SHALL BE APPROX. 50 mm/mtr.
- THE ORIENTATION OF THE TRANSMITTERS WITH RESPECT TO VALVE MANIFOLDS ETC. TO BE FINALISED DURING DETAILED ENGINEERING KEEPING IN VIEW THE MANUFACTURER'S RECOMMENDATIONS.
- COMMON INSTRUMENT AIR HEADER (1" NB) USING REDUNDANT AIR FILTER REGULATORS WILL BE MADE IN EACH TRANSMITTER ENCLOSURE REQUIRING PURGE AIR. PURGE AIR FOR EACH INSTRUMENT LINE SHALL BE TAPPED FROM THIS HEADER USING INDIVIDUAL PURGE ROTAMETERS AS SHOWN IN DRG. NO. 0000-405-POI-A-034 TYPICALLY.

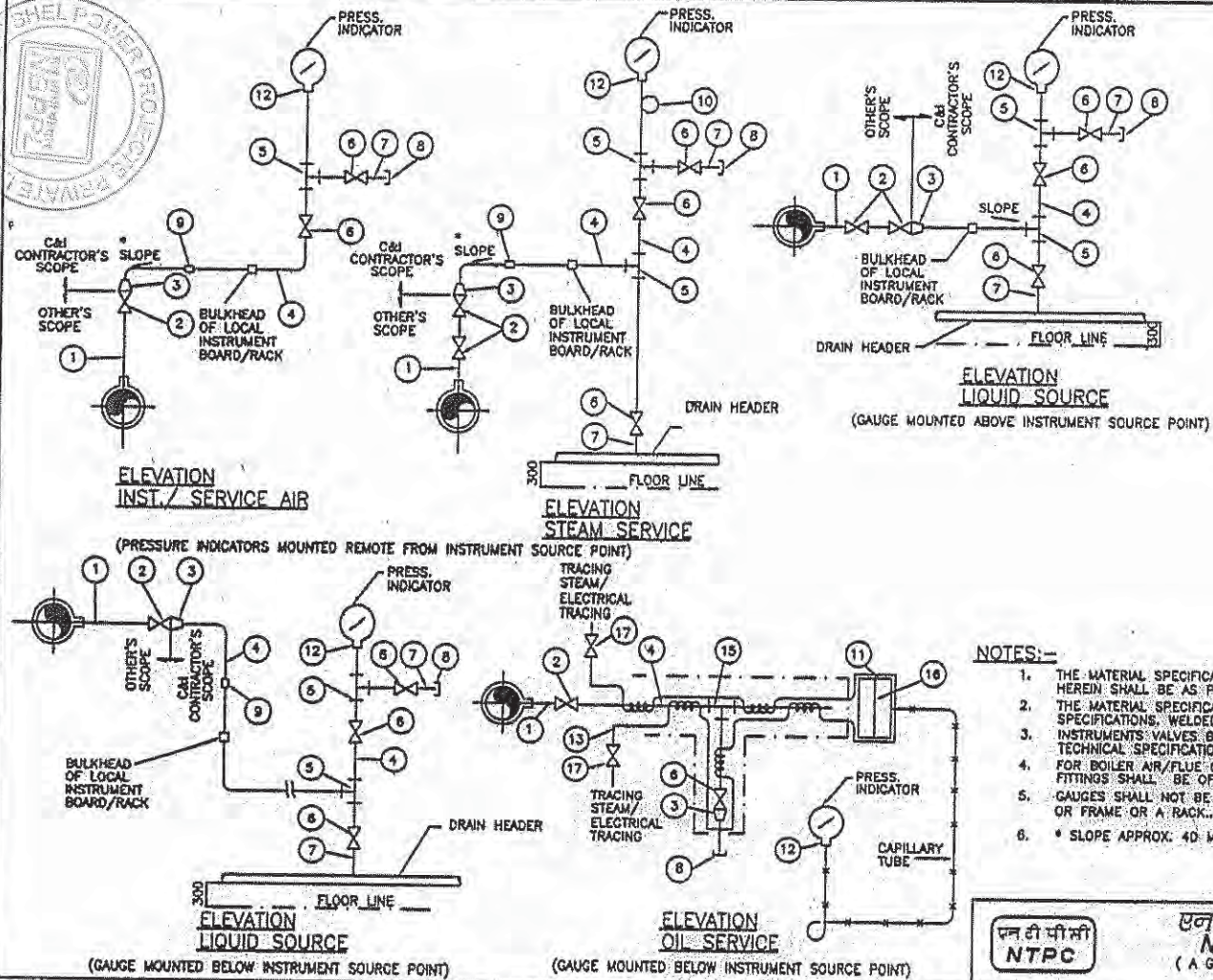
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		एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE.) ENGINEERING DIVISION	
PROJECT		TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (PRESSURE MEASUREMENT USING PRESS / DP TRANSMITTERS (INST./SERVICE, DIRTY AIR/FLUE GAS))	
REV. NO.	A	DATE	26.04.06
DESCRIPTION	DRAWN DESIGN CHKD. M E C C&I ARCH. APPD. DATE CLEARED BY		
SIZE	A3	SCALE	N.T.S.
DRG. NO.	0000-405-POI-A-023		REV. NO. A

09929



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LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	1/2" 3/4" 1" NPS SCH 40/80/160/XXS/P91 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE.
2.	1/2"/3/4"/1" SW GLOBE VALVE/GATE VALVE
3.	3/4" / 1" x 1/2" SW REDUCING INSERT
4.	1/2" / 3/4" PIPE
5.	1/2" / 3/4" SW EQUAL TEE
6.	1/2" / 3/4" SW GLOBE VALVE.
7.	1/2" / 3/4" NPS SW x 1/2" / 3/4" NPT(M) CARBON/ALLOY STEEL NIPPLE.
8.	1/2" / 3/4" NPT(F) CS CAP.
9.	1/2" / 3/4" PIPE UNION.
10.	6" SS SYPHON
11.	1/2" BLIND 300lbs RF ANSI FLANGE DRILLED AND TAPED FOR 1" NPT PIPE.
12.	SUITABLE ADAPTER.
13.	1/4" CHROME MOLY STEEL TUBE.
14.	
15.	1"/3/4" SW EQUAL TEE.
16.	DIAPHRAGM(WAFER ELEMENT)
17.	ISOLATION VALVE 316 SS, 1/4"SW

NOTES:-

- THE MATERIAL SPECIFICATION AND SCHEDULE NO. OF IMPULSE PIPE & NIPPLE AS LISTED HEREIN SHALL BE AS PER TECHNICAL SPECIFICATIONS.
- THE MATERIAL SPECIFICATION AND RATING OF FITTINGS AS LISTED SHALL BE AS PER SPECIFICATIONS. WELDED/THREADED FITTINGS SHALL CONFIRM TO ANSI-B.16-11.
- INSTRUMENTS VALVES BODY STEM MATERIAL AND PRESSURE CLASS SHALL BE AS PER TECHNICAL SPECIFICATIONS.
- FOR BOILER AIR/FLUE GAS SERVICES SOURCE CONNECTIONS IMPULSE PIPING AND ALL FITTINGS SHALL BE OF 3/4" NB SIZE.
- GAUGES SHALL NOT BE MOUNTED ON THE PIPE. IT WILL BE MOUNTED ON A CHANNEL OR FRAME OR A RACK.
- * SLOPE APPROX. 40 MM / METRE.

FOR TENDER PURPOSE ONLY

एन टी पी सी लिमिटेड
NTPC LIMITED
 (A GOVERNMENT OF INDIA ENTERPRISE)
 ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (STATION C&I PACKAGE)			
TITLE	INSTRUMENT INSTALLATION DIAGRAM (FOR PRESSURE GAUGE)			
SIZE	A3	SCALE	N.T.S.	
DRG. NO.	0000-405-POI-A-022		REV. NO.	A

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE
A	FIRST ISSUE										28.04.06
CLEARED BY											

02928

**LIST OF DOCUMENTS TO BE SUBMITTED AFTER
AWARD OF CONTRACT**

LIST OF DELIVERABLES OF PEM -

500 MW FGUTPP)

DOCUMENT NUMBER		PE-GL-401-145-I100	SHEET	1 of 1
SI.No.	DRAWING NO.	DRAWING/DOCUMENT TITLE	CATEGORY	
1	PE-V0-401-145-I901	CONTROL & OPERATIONAL WRITE-UP FOR THE SYSTEM	A	
2	PE-V0-401-145-I902	CONTROL SCHEME/LOGIC DIAGRAM(TO BE IMPLEMENTED IN DDCMIS)	A	
3	PE-V0-401-145-I903	HMI PICTURES/PLANT SCHEMATICS	A	
4	PE-V0-401-145-I904	INSTRUMENT SCHEDULE	A	
5	PE-V0-401-145-I905	I/O LIST (ANALOG & BINARY)	A	
6	PE-V0-401-145-I906	DRIVE LIST/SOLENOID/ACTUATOR VALVE LIST WITH LOCATION DATA	A	
7	PE-V0-401-145-I907	FIELD JB TERMINATIONS	A	
8	PE-V0-401-145-I908	DATASHEETS FOR INSTRUMENTS, JBs, etc.	A	
9	PE-V0-401-145-I909	QUALITY PLANS (INSTRUMENTS,VMS, etc.)	A	
10	PE-V0-401-145-I910	DRIVE LIST/SOLENOID/ACTUATOR VALVE LIST WITH LOCATION DATA	A	
11	PE-V0-401-145-I911	THERMOWELL SIZING CALCULATION	A	
12	PE-V0-401-145-I912	VIBRATION MONITORING SYSTEM GA/LAYOUT, DATASHEETS, WIRING DIAGRAM,BOQ,TRANSDUCER MOUNTING PAD DRAWING	A	
13	PE-V0-401-145-I913	CABLE SCHEDULE & INTERCONNECTION	A	
14	PE-V0-401-145-I914	ANNUNCIATION & SOE LIST	A	

NOTES:

1. ANY OTHER DOCUMENT DECIDED DURING DETAILED ENGINEERING SHALL BE PROVIDED BY BIDDER WITHOUT ANY COMMERCIAL/TECHNICAL IMPLICATION.


2. CONTRACTOR TO SUBMIT REUSABLE DATABASE FORMATS IN BHEL/NTPC APPROVED FORMATS LIKE MS EXCEL,MS ACCESS OF DOCUMENTS LIKE INSTRUMENT SCHEDULE, I/O LIST, DRIVE LIST,FIELD JB TERMINATIONS, CABLE SCHEDULE & INTERCONNECTION, etc.
SOFT COPY OF FORMATS SHALL BE PROVIDED TO SUCCESSFUL BIDDERS.



TITLE
TECHNICAL SPECIFICATION FOR
1X500 MW UNCHAHAR TPP

SPECIFICATION NO. PE-TS-401-555-A001	
VOLUME IIB	
SECTION C.5	
REV 00	DATE: JUNE 2014

APPROVED SUB-VENDOR LIST

		SUB VENDOR LIST & INSPECTION CATEGORISATION			
COMPRESSED AIR SYSTEM					
SL No	Item	QP / Insp.Cat	Proposed Subvendor	Place of Manufacturer	Remarks
1	HOC / REACTIVATED BLOWER TYPE ADP	I	DELAIR	GURGAON	
			SUMMITS	COIMBATORE	
			MELLCON	NEW DELHI	
			ATLAS COPCO Testing at Atlas Copco Works - Pune	Belgium (Pune)	Only for MD type Air Drying Plant
2	MS/GI Pipes –ERW IS 1239 / IS 3589 (Quantity < 200 meters Assorted sizes)	III	SAIL	Rourkela	Material will be accepted on the basis of Main contractor COC supported by manufacturer TC as per relevant Code. In addition to above main contractor will certify availability of correlated identification marks on pipe wrt Manf TC and will also certify that pipes are free from rust
			Jindal (upto 350NB)	Ghaziabad	
			Surya Roshni (upto 400NB)	Bahadurgarh	
			Tata (upto 150NB) IS 1239 Pipes	Jamshedpur	
3	Forged/Formed fittings	III	EBY	Taloja	
			Siddarth & Gautam	Faridabad	
			Pipefit	Baroda	
			MS Fittings	Kolkata	
			Tube Products	Baroda	
			Bharat Forge	Pune	
			NL Hazra	Kolkata	
4	Ball Valve	I	Precision Engg	Nasik	upto 400NB 150 class
			Microfinish Valves Ltd	Hubli	upto 50NB 800 class; 400 NB 300 class
			BDK engg Industries	Hubli	upto 50NB 800 class ; 400NB 150 class
			Flow chem. Industries	Ahmedabad	upto 50 NB 800 Class: 350NB 150 class
			Audco	Chennai	
			Akay India	Hubli	upto 50NB 800 class

SL No	Item	QP / Insp.Cat	Proposed Subvendor	Place of Manufacturer	Remarks
5	CS/FS Gate/Globe/Check valves Upto 600 NB 150 Class, 50 NB 800 Class	III	Fouress	Mumbai/ Aurangabad	
			BDK	Hubli	
			Audco	Chennai	
			Leader	Jullundhar	
			KSB	Coimbatore	
			KBL	Kondhapuri	
6	Butterfly Valve (Upto 500 NB PN 16)	II	KBL	Kondhapuri	
			Fouress	Bangalore	
			Audco	Chennai	
			BDK	Hubli	
			Tyco	Halol	
			Inter Valve	Pune	
7	Air Receiver	I	Integrated Engineers	Mumbai	
			Diamond Fabricators	Pune	
			Parkaire	Delhi	
			Temasme Vesselex	Noida	
			United Engineering Works	Nasik	
8	Safety Relief Valve	III	LEADER	JALANDHAR	
			SPIRAX MARSHALL	PUNE	
			FISCHER SANMAR	CHENNAI	
9	Pr./Vacuum/Dp Gauges	III	Auxitrol	U.K	
			Switzer (for DP gauge)	Chennai	
			Budenburg	U.K	
			A.N.Instruments	Kolkata	
			Bells Control	Kolkata	
			Manometer India	Mumbai	
			H Guru	Muzzafarpur / Risra	
			General Inst.	Mumbai/Goa	
10	Pr./Vacuum/DP.switch	II*	Indfos Ind.	Ghazibad	* If the total Quantity is <= 10, then inspection category III. However, manufacturer TC to be submitted
		III	Barton Inst.system	USA	
		I*	Gauges Bourdon	Mumbai	
		II*	Switzer	Chennai	
11	Temperature Gauge	III	Budenburg	U.K	
			A.N.Instruments	Kolkata	
			Bells Control	Kolkata	
			H Guru	Muzzafarpur / Risra	
			General Inst.	Mumbai/Goa	
12	Temperature Transmitter	I	(ABB)	Faridabad / Germany	For Din Rail Type only
		II*	Yokogawa	Japan	* If the total Quantity is <= 10, then inspection category III. However, manufacturer TC to be submitted

SL No	Item	QP / Insp.Cat	Proposed Subvendor	Place of Manufacturer	Remarks
		II*	Emerson (Rosemount)	USA	
13	Pr./DP Transmitter	I	(ABB) -2600T series	Faridabad/Italy	
		II*	Honeywell	USA/India	* If the total Quantity is <= 10, then inspection category III. However, manufacturer TC to be submitted
		III	Fuji	Japan	
		III	Emerson (Rosemount)	USA	
		II*	Emerson (Rosemount)	Daman	* If the total Quantity is <= 10, then inspection category III. However, manufacturer TC to be submitted
		II*	Yokogawa	Japan	* If the total Quantity is <= 10, then inspection category III. However, manufacturer TC to be submitted. Calibration at YIL Bangalore is acceptable
14	HT Motor for Air compressor	I	CGL	Mandideep	Upto 1600 KW, 6.6 KV; Upto 1310 KW, 11 KV
			Marathon Electric	Kolkata	Upto 6.6 KV, 750 KW
			BHEL	Bhopal	
			SIEMENS	Germany	
			Hyosung	Korea	
			Hyundai	Korea	
15	Flow Switch	III	Switzer	Chennai	
			Levecon	Kolkata	
			DK Instruments	Kolkata	
			Delta	UK	
			ITT Barton	USA	
16	Temp Sensor	III	Pyro Electric	Mumbai	
			Detriv	Mumbai	
17	Flow Indicator	III	Sigma	Mumbai	
			Eureca	Pune	
18	Auto Drain Trap	III	Main Contractor approved sources		
19	Dew point meter	III	GE Sensing	Ireland	
			Michell Instruments	UK	
			Shaw	UK	
20	Flow Meter / Rota Meter	III	Trac	Hyderabad	
			Eureca	Pune	
21	Level Indicator/ Gauge	III	Sigma	Mumbai	
			Levcon	Kolkata	
			Pune Techtrol	Pune	
			SBEM	Pune	
22	Solenoid Valve	III	HERION	GERMANY/ ITALY	
			ROTEX AUTOMATION LTD.	V V NAGAR/ BARODA	
			ASCO	CHENNAI	
			JEFFERSON	ARGENTINA	
			AVCON	MUMBAI	

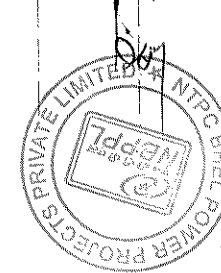
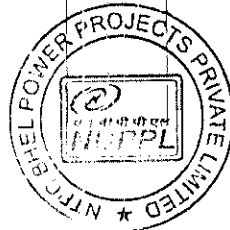
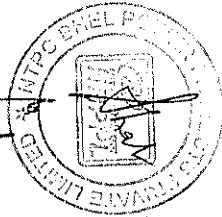
SL No	Item	QP / Insp.Cat	Proposed Subvendor	Place of Manufacturer	Remarks
23	Cable trays (max 300 meters)	III	INAR PROFILE	ANNAKAPALLI	
			ANAND UDYOG	THANE	
			MJ ENGG.	DELHI	
			INDIANA	MUMBAI	Galvanizing. At Karmatara
			TECHNO ENGG	CHANDIGARH	
			JAMUNA METAL	DELHI	
			INDUSTRIAL PERFORATION	KOLKATA	Galvanizing at Unistar
			VATCO	MUMBAI	Galvanizing At Sigma Mumbai
24	Cable Glands	III	SUNIL& COMPANY	KOLKATA	
			ARUP ENGG	KOLKATA	
			COMMET	MUMBAI	
			QUALITY PRECISION	KOLKATA	
25	Cable Lugs	III	DOWELLS	MUMBAI	
			CHEटना ENGG	NASIK	
			3D	VALSAD	
26	Control cable	I*	RADIANT CABLES	HYDERABAD	* FOR LENGTH LESS THAN 500 M TO BE CONSIDERED AS CAT-III
			HVPL	FARIDABAD	
			PARAMOUNT CABLES	ALWAR	
			NICCO	SHYAMNAGAR	
			UNIVERSAL CABLES	SATNA	
			ICL	RAJPURA	
			DELTON CABLE	FARIDABAD	
			KEI	BHIWADI	
			POLYCAB	DAMAN	
			TORRENT	NADIAD	
27	Instrument cable	I*	POLYCAB	DAMAN	* FOR LENGTH LESS THAN 500 M TO BE CONSIDERED AS CAT-III
			UNIVERSAL CABLES	SATNA	
			NICCO	KOLKATA	
			RELIANCE	BANGLORE	
			CORDS	BHIWADI	
			PARAMOUNT CABLE	KHUSKHERA	
			INCAB	PUNE	
28	Junction Box	III	Main Contractor Approved Sources		

NOTE :

- 1) INSP CAT I : FOR THOSE ITEMS THE QUALITY PLANS ARE APPROVED BY NTPC AND FINAL ACCEPTANCE WILL BE ON PHYSICAL INSPECTION WITNESS BY BHEL & NTPC.
- 2) INSP CAT II : FOR THOSE ITEMS THE QUALITY PLANS ARE APPROVED BY NTPC. HOWEVER NO PHYSICAL INSPECTION WILL BE DONE BY BHEL / NTPC. THE FINAL ACCEPTANCE BY BHEL / NTPC SHALL BE ON THE BASIS OF REVIEW OF DOCUMENTS AS PER QP.
- 3) INSP CAT III : FOR THOSE ITEMS FINAL ACCEPTANCE BY BHEL / NTPC BASED ON BIDDER'S COC.

APPROVED VENDOR LIST

SR NO	ITEM	QP /INS -PN CAT *	QP NO. 1450-001-9	QP SUB-MISSION SCHEDULE	QP APPL SCHED ULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB-SCHED ULE	SC APPL SCHED ULE	REMARKS
31	E/P Converter or I/P Converter	III	QVI-Q-013			ABB	GERMANY	A			Subject to meeting the NTPC Spec. requirement.
		III				FAIRCHILD	USA	A			
		III				ECKARDT	GERMANY	A			
		III				IMI Norgren (Watson Smith Instrumentation)	UK	A			
		III				MTL	CHENNAI	A			Make - Watson Smith, UK
		*				SMC	NOIDA	DR			* Inspection category will be decided during evaluation.
32	Electrical Actuator (With Gear Box)	II	QVI-Q-014			Rotork India	Chennai	A			GEAR BOX FROM ROTORK UK FOR MULTITURN & BRQT SERIES FOR QUARTER TURN FROM ROTORK CHENNAI
		I				Limitork	Faridabad	A			
		II				Limitork	USA	A			
		II				Rotork	UK	A			
		I				Rotork India	Bangalore	A			GEAR BOX FROM ROTORK UK FOR MULTITURN & BRQT SERIES FOR QUARTER TURN FROM ROTORK CHENNAI
		II				Auma	Germany	A			
		II				Auma India	Bangalore	A			
		II				Nippon Gear	Japan	A			



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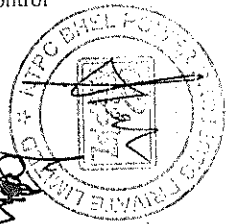
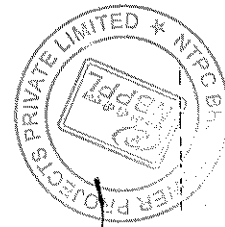
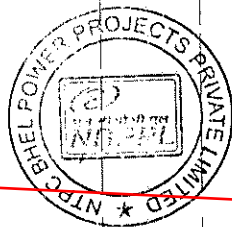
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ENGINEERING DIV / QAI

APPENDIX-E (MOM-QA)
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SR NO	ITEM	QP /INS -PN CAT *	QP NO. 1450-001-9	QP SUB-MISSION SCHEDULE	QP APPL SCHED ULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB-SCHED ULE	SC APPL SCHED ULE	REMARKS
44	Flow Nozzle Assembly	II	QVI-Q-019			Daniel Flow Products	USA	A			(WITH OUT ROOT VALVE) NOT P91 MATERIAL
		II		Seiko	Austria	A					
		I		Instrumentation Ltd	Palghat	A					
		II		Technomatic	Italy	A					
		II		ISA Controls	UK	A					
		I		Micro Precision	Faridabad	A					
45	Flow Switch	III	QVI-Q-020			Delta Controls	UK	A			
		III		Switzer	Chennai	A					
		III		Barton Instrument System	USA / UK	A					
		III		Auxitrol	UK	A					
		III		Dressor (Asheroft)	USA	A					
		III		Magnetrol	Belgium	A					
		III		Mercoid Controls	USA	A					
		III		Universal Flow Meter	USA	A					
		III		Merium	USA	A					
46	Fractional Horse Power Motor					BHEL Approved Sources		Noted			
47	FRP Junction Box	III				BHEL Approved Sources		A			
48	FSSS, SBCP, SADC, APKDS, PH Control Panel, MMI, ERV Control Station, VFD	I	QVI-Q-021			BHEL EDN	Bangalore	A			BHEL EDN QP. SYSTEMS AS AGREED WITH NTPC ENGG.



APPENDIX-E (MOM-QA)
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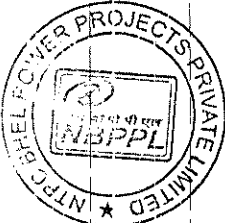
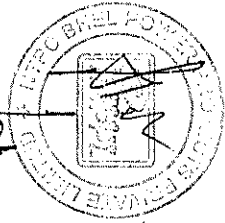
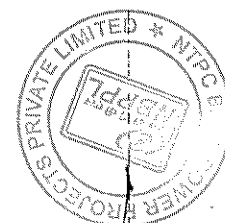
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SR NO	ITEM	QP /INS- -PN CAT	QP NO. 1450-001-9	QP SUB- MISSION SCHEDULE	QP APPL. SCHED ULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB- SCHED ULE	SC APPL SCHED ULE	REMARKS
56	Level Guage	III				V Automat	New Delhi	A			UPTO 40 KG/CM2
		III				Pane Techtrol	Pune	A			UPTO 40 KG/CM2
		III				Chemtrols	Goa	A			UPTO 40 KG/CM2
		III				Levcon	Calcutta	A			UPTO 40 KG/CM2
		III				Krohne	Germany	A			
		III				E&H	Germany	A			
		III				Sigma	Mumbai	A			UPTO 40 KG/CM2
57	Level Switch (Capacitance Type, Water)	III				SBEM	Pune	A			
		III				PUNE TECHTROL	PUNE	A			
		III				E&H	Germany	A			
		III				LEVCON	KOLKATA	A			
		III				Nivo	Indore	A			
58	Level Switch (Conductivity Type)	II	QVI-Q-028			BHEL	Trichy	A			
		II				Solartron (Mobrey)	UK	A			
		II				Yarway	USA	A			
		II				Levelstate	UK	A			
59	Level Switch (Float / Displacer Type)	III				Pune Techtrol	Pune	A			(UPTO 40 Kg/Cm2)
		III				Sigma	Mumbai	A			(UPTO 40 KG/CM2)
		III				Delta Controls	UK	A			
		III				V Automat	New Delhi	A			(UPTO 40 Kg/CM2)
		III				ISA Controls	UK	A			
		III				Mswzuiker	UK	A			
		III				Gauges Bourdon	Panvel	A			(UPTO 40 KG/CM2)
		III				Foxboro	UK	A			



APPENDIX-E (MOM-QA)
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Signature

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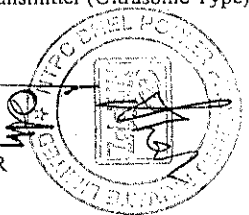
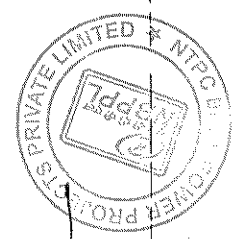
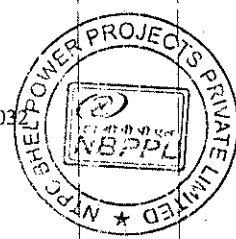
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SR NO	ITEM	QP /INS- -PN CAT *	QP NO. 1450-001-9	QP SUB- MISSION SCHEDULE	QP APPL SCHED ULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB- SCHED ULE	SC APPL SCHED ULE	REMARKS
59	Level Switch (Float / Displacer Type)	III				SBEM	Pune	A			(UPTO 40 KG/CM2)
		III				Magnetrol	Belgium	A			
		III				Levcon	Kolkata	A			(UPTO 40 Kg/Cm2
		III				BESTOBELL MOBREY	UK	A			
		III				Tokyo Keiso	Japan	A			
		III				Transducer & Controls	Hyderabad	A			UP TO 40 KG/SQ CM
60	Level Transmitter (Displacer Type)	I	QVI-Q-030			Chemtrols	Goa	A			
		II				Dresser Masoneilan	France/ Coimbatore	A			
		II				Eckdart	Germany	A			
		II				Yamatake Honeywell	Japan	A			
		I				V AUTOMAT	DELHI	DR			
61	Level Transmitter (Radar Type)	II	QVI-Q-031			Magnetrol	Belgium	A			
		II				E&H	Germany	A			
		II				Emerson (Saab Rosemount)	Sweden	A			
		II				K. Tek	USA	A			
		II				Emerson	Daman	DR			
		II				Chemtrols	Goa	DR			
62	Level Transmitter (Ultrasonic Type)	II	QVI-Q-032			E&H	Germany	A			
		II				Siemens Milltronics	Canada	A			
		II				Kab Instruments	South Africa	A			
		II				Kristler Morse	USA	DR			
63	LIE / LIR	II	QVI-Q-033			Frammen Industries	Pudikottai	A			
		II				Saajas Electricals	Trichy	A			

APPENDIX-E (MOM-QA)
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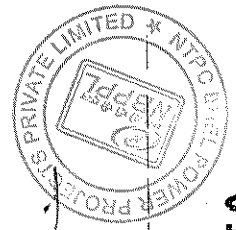
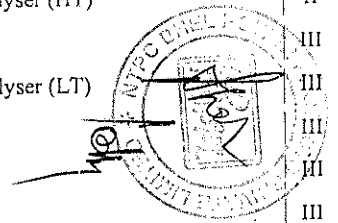
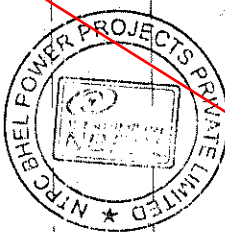
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SR NO	ITEM	QP /INS- -PN CAT *	QP NO. 1450-001-9	QP SUB- MISSION SCHEDU LE	QP APPL SCHED ULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB- SCHED ULE	SC APPL SCHED ULE	REMARKS
63	LIE / LIR	II	QVI-Q-033			Instrumentation Ltd	Kota	A			Also approved vendor of Control Desk
		II				Chemin	Pondihery	A			
		II				ECIL	Hyderabad	A			
		II				Pyrotech	Udaipur	A			Also approved vendor of Control Desk
64	Local indication Box for EWLJ	III				BHEL System		Noted			
65	Local Push Button Box, D C Motor Starter Box, Local Power Dist. Box	III				BHEL Approved Sources					
66	LT Motors										REFER TABLE 1450-001-Q01-R03 A Sr. no 12 & NOTE 2
67	MCC / LT Boards	I	QVI-Q-034					A			REF LIST 1450-001--QOE-R-47-R00
68	Micro Switch	III				BHEL System		Noted			
69	Mosaic Tiles / Console Items	III				Pro plan(Boyko Strey)	Germany	A			
		III				Subklew	Germany	A			
70	Name Plates, Cable Gland Adaptor, Cable Tags, Cable Dressing Materials	III				BHEL System		Noted			
71	Network Components	III				BHEL Approved Sources		Noted			
72	O2 Analyser (HT)	II	QVI-Q-035			Seco	Chennai	A			
		III				Marathon Monitor	USA	A			
73	O2 Analyser (LT)	III				Yokogawa	Japan	A			
		III				Emerson (Rosemount)	USA	A			
		III				ABB	UK	A			
		III				Enotek	Germany	A			
74	Orifice Plate Assembly	III				Daniel Flow Products	USA	Noted			

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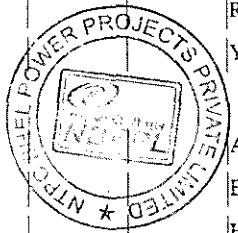
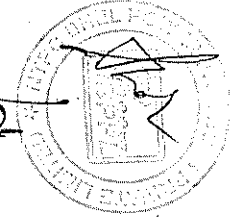
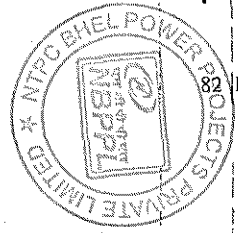
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SR NO	ITEM	QP /INS- -PN -CAT *	QP NO. 1450-001-9	QP SUB- MISSION SCHEDULE	QP APPL SCHEDULE	PROPOSED SUB SUPPLIER	PLACE	SS APPL STATUS / CAT	SS DETAIL SUB- SCHEDULE	SC APPL SCHEDULE	REMARKS
79	PLC System	I	QVI-Q-037			GE Intelligent Plateforms	Bangalore	A			* - Inspection Category will be decided during evaluation
		I				ABB	Bangalore	A			
		I				Rockwell Automation (AB)	Sahibabad	A			
		I				Seimens	Nasik	A			
80	Positive Displacement Flow Meter / Transmitter	II	QVI-Q-038			Brooks	USA	A			
		I				Toshniwal Hyvac	Chennai	A			
		II				Oval	Japan	A			
		II				Bopp & Routhier	Germany	A			
		*				Rockwin Flow Meter Indian Pvt Ltd	New Delhi	DR			
81	Power Cylinder (Pneumatic Actuator / SADC)	I	QVI-Q-039			SMC	Noida	A			
		I				Keltron	Cochin (Alleppy)	A			
		I				Instrumentation Ltd	Palghat	A			
		II				RGS Electro Pneumatic	UK	DR			
		I				Rotex Manufacturers	Vadodara	DR			
82	Pressure / D P / Flow Transmitters	II	QVI-Q-040			Yokogawa	Japan	A			Calibration at M/s YIL Bangalore is also acceptable 2600 T series
		II				ABB	Italy	A			
		II				Emerson process mgt.	Daman	A			
		II				Honeywell	U.S.A.	A			
		II				Emerson process mgt.	U.S.A.	A			
		II				Fuji Electric	Japan	A			



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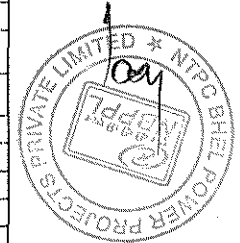
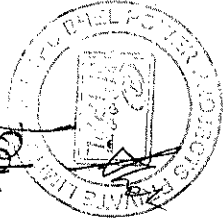
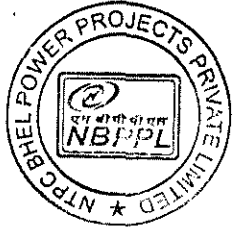
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VENDOR LIST FOR BHEL-PEM SCOPE (FGUTPP-1V(1X500MW))

S.NO	ITEMS	VENDOR NAME	PLACE	APPROVAL STATUS	INSPECTION CATEGORY	TYPE OF QUALITY PLAN	Remarks
		TYCO	HALOL	A	CAT-I	MQP/RQP	UP TO 500NB; PN-16, UPTO 900NB, PN-10 & UPTO 2200NB, PN-06
		INTERVALVE	PUNE	A	CAT-I	MQP/RQP	UPTO 500NB 1400NB
25	AIR RELEASE VALVES(TG)	H SARKAR & COMPANY	HOWRAH	N	CAT-III		
		LEADER VALVES	JALANDHAR	N	CAT-III		
		AV VALVES LTD	AGRA	N	CAT-III		
26	LP CHEMICAL DOSING SYS (TG)	VK PUMPS	THANE	A	CAT-I	MQP	
		PSI	CHENNAI	A	CAT-I	MQP	
		MILTON ROY	CHENNAI	A	CAT-I	MQP	
		SWELLORE	AHEMDABAD	A	CAT-I	MQP	FOR PUMPS ONLY
		TECHNO STRENGTH	HYDERABAD	DR			
		EMPRO INDUSTRIES	PUNE	DR			
		TECHNO CONSULTANT	MUMBAI	A	CAT-I	MQP	APPROVED FOR ARAVALI.
27	OTHER EOT CRANES & HOISTING EQUIPMENT (EXCEPT TG HALL CRANE) (TG)	TURBO FARGUSON		A	CAT-I	MQP	UPTO 8 T CRANES ONLY
		TRACTEL TREFET	FARIDABAD	A	CAT-III		CHAIN PULLEY BLOCK ONLY
	THE ITEM CHAIN PULLEY BLOCK IS CAT-III.	ANUPAM	VV NAGAR	A	CAT-I	MQP	
		MUKANID	MUMBAI	A	CAT-I	MQP	
		REWA	FARIDABAD	A	CAT-I	MQP	
		EDDY CRANES PVT LTD	PUNE	A	CAT-I	MQP	UPTO 10T ONLY
		LINIQUE IND. HANDLERS	NASHIK	A	CAT-I	MQP	UPTO 30T ONLY
		WMI	MUMBAI	A	CAT-I	MQP	
		HERCULES HOISTS LTD	RAIGARH	DR	CAT-I	MQP	HERCULES MUMBAI IS APPROVED FOR HOIST AND CP UPTO 15 T ONLY
		LIFTING EQUIPMENT & ACCESSORIES	DELHI	A	CAT-I	MQP	ONLY FOR CP BLOCK UPTO 5T
		FAFECO	MUMBAI	A	CAT-I	MQP	
		CONSOLIDATED HOISTS	PUNE	A	CAT-I	MQP	UPTO 25 T ONLY
		TISCO GROWTH SHOP	JAMSAOUPUR	A	CAT-I	MQP	
		DEMAG CRANES	PUNE	DR			
		AVON CRANES	GURGAON	A	CAT-I	MQP	UPTO 30 T FOR CRANES /HOIST UPTO 20T
28	DUAL PLATE CHECK VALVES (TG)	R & D MULTIPLES PVT LTD	MUMBAI	A	CAT-I	MQP	
		ADVANCE VALVES	NOIDA	A	CAT-I	MQP	
29	JUNCTION BOXES, EARTING AND LIGHTING MATERIALS (TG)(FRP TYPE)	MANISHA ENTERPRISES	PUNE	N	CAT-III		GALVANISING FROM NTPC APPROVED GALVANISERS. JUNCTION BOX OR COLD JUNCTION COMPENSATION BOX.
		DEVI POLYMERS	CHENNAI	N	CAT-III		



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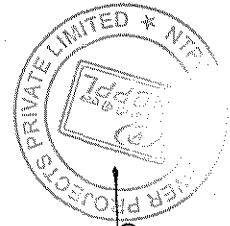
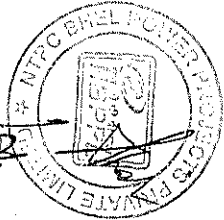
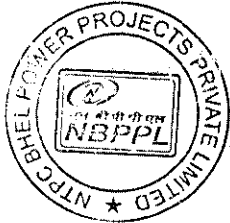
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VENDOR LIST FOR BHEL-PEM SCOPE (FGUTPP-1V(1X500MW))

S.NO	ITEMS	VENDOR NAME	PLACE	APPROVAL STATUS	INSPECTION CATEGORY	TYPE OF QUALITY PLAN	Remarks
		SUCHITRA INDUSTRIES	BANGALORE	N	CAT-III		
		CREATIVE INSTRUMENTS & CONTROLS	BANGALORE	N	CAT-III		
		BALIGA LIGHTING EQUIP.	MUMBAI	N	CAT-III		
		INFO CONTROL BANGALORE	BANGALORE	N	CAT-III		
		AJMERA INDUSTRIES	MUMBAI	DR			
		ELECTROMAC	MUMBAI	DR			
		KS INSTRUMENTS (P) LTD	BANGALORE	N	CAT-III		
30	CONTROL VALVES (TG)	IL	PALGHAT	A	CAT-I	SQP	
		FISHER CONTROLS	UK / USA	A	CAT-I	SQP	
		CCI	USA	A	CAT-I	SQP	
		NIPPON FISHER	JAPAN	A	CAT-I	SQP	
		DRESSER	COIMBATORE	DR			BHEL TO MENTION THE APPLICATION, TYPE AND SIZE OF THE VALVES.
		EMERSON	FRANCE	A	CAT-I	SQP	
		MIL CONTROLS	ALWAYE	A	CAT-I	SQP	
		DRESSER MESONILAN	FRANCE	A	CAT-I	SQP	
		HORA	GERMANY	A	CAT-I	MQP	
		LESILE CONTRL	USA	DR			
		KOSO FLUID	PALGHAT	DR			
		COPE'S VALCUN	UK	A	CAT-I	SQP	
		FISHER SANMAR	CHENNAI	A	CAT-I	SQP	UPTO 1500 CLASS. EARLIER COMPANY NAME WAS FISHER XOMOX SANMAR
31	FLOW ELEMENT (TG)	MICROPRECISION	FARIDABAD	A	CAT-I	SQP	NOT APPROVED FOR P-91 MATERIAL
		CALO DYNAMICS	HYD	A	CAT-I	SQP	ONLY FOR ORIFICE PLATE
	ORIFICE-CAT-III	STAR MECH CONTROLS	PUNE	A	CAT-I	SQP	APPROVED FOR ARAVALI
	NOZZLE-CAT-I	IL	PALGHAT	A	CAT-I	SQP	
		BRISTOL BABCOCK	UK	A	CAT-I	SQP	
		MINCO	GOA	DR			
		ENGINEERING SPECIALITIES	KOLKATA	DR			
32	EOT TO HALL (TG) SUB-OR	WMI	MUMBAI	A	CAT-I	MQP	UP TO 300TON
		TISCO GROWTH SHOP	JAMSADPUR	A	CAT-I	MQP	UP TO 100TON
		ANUPAM	V V NAGAR	A	CAT-I	MQP	UP TO 100TON
		MUKUND	MUMBAI	A	CAT-I	MQP	UP TO 300TON



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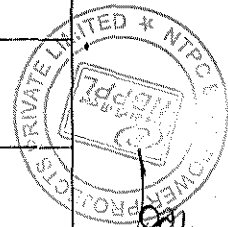
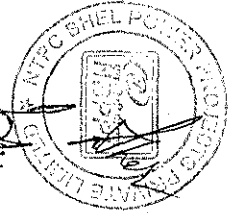
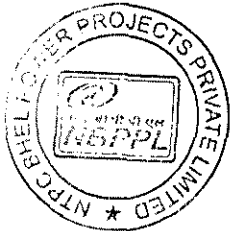
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VENDOR LIST FOR BHEL-PEM SCOPE (FGUTPP-1V(1X500MW))

S.NO	ITEMS	VENDOR NAME	PLACE	APPROVAL STATUS	INSPECTION CATEGORY	TYPE OF QUALITY PLAN	Remarks
		FAFCO	MUMBAI	A	CAT-I	MQP	UP TO 200TON
		HEC	RANCHI	DR A			
		DEMAG CRANES	PUNE	DR			
		UNIQUE IND. HANDLERS	NASHIK	A	CAT-I	MQP	UP TO 200TON. APPROVED FOR BARH
33	HYDROGEN GENERATION PLANT (TG)	CASALE CHEMICAL	SWITZERLAND	DR			
		ELECTROLISER CORP.	CANADA	A	CAT-II	MQP	
		TELEDYNE ENERGY SYSTEM	USA	A	CAT-II	MQP	
		TIANJIN MAINLAND	CHINA	A	CAT-I	MQP	
		EASTERN ELECTROLYSER	DELHI	A	CAT-I	MQP	
		HYDROGENICS EUROPE	BELGIUM	A	CAT-II	MQP	ALREADY APPROVED FOR MAUDA AS PER NTPC LETTER REF NO.CC:PEV:9561:110:PE:003/02 DT: 24.07.09
34	ALUMINUM SHEET(TG)	BALCO		N	CAT-III		
		NALCO		N	CAT-III		
		HINDALCO		N	CAT-III		
		INDALCO		N	CAT-III		
35	PRESSURE GAUGE(TG)	AN INSTRUMENTS		A	CAT-III		
		GAUGES BOURDON	PANVEL	A	CAT-III		
		H GURU IND.	MUZZAFARPUR/RISHN	A	CAT-III		
		MANOMETER(I) PVT LTD		A	CAT-III		
		FORBES MARSHALL	HYDERABAD	DR			
		WAAREE INSTRUMENTS	VAPI	A			
		H GLIRU INSTRUMENTS	BANGALORE	A	CAT-III		
36	PRESSURE SWITCH (TG)	SWITZER INSTRUMENTS		A	CAT-II	SQP	
		BARSDALE	GERMANY	A	CAT-II	MQP	
		GAUGES BOURDON	PANVEL	A	CAT-II	MQP	
		INDFOSS	GHAZIABAD.	A	CAT-II	SQP	
37	ROTAMETER (TG)	INSTRUMENTS ENGRS PVT LTD		A	CAT-III		
		TRANSDUCERS & CONTROL		A	CAT-III		
		EUREKA IND		A	CAT-III		
38	TEMPRATURE ELEMENT (TG)	GENERLA INSTRUMENT CONSORTIUM		A	CAT-II	SQP	
		DETRIVE INSTN & ELECTRONICIS		A	CAT-II	SQP	
		TEMSPSENS	UDAIPUR	A	CAT-II	SQP	
		WAREE	VAPI	DR			



Nijay Kumar

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Akshay

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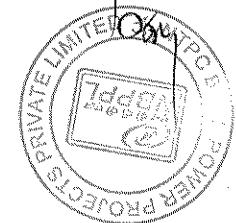
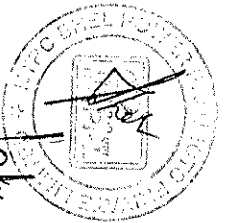
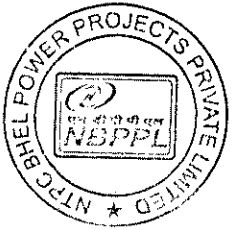
VENDOR LIST FOR BHEL-PEM SCOPE (FGUTPP-1V(1X500MW))

S.NO	ITEMS	VENDOR NAME	PLAGE	APPROVAL STATUS	INSPECTION CATEGORY	TYPE OF QUALITY PLAN	Remarks
		PYROELECTRIC INSTRUMENTS	GOA	A	CAT-II	SQP	

Vijay Kumar
 V. K. Verma
 En. - VP

N. C. Sharma
 N. C. Sharma
 En. - VD

Akshay
 (ALBEST KUTUR)
 Engr/MKTA/NBPPL



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VENDOR LIST FOR BHEL-PEM SCOPE (FGUTPP-1V(1X500MW))

S.NO	ITEMS	VENDOR NAME	PLACE	APPROVAL STATUS	INSPECTION CATEGORY	TYPE OF QUALITY PLAN	Remarks
39	FS/FS GATE/GLOBE VALVES (TG)(UP TO 50NB & 800#)	BABCOCK BORSIG	GERMANY	A	CAT-II	SQP	
		BOK	HUBLI	A	CAT-II	SQP	
		LEADER VALVES	JALLANDHAR	A	CAT-II	SQP	
		KSB PUMPS,	PUNE	A	CAT-II	SQP	
		PETROL VALVES	ITALY	A	CAT-II	SQP	
		FOURESS	THANE	A	CAT-II	SQP	
		STEEL STRONG	MUMBAI	A	CAT-II	SQP	
		AUDCO	CHENNAI	A	CAT-II	SQP	
		VELAN	CANADA	A	CAT-II	SQP	
40	SIGHT FLOW INDICATOR	SIGMA INSTRUMENTS		N	CAT-III		
		TELACE EQUIPMENTS		N	CAT-III		
		INSTRUMENTATION ENGINEERS		N	CAT-III		
		BLISS ANAND PVT		N	CAT-III		
		BK EQUIPMENTS	CHENNAI	N	CAT-II		
		CHEMTROLS SAMIL(I)	MUMBAI	N	CAT-III		

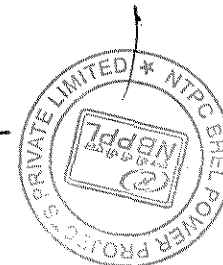
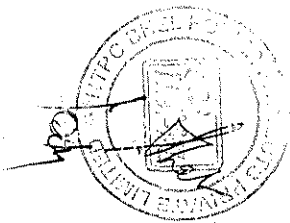
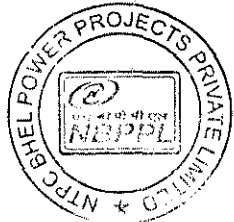
N & A- Proposed vendor is acceptable to NTPC, DR - "Details required" for NTPC review.

2 QP/INSPECTION CATEGORY :

CAT - I : For those items the Quality Plans are approved by NTPC and final acceptance will be on physical inspection witness by NTPC.

CAT - II : For those items the Quality Plans are approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis of review of documents as per QP.

CAT-III : For those items main supplier approves Quality Plan. The final acceptance by NTPC shall on the basis of Certificate of Conformance by main supplier.



1113

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TITLE
TECHNICAL SPECIFICATION FOR
1X500 MW UNCHAHAR TPP

SPECIFICATION NO. PE-TS-401-555-A001	
VOLUME IIB	
SECTION	
REV 00	DATE: JUNE 2014

MANDATORY SPARES

MANDATORY SPARES FOR STEAM GENERATOR PACKAGE FOR CAS						
FGUTPS, (1 X 500 MW)						
CLAUSE NO	ITEM	PARTICULARS	QUANTITY	Unit Ex-Works price (Rs.)	Total Ex-Works price (1 x 500 MW set) (Rs.)	Remarks
6.00.00		MEASURING INSTRUMENTS (for all systems including Air Compressor, FO Dosing System, ECW System etc.)				
	1	Electronic Transmitters				
	(i)	Transmitters of all types, ranges and model no. (for the measurement of Pressure,differential pressure flow, level, etc.) (1) Pressure Transmitter (2) Level Transmitter (3) Flow Transmitter (4)Electronic dew point meter	10% or 1 no. of each type and model			
	2	Temperature elements				
	(i)	RTD's* of each type and length	10% or 2 nos. of each type and length, whichever is more			
	(ii)	Thermocouples of each type like K-type, R-type, metal etc. * and length	10% or 2 nos. of each type and length which ever is more			
	(iii)	Cold junction compensation boxes of each model	10% or 2 nos. , which ever is more			
	(iv)	Thermocouple units for each model of CJC box	10% or 2 nos. , which ever is more			
	(v)	Thermowell for application like mill outlet temperature and SH/RH/Eco/ flue gas temp. in furnace	10% or 2 nos. of each type and length whichever is more			
	(vi)	Temperature transmitters	10% of each type and length			
	3	Local Indicators like temperature gauges, pressure gauges, differential pressure gauges, flow gauges, flow meters etc.,	5% or 1 no. of each make, model and type whichever is more (to be divided to various ranges in proportion to main of all make, model, type population)			
	4	Process Actuated Switch Devices Includes all types of Pressure, differential pressure, flow, temperature, differential temperature, level switch Devices	5% or 1 no. of each type and model whichever is more			

	5	Electrical Metering instruments Electrical meters including voltmeter, motor current ammeter	5% or 1 no. of each type and model whichever is more			
	6	Instrument within compressor skid	5% or 1 nos. of each type and length whichever is more			
	7	Instrument within dryer skid	5% or 1 nos. of each type and length whichever is more			
7.00.00		POWER SUUPLY SYSTEM				
		24 DC power supply system				
	(i)	Silicon controlled thyristors, diodes, power transistors	10%			
	(ii)	Capacitors	1 set			
	(iii)	Fuses of each types and rating	200%			
	(iv)	Fuse free circuit breakers	5% of each type and model whichever is more			
	(v)	Electronic modules of all types	10% or 2 nos. of each type and length, whichever is more			
	(vi)	indication lamps	100%			
	(vii)	Lamp holders with series resistor, if any	10% or 2 nos. of each type and length, whichever is more			
	(viii)	Cooling fans	1 No of each type			
	(ix)	Relays of all types including overload relays	10% or 2 nos. of each type and length, whichever is more			
9.00.00		INSTRUMENTATION CABLE, INTERNAL WIRING & ELECTRICAL FIELD				
	(i)	Pre fabricated cable of each type.	10% of installed quantity			
	(ii)	Pre fabricated cable connector of each type	10% or 1 no. of each type and model, whichever is more.			
	(iii)	Other cables	5% of each type, pair and size of actual installed quantity			
10.00.00		CONTROL VALVES, ACTUATORS & ACCESSORIES				
	1	Pneumatic and electro-hydraulic actuator assembly	10% or 1 no. of each type and model, whichever is more.			
	2	Position feed back transmitter	10% or 2 nos. of each type and length, whichever is more			
	3	Valve trim (including cage, plug, stem, seal rings, guide bushings etc)	1 set for each type of control valve			

	4	Diaphragm, O'ring, seals etc. of all type, make etc	100%			
	5	Pneumatic air-filter /regulator of each type,make,rating etc.	10% or 2 nos. of each type and length, whichever is more			
	6	Pressure Gauges of all types, make , rating etc.	10% or 2 nos. of each type and length, whichever is more			
	7	Solenoid valves	10% or 2 nos. of each type and length, whichever is more			
	8	Air lock relays	10% or 2 nos. of each type and length, whichever is more			
	9	Pneumatic relays	10% or 2 nos. of each type and length, whichever is more			
	10	Positioner unit	20% or 2 nos. of each type and length, whichever is more			
11.00.00		ELECTRICAL ACTUATORS				
	1	Actuators for each type of damper	1 No of each type			
12.00.00		PLC CONTROL SYSTEM				
	1	Power Supply unit	2 Nos of each type and model			
	2	Electronic module	2 Nos of each type and model			
	3	Central processor unit	2 Nos of each type and model			
	4	Electronic module	2 Nos of each type and model			
	5	Interconnecting cables	1 run length of each type and size			
	6	Connectors	10%			
	7	Cooling Fan in PLC system / cabinet	10% or 2 nos. of each type and length, whichever is more			
	8	Audible devices	10% or 2 nos. of each type and length, whichever is more			
	9	Graphical Interface Unit	1 No of each type			
			OR			
12.00.00		MICRO-PROCESSOR BASED CONTROL PANEL	1 No of each type			



PACKAGE: COMPRESSED AIR SYSTEM

SPECIFICATION NO.
PE-TS-401-555-A001

VOLUME NO. : IIB

SECTION : C.7

SUB-SECTION :VII

VOLUME IIB
SECTION C.7
FUNCTIONAL GUARANTEE



**COMPRESSED AIR SYSTEM
FUNCTIONAL GUARANTEES**

DOCUMENT NO.:

VOLUME- I

SECTION-C1

REV. 0

SHEET 1 OF 1

1.0 For Category-I Guarantees.

Reject the equipment/system/plant and recover the payments already made.

OR

Accept the equipment/system/plant after levying Liquidated damages as specified.

A) Power consumption for Compressed Air system comprising of :

- i) Instrument Air Compressor 1 No Duty Factor = 0.6
- ii) Plant Air Compressor 1 No Duty Factor = 0.33
- iii) Air drying plant 1 No Duty Factor = 1.0

2.0 For Category-III Guarantees.

Reject the equipment/system/plant and recover from the contractor the payments already made.

OR

Accept the equipment/system after assessing the deficiency in respect of the various ratings, performance parameters and capabilities and recover from the contract price an amount equivalent to the damages as determined by the employer. Such damages shall, however be limited to the cost of replacement of the deficiency so as to achieve the guarantee performance.

- A) Capacity and discharge pressure of each compressor (to be demonstrated at shop).
- B) Parallel operation of air compressors (to be demonstrated at site).
- C) Dew point of air at the outlet of air drying plants of instrument air compressor (to be demonstrated at site).
- D) Pressure drop across Air Drying Plant (to be demonstrated at site).
- E) Vibration and noise level of each air compressor, blowers of air drying plant (to be demonstrated at site).

Note: Test shall be carried out on all compressors with contract drive motor.



TITLE

**TECHNICAL SPECIFICATION
SCOPE OF SUPPLY & SERVICES
OF COMPRESSED AIR SYSTEM**

SPEC NO. PE-TS-401-555-A001

VOLUME IIB


SECTION D


DATE


JUNE 2014


SECTION – D

TECHNICAL DATA SHEET

CLAUSE NO.	Bidder's Name			
	COMPRESSED AIR SYSTEM			
1.00.00	AIR COMPRESSOR	INSTRUMENT AIR (IA)	SERVICE AIR (SA)	
1.01.00	Capacity selection (in NM ³ /min) <ul style="list-style-type: none"> a) SG & Its auxiliaries requirement per unit b) TG & its auxiliaries / Unit c) Water Treatment Plant d) Station C&I System e) Selected Capacity as per design criteria specified (in NM³/min) 			
1.02.00	General Data <ul style="list-style-type: none"> (a) Manufacturer name (b) Model No. (c) Type of compressor (d) Total numbers offered 			
1.03.00	Guaranteed Performance			
1.03.01	Capacity of each compressor (NM ³ /min.) considering design ambient condition	.....	
1.03.02	Discharge pressure {(Kg/cm ² (g))} at Compressor HP outlet	.....	
1.03.03	Discharge pressure {(Kg/cm ² (g))} of Instrument Air at ADP Outlet	.....	
1.03.04	KW input required at the compressor shaft at design condition	.....	
1.03.05	Guaranteed power consumption at motor input terminals at rated conditions (i.e. without any tolerance)	.....	
1.03.11	KW rating of drive motor	.....	
1.03.12	Drive motor speed (rpm)	.....	
1.03.13	Guaranteed Power Consumption of ADP	.....	
1.03.14	Whether the Material of Construction of compressor is as per Specification?	YES / NO		
NAME OF THE ROJECT..... STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART-F SUB-SECTION : DM8	PAGE 1 OF 4	

CLAUSE NO.	Bidder's Name				
2.00.00	AIR RECEIVERS				
2.01.00	Design code	.....		
2.02.00	Design Pressure [Kg/cm ²]	.....		
2.03.00	Material of Construction	.....		
2.04.00	Number of Air receivers & capacity	.....		
3.00.00	INTERCOOLER, AFTER COOLER & HEAT EXCHANGERS OF ADP	Inter cooler	After cooler	Heat Exchan-ger (in case of type)	Dehumdier Blower (in case of HOC type)
3.01.00	Numbers per compressors or per ADP offered (as the case may be)	.....	.....	.....	.....
3.02.00	Temperature, deg.C. (a) Compressed air inlet/outlet (b) Cooling water inlet/outlet deg.C	.....			.....
3.03.00	Moisture separator provided as per specification?	Yes/No	Yes/No	Yes/No	Yes/No
3.04.00	Level gauge, automatic drain trap etc provided as per specification?	Yes/No	Yes/No	Yes/No	Yes/No
3.05.00	Whether the Material of construction is as per Specification?	-----YES / NO -----			
4.00.00	AIR DRYING PLANT				
4.01.00	Manufacturer	.....		
4.02.00	Type of ADP offered (Strike out whichever is not applicable)	Open Through(Blower Reactivated) type / HOC Type			
4.03.00	Number of drying plants offered	.....		
4.04.00	Whether two adsorber vessel is provided for each ADP ?	YES / NO			
4.05.00	Design airflow, at plant inlet NM3/min	.....		
4.06.00	Guaranteed dew point at the outlet throughout the operating cycle at atmospheric pressure	.....		
4.07.00	Max. pressure drop in the air steam	.....		
NAME OF THE ROJECT..... STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART-F SUB-SECTION : DM8	PAGE 2 OF 4	

CLAUSE NO.	Bidder's Name			
4.08.00	Whether Filters provided as per Specification ?	YES / NO		
4.09.00	Reactivation Blower (in case of open through heat reactivated ADP) (a) Capacity & Head (b) Nos. per ADP (c) KW Rating for the Blower motor	..... ..... .....	..... ..... .....
4.10.00	Electric Heater (in case of open through heat reactivated ADP) or for HOC type ADP for temperature stabilization (a) Type (b) Nos. per ADP (c) KW Rating/heating element	..... ..... .....	..... ..... .....
4.11.00	Guaranteed Power consumption per cycle for ADP (KW) (a) For Blowers (b) For Heaters	..... .....	..... .....
5.00.00	COMPRESSOR HOUSE CRANE (E.O.T. TYPE) (a) Manufacturer (b) Type (c) Number offered (d) Crane capacity (Tonne)	..... ..... ..... .....	..... ..... ..... .....
6.00.00	a) Cooling water required for Air Compressors (per compressor) - M ³ /hr. (including after cooler) b) Temperature rise across compressor inter cooler after cooler (deg.C) c) Cooling water required for each ADP (including all heat exchanger) - M ³ /hr.	..... ..... .....	..... ..... .....
NAME OF THE ROJECT..... STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART-F SUB-SECTION : DM8	PAGE 3 OF 4

CLAUSE NO.	Bidder's Name			
7.00.00	<p>d) Temperature rise across ADP circuit (deg.C)</p> <p>Complete Instrumentation & Controls along provided as per specification for compressors and Air Drying Plants ?</p> <p style="text-align: right;">Yes/No</p>			
NAME OF THE ROJECT..... STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2	PART-F SUB-SECTION : DM8	PAGE 4 OF 4	



PACKAGE: COMPRESSED AIR SYSTEM

SPECIFICATION NO.
PE-TS-401-555-A001

VOLUME NO. : IIB

SECTION : E

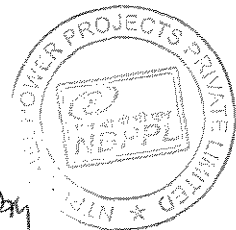
VOLUME IIB

SECTION E

QUALITY ASSURANCE
(MECHANICAL, ELECTRICAL & CONTROL &
INSTRUMENTATION)

09050

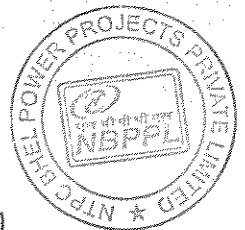
QUALITY ASSURANCE
COMPRESSED AIR SYSTEM
E-32 TO E-32



09051

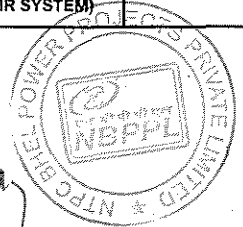
SUB-SECTION – E-32

**AIR RECEIVER, HEAT
EXCHANGERS, MOISTURE**




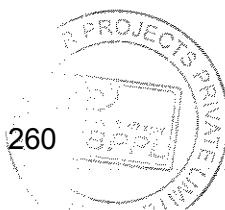
09052

CLAUSE NO.	QUALITY ASSURANCE		
1.00.00	<div style="text-align: right; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">एनटीपीसी NTPC</div> <p>AIR RECEIVER, HEAT EXCHANGERS, MOISTURE SEPERATORS, AIR DRYING PLANT:</p> <p>a) Each finished vessel shall be hydraulically tested to 150% of the design pressure for a duration of 30 minutes.</p> <p>b) NDT on weld joints shall be as per respective code requirements or the minimum as specified below:</p> <p style="margin-left: 20px;">(i) 100 % DPT on root run of butt welds.</p> <p style="margin-left: 20px;">(ii) 100% DPT on all finished butt welds and fillet welds</p> <p style="margin-left: 20px;">(iii) 10% RT on butt welds which shall include all T- joints.</p> <p>c) Tube to Tube sheet joint of the heat exchangers shall be subject to Mock-up test as per the relevant standards.</p> <p>d) Reactivation blowers shall be tested for FAD, temp. rise, noise & vibration. Rotating parts shall be dynamically balanced.</p> <p>e) Completely assembled ADP shall be pneumatically tested at design pressure for a duartion of 5 minutes. Functional and sequential operation testing of the completely assembled ADP shall be demonstrated at shop. Other accessories shall be tested as per relevant code and sections. Dew point measurement shall be done .</p>		
1.04.00	<p>H.O.T. CRANE :</p> <p>a) Chain pulley Blocks shall be tested as per IS: 3832.</p> <p>b) Following NDT requirements shall be met :</p> <p style="margin-left: 20px;">(i) 100% RT of Butt welds in tension and 10% RT of butt welds in compression.</p> <p style="margin-left: 20px;">(ii) DP at random on all weldments.</p> <p>Deflection, load, overload & travel check on HOT crane assembly shall be carried out as per IS:3177.</p>		
1.05.00	<p>PIPING, VALVES, FITTINGS AND OTHER SPECIALITIES</p> <p>a) All pipes and fittings shall be tested as per applicable code. DPT of pipe welds (in case of rolled and welded pipes only) shall be carried out for root and finished welds.</p>		
SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION - VI PART-B	SUB-SECTION-E-32 AIR RECEIVER, HEAT EXCHANGERS, MOISTURE (COMPRESSED AIR SYSTEM)	PAGE 1 OF 2



09053

CLAUSE NO.	QUALITY ASSURANCE			
	<p>b) All valves shall be hydraulically tested for body, seat and back-seat (if applicable) as per relevant standard. Check valves shall also be tested for leak tightness test at 25% of the specified seat test pressure. All forgings, dia ≥ 50 mm shall be Ultrasonic Tested irrespective of the type, size & rating of the valve. Valves shall be offered for hydro test in unpainted condition. Functional checks of the valves for smooth opening and closing shall also be done.</p>			
SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION - VI PART-B	SUB-SECTION-E-32 AIR RECEIVER, HEAT EXCHANGERS, MOISTURE (COMPRESSED AIR SYSTEM)	PAGE 2 OF 2	



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**STANDARD QUALITY PLAN
FOR
LOCAL CONTROL PANEL**

STD QUALITY PLAN NO.: PE-QP-999-145-1056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	1 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
1.0	INCOMING Sheet Steel (CRCA & HR)	1. Chemical Composition	MA	Chemical analysis	Sample	IS:1079 IS:513	IS:1079 IS:513	Test Certificate	3	---	2	
		2. Bend Test	CR	Mech. test	Sample	IS:1079 IS:513	IS:1079 IS:513	Log Book	2	---	---	
		3. Surface finish	MA	Visual	100%	Factory Standard / Sample	Factory Standard / Sample	Log Book	2	---	---	
		4. Waviness	MA	Visual	100%	Factory Standard	No Waviness	Log Book	2	---	---	
		5. Thickness	MA	Measurement	100%	BHEL Spec.	BHEL Spec.	Log Book	2	---	---	
		6. Mill marking	MA	Visual	100%	Factory Standard	Factory Standard	Log Book	2	---	1	
2.0	Flats / Angles / Channels	1. Dimensions	MA	Measurement	Sample	IS:2062	IS:2062	Log Book	2	---	---	
		2. Surface Defects	MA	Visual	100%	Factory Standard / Sample	Factory Standard / Sample	Log Book	2	---	---	
		3. Straightness	MA	Measurement	100%	Factory Std.	Factory Std.	Log Book	2	---	---	
		4. Mill marking	MA	Visual	100%	IS:2062	IS:2062	Log Book	2	---	1	
3.0	Cables / Wires	1. Visual / Surface defects	MA	Visual	100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	2	---	---	
		2. IR and HV	MA	Electrical	100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	2	---	---	

LEGEND: * CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

[§] P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

1 - BHEL
2 - Vendor
3 - Sub-vendor



PEM :: C&I

STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL

STD QUALITY PLAN NO.: PE-QP-999-145-I056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	2 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
		3. Conductor a) Resistance b) Size c) Sheet colour	MA MA MA	Electrical Measurement Visual	100% 100% 100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	2	---	---	
		4. Type / Routine Test Certificates	MA	Verification	100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	3	---	2	
4.0	Electrical Components like Annunciator Transformers Lamps Switches PBs Contactors Relays Timers Space Heaters Thermostat Indicating meters etc.	1. Verification at make and Type 2. Verification of Test Certificates 3. Operation / Functional check 4. I.R. 5. H.V. 6. Calibration 7. Pick up / Drop off Voltage	CR CR CR MA MA MA MA	Visual Scrutiny of Type / Routine T.Cs. Electrical Electrical Electrical Electrical	Sample 100% Sample+ 100% 100% 100% 100%	BHEL Spec. and BOM Relevant IS Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue	BHEL Spec. and BOM Relevant IS Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue	Log Book Log Book Log Book Log Book Log Book Log Book	2 2 2 2 2 2	--- --- --- --- --- ---	--- --- --- --- --- 1	+ for relay & contactors only @ for all components except relays & contactors.

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**STANDARD QUALITY PLAN
FOR
LOCAL CONTROL PANEL**

STD QUALITY PLAN NO.: PE-QP-999-145-1056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	3 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
5.0	Misc. Components like Gaskets, Terminal Blocks etc.	1. Verification of Type / Make	MA	Visual	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
		2. Surface defects	MA	Visual	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
		3. IR / HV on Terminal Blocks	MA	Electrical	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
6.0	IN PROCESS Blanking / Bending / Forming	1. Dimensions	MI	Measurement	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
		2. Surface defects after bending	MA	Visual	100%	Factory Standard	Factory Standard	Log Book	2	---	---	
7.0	Nibbling / Punching	1. Cutout Sizes	MI	Measurement	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
		2. Deburring	MA	Visual	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
8.0	ASSEMBLY Frame Assembly & Sheet fixing	1. Dimensions	MA	Measurement	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		2. Alignment	MA	Measurement	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		3. Welding Quality	MA	Visual	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		4. Surface defects	MA	Visual	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	

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2 - Vendor
3 - Sub-vendor



PEM :: C&I

STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL

STD QUALITY PLAN NO.: PE-QP-999-145-I056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	4 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
9.0	Pre-treatment and Painting	1. Pretreatment Process	MA	Visual	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		2. Process parameters like bath temp. concentration etc.	MA	Measurement	Periodic	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		3. Dipping / Removal Time	MA	Measurement	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		4. Surface quality after every dip	MA	Visual	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		5. Primer after phosphating	MA	Visual, Thickness	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		6. Putty Application & Rubbing after primer	MA	Visual	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		7. Paint first coat	MA	Visual, Thickness	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		8. Putty Application and Rubbing after first coat of paint	MA	Visual	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	
		9. Paint second coat	MA	Visual, Thickness, Scratch test Colour adhesion	100%	Factory Standard & IS: 6005	Factory Standard & IS: 6005	Log Book	2	---	1	

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MI - Minor characteristics

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V - Agency Verifying the Test.

1 - BHEL
2 - Vendor
3 - Sub-vendor



STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL

STD QUALITY PLAN NO.: PE-QP-999-145-I056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	5 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
10.	Panel Wiring	1. Wiring Layout	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		2. Wiring Termination (Crimped Lugs)	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		3. Ferrule numbers	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		4. Colour of wiring	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	1	
		5. Size of Conductor	MA	Measurement	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	1	
11.	Component Mounting	1. Correct components	MA	Visual	100%	Approved drgs., Specs. & BOM	Approved drgs., Specs. & BOM	Log Book	2	---	---	
		2. Fixing	MA	Visual	100%	Approved drgs., Specs. & BOM	Approved drgs., Specs. & BOM	Log Book	2	---	---	
12.	FINAL Final Inspection	1. Workmanship	MA	Visual	100%	Factory Standard	Factory Standard	Inspection Report	2	1	1	} At Random by BHEL, based on 100 % internal test reports by Mfr.
		2. Component layout (neatness, accessibility & safety) Mounting / Proper fixing of all components	MA	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		3. Components identification Marking / Name plates	MA	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	

LEGEND: * CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

[§] P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

1 - BHEL
2 - Vendor
3 - Sub-vendor



**STANDARD QUALITY PLAN
FOR
LOCAL CONTROL PANEL**

STD QUALITY PLAN NO.: PE-QP-999-145-I056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	6 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
		5. Dimensions	MA	Measurement	100%	BHEL approved drg. / Spec., BOM	BHEL approved drg. / Spec., BOM	Inspection Report	2	1	1	At Random by BHEL, based on 100 % internal test reports by Mfr.
		6. Door functioning	MA	Functional	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		7. Paint Shade	CR	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		8. Paint Thickness	CR	Measurement	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		9. Workmanship of Gaskets	MA	Visual	100%	Factory Standard	Factory Standard	Inspection Report	2	1	1	
		10. Wiring Layout	MA	Visual	100%	BHEL approved drg.	BHEL approved drg.	Inspection Report	2	1	1	
		11. Wire Termination	MA	Pulling manually	Sample	----	Firm termination	Inspection Report	2	1	1	
		12. Continuity	MA	Electrical	100%	----	Continuity OK	Inspection Report	2	1	1	

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**STANDARD QUALITY PLAN
FOR
LOCAL CONTROL PANEL**

STD QUALITY PLAN NO.: PE-QP-999-145-I056	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	22-02-2008
SHEET	7 OF 7


Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
13.	TYPE TEST	Degree of Protection	CR	Mech. Protection	Sample	BHEL approved spec., drg relevant IS-13947 Part-1, IS-2148.	BHEL approved spec., drg relevant IS-13947 Part-1, IS-2148.	Type Test Certificate	3	---	1	
14	ROUTINE TEST	IR before & after HV Test	CR	Electrical	100%	BHEL approved spec., drg., BOM & relevant IS.	BHEL approved spec., drg., BOM & relevant IS.	Test Report	2	1	1	
15	FUNCTIONAL TEST	1. Control Logic Operation	CR	Electrical	100%	BHEL approved spec. / drg.	BHEL approved spec. / drg.	Inspection Report	2	1	1	
		2. Instrument Calibratio	CR	Electrical	10%	BHEL approved spec. / drg.	BHEL approved spec. / drg.	Inspection Report	2	1	1	
		3. Temperature rise	CR	Electrical	100%	BHEL approved spec/drg. & relevant IS.	BHEL approved spec/drg & relevant IS.	Inspection Report	2	1	1	

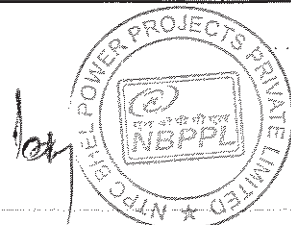
LEGEND: * CR - Critical characteristics
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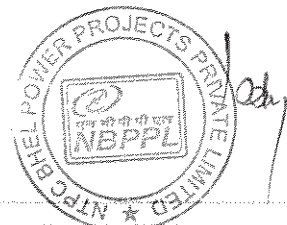
08952


CLAUSE NO.	QUALITY ASSURANCE										
MEASURING INSTRUMENTS (PRIMARY AND SECONDARY)											
ITEMS	TESTS	Dimensions (R)	Make, Model, Type, Rating (R)	Process / Electrical connection (R)	Calibration (R)	Test as per standard (R)	Insulation Resistance (R)	IBR Certification (if applicable) (R)	Hydro Test (R)	Material Test certificate @	
1. PR Gauge (IS-3624)		Y	Y	Y	Y	Y					
2. Temp. Gauge (BS-5235)		Y	Y	Y	Y	Y					
3. Pr./D.P.Switch(BS-6134)		Y	Y	Y	Y	Y	Y				
4. Electronic Transmitter(IEC-770)		Y	Y	Y	Y	Y	Y				
5. Temp. Switch		Y	Y	Y	Y	Y	Y				
6. Recorder(IS-9319/ANSI C-39.4)		Y	Y	Y	Y	Y	Y				
7. Vertical indicators		Y	Y	Y	Y		Y				
8. Digital Indicators		Y	Y	Y	Y		Y				
9. Integrators		Y	Y	Y	Y						
10. Electrical Metering Instrument (IS-1248)		Y	Y	Y	Y	Y	Y				
11. Transducer (IEC-688)		Y	Y	Y	Y	Y	Y				
12. Thermocouples (ANSI-MC-96.1)		Y	Y	Y	Y	Y	Y				
13. RTD(IEC-751)		Y	Y	Y	Y	Y	Y				
14. Thermowell		Y		Y				Y	Y	Y	
R-Routine Test A- Acceptance Test Y – Test applicable											
: Note: 1) Detailed procedure of Environmental stress screening test shall be as per Quality Assurance Programme in General Technical Conditions											
2) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.											
SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE			TECHNICAL SPECIFICATION SECTION - VI PART-B			SUB-SECTION-E-05 MEASURING INSTRUMENTS (PRIMARY AND SECONDARY) (AIR CONDITIONING SYSTEM)			PAGE 1 OF 2		



08953

CLAUSE NO.		QUALITY ASSURANCE											एनटीपीसी NTPC
ITEMS	TESTS	Dimensions (R)	Make, Model, Type, Rating (R)	Process / Electrical connection (R)	Calibration (R)	Requirement as per standard (R)	WPS approval (A)	Non-destructive testing (R)	Calculation for accuracy (R)	Insulation Resistance (R)	IBR Certification as applicable (R)	Hydro test (R)	Material test certificate (A)
		15. Cold junction compensation box	Y	Y	Y	Y					Y		
16. Orifice plate(BS-1042)	Y	Y	Y	Y*	Y	Y**	Y**			Y	Y**	Y	
17. Flow nozzle(BS-1042)	Y	Y	Y	Y*	Y	Y	Y			Y	Y	Y	Y
18. Impact head type element	Y	Y	Y					Y					Y
19. Level transmitter/float type switch	Y	Y	Y	Y					Y	Y	Y	Y	Y
20. Flue Gas analyser	Y	Y	Y	Y									
21. Dust emission monitors	Y	Y	Y	Y									
*Calibration to be carried out on one flow element of each type and size if calibration carried out as type test same shall not be repeated.													
** If applicable													
R-Routine Test A- Acceptance Test Y – Test applicable													
<p>Note: 1) Detailed procedure of Environmental stress screening test shall be as per Quality Assurance Programme in General Technical Conditions.</p> <p>2) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.</p>													
SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION - VI PART-B				SUB-SECTION-E-05 MEASURING INSTRUMENTS (PRIMARY AND SECONDARY) (AIR CONDITIONING SYSTEM)				PAGE 2 OF 2			



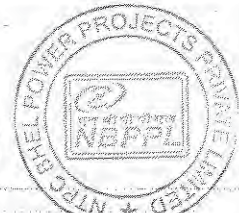
CLAUSE NO.		QUALITY ASSURANCE																	
																			
		POWER SUPPLY SYSTEM																	
ITEMS	TESTS	Visual/dimension/rating/ Paint Adhesion/ Thickness (R)	General arrangement/BOM/make of components /Mimic @	Efficiency ,regulation(R)	Input voltage variation (A)	Out put voltage and frequency adj.range(A)	Preliminary light load test(R)	Load transfer retransfer test (R) *	AC input failure and return test (R)	Parallel operation and current divison(R) *	Relative harmonic content(R)	Restart with PRI A.C and battery (separately)(R)	System transfer and retransfer (R)*	Asynchronous transfer(R)	Ripple content(R)	Load limiter operation (R)	IR/HV(R)	Tests as per standard & specification (R)&(A)	
		UPS/CONVERTER (IEC-146 PT-4)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VOLTAGE STABILISER	Y	Y	Y	Y	Y					Y		Y					Y		
LEAD ACID BATTERY(TUBLAR)-IS-1651																		Y	
LEAD ACID BATTERY (PLANTE)-IS-1652																		Y	
NICKEL CADMIUM BATTERY(IS-10918/IEC-623)																		Y	
R-Routine Test		A- Acceptance Test						Y – Test applicable											
<p>* Transfer time and Over shoot /under shoot during load, & system transfer shall be recorded .</p> <p>Note: 1) Detailed procedure of Environmental stress screening test shall be as per Quality Assurance Programme in General Technical Conditions</p> <p>2) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.</p>																			

SINGRAULI STPP STAGE-III
(1X500 MW)
EPC PACKAGE

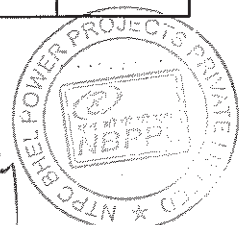
TECHNICAL SPECIFICATION
SECTION - VI
PART-B

SUB-SECTION-E-18
PLC BASED PLANT
AUXILIARY SYSTEM
(CHP)

PAGE
3 OF 3



CLAUSE NO.		QUALITY ASSURANCE											एनटीपीसी NTPC		
ELECTRICAL ACTUATOR WITH INTEGRAL STARTER															
Test/Attributes	Characteristics	ITEM/ COPONENT/ SUB SYSTEM ASSEMBLY/ TESTING	RPM ®	No Load Current ®	IR & HV Test®	Mounting Dimension®	All routine Test as per Standard & Specification®	Correct Phase Sequence®	Operation & Setting of limit Switch/Torque Switch®	Stall Torque/Current (A)	Hand Wheel operation/ Auto de clutch function (A)	Function of Aux. like Potentiometer, space heater, position indicator ®	EPT output ®	Grease leakage ®	Local/ Remote (Open-Stop-Close) Operation® Safety check (Single phasing, Phase correction, Tripping etc.) (A)
			ELECTRICAL ACTUATOR WITH INTEGRAL STARTER (IS_9334)												
Motor			Y	Y	Y	Y	Y								
Final Testing			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<p>Note: 1) Detailed procedure of Environmental Stress Screening test shall be as per Quality Assurance Programme in General Technical Conditions 2) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the practices and procedure adopted along with relevant supporting documents.</p> <p>® - Routine Test (A) - Acceptance Test Y - Test applicable</p>															
SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE				TECHNICAL SPECIFICATION SECTION - VI PART-B				SUB-SECTION-E-72 ELECTRICAL ACTUATORS (FIRE PROTECTION SYSTEM)				PAGE 1 OF 1			

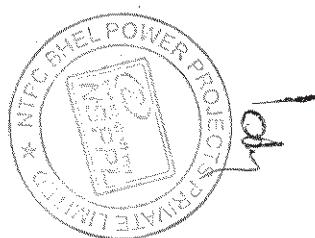


PROCESS CONNECTION AND PIPING

ITEMS	TESTS																
	Visual @	GA, BOM, Layout of component & construction feature@	Dimension @	Paint Shade/thickness @	Flattening,flaring,hydrotest,hardness check as per ASTM standard (A)	Component Ratings @	Wiring @	Make, Model, Type, Rating@	IR & HV @	Review of TC for instrument/devices (R)	Accessibility of TBs/Devices @	Illumination,grounding @	Tubing @	Leak/Hydro test(A)	Chemical/physical properties of material (A)	Proof pressure test,Dismantling & reassembly test,Hydraulic impulse and vibration test (R)	Tests as per standards & specification
Local Instrument enclosure	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				
Local instruments racks	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				
Junction Box	Y	Y	Y	Y*		Y	Y	Y	Y								
Gauge Board	Y	Y	Y	Y		Y	Y	Y	Y			Y	Y				
Impulse pipes and tubes	Y		Y		Y			Y							Y		
Socket weld fittings ANSI B-16.11	Y		Y					Y						Y			Y
Compression fittings	Y		Y					Y					Y	Y	Y		
Instrument valves & Valve manifolds	Y		Y					Y					Y	Y			
Copper tubings ASTM B75	Y							Y									Y


*-applicable for painted junction boxes.
 Note: R-Routine Test A- Acceptance Test Y – Test applicable
 Note: This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.


09180



SINGRAULI STPP STAGE-III (1X500 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION - VI PART-B	SUB-SECTION-E-76 PCP (FIRE PROTECTION SYSTEM)	PAGE 1 OF 1
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		QUALITY PLAN			CUSTOMER :		PROJECT TITLE		SPECIFICATION : NUMBER :			
		SHEET 1 OF 9			BIDDER/ VENDOR :		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03		SPECIFICATION : TITLE			
		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)		SECTION		VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
1.0	RAW MATERIAL & BOUGHT OUT CONTROL											
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK	3	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	-DO-	3	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	-DO-	-DO-	-DO-	INSPEC. REPORT	3	-	2	
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, UN-EVENNESS ETC.	-DO-	3	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	MANFR'S DRG./SPEC BOOK	RELEVENT IS/SPEC.	SUPPLIERS TC & LOG	3	-	2	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK	3	-	2	
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	MANFR'S DRG./SPEC	RELEVENT IS/	SUPPLIER'S TC	3	-	2	HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	MANUFR'S DRG.	MANUFR'S DRG.	LOG BOOK	3	-	2	
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	LOG BOOK	3	-	2	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE					BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN			CUSTOMER :			PROJECT			SPECIFICATION :		
					BIDDER/ VENDOR			TITLE			NUMBER :		
SHEET 2 OF 9		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			SECTION VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED	
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	MFG. DRG. SPEC.	RELEVANT IS	SUPPLIER'S TC	3	-	2		
		3. DIMENSIONS	MA	MEASUREMENT	100%	-DO-	MANUFR'S DRG.	LOG BOOK	3	-	2		
		4. INTERNAL FLAWS	CR	UT	-DO-	ASTM-A388	MANUFR'S SPEC. BHEL SPEC.	-DO-	3	2	1		FOR DIA OF 55 MM & ABOVE
1.6	SPACE HEATERS, CONNECTORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	-DO-	MANUFR'S DRG. SPEC.	MANUFR'S DRG. SPEC.	-DO-	3	-	2		
		2. PHYSICAL COND.	MA	-DO-	-DO-	-	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	-DO-	3	-	2		
		3. DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG./ SPEC.	MANUFR'S DRG. / SPEC.	-DO-	3	-	2		
		4. PERFORMANCE/ CALIBRATION	MA	TEST	100%	-DO-	-DO-	INSP. REPORT	3	-	2		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN			CUSTOMER :			PROJECT			SPECIFICATION :		
					BIDDER/ VENDOR			TITLE			NUMBER :		
SHEET 3 OF 9		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION			VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC. 2. OTHER CHARACTERISTICS	MA MA	VISUAL TEST	100% SAMPLE	- MANUF'S SPEC.	NO VISUAL DEFECTS MANUF'S SPEC.	INSPT. REPORT LOG BOOK AND OR SUPPLIER'S TC	3 3	- -	2 2		
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND. 2. DIMENSIONS INCLUDING BURS HEIGHT 3. ACCEPTANCE TESTS	MA MA MA	VISUAL MEASUREMENT ELECT. & MECH TESTS	100% SAMPLE -DO-	- MANUF'R'S DRG. . MANUF'S SPEC./ RELEVANT IS	NO VISUAL DEFECTS (FREE FROM BURS) MANUF'R'S DRG. RELEVANT IS	LOG BOOK -DO- SUPPLIER'S TC	3 3 3	- -	- 2 2		
1.9	CONDUCTORS	1. SURFACE FINISH 2. ELECT. PROP, & MECH. PROP	MA MA	VISUAL ELECT. & MECH. TEST	100% SAMPLES	- RELEVANT IS/ BS OR OTHER STANDARDS	FREE FROM VISUAL DEFECTS RELEVANT IS/ BS OR OTHER STANDARDS	LOG BOOK SUPPLIERS TC & VENDOR'S INSPN. REPORTS	3* 3	- -	2* 2	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HIS WORKS AND MAINTAIN RECORD FOR VERIFICATION BY BHEL/CUSTOMER.	
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE			BIDDER'S/VENDORS COMPANY SEAL							



QUALITY PLAN		CUSTOMER :				PROJECT			SPECIFICATION :			
		BIDDER/ VENDOR :				TITLE			NUMBER :			
SHEET 4 OF 9		SYSTEM				ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.10	BEARINGS	3.DIMENSIONS	MA	MEASUREMENT	-DO-	-DO-	-DO-	Log Book	3	-	2	
		1.MAKE & TYPE	MA	VISUAL	100%	MANFR'S DRG./ APPROVED DATASHEET	MANFR'S DRG./ APPROVED DATASHEET	-DO-	3	-	2	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	BHEL DATA SHEET	BHEL DATA SHEET BEARING MANUF'S CATALOGUES	-DO-	3	-	2	
		3.SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	2	
1.11	SLIP RING (WHEREVER APPLICABLE)	1.SURFACE COND.	MA	VISUAL	100%	-	-DO-	-DO-	3	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	-DO-	MANUF'S SPEC./ BHEL SPEC.	MANUF'S SPEC./ BHEL SPEC.	-DO-	3	-	2	
		4.HV/IR	MA	-DO-	100%	-DO-	-DO-	-DO-	3	-	2	
1.12	OIL SEALS & GASKETS	1.MATERIAL OF GASKET	MA	VISUAL	100%	MANUF'S DRG/SPECS	MANUF'S DRG./ SPECS.	-DO-	3	-	-	
		2.SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN			CUSTOMER :			PROJECT			SPECIFICATION :		
					BIDDER/ VENDOR :			TITLE			NUMBER :		
SHEET 5 OF 9		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III			REMARKS	
									AGENCY	P	W		V
1	2	3	4	5	6	7	8	9	10			11	
2.0	IN PROCESS												
2.1	STATOR FRAME WELDING (IN CASE OF FABRICATED STATOR)	1.WORKMANSHIP & CLEANNESS	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	3/2	2	-		
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-		
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	2	-	-		
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-		
		3.SHAFT SURFACE FLOWS	MA	PT	-DO-	RELEVANT SPEC./ ASTM-E165	MANUF'R'S SPEC./ BHEL SPEC./	-DO-	2	-	1		
2.3	PAINING	1.SURFACE PREPARATION	MA	VISUAL	100%	MANFR'S SPEC/BHEL SPEC./ RELEVANT STAND	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-		
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-DO-	-DO-	-DO-	2	-	-		
		3.SHADE	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-		
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	-DO-	-DO-	-DO-	Log Book	2	-	-		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				



QUALITY PLAN

SHEET 6 OF 9

CUSTOMER :

PROJECT
TITLE

SPECIFICATION :
NUMBER :

BIDDER/
VENDOR

QUALITY PLAN
NUMBER PED-506-00-Q-007, REV-03

SPECIFICATION :
TITLE


SYSTEM

ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)

SECTION

VOLUME III

SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	MANUFR'S SPEC.	MANUFR'S SPEC.	Log Book	2	-	-	
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-DO-	-DO-	Log Book	2	-	-	
		3.CORE LOSS & HOTSPOT	MA	ELECT.TEST	-DO-	-DO-	-DO-	Log Book	2	1*	1	
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	MANUFR'S SPEC./BHEL SPEC.	MANUFR'S SPEC./BHEL SPEC.	Log Book	2	-	-	(FOR MOTORS OF 2MW AND ABOVE) * ON 10% RANDOM SAMPLE
		2.CLEANLINESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-	
		3.IR-HV-IR	CR	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2	-	1	
		4.RESISTANCE	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	
		5.INTERTURN INSULATION	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-	
		6.SURGE WITH STAND AND TAN. DELTA TEST	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	FOR MV MOTOR
2.6	IMPREGNATION	1.VISCOSITY	MA	PHY. TEST	AT STARTING	-DO-	-DO-	Log Book	2	-	-	
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-DO-	-DO-	Log Book	2	-	-	
		3.NO. OF DIPS	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	THREE DIPS TO BE GIVEN
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN SHEET 7 OF 9			CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :		
					BIDDER/ VENDOR		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
2.7	COMPLETE STATOR ASSEMBLY	4.DURATION	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	
2.8	BRAZING/COMPRESSION JOINT	1.COMPACTNESS & CLEANLINESS	MA	VISUAL	100%	-DO-	-DO-	Log Book	2	-	-	
2.9	COMPLETE ROTOR ASSEMBLY	1.COMPLETENESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-	
		2.SOUNDNESS	CR	MALLETT TEST & UT	-DO-	-DO-	-DO-	Log Book	2		1	
		3.HV	MA	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2		1	
2.10	ASSEMBLY	1.RESIDUAL UNBALANCE	CR	DYN. BALANCE	-DO-	MFG SPEC./ ISO 1940	MFG. DWG.	Log Book	2		1	VERIFICATION FOR MV MOTOR ONLY
		2.SOUNDNESS OF DIE CASTING	CR	ELECT. (GROWLER TEST)	-DO-	MFG. SPEC.	MFG. SPEC.	Log Book	2		1	
2.10	ASSEMBLY	1.ALIGNMENT	MA	MEAS.	-DO-	-DO-	-DO-	Log Book	2	-	-	
		2.WORKMANSHIP	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-	
		3.AXIAL PLAY	MA	MEAS.	-DO-	-DO-	-DO-	Log Book	2	-	1	
		4.DIMENSIONS	MA	-DO-	-DO-	MFG.DRG./ MFG SPEC.	MFG. DRG/ RELEVANT IS	Log Book	2	-	-	
		5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	MFG SPEC. RELEVANT IS	MFG SPEC. RELEVANT IS	Log Book	2	-	-	
		6. RTD, BTD & SPACE HEATER MOUNTING.	MA	VISUAL	100%	MFG SPEC. RELEVANT IS	MFG SPEC. RELEVANT IS	Log Book	2		1	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
					BIDDER'S/VENDORS COMPANY SEAL							



QUALITY PLAN

SHEET 8 OF 9


CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :		
BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III

SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS AS PER BHEL SPEC.	MA	ELECT.TEST	1/TYPE/SIZE	IS-325/ BHEL SPEC./ DATA SHEET	IS-325/ BHEL SPEC./ DATA SHEET	TEST REPORT	2	1*	1	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	-DO-	100%	IS-12075 & IS-12065	IS-12075 & IS-12065	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPC. REPORT	2	1	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	RELEVANT IS	BHEL SPEC. AND DATA SHEET	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		8. NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPC. REPORT	2	1 ^{\$}	1	^{\$} NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	IS-3682 IS-8239 IS-8240	IS-3682 IS-8239 IS-8240	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	BHEL SPEC. & DATA SHEET	BHEL SPEC. & DATA SHEET	TC	2	1 ^{\$}	1	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY ^{\$} NOTE - 2

BHEL			PARTICULARS			BIDDER/VENDOR					
			NAME								
			SIGNATURE								
			DATE						BIDDER'S/VENDORS COMPANY SEAL		

		QUALITY PLAN SHEET 9 OF 9			CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :		
					BIDDER/ VENDOR			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
SL. NO.		COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III			
1		2	3	4	5	6	7	8	9	10		11	
<p>NOTES:</p> <p>1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED.</p> <p>2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON.</p> <p>3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THESE TEST MAY NOT BE REPEATED.</p> <p>4 WHEREVER CUSTOMER IS INVOLVED IN INSPECTION, AGENCY (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER.</p> <p><u>Legends for Inspection agency</u></p> <p>1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER)</p> <p>P. PERFORM W. WITNESS V. VERIFY</p>													
BHEL				PARTICULARS			BIDDER/VENDOR						
				NAME									
				SIGNATURE									
				DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :			PROJECT			SPECIFICATION :		
		SHEET 1 OF 2		BIDDER/ VENDOR :			TITLE			NUMBER :		
				SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-006, REV-01			SPECIFICATION TITLE		
							ITEM AC ELECT. MOTORS BELOW 55KW (LV)			SECTION		VOLUME III
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	MANUF'S SPEC	MANUF'S SPEC	-DO-	2	-	-	
		2.DIMENSIONS	MA	-DO-	-DO-	MFG. DRG./MFG. SPEC.	MFG. DRG./MFG. SPEC.	-DO-	2	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/COLOUR CODE	MA	VISUAL	100%	MFG.SPEC./ RELEVANT IS	MFG.SPEC. RELEVANT IS	-DO-	2	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	MANUFR'S SPEC/BHEL SPEC./RELEVANT STANDARD	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	IS-325/ BHEL SPEC./ DATA SHEET	SAME AS COL.7	TEST REPORT	2	1		NOTE -1 & NOTE-3
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPN. REPORT	2	1	-	NOTE -1 & NOTE-3
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									

	QUALITY PLAN		CUSTOMER :			PROJECT			SPECIFICATION :			
	SHEET 2 OF 2		BIDDER/ :			TITLE			NUMBER :			
			VENDOR			QUALITY PLAN			SPECIFICATION :			
		SYSTEM			NUMBER PED-506-00-Q-006, REV-01			TITLE :				
					ITEM AC ELECT. MOTORS BELOW 55KW (LV)			SECTION		VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
		3.NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPN. REPORT	2	1	-	
<p>NOTES:</p> <p>1 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON</p> <p>2 WHERE EVER CUSTOMER IS INVOLVED IN INSPECTION, (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER.</p> <p>3 FOR EXHAUST/VENTILATION FAN MOTORS OF RATING UPTO 1.5KW , ONLY ROUTINE TEST CERTIFICATES SHALL BE FURNISHED FOR SCRUTINY.</p> <p><u>Legends for Inspection agency</u></p> <p>1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER)</p> <p>P. PERFORM W. WITNESS V. VERIFY</p>												
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			