Bharat Heavy Electricals Limited

(A Government of India Undertaking)

Piping Centre, No.80, GN Road, T.Nagar, Chennai – 600 017, Tamil Nadu

ENLISTMENT OF VENDORS

BHEL – One of the Navratna PSUs is looking for Vendors for their Piping Centre, Chennai who are technically competent, Financially sound and capable of Design, Manufacture and Supply of the following items as per BHEL's Specification/ TDC / Drawings etc which are available in our Website http://www.bhel.com. Filled-in Formats together with annexures may be forwarded to Supplier Development Cell/Purchase Dept/ Piping Centre. Contact Persons :

1. D.V.Ravi, Addl.Gen.Manager/Purchase- 044-28161216
2. K.Umashankar, Manager/Purchase- 044-28161247

Pre-Qualification requirement: Only Genuine manufacturers need to apply. Application of Traders/ Stockists will not be considered. The Vendor should have, adequate experience of having supplied for atleast two boilers, manufacturing facilities with Quality Systems and capability of meeting product specifications for the items. Vendors approved by IBR and NTPC will be considered as additional merit.

Items for which Vendors are required for Industrial/Power Boilers:

1. Flow Nozzle Assembly (including rating upto class 2500 and special material involving SA 335 P91) in steam and water lines.
2. Auxiliary PRDS, Control Valves with smart positioner, and associated remote unit for set point adjustment and softwares with Personal Computers
3. Chemical Dosing System – Skid Mounted -- Phosphate/Hydrazine/Ammonia Dosing skid consisting of tanks, pumps, agitators & instruments along with starter panel.
4. Conductivity Type Level Switches to detect presence of steam/water in drain pots.
5. Local Instrument Racks consisting of fittings for mounting of pressure and temperature instruments with instrument root valves and manifold.
6. Tie Rods threaded, galvanized and yellow chromotised for hanger and supports.

While submitting the Vendor Registration documents, kindly highlight whether you are registered with any of our BHEL Sister Units for the above products.

Interested Parties may submit the documents on or before 31.05.10.

AGM/MM

Bharat Heavy Electricals Limited
Piping Centre Chennai-17

ENGINEERING DEPARTMENT

Rev.No	Specification No.	Sheet No.
04	**PC : TSP : 81002**	1 of 5

TECHNICAL SPECIFICATION FOR PRIMARY FLOW ELEMENTS

REV.	DATE	ALATERATION	PREPARED	CHECKED	APPROVED
09					
08					
07					
06					
05					
04	23.11.04	Clause 3.6 altered Clause 3.10 deleted	E.Loganathan	R.Prabha	GR.Srinivasan
03	08.07.04	Generally updated	-sd- E.Loganathan	-sd- R.Prabha	-sd- GR.Srinivasan
02	24.08.02	Generally revised	-sd- E.Loganathan	-sd- R.Prabha	-sd- GR.Srinivasan
01	27.10.98	Generally revised	-sd- M.Devendran	-sd- R.Prabha	-sd- GR.Srinivasan
00	24.08.98	Fresh issue	-sd- M.Devendran	-sd- R.Prabha	-sd- GR.Srinivasan

TECHNICAL SPECIFICATION FOR PRIMARY FLOW ELEMENTS

1.0 SCOPE

1.1 This standard specifies the requirement of flow elements for use in Utility / Captive Power Plants.

2.0 DATA SHEET

2.1 In addition to the general specification, specific data sheet is enclosed indicating special requirements of each instrument / group of instruments.

2.2 Wherever the specification / data sheet requires information to be furnished by the tenderer / supplier, the same shall be furnished in the offer.

3.0 TECHNICAL REQUIREMENTS

3.1 The flow element shall be sized as per the standard specified in the data sheet for the respective services and shall meet the specified requirement.

3.2 The flow element sizing shall be done for "maximum operating condition" indicated vide "condition-3" of Data sheet, provided "minimum to maximum flow" is less than 1:10. If the ratio is > 10 then the sizing shall be done for "normal operating condition" indicated vide "condition-2" of Data sheet.

3.3 The flow equation (Q Vs ΔP) thus arrived will be used for computing Δp corresponding to "design flow" which corresponds to "maximum flow value of secondary instrument." The value of design pressure & design temperature shall be used for mechanical design of "Flow Element Assemblies".

3.4 The flow element shall be assembled and supplied complete with inlet and outlet pipe sections as a meter run, along with all accessories as specified in the data sheets.

3.5 The flow element shall be perfectly aligned with the inlet and outlet pipe sections.

3.6 The pipe assembly shall have a minimum length of **2.85 metres** or 10D whichever is maximum.

3.7 The pipe internal surface shall be straight, free from mill scales, pits, holes, reamer scores or reflings, bumps and other irregularities. The pipe roughness should not be greater than 350 micro inch and the internal diameter shall not depart from the average diameter D by more than 0.33 percent.

3.8 Internal boring, if required, to obtain the degree of surface roughness and roundness shall extend for a minimum of 5D preceding and 3D following the inlet face of the flow element. The bored portion shall be flared into the un-bored portion at an included angle of less than 50 Deg.

3.9 The meter run shall be suitably edge prepared and shall match the main pipe size indicated in the data sheet.

~~3.10~~ ~~Approx. 110% of maximum flow shall be taken as scale range for which the sizing shall be done. Parameters indicated vide normal conditions shall be used in sizing.~~

3.11 Maximum diameter of pressure tap hole shall be as per ASME PTC 19.5. The diameter of hole shall remain same for a distance of 8.5 times ID of branch pipe.

3.12 The flow element type, material, construction, location etc. shall be as specified in the data sheet.

3.13 The available straight length in which the flow element is to be installed is furnished in the data sheet. Bidder shall suitably apportion the same for upstream and downstream straight lengths and use it in the sizing calculations.

3.14 Drain and vent stubs shall be provided as required by the respective service. Vent stub shall be located at the top and drain stub at the bottom of the flow nozzle assembly. The drain and vent holes shall be tangential to the inside of the pipe. Location of pressure tap shall be within 1.5mm of distance specified.

3.15 For all steam services and water services where process temperature exceeds 200°c, condensing vessels / cooling vessels for each type to be provided as indicated vide Data sheet. Condensing / cooling vessels shall comply with the requirement of standard ISO 2186. Detailed calculation shall be submitted for review.

4.0 INSPECTION & TESTING

Please refer BHEL / Piping Centre's Document No. QPG 017.

5.0 DOCUMENTS

5.1 The following documents in ENGLISH shall be supplied in triplicate along with the offer.

5.2 Detailed catalogue of instrument and all accessories along with O&M manual.

5.3 Detailed drawing of the instrument and mounting arrangement drawing.

5.4 Quality Plan.

5.5 Tenderer shall provide a note of commitment that the offer complies in all respects with the specification or a deviation list with reasons, if any.

5.6 Within one month after placement of order, vendor shall submit the following documents in ENGLISH (15 sets each).

5.6.1 Catalogue
5.6.2 Data Sheet and Sizing Calculations
5.6.3 O & M Manual
5.6.4 Certified Dimensional Drawings
5.6.5 DP vs Flow Characteristic Curves (RTF)

6.0 IDENTIFICATION

6.1 Each flow element assembly shall be identified with the following information.

6.1.1 Manufacturer's name or Identification Number.
6.1.2 Manufacturer's model and / or serial number.
6.1.3 Stainless steel arrows on F.E. assembly to indicate direction of flow.

The above shall be in permanent form in a metal nameplate attached to the instrument.

6.2 In addition, the following information shall be attached to the instrument in the form of a removable metal tag wired to the device.

6.2.1 Material Code as per Purchase Order
6.2.2 BHEL Tag Number
6.2.3 Service
6.2.4 Model Number

7.0 PACKING

7.1 Packing shall be such that it is sea / road worthy and capable of withstanding transit risks.

7.1.1 A suitable preservative shall be included for withstanding one year storage contingencies.

7.1.2 The package shall be clearly and legibly marked in a suitable manner with following information in addition to destination details.

7.1.2.1 Purchaser's Order Number

7.1.2.2 Number of pieces in shipment

8.0 GENERAL

8.1 Whenever the information furnished in the enclosed data sheet contradicts that furnished in the general specification, the information furnished in the data sheet shall be applicable.

8.2 It is not the intent to specify completely herein all aspects of design and construction of equipment. Nevertheless the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the owner who will interpret the meaning of specification for the purpose of which the owner reserves the right to alter the specification even during the contract execution stage for which commercial implications will not be entertained.

8.3 Routine Test Certificate detailing test results of each instrument along with reports of type tests shall be furnished.

9.0 GUARANTEE

This shall cover 24 months from the date of shipment or18 months from the date of commissioning whichever is later.

Write up on Auxiliary PRDS control valves

Auxiliary steam system is designed to provide steam for the turbine auxiliaries, boiler auxiliaries and fuel oil heating system during start-up, low loads and normal running of unit.

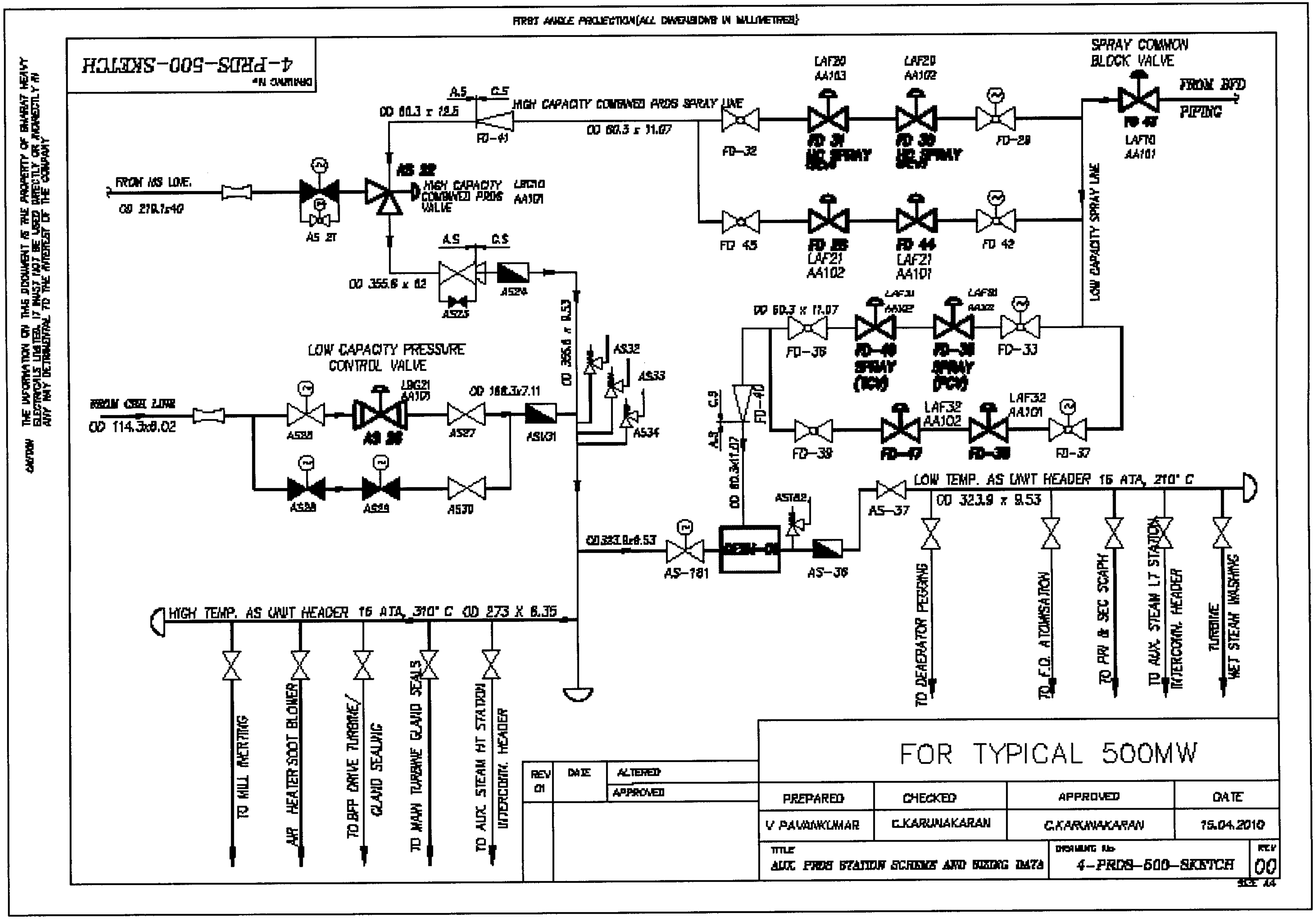
To meet the continuous and start-up auxiliary steam requirements of the unit, two auxiliary pressure reducing and desuperheating stations (PRDS) are used as mentioned below.

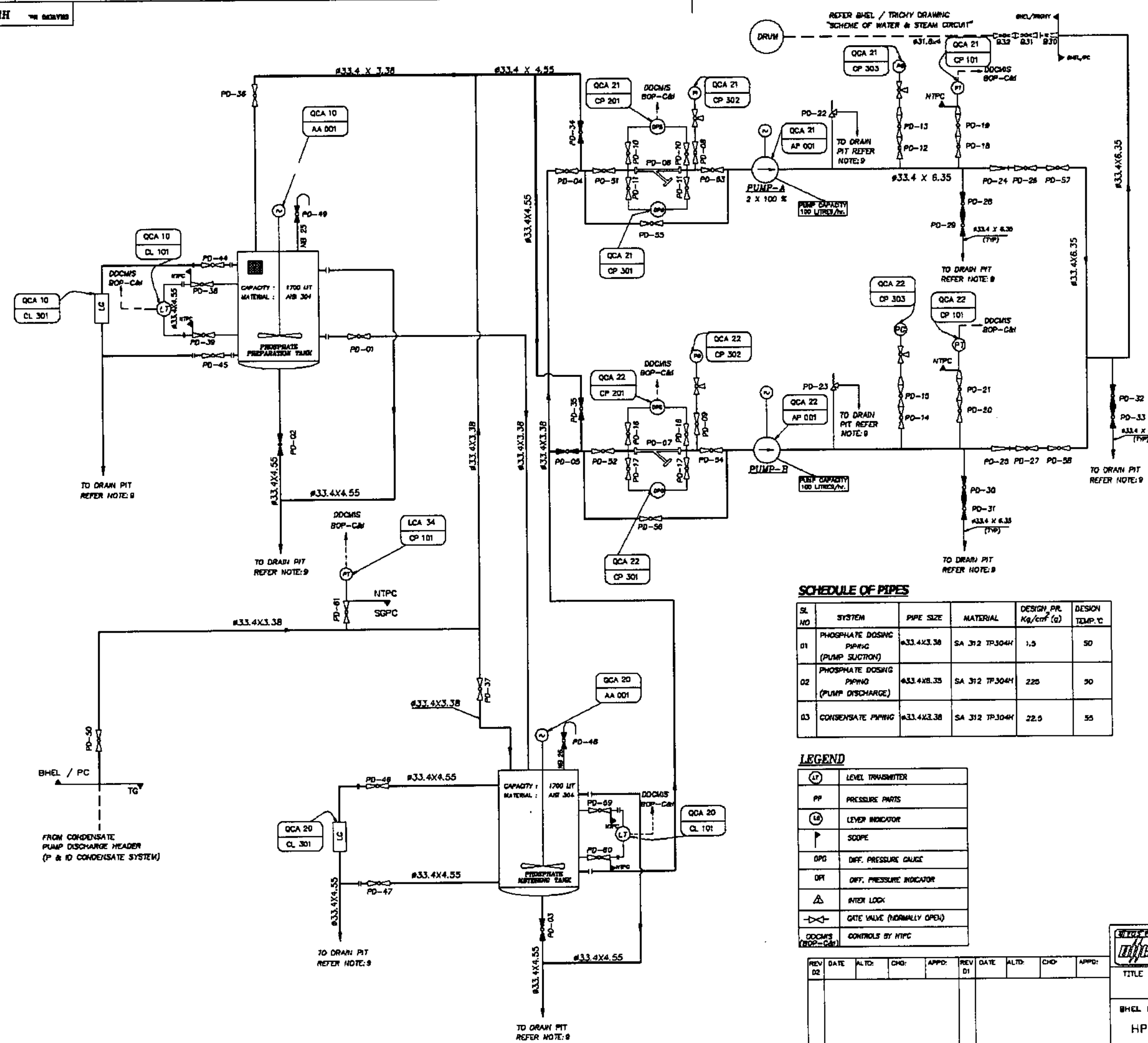
I) High capacity PRDS taking tap off from Main Steam
(188.5 Kg/cm^2 & 540^0C)

II) Low capacity PRDS taking tap off from Cold Reheat
(54 Kg/cm^2 & 360^0C)

These two stations will reduce the pressure and temperature of the steam tapped off from Main Steam line to 16 Kg/cm^2 (abs) & 310^0 C at the High Temperature auxiliary steam header and subsequently to 16 Kg/cm^2 (abs) & 210^0 C at the low Temperature auxiliary steam header through a suitable Desuperheater between the High Temperature and Low Temperature auxiliary steam headers.

For Location of Auxiliary PRDS control valves and Desuperheating stations refer scheme No. **4-PRDS-500-SKETCH**


FIRST ANGLE PROJECTION(ALL DIMENSIONS IN MILLIMETRES)
4-PRDS-500-SKETCH
SPRAY COMMON BLOCK VALVE
FROM BFD PIPING
HIGH CAPACITY COMBINED PRDS SPRAY LINE
LOW CAPACITY SPRAY LINE
FROM HS LINE.
OD 219.1x40
HIGH CAPACITY COMBINED PRDS VALVE
LOW CAPACITY PRESSURE CONTROL VALVE
OD 114.3x8.02
OD 355.6 x 62
OD 355.6 x 9.53
OD 168.3x7.11
OD 60.3 x 12.5
OD 60.3 x 11.07
LOW TEMP. AS UNIT HEADER 16 ATA, 210° C
OD 323.9 x 9.53
HIGH TEMP. AS UNIT HEADER 16 ATA, 310° C OD 273 X 6.35
TO DEAERATOR PEGGING
TO F.O. ATOMISATION
TO PRI & SEC SCAPH
TO AUX. STEAM LT STATION INTERCONN. HEADER
TURBINE WET STEAM WASHING
TO MILL INERTING
AIR HEATER SOOT BLOWER
TO BFP DRIVE TURBINE/ GLAND SEALING
TO MAIN TURBINE GLAND SEALS
TO AUX. STEAM HT STATION INTERCONN. HEADER
FOR TYPICAL 500MW
PREPARED
CHECKED
APPROVED
DATE
V PAVANKUMAR
C.KARUNAKARAN
C.KARUNAKARAN
15.04.2010
TITLE
AUX. PRDS STATION SCHEME AND SIZING DATA
DRAWING No.
4-PRDS-500-SKETCH
REV
00
SIZE A4
CAUTION THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY



NOTES:

1. ALL VENT SIZES ARE OF Nb 25
2. DRAINS ARE OF SIZE Nb 25
3. ALL LEVEL TAPPINGS ARE OF SIZE NB 25
4. PRESSURE TAPPINGS FOR PRESSURE < 40 Kg/cm TO BE OF NB 15. FOR PRESSURE > 40 Kg/cm TO BE OF NB 25.
5. EACH DOSING PUMP IS PROVIDED WITH AUTO 4-20 mA CONTROL
6. ALL INTERLOCKS SHALL BE BUILT-IN THE BOP C&I DDCMS BY NTPC
7. ONE DRAIN PIT IS AVAILABLE IN HP DOSING AREA. CONNECTED TO ONE PIPE
8. LOCAL CONTROL PANEL (LCP) IS SUPPLIED BY BHEL-PC
   - THE PANEL HOUSES THE STARTERS FOR PUMPS & AGITATORS.
   - START/STOP P.B AND INDICATING LAMPS AND MOUNTED ON PANEL FRONT FACIA.
   - THE AUTO STROKE CONTROLLER (RECEIVE 4-20MA FROM DDCMS) WHICH ARE SUPPLIED ALONG WITH THE PUMPS ARE ALSO MOUNTED ON PANEL.
   - INDICATION LAMPS ARE DRIVEN (24V,DC) FROM DDCMS.
   - CONTACTS ARE MADE AVAILABLE FROM LCP TO DDCMS FOR ANNUNCIATION.
   - DOSING LOGICS ARE BUILT IN DDCMS-BOP-C&I BY NTPC.
9. FOR INSTRUMENT SCHEDULE REFER DRG. NO. 3-81-417-01397.
10. DIRECT MOUNTED DPS & DPI WILL BE SUPPLIED PUMP VENDOR ALONG WITH 3-VALVE MANIFOLD & MOUNTED INTEGRAL TO STRAINER.
11. DISCHARGE SIDE PRESSURE GAUGES WILL BE MOUNTED IN RACK. FOR DETAILS BEYOND ROOT VALVE REFER DRG. NO. 3-81-419-01586.
12. DEPENDING UPON ACTUAL LAYOUT REQUIREMENTS, No. OF DRAINS/VENTS MAY VARY.

SCHEDULE OF PIPES

SL NO	SYSTEM	PIPE SIZE	MATERIAL	DESIGN PR. Kg/cm² (g)	DESIGN TEMP. °C
01	PHOSPHATE DOSING PIPING (PUMP SUCTION)	ø33.4X3.38	SA 312 TP304H	1.5	50
02	PHOSPHATE DOSING PIPING (PUMP DISCHARGE)	ø33.4X6.35	SA 312 TP304H	225	50
03	CONDENSATE PIPING	ø33.4X3.38	SA 312 TP304H	22.5	55

LEGEND

LT	LEVEL TRANSMITTER
PP	PRESSURE PARTS
LG	LEVER INDICATOR
(flag)	SCOPE
DPG	DIFF. PRESSURE GAUGE
DPI	DIFF. PRESSURE INDICATOR
(triangle)	INTER LOCK
(valve)	GATE VALVE (NORMALLY OPEN)
DDCMS (BOP-C&I)	CONTROLS BY NTPC

LEGEND

(valve)	GLOBE VALVE (NORMALLY OPEN)
(valve)	GLOBE VALVE (NORMALLY CLOSED)
(valve)	3 WAY VALVE
(valve)	RELIEF VALVE
(symbol)	REDUCER
(symbol)	VENT TO ATMOSPHERE
(symbol)	FLANGED CONNECTION
(symbol)	NON RETURN VALVE
(triangle)	ALARM
(square)	BASKET
(~)	MOTOR
LL	LOW LEVEL
HL	HIGH LEVEL
LCP	LOCAL CONTROL PANEL
PT	PRESSURE TRANSMITTER
PG	PRESSURE GAUGE
DPG	DIFF. PRESSURE GAUGE

REV 02	DATE	ALTD:	CHD:	APPD:	REV 01	DATE	ALTD:	CHD:	APPD:

BHARAT HEAVY ELECTRICALS LTD
PIPING CENTRE
CHENNAI-600 017

DEPT CODE		NAME	SIGN	DATE
	DRN	R.S.MAL		
	CHD	B.R.K.R		
	APPD	C.T.KABAN		

TITLE

PHOSPHATE DOSING SCHEME-NTPC 500MW

BHEL DRAWING NO: HPD-500-001

SCALE N.T.S

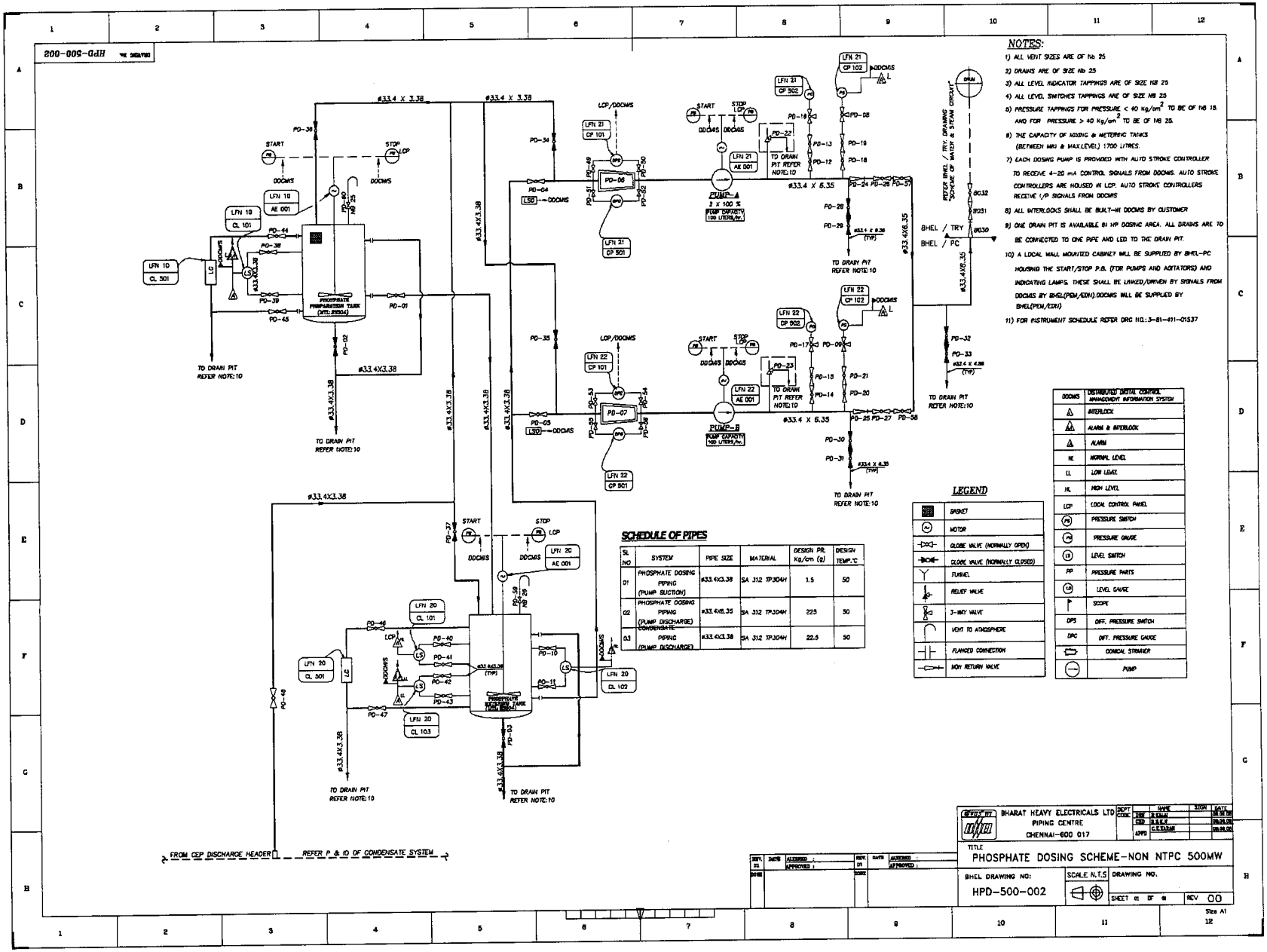
DRAWING NO.

SHEET 01 OF 01

REV 00

Size A1

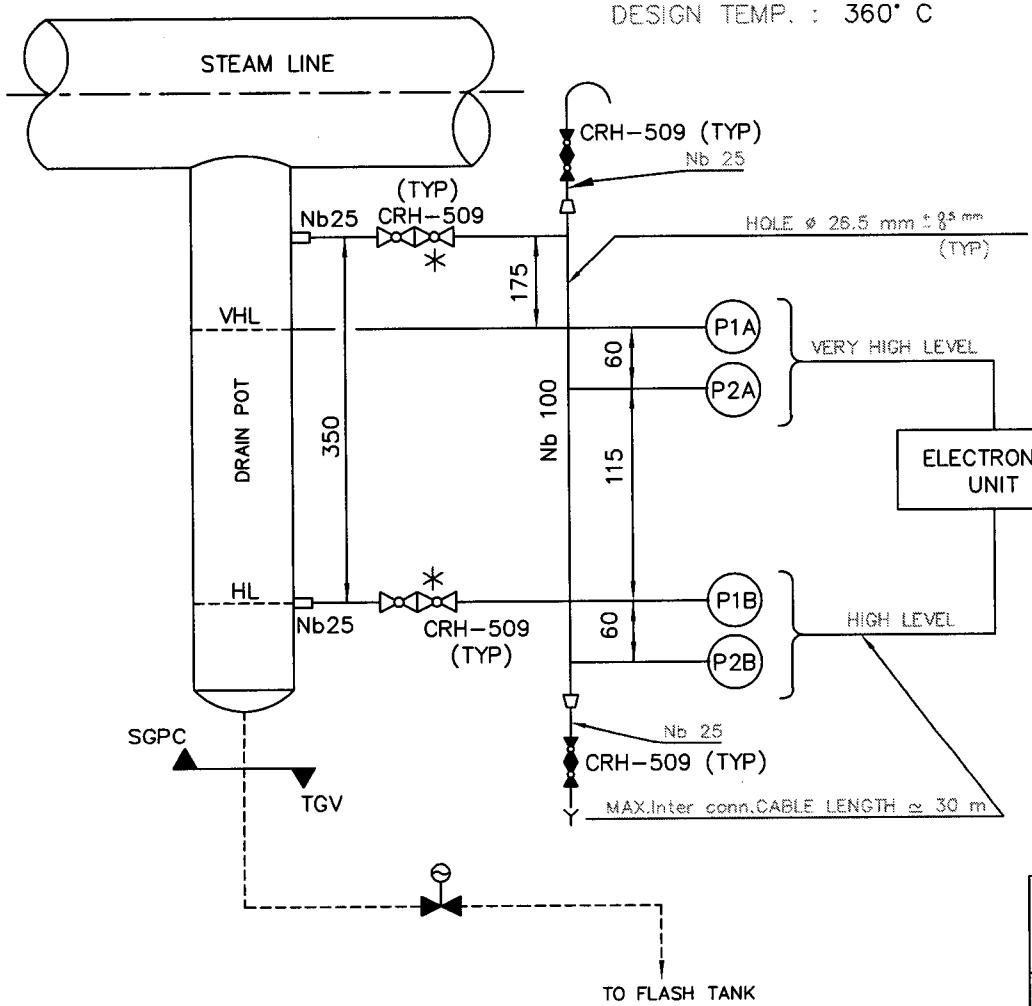
DRAWING No. HPD-500-001


HPD-500-002
NOTES:
1) ALL VENT SIZES ARE OF NB 25
2) DRAINS ARE OF SIZE NB 25
3) ALL LEVEL INDICATOR TAPPINGS ARE OF SIZE NB 25
4) ALL LEVEL SWITCHES TAPPINGS ARE OF SIZE NB 25
5) PRESSURE TAPPINGS FOR PRESSURE < 40 Kg/cm2 TO BE OF NB 15. AND FOR PRESSURE > 40 Kg/cm2 TO BE OF NB 25.
6) THE CAPACITY OF MIXING & METERING TANKS (BETWEEN MIN & MAX LEVEL) 1700 LITRES.
7) EACH DOSING PUMP IS PROVIDED WITH AUTO STROKE CONTROLLER TO RECEIVE 4-20 mA CONTROL SIGNALS FROM DDCMS. AUTO STROKE CONTROLLERS ARE HOUSED IN LCP. AUTO STROKE CONTROLLERS RECEIVE I/P SIGNALS FROM DDCMS
8) ALL INTERLOCKS SHALL BE BUILT-IN DDCMS BY CUSTOMER
9) ONE DRAIN PIT IS AVAILABLE IN HP DOSING AREA. ALL DRAINS ARE TO BE CONNECTED TO ONE PIPE AND LED TO THE DRAIN PIT.
10) A LOCAL WALL MOUNTED CABINET WILL BE SUPPLIED BY BHEL-PC HOUSING THE START/STOP P.B. (FOR PUMPS AND AGITATORS) AND INDICATING LAMPS. THESE SHALL BE LINKED/DRIVEN BY SIGNALS FROM DDCMS BY BHEL(PEM/EDN). DDCMS WILL BE SUPPLIED BY BHEL(PEM/EDN)
11) FOR INSTRUMENT SCHEDULE REFER DRG NO.: 3-81-411-01537
SCHEDULE OF PIPES
SL NO | SYSTEM | PIPE SIZE | MATERIAL | DESIGN PR. Kg/cm (g) | DESIGN TEMP.°C
01 | PHOSPHATE DOSING PIPING (PUMP SUCTION) | ø33.4X3.38 | SA 312 TP.304H | 1.5 | 50
02 | PHOSPHATE DOSING PIPING (PUMP DISCHARGE) | ø33.4X6.35 | SA 312 TP.304H | 225 | 50
03 | CONDENSATE PIPING (PUMP DISCHARGE) | ø33.4X3.38 | SA 312 TP.304H | 22.5 | 50
LEGEND
BASKET
MOTOR
GLOBE VALVE (NORMALLY OPEN)
GLOBE VALVE (NORMALLY CLOSED)
FUNNEL
RELIEF VALVE
3-WAY VALVE
VENT TO ATMOSPHERE
FLANGED CONNECTION
NON RETURN VALVE
DDCMS DISTRIBUTED DIGITAL CONTROL MANAGEMENT INFORMATION SYSTEM
INTERLOCK
ALARM & INTERLOCK
ALARM
NL NORMAL LEVEL
LL LOW LEVEL
HL HIGH LEVEL
LCP LOCAL CONTROL PANEL
PS PRESSURE SWITCH
PG PRESSURE GAUGE
LS LEVEL SWITCH
PP PRESSURE PARTS
LG LEVEL GAUGE
SCOPE
DPS DIFF. PRESSURE SWITCH
DPG DIFF. PRESSURE GAUGE
CONICAL STRAINER
PUMP
FROM CEP DISCHARGE HEADER
REFER P & ID OF CONDENSATE SYSTEM
TO DRAIN PIT REFER NOTE:10
BHEL / TRY
BHEL / PC
REFER BHEL / TRY. DRAWING SCHEME OF WATER & STEAM CIRCUIT
BHARAT HEAVY ELECTRICALS LTD
PIPING CENTRE
CHENNAI-600 017
TITLE
PHOSPHATE DOSING SCHEME-NON NTPC 500MW
BHEL DRAWING NO:
HPD-500-002
SCALE N.T.S
DRAWING NO.
REV 00
Size A1

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MILLIMETRES)

DRAWING NO. 3-81-414-00747

DESIGN PR. : 54 Kg/Cm² (g)
DESIGN TEMP. : 360° C



LEGEND

A — ANNUNCIATION

I — INTER LOCK

VH VERY HIGH
H HIGH
P1A,P2A PROBES FOR VERY HIGH LEVEL VALIDATION
P1B,P2B PROBES FOR HIGH LEVEL VALIDATION

VH A H I

HIGH LEVEL : 256 mm from bottom dish end of drain pot.
VERY HIGH LEVEL : 431 mm from bottom dish end of drain pot.

NOTES

01. * TWO ROOT VALVES TO BE PROVIDED,IF PROCESS PRESSURE EXCEEDS 40 KG/SQ.CM
02. ENVISAGED FOR CRH DRAIN POT LEVEL SWITCH.
LBC10 CL201 – LEVEL HIGH.
LBC10 CL202 – LEVEL VERY HIGH.
03. TWO FEEDERS OF 100VA, 240 V, 1 PHASE AC SHALL BE MADE AVALIABLE TO THE ELECTRONIC UNIT BY NTPC

FOR REFERENCE ONLY

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
03			02			01		
ZONE			ZONE			ZONE		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT	INSTALLATION DRAWING

BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE
MADRAS 600 017

	NAME	SIGNATURE	DATE	NO.OF VAR.
DRN	E.LOGANATHAN		28 10 94	
CHD	R.PRABHA		28 10 94	
APPD	G.R.SRINIVASAN		28 10 94	

DEPT / CODE	GRADE OF UNTOL. DIM C/M/F	SCALE	WEIGHT (KG)	REF. TO ASSY./OLD DRG.	ITEM NO.	NO.OF ITEMS
		N.T.S				

TITLE	CARD CODE	DRAWING NO.	REV
CONDUCTIVITY TYPE LEVEL SWITCH FOR CRH DRAINPOT	U 01	3-81-414-00747	00

Size A4

Bharat Heavy Electricals Limited
Piping Centre Chennai-17

ENGINEERING DEPARTMENT

Rev. No	Specification No.	Sheet No.
02	**PC : TSP : 81049**	1 of 4

TECHNICAL SPECIFICATION FOR INSTRUMENTS RACKS

REV.	DATE	ALTERATION	PREPARED	CHECKED	APPROVED
09					
08					
07					
06					
05					
04					
03					
02	13.04.05	Generally Revised	E.Loganathan	R.Prabha	GR.Srinivasan
01	19.10.02	Format altered	-Sd- E.Loganathan	-Sd- R.Prabha	-Sd- GR.Srinivasan
00	10.07.97	Fresh issue	-sd- M.Devendran	-sd- R.Prabha	-sd- GR.Srinivasan

TECHNICAL SPECIFICATION FOR INSTRUMENTS RACKS

1.0 SCOPE OF SUPPLY

1.1 Scope of this specification includes design, fabrication, assembly, testing, inspection and supply of instrument racks including all materials inside racks, as given below.

1.1.1 Impulse Pipe
1.1.2 Nipples
1.1.3 Valves
1.1.4 Matching Pieces
1.1.5 Connectors
1.1.6 Drain Headers
1.1.7 Bulk Heads
1.1.8 Siphon
1.1.9 Junction Box

2.0 TECHNICAL REQUIREMENTS

2.1 Racks shall be made of channels, angles and plates of requisite dimension and materials as mentioned in enclosed **Rack Fabrication drawing**.

2.2 All materials inside racks excluding instruments are to be supplied by Bidder.

2.3 The impulse pipe and layout inside enclosure for pressure instruments is as detailed vide enclosed **Instrument Installation drawing**.

2.4 All impulse pipe, fittings, headers, nipples and valves shall be neatly laid and welded. The connections shall be socket welded. The electrodes used shall be indicated and are subject to owner's approval.

2.5 The materials of impulse pipe, fittings, syphon etc. excluding valves shall be of stainless steel 316 SS(A).

2.6 Valves shall be of WCB for temperature less than 420oC and WC9 for temperature more than or equal to 420oC. All valves shall be globe type with class rating suitable for the specified service.

2.7 The class rating, hydro test pressure values for each pressure instrument fitting (excluding instrument) is indicated vide Annexure-1 of this specification.

2.8 The grouping of instruments is as per enclosed **schedule of LIR's**.

2.9 The pressure instruments supplied by owner will have instrument connections, as ½"NPT(F). All impulse piping, necessary matching pieces, clamps etc. to be provided by Bidder.

2.10 All valves, impulse piping, fitting, matching pieces, syphon shall be under IBR. Bidder shall obtain necessary IBR approvals and shall furnish Form IIIC.

2.11 Makes of valves, impulse pipe, fitting etc. shall be of owner approved make.

2.12 A JB to receive sufficient number of contacts shall be provided in each rack. Cabiing between switch and JB will be done by Purchaser. JB shall be capable of receiving 2.5mm2 conductor side entry. JB shall have plug and socket connections of M/s Allied Electronics make. TB shall be cage clamp type. TB shall be mounted using DIN RAIL. 20% spare terminals to be provided. Earthing-M6 earthing stud with GI shield bus inside JB.

2.13 Lighting : 2 Nos CFL, 11 watts with suitable fittings.

2.14 Cable gland : Brass, double compression with nickel plating. To be supplied in loose, suitable for 4 pair, 0.5 sq.mm and 1 No. for 2 core ,2.5 sq.mm for power cable.

2.15 Name plate : Anodised aluminium (3 mm thick) with Tag No. iinscription

3.0 GENERAL

3.1 The purpose of instrument rack is to provide adequate weather proof protection and hence the O.G.A. as detailed vide enclosed drawing, shall be strictly adhered. However, any changes for improvement has to be clearly identified.

3.2 Painting

3.3 Colour Shade : Exterior : Grey DIN RAL 9002 as per 7 tank process

3.4 Impulse Pipe : Red

3.5 Valves : Grey

3.6 2 coats of primer (minimum 65 microns) and 2 spray coats of finished color (minimum 100 microns)

4.0 TECHNICAL SPECIFICATION FOR INSTRUMENT RACKS

Adequate illumination to be provided (40W, single phase, 240V fluorescent lamp suggested).

5.0 TESTING AND INSPECTION

5.1 Hydro test of individual components and assembly, including valves.

5.2 IBR Form IIIC

5.3 Overall dimension of assembly.

5.4 Material TC for all components.

6.0 GENERAL

It is not the intent to specify completely herein all aspects of design and construction of equipment. Nevertheless the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the owner who will interpret the meaning of specification for the purpose of which the owner reserves the right to alter the specification even during the contract execution stage, for which commercial implications will not be entertained.

7.0 NOTES FOR LIR :

7.1 The LIRs have to be guaranteed for satisfactory performance towards manufacturing defects for a period of 24 months from the date of supply or 18 months from the date of commissioning which ever is later. Any leakages, defects or imperfections found in LIR at a later stage during erection / commissioning shall be rectified by vendor at their own expense.

7.2 Colour code for impulse lines in LIR other than SS tubes and SS fittings shall be intimated later during drawings approval stage after PO.

7.3 The welders involved for this job shall be IBR qualified for at least 3G positions.

7.4 Electrode shall be as per BHEL approved list.

7.5 All Impulse pipes coming under steam and water lines shall be IBR certified and the certificate shall be submitted in **Form IIIC.**

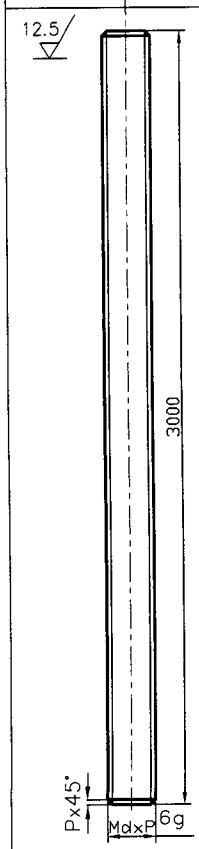
7.6 Operating height shall be within 700mm to 1800mm.

7.7 Minimum distance between limbs should be 200 mm.

7.8 Drain pipe shall be placed 300 mm above the floor level.

FIRST ANGLE PROJECTION (ALL DIMENSION IN MILLIMETRES)

DRAWING NO. 3-80-999-97745



VAR No.	MdxP 6g	STOCK CODE	WEIGHT kg.	OP.LOAD kg.	HYD.LOAD kg.	
01	M12x1.75	92 XXX XXX 0000	4.080	250	450	
02	M16x2	01	7.560	630	1130	
03	M20x2.5	01	8.190	1000	1800	
04	M24x3	01	10.780	2500	4500	
05	M30x3.5	01	17.550	4000	7200	
06	M36x4	01	26.900	6300	11340	
07	M42x4.5	01	40.800	8200	14760	
08	M48x5	01	43.500	10000	18000	
09	M56x4	01	62.460	16000	28800	
10	M64x4	01	103.800	20500	36900	
11	M68x4	01	106.700	25000	45000	
12	M72x4	01	109.700	30000	54000	
13	M85x4	01	167.200	40000	72000	

NOTES:
01. THREADS SHALL BE AS PER IS4218 & IS1367.
02. TIE ROD SHALL BE ELECTRO-GALVANISED TO A DEPTH OF 15 MICRONS & YELLOW CHROMOTISED.
03. TIE ROD SHALL BE PROTECTED SUITABLY TO AVOID DAMAGE OF THREADING, DURING HANDLING, STORAGE, TRANSIT, ETC.
04. TIE RODS SHALL BE STRAIGHT WITHIN 5mm.
05. TIE ROD MATERIAL SHALL BE OF CERTIFIED QUALITY.
06. BRIGHT BARS OF SAME Md CAN BE USED.
07. MATERIAL: SA105 / BS970Gr080M40 (EN8).

DRAFT

STANDARD

REV	DATE	ALTERED / APPROVED
01		

BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI, 600 017

	NAME	SIGN	DATE
DRN	R.ANANTH		09.04.2009
CHD	R.ANANTH		09.04.2009
APPD	M.N.VASUDEVAN		09.04.2009

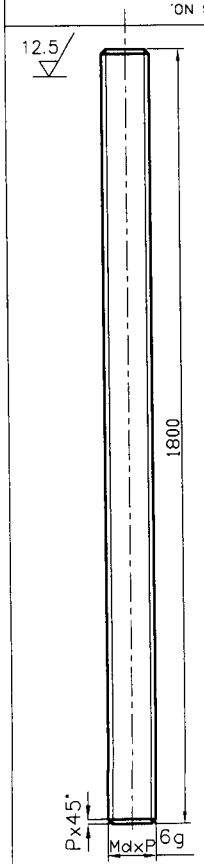
DEPT. / CODE	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	REF.TO ASSY / OLD DRG.
	C/M/F	N.T.S.	1.960	

TITLE	CARD CODE	DRAWING No.	REV
TIE ROD (Fully Threaded)	U 01	3-80-999-97745	00

SIZE A3

FIRST ANGLE PROJECTION (ALL DIMENSION IN MILLIMETRES)

DRAWING NO. 3-80-999-97783



VAR No.	MdxP 6g	MATERIAL CODE	WEIGHT kg.	OP.LOAD kg.	HYD.LOAD kg.	
01	M48x5	15 039 142 0000	25.500	10000	18000	
02	M56x4	15 039 143 0000	35.000	16000	28800	
03	M64x4	15 039 144 0000	45.500	20500	36900	

NOTES:

01. THREADS SHALL BE AS PER IS4218 & IS1367.
02. TIE ROD SHALL BE ELECTRO-GALVANISED TO A DEPTH OF 15 MICRONS & YELLOW CHROMOTISED.
03. TIE ROD SHALL BE PROTECTED SUITABLY TO AVOID DAMAGE OF THREADING, DURING HANDLING, STORAGE, TRANSIT, ETC.
04. TIE RODS SHALL BE STRAIGHT WITHIN 4mm.
05. TIE ROD MATERIAL SHALL BE OF CERTIFIED QUALITY.
06. BRIGHT BARS OF SAME Md CAN BE USED.
07. MATERIAL: SA105 / BS970Gr080M40 (EN8).

STANDARD

BHARAT HEAVY ELECTRICALS LTD., PIPING CENTRE, CHENNAI, 600 017

	NAME	SIGN	DATE
DRN	R.ANANTH		12.04.2010
CHD	R.ANANTH		12.04.2010
APPD	M.N.VASUDEVAN		12.04.2010

REV	DATE	ALTERED / APPROVED
01		

DEPT. / CODE	GRADE OF UN TOL. DIM	SCALE	WEIGHT (Kg).	REF.TO ASSY / OLD DRG.
	C/M/F	N.T.S.		

TITLE: TIE ROD L1800 (Fully Threaded)

CARD CODE: U 01

DRAWING No.: 3-80-999-97783

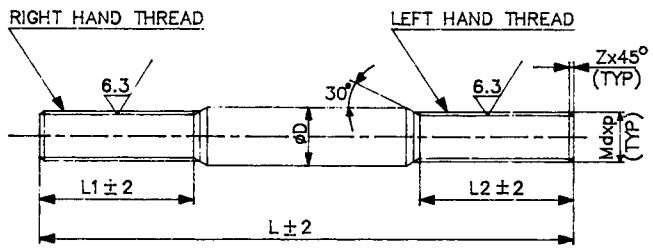
REV: 00

SIZE A3

DRAWING NO. 3-80-999-99333

ALL DIMENSION

6.3



VAR NO.	Md x p	øD	Z	L 1	L 2	DESCRIPTION	MATERIAL CODE	BIN CODE	UNIT WT. kg
13	M85x4	100	4.0	240	320	Rod ø100; L= 650	15–039– 134		29.010
12	M72x4	80	4.0	240	320	Rod ø80; L= 650	15–039– 144		20.190
11	M68x4	80	4.0	200	270	Rod ø80; L= 550	15–039–144		15.570
10	M64x4	80	4.0	200	270	Rod ø80; L= 550	15–039– 144		14.060
09	M56x4	60	4.0	200	270	Rod ø60; L= 550	15–039– 380		10.050
08	M48x5	50	5.0	160	220	Rod ø50; L= 450	15–039–142		5.790
07	M42x4.5	50	4.5	160	220	Rod ø50; L= 450	15–039–142		4.650
06	M36x4	40	4.0	120	190	Rod ø40; L= 350	15–039–141		2.530
05	M30x3.5	32	3.5	120	190	Rod ø32; L= 350	15–039–140		1.740
04	M24x3	25	3.0	120	190	Rod ø25; L= 350	15–039– 139		1.080
03	M20x2.5	22	2.5	80	130	Rod ø22; L= 250	15–004–022		0.560
02	M16x2	22	2.0	80	130	Rod ø22; L= 250	15–004–022		0.410
01	M12x1.75	16	1.75	80	130	Rod ø16; L= 250	15–004–106		0.230

NOTES:–

1. THREADS SHALL BE AS PER IS4218 AND IS1367.
2. THREADED PORTION SHALL BE ELECTRO–GALVANISED TO A THICKNESS OF 15 μm AND YELLOW CHROMOTISED.
3. MATERIAL:
   a) FOR RODS UPTO ø22mm
   (BMC 20) IS: 2062 - Fe 410 WA. (61)
   b) FOR RODS ø25mm AND ABOVE
   SA 105.
   c) ALL MATERIAL WILL BE OF CERTIFIED QUALITY.
4. THE TOLERANCE CLASS FOR THE THREADS SHALL BE OF 6g.
5. THREADED PORTION SHALL BE PROTECTED SUITABLY TO AVOID DAMAGES IN HANDLING.
6. TIE ROD SHALL BE STRAIGHT WITHIN THE FOLLOWING LIMIT:–
   OUT OF STRAIGHTNESS (Maximum) = (0.0025xL) + 0.05mm.

REV	DATE	ALTERED	CHECKED
01	13/12/95		

MATERIAL FOR RODS UPTO ø22mm CHANGED FROM I S 226 Fe 410S TO IS 2062 Fe 410 WA.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: STANDARD

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI–620014.

	NAME	SIGN	DATE	NO. OF VAR.
DRN	A MIAN		18.10.89	
CHD	R ANANTH		20.10.89	
APPD	S J KUMAR		22.10.89	

DEPT / CODE	GRADE OF UNTOL DIM C / M / F	SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.	ITEM NO.	NO. OF ITEMS
		N T S				

TITLE: TIE ROD L/R

CARD CODE: U 01

DRAWING NO. 3-80-999-99333 01