

**TITLE**

4 X 270 MW BHADRADRI TPS
TECHNICAL SPECIFICATION FOR
CW/RW/PW CHLORINATION PLANT

SPECIFICATION NO.

PE-TS-411-174A-A001

VOLUME: II B

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SECTION C1 – F

DATASHEET A



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DATASHEET A FOR GAS CHLORINATION PLANT

SL NO.	PARTICULARS	DESCRIPTIONS
1.0	CAPACITY OF PLANT	CW CHLORINATION: 6 NOS @ 185KG. /HR. FOR CW CHLORINATION PLANT (3 NOS @ 185 KG. /HR (2 WORKING+ 1 STANDBY FOR UNIT I & II & 3 NOS @ 185 KG. /HR (2 WORKING+ 1 STANDBY FOR UNIT III & IV) RW CHLORINATION: 3 NOS @ 10 KG. /HR. (2 WORKING+ 1 STANDBY) FOR RW CHLORINATION. PW CHLORINATION: 2 NOS @ 100 GMS. /HR. (1 WORKING+ 1 STANDBY) FOR PW CHLORINATION.
2.0	DOSING	
2.1	Continuous	1 ppm for CW chlorination, 3 ppm for RW chlorination plant & 1 ppm for Potable water.
2.2	Shock	5 ppm 1/2 hr every 8 hrs. for CW chlorination and NIL for RW chlorination.
3.0	TON CONTAINER	
3.1	Type	Ton container
3.2	Nos.	Total (66) nos. (Thirty (30) [8 connected+ 22 stand by] for CW chlorination for unit I & II and Thirty (30) [8 connected+ 22 stand by] for CW chlorination for unit III & IV) and six (6) [4 connected+ 2 stand by] for RW chlorination
3.3	Capacity	Not less than 900 Kg.
3.4	Size	
3.4.1	Overall length	2600 mm (approx.)
3.4.2	Diameter	760 mm (approx.)
3.4.3	Test pressure	40 kg/cm ² (g)
3.4.4	Design code	ASME Sec VIII/BS-1500 Pt-1-1958
3.5	Material of construction	ASTM-A-285 Gr.C /ASTM A 512 Gr. 70.
3.6	Design pressure	25 Kg./Cm ² (g)
3.7	Radiography	100 %
3.8	Heat treatment	Fully stress relieved
3.9	Corrosion allowance	1.5 mm (minimum).
3.10	Mounting	Each Chlorine container mounted on two nos. metallic brackets, each provided with two roller supports. These brackets will be mounted on civil foundation and all necessary anchor bolts, inserts, nuts etc.
3.11	Applicable code	Design, fabrication and testing to conform to the regulations of Chief Controller of Explosive. Govt. of India / Chlorination Institute, U.S.A.
3.12	Container Valves	One set for each container as per IS-3224 & BS-341 or approved equivalent.
4.0	CHLORINE EVAPORATOR	
4.1	Numbers and Capacity	One for each chlorinator (Total = 6 nos) @ 185 Kg. /Hr for CW Chlorination only. (3 Nos @ 185 Kg. /Hr (2 working+ 1 standby for unit I & II & 3 Nos @ 185 Kg. /Hr (2 working+ 1 standby for unit III & IV)
4.2	Type	Electrically heated constant temperature water bath type.
4.3	Location	Indoor
4.4	Accuracy	± 2%
4.5	Materials of construction	


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4.5.1	Vaporiser body	Seamless steel tubes as per ASTM A-106 Gr.B.
4.5.2	Flanges	IS 2002 Gr.B plates /ASTM 515 Gr 70
4.5.3	Corrosion allowance	Min. 3mm.
4.5.4	Welding radiograph	100 %
4.5.5	Stress relieved	Yes
4.5.6	Code of fabrication	ASME Sec.VIII Div.I or IS 2825.
4.6	Hydraulic test pressure	40 Kg. /cm ² (g) for leak tightness.
4.7	Special features	Evaporator shall provide some degree of super heat to present some mist in the downstream side. Each evaporator shall be sized with amply safety factor to allow for partial filling of the chlorine chamber with junk.
4.8	Accessories	
4.8.1	Rupture Disc	
4.8.1.1	Number	One (1) for each Evaporator.
4.8.1.2	Type	Bellow/Diaphragm type with local facility for adjustment of set point.
4.8.1.3	Material of construction	Body – Silver coated Carbon Steel/Monel.
4.8.2	Expansion Chamber	
4.8.2.1	Number	One (1) for each Evaporator complete with pipe works, unions, isolation valve, nuts and bolts, support brackets and all other accessories.
4.8.2.2	Material of construction	Carbon Steel body with 100% radiography.
4.8.2.3	Body Test Pressure	40 Kg/cm ² (g).
4.8.3	Heating Element	Immersion type, 3-Phase, 415 V, 50 Hz as per IS 4158.
4.8.4	Pressure Relief Valve	
4.8.4.1	Number	One (1) for each stream.
4.8.4.2	Type	Spring Loaded type and provided with Rubber Disc for protection from chlorine gas.
4.8.4.3	Vent Line	The chlorine gas vented from Pressure Relief Valve, shall be led to a Caustic Soda Soak Pit through PVC pipe.
4.8.4.4	Material of construction	Body - Carbon Steel as per ASTM A 105. Diaphragm - PTFE. Trim - Monel.
4.8.4.5	Body Test Pressure	40 Kg/cm ² .
4.8.5	Electrically interlocked shut-off valve at the gas discharge line from Evaporator	Shall be provided by bidder.
4.8.6	Cathodic protection system	Shall be provided to protect Water Bath and outside of Evaporator.
4.8.7	One (1) no. Control Cubicle complete with necessary contactors, fuses, push buttons, indication lamps, ammeters and other instruments for each Evaporator	Shall be provided by bidder.
5.0	CHLORINE GAS STRAINERS	
5.1	Number	Two (2) for each Chlorinator (1W+1S).
5.2	Capacity	100 % for each Chlorinator.
6.0	PRESSURE REGULATING VALVE	
6.1	Number	One (1) for each stream.
6.2	Material of construction	



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6.2.1	Body	Carbon Steel as per ASTM A 105.
6.2.2	Diaphragm	PTFE.
6.2.3	Trim	Monel.
6.3	Size	Suitable
6.4	Spring range	0-8 Kg/cm ² .
6.5	Body Test Pressure	40 Kg/cm ² .
7.0	CHLORINATOR	
7.1	Nos and Capacity	6 NOS @ 185 KG. /HR. FOR CW CHLORINATION PLANT (3 NOS @ 185 KG. /HR (2 WORKING+ 1 STANDBY FOR UNIT I & II & 3 NOS @ 185 KG. /HR (2 WORKING+ 1 STANDBY FOR UNIT III & IV) AND 3 NOS @ 10 KG. /HR. (2 WORKING+ 1 STANDBY) FOR RW CHLORINATION
7.2	Type	Vacuum solution feed type. The chlorinator shall be of fibreglass, self-coloured, resistant to corrosion by chlorine gas & chlorinated water solution.
7.3	Location	Indoor
7.4	Chlorine feed rate adjuster (manual)	Shall be provided.
7.5	EJECTOR	
7.5.1	Number	One for each chlorinator.
7.5.2	Material	CI to IS 210 Gr 260 with FRP/RL inside. The injector shall include ebonite jet. The throat studs shall be of SS-316 & gasket shall be of rubber.
7.6	MATERIAL OF CONSTRUCTION OF MAJOR COMPONENTS:	
7.6.1	Pressure vacuum regulator	
7.6.1.1	Body	PVC
7.6.1.2	Diaphragm	Teflon
7.6.1.3	Plug	Silver
7.6.2	Feed rate adjuster	
7.6.2.1	Plug	Silver
7.6.2.2	Seat	Silver
7.6.3	Injector	
7.6.3.1	Body	Mild steel rubber lined
7.6.3.2	Nozzle	Solid ebonite
7.6.4	Chlorine gas pressure piping	Schedule 80 Seamless steel
7.6.5	Chlorine gas vacuum piping	PVC
7.6.6	Cabinet	Fibre glass moulded design, steel framed with chlorinated rubber paint.
7.6.7	Filter	ASTM A 106 B Seamless , Sch. 80
8.0	WATER BOOSTER PUMPS:	
8.1	Nos.	Nine nos. (3 NOS. (2 WORKING+ 1 STANDBY FOR UNIT I & II & 3 NOS (2 WORKING+ 1 STANDBY FOR UNIT III & IV) AND 3 NOS (2 WORKING+ 1 STANDBY) FOR RW CHLORINATION.
8.2	Capacity	To suit the requirement of each chlorinator.
8.3	Type of pump	Horizontal, Centrifugal
8.4	Type of casing	Radial split.
8.5	Type of impeller	Semi open or open.
8.6	Location	Indoor
8.7	Material of construction:	
8.7.1	Casing	CI as per IS-210 FG 260



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8.7.2	Shaft	CS to EN8, BS 970
8.7.3	Impeller	Bronze, IS-318 or SS 316.
8.8	Casing & impeller type	End suction top discharge & closed impeller.
8.9	Range of operation	From 30 % to 120 % of rated capacity.
8.10	Design standard	IS-1520 and IS-5659.
8.11	Rated speed	3000 rpm (max.)
8.12	Noise level for pump	85 db at a distance of 1.0 M
8.13	Service temperature	60 Deg C.
8.14	Range of operation	30-120%.
8.15	Suction Condition	Shall be finalised during detailed engineering.
8.16	Suction Strainer	Two Nos. (2X100 %).
9.0	CHLORINATED WATER DIFFUSER AND MIXING SYSTEM	
9.1	Location for injection of chlorinated water	CW forebay and at each CW Pump pit for CW Chlorination and stilling chamber for RW Chlorination.
9.2	Device for injection of chlorinated water	Diffusers.
9.3	Location of diffusers	Well below minimum water level.
9.4	Material of construction	Rubber Lined Perforated Steel Tubes /Polypropylene Diffusers/HDPE/equivalent.
10.0	SAFETY & SUPERVISORY INSTRUMENTS:	
10.1	Gas Mask and Oxygen Breathing equipment along with Breathing Apparatus	
10.1.1	Number	Six (6). Sets.
10.1.2	Capacity	One (1) hour minimum.
10.1.3	Accessories to be provided	Four sets of Full mask, full vision face pieces, Protective clothing valves and all other accessories as required.
10.2	Canister Type Breathing Apparatus	
10.2.1	Number	Six (6).nos.
10.2.2	Type	The moisture content from exhaled air of the User should react with granular chemical in Breathing Apparatus and liberates oxygen. The released Oxygen should enter a breathing bag from which the User can inhale.
10.3	Ammonia bottles	
10.3.1	Number	Twelve (12) nos.
10.3.2	Capacity	500 ml each.
10.3.3	Accessories to be provided	Filled up with commercial grade ammonia solution (26 deg. Be) to detect leakage of chlorine.
10.4	Moisture Absorbing Breathing Bottles	
10.4.1	Number	One (1) no. for each Chlorine Ton-Container.
10.4.2	Capacity	Two (2) litres silica gel for each bottle.
10.4.3	Type	The moisture absorber shall be fitted to the connection pipe to the Chlorine Ton-Container, as soon as the container detached from the system. The breather shall absorb the moisture and allow dry air in the system to prevent corrosion of pipes and system.
10.4.4	Material of construction	Glass body.
10.5	Chlorine Residual Test Kit	
10.5.1	Number	Six (6) nos.
10.5.2	Type	Colorimetric Test Comparator
10.5.3	Range	One 0 to 0.5 ppm in steps of 0.05 ppm and second 0.5 to 6 ppm in steps of 0.5 ppm.



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10.6	Chlorine Leak Detector			
10.6.1	Number	1 no. for each set of connected tonner + 2 nos. in tonner room + 1 no. in chlorinator evaporator room hence total 5 nos. Chlorine Leak Detector with Four sensors probe for each CW chlorination system 1 no. for each set of connected tonner + 1 no. for non-connected tonners + 1 no. in chlorinator evaporator room hence total 4 nos. Chlorine Leak Detector with two sensors probe for RW chlorination. 1 no. Chlorine Leak Detector with two sensors probe for potable water chlorination system.		
10.6.2	Type	Electronic type.		
10.6.3	Alarm	Shall be provided in case of leakage of Chlorine.		
10.6.4	Interlock	Shall be provided.		
10.7	Emergency Kit			
10.7.1	Number	Six (6) nos.		
10.7.2	Accessories to be provided	All accessories shall be provided to seal off Chlorine Ton-Containers.		
10.8	Weather Cock			
10.8.1	Number	Three (3) nos.		
11.0	Instrumentation	As per P&I enclosed and system requirement.		
12.0	PIPING:			
12.1	Chlorine liquid handling pipe:			
	i)Material:			
	a) Tubing	Annealed Cu as per ASTM B 88 Cadmium plated of type 'K'.		
	b) Nipple	Silver coated Cu nipple.		
	ii)Hydro test pressure for tubing	40 Kg/cm2 (g).		
12.2	Pipe handling chlorine:			
	MATERIAL OF CONSTRUCTION:	DRY CHLORINE	LIQUID CHLORINE	DRY CHLORINE GAS UNDER PRESSURE
12.2.1	PIPE	CARBON STEEL TO ASTM A 106 GR B SEAMLESS SCH. 80.		CHLORINATE D WATER SERVICE.
12.2.2	FITTINGS	CARBON STEEL ASTM A 105 GR I, 2000 RATING.		PVC
12.2.3	FLANGES	CARBON STEEL TO ASTM A 181 GRI, CLASS 300.		--
12.3	GAS / LIQUID CHLORINE LINES:			
12.3.1	Globe valve:			
12.3.1.1	Body	Forged steel ASTM A-105 /ASTM A215 WCB		
12.3.1.2	Stem	Hastelloy C/Monel ASTM B164 / ASTM A4 M-35-1 or M-35-2/ ASTM A 216 type		
12.3.1.3	Seat	Monal as per ASTM B164 /ASTMA494 M-35-1- or M-35-2/ TEFLON / PTFE.		
12.3.1.4	PACKING	PTFE impregnated asbestos/TEFLON		
12.3.1.5	FITTINGS	Flanged to ANSI B 16.5 class 150		
12.3.1.6	DESIGN code	IS- 3224		
12.3.2	b) BALL VALVE:			
12.3.2.1	Design code	IS-3224		
12.3.2.2	Body	ASTM A 216 WCB / Equivalent		
12.3.2.3	Ball	Hastalloy 'C'		



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12.3.2.4	Stem	ASTM A 216 type 316 /Monel as per ASTM B164 /ASTM A 494 M-35-1- or M-35-2.
13.4	WATER SERVICE:	
12.4.1	GLOBE VALVE:	
12.4.1.1	Design Code	IS- 780 PN - 1
12.4.1.2	Body	IS 210 FG 260
12.4.1.3	Trim	As recommended by IS-780
12.4.1.4	Fittings Flanged:	ANSI B16.5 Class 150
12.4.2	GATE VALVE:	
12.4.2.1	Body	IS-210 FG 260
12.4.2.2	Steam	IS-780 PN-1
12.4.2.3	Seat ring	IS-780 PN-1
12.4.2.4	Fittings	Flanged ANSI B 16.5 class 150
12.4.3	NON RETURN VALVE:	
12.4.3.1	Design code	IS-5312 Pt I
12.4.3.2	Body	IS-210 FG 260
12.4.3.3	Disc	IS-5312 Pt I.
13.0	CHLORINE ABSORPTION SYSTEM (2 NOS. FOR CW & 1 NO. FOR RW CHLORINATION):	
13.1	Type/Location	Packed counter-current absorption system/Out door.
13.2	Capacity to tonner max.	900 kg of chlorine
13.3	Designed for leak rate at any time	One tonner at one time
13.4	Absorption capacity of absorbent for one filling	About 900 kg of chlorine in one hour +20%.
13.5	CAUSTIC SOLUTION PREPARATION CUM RECIRCULATION TANK:	
13.5.1	Numbers	Three (3) nos. (One (1) for CW Chlorination for unit I & II and One (1) for each CW Chlorination for unit III & IV) and One no. for RW Chlorination Plant.
13.5.2	Type	Vertical cylindrical with flat bottom.
13.5.3	Type of fluid to be handled	20% w/w (maximum) caustic solution.
13.5.4	Effective capacity, in m3	Adequate for absorption of chlorine leaked from one (1) nos. completely filled Chlorine Ton Containers plus 20% margin.
13.5.5	Minimum Free Board, in mm	300.
13.5.6	Capacity	Adequate to absorb one (1) nos. completely leaked tonner + 20% margin in addition the freeboard.
13.5.7	Design Pressure, Kg/cm2.g	As per system requirement.
13.5.8	Material of Construction	Carbon-Steel as per IS 2062 or A 515 Gr. 70 with natural rubber lining (4.5mm thick rubber lining in 3 layers, each layer 1.5 mm thick). The lining shall be of rubber having a hardness of 65 ±5 shore -A meeting the requirements of IS:4682 ,Part-I Dissolving basket MOC –SS: 316.
13.5.9	Agitator along with drive motor and other accessories	Agitator shall be motor driven through reduction gear. All wetted parts of the agitator shall be of SS-316 construction.
13.5.10	Instruments	As per system requirement.
13.6	BLOWERS:	
13.6.1	Number	Six nos. Two (2) [1W+1S] for each absorption system.
13.6.2.	Location	Outdoor.
13.6.3	Fluid to be handled	Chlorine Gas leaked from Chlorine Ton Container.
13.6.4	Service	To transfer with Chlorine Gas leaked from Chlorine Ton Container to Chlorine Absorption Tower.
13.6.5	Duty	Intermittent.
13.6.6	Type of Blower	Centrifugal.



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13.6.7	Type of Impeller	Fan Blade.
13.6.8	Service temperature, in °C	60 maximum.
13.6.9	Rated Capacity	Adequate for absorption of chlorine leaked from one (1) no. completely filled Chlorine Ton Container, within one hour (maximum).
13.6.10	Head to be developed at rated capacity	As per system requirement and shall be decided during detailed engineering.
13.6.11	Material of construction	
13.6.11.1	Casing	MS-FRP or MS-RL or equivalent.
13.6.11.2	Impeller	MS-FRP or MS-RL or equivalent.
13.6.12	Type of drive	Electrical Motor
13.6.13	Rated speed (RPM)	1500 (Sync.) maximum.
13.7	CHLORINE GAS DUCT:	
13.7.1	Material of construction	FRP-NP-6-Class
13.7.1	Purpose	All working and non-working tonners shall be connected to the chlorine leak absorption system through FRP duct.
13.7.2	Nature of fluid	Mixture of Cl ₂ gas and air
13.7.3	Pressure rating	Suitable
13.8	ABSORBENT:	
13.8.1	Chemicals	Sodium hydroxide and OR Sodium Thiosulphate
13.8.2	Concentration	NaOH, Na ₂ S ₂ O ₃ / 20%
13.9	RECIRCULATION PUMP FOR CAUSTIC SOLUTION:	
13.9.1	Type	Centrifugal
13.9.2	Fluid handled	20% w/w (maximum) caustic solution.
13.9.3	Location	Outdoor.
13.9.4	Service	To absorb chlorine leaked from Chlorine Ton Containers.
13.9.5	Duty	Intermittent and to be suitable for parallel operation.
13.9.6	Type of Pump	Horizontal Centrifugal Non Clog type
13.9.7	Design standard	As per IS-5659 & IS-5120.
13.9.8	Service temperature, in Deg C.	80 maximum.
13.9.9	Rated Capacity, in m ³ /hr	Suitable for absorption of chlorine leaked from one completely filled Chlorine Ton Container, within one hour (maximum) plus 20% margin.
13.9.10	Range of operation	20 % - 120 %.
13.9.11	Head to be developed at rated capacity	Each pump to have adequate head to meet the requirements of chlorine absorption system (C should be considered as 120 to calculate the frictional loss in pipe as per Hazen Williams Equation).
13.9.12	Material of construction	
13.9.12.1	Casing	Polypropylene
13.9.12.2	Impeller	Polypropylene.
13.9.12.3	Shaft	EN-8 to BS-970.
13.9.12.4	Type of drive	Electrical Motor
13.9.13	Rated speed (RPM)	1500 (Sync.) maximum.
13.9.14	Number	Six nos. Two (2) [1W+1S] for each absorption system.
13.10	VENTILATION FANS	
13.10.1	Number	As per system requirement.
13.10.2	Description for each Fan	
13.10.2.1	Location	Indoor (At chlorinator room).
13.10.2.2	Fluid to be handled	Ambient Air inside the Chlorine Ton Container Storage Room considering 30 air exchanges per hour.



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13.10.2.3	Type	Bifurcated type.
13.10.2.4	Rated Capacity	As per system requirement.
13.10.2.5	Head to be developed at rated capacity	As per system requirement.
13.10.3	Material of construction	Polypropylene or FRP.
13.10.4	Type of drive	Electrical Motor
13.10.5	Rated speed (RPM)	1500 (Sync.) maximum.
13.11	CHLORINE ABSORPTION TOWER	
13.11.1	Numbers To be provided	Three (3) nos. One (1) no. for each absorption system.
13.11.2	Type	Vertical Cylindrical Packed Absorption Tower. The Absorption Tower shall be mounted on the Caustic Solution Preparation cum Recirculation Tank (described hereinafter).
13.11.3	Type of fluid to be handled	20% w/w (maximum) caustic solution and chlorine gas.
13.11.4	Rated Absorption Capacity, kg of chlorine/hr	Adequate for absorption of chlorine leaked from one (1) no. completely filled Chlorine Ton Container within one hour (maximum).
13.11.5	Caustic Flow Rate, m3/hr	Adequate for absorption of chlorine leaked from one (1) no. Completely filled Chlorine Ton Container within one hour (maximum).
13.11.6	Cl ₂ content at outlet of Chlorine Absorption Tower	Free residual chlorine shall not be more than 0.1 ppm.
13.11.7	Size	As per system requirement and shall be decided during detailed engineering.
13.11.8	Material of Construction	FRP
13.11.9	Fill	Polypropylene Raschig/Pall rings along with baffle plates to keep entrainment loss less than 0.1% of circulating liquid flow rate.
13.11.10	Instruments	As per system requirement.
13.11.11	Location	The absorber shall be mounted on the caustic solution preparation-cum-recirculation tank.
14.0	TONERS STORAGE AREA	
15.0	LIFTING AND HANDLING DEVICES	
15.1	Monorail hoist	
15.1.1	Number	Three (3) nos.
15.1.2	Type	Electrically operated.
15.1.3	Duty	To handle Chlorine Ton-Container.
15.1.4	Safe working load	3000 kg maximum.
15.2	Weighting Scale	
15.2.1	Number	Three (3) nos.
15.2.2	Type	Portable Platform Type Weighing Scale with electronic display.
15.2.3	Duty	To handle Chlorine Ton-Container.
15.2.4	Range	0 – 3000 kg.
16.0	Chlorine solution	2000 ppm.
17.0	Portable residual chlorine analyser for station	3 nos.
18.0	POTABLE WATER CHLORINATION	
18.1	Cylinder Mounted Chlorinator	
18.1.1	Capacity	100 Gms. / hr
18.1.2	Number	2nos.(1W +1 SB)



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18.2	Chlorine cylinder for PW chlorination	Two (2) no. (1W+1S), 100 Kg each
18.3	Injector	
18.3.1	Injector Number	One for each Cylinder Mounted Chlorinator.
18.3.2	Injector Material	CI to IS 210 Gr 260 with FRP/RL inside. The injector shall include ebonite jet. The throat studs shall be of SS-316 & gasket shall be of rubber.
18.4	Booster Pumps for PW chlorination	
18.4.1	Nos.	Two nos. (1 working+ 1 standby) for PW chlorination.
18.4.2	Capacity	To suit the requirement of each PW chlorination.
18.4.3	Type of pump	Horizontal, Centrifugal
18.4.4	Type of casing	As per manufacturer standard
18.4.5	Type of impeller	Semi open or open.
18.4.6	Location	Indoor
18.4.7	Material of construction:	
18.4.7.1	Casing	CI as per IS-210 FG 260
18.4.7.2	Shaft	CS to EN8, BS 970
18.4.7.3	Impeller	Bronze, IS-318 or SS 316.
18.4.7.4	Casing & impeller type	End suction top discharge & closed impeller.
18.4.7.5	Range of operation	From 30 % to 120 % of rated capacity.
18.4.7.6	Design standard	IS-1520 and IS-5659.
18.4.7.7	Rated speed	3000 rpm (max.)
18.4.7.8	Noise level for pump	85 db at a distance of 1.0 M
18.4.7.9	Service temperature	60 Deg C.
18.5	Diffuser and Dosing Location	
18.5.1	Quantity and size	1 no. and as per system requirement
18.5.2	Location for injection of chlorinated water	Potable water pump discharge line
18.5.3	Material of construction of diffuser	Rubber Lined Perforated Steel Tubes /Polypropylene Diffusers/HDPE/equivalent.
18.6	Working Pressure of Potable water pump (in BHEL scope)	5.2 kg/cm2(g)

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A) DATASHEET OF ELECTRIC HOIST:

Sl.no	DESCRIPTION	TECHNICAL PARTICULARS
1.0	Type	Steel wire electric hoist with electrically operated trolley
2.0	Scope (Qty., Capacity, Lift, Travel Length)	As per specification and layout requirement
3.0	Type of service	Indoor
4.0	Overload test	125% of SWL
5.0	Design Ambient temperature	50° C
6.0	General Design	As per IS: 3938 / 1983 or latest, Class-II duty
7.0	Operating speed	
7.1	Hoisting speed	3 MPM.
7.2	Trolley speed	15 MPM
8.0	Type of transmission	Through Electric motor and gear box.
9.0	Wire Rope	
9.1	Construction / core	6 x36/ 6X37 (Steel core)
9.2	Code	IS:2266
9.3	Number of falls	Min. 4
9.4	Factor of safety	Not less than 5
10.0	Load Hook and block	NORMALISED HOOK ONLY
10.1	Type of load hook	Plain shank trapezoidal section with safety latch.
10.2	Load hook Code	IS: 15560
10.3	Load hook Material	As per IS:15560
10.4	Hook suspension	Thrust bearing
10.5	Material of block suspension	Fabricated from steel plate, Material: IS: 2062
11.0	Gearing	
11.1	Type	Spur / Helical
11.2	Gear/ pinion material	as per IS 3938
11.3	Lubrication	Oil splash/ grease lubricated
11.4	Bearing type	Antifriction Ball / Roller
12.0	Trolley drive	

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12.1	Wheel	Single flange taper thread
12.2	Wheel conform to (Std. / code)	IS: 3938
12.3	Wheel material	As per IS:3938
12.4	Bearing type	Antifriction Ball / Roller
12.5	Trolley type	Rolled structural steel with side plates extended beyond wheel flanges to protect wheels.
12.6	Hardness	Max hardness 200 BHN
13.0	SHEAVE	
13.1	Material	Fabricated from steel plate. IS: 2062 Gr. A or Gr. B / as per IS: 3938
13.2	Bearing type	Antifriction Ball / Roller.
14.0	BRAKE (HOIST and TROLLEY)	
14.1	Type	DC EM brakes disc type (fail to safe).
14.2	Capacity	As per IS 3938.
14.3	Number	One number for each motor.
15.0	ROPE DRUM	
15.1	Material	Cast iron, cast steel or mild steel.
15.2	Flange / Flangeless	Flanged
15.3	Type of groove	As per manufacturers standard to suit the layout requirement.(Shall be decided during detail engineering)
17.0	TYPE OF DSL	
17.1	CT travel	PVC Shrouded bus bar conductor type DSL
18.0	MOTORS	
18.1	Type	Sq. Cage induction, TEFC, S4 duty, 40% CDF.
18.2	Number of start	150 starts / hr
18.3	Voltage , Phase and Frequency	415V $\pm$ 10%, 3 phase, 4 wire, 50 Hz
18.4	Class of insulation	Class "F" and temperature rise limited to class B.
18.5	Type of enclosure	TEFC



TITLE

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18.6	Degree of protection provided for enclosure	IP-54/IP-55 depending upon Indoor / Outdoor application	
18.7 R1	Margin	Motor rating will be calculated keeping margin of at least 15% over the maximum power requirement in the duty condition specified.	
19.0	LIMIT SWITCHES	Hoisting	Trolley
19.1	Type	Snap action, self actuating type	Lever type
20.0	Control panel	* Fabricated from Cold rolled sheet steel not less than 2.5mm for front & rear & 2mm for side, top & bottom portion with gland plate of 3mm thick. * Degree of protection shall be IP 54. * Power on indicating lamps shall be provided * Panel illumination lamps operated by door switch. * 2 nos earthing terminals on panel. * 20 % spares terminals (clip on type) shall be provided. * Power and control terminals (clip on type) shall be on separate channels. * Gland plate shall be double brass compression type.	
20.1	Qty	1 No.	
21.0	Pendent Push buttons	Up /down / forward / Reverse push buttons. Indicative marking for easy operation shall be provided.	
22.0	Power cables	FRLS / EPR flexible Cu cable / Aluminum cable	
23.0	Control cable	FRLS / EPR flexible Cu cable	
24.0	Control Voltage	110 V	
25.0	Painting	A) <u>Structural</u> Surface preparation : De greasing and Mechanical cleaning with wire brush or hand tool. (SA 1/ ST 2 / ST 3 as applicable) Primer : Red oxide Zinc phosphate (Alkyd medium)- 2 coat , DFT 35 µ per coat. Finish Coat : Synthetic enamel (Alkyd medium) as per IS: 2932- 2 coats, DFT 35 µ per coat. Total DFT : 140µ B) <u>Electrical /Control Panel</u> Surface preparation: Seven tank process Primer : Red Oxide Zinc phosphate (Alkyd medium)- 2 coat , Minimum DFT 35 µ per coat. Finish Coat : Synthetic enamel (Alkyd medium) as per IS: 2932- 2 coats, Minimum DFT 35 µ per coat. Total DFT : 140 µ	

B) MANUAL HOIST (CHAIN PULLEY BLOCK):



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DATA SHEET-A

1	Type	Chain pulley block with/without travelling trolley
2	General Design	IS: 3832
3	Duty Class as per IS:3832	Class –II
4	Hoisting Mechanism	
a)	Type	Hand operated gear transmission
b)	Type of gear	Spur / Helical
c)	Load Chain	
i)	Type	Link type
ii)	Material	T (8) as per IS: 6216
iii)	Conforms to (Std./Code)	IS: 6216
d)	Hand Chain	
i)	Type	Link type
ii)	Material	Mild steel Grade 30
iii)	Conform to Std.	IS:2429 (Part I)
e)	Load Hook & Hook Block	
i)	Type of load hook	Plain shank- Trapezoidal section
ii)	Load hooks conforms to	IS: 15560
iii)	Type of hook suspension	Swivelling type with lock
iv)	Type of make of bearing	Thrust ball bearing of hook suspension
v)	Type & Material of hook	Carbon steel/forged steel As per IS 15560
f)	Gears/ Pinion	
i)	Type	Spur
ii)	Material	Alloy steel / carbon steel
iii)	Type of Bearing	Antifriction ball bearing / Roller
h)	Sprockets:	
	Type of bearings used	Antifriction ball bearing / Roller
i)	Method of lubrication	
	Bearings	Grease
	Gearing & Pinions	Grease
	Sprockets	Grease
j)	Brakes	
	Type	Screw and friction disc type
5	Trolley and Bridge drive	
a)	Trolley	
i)	Type	Geared (Manually operated)
ii)	Material of frame	Mild steel (IS:2062 Grade A or B)
b)	Drive Chain	
i)	Type	Link type

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ii)	Material	Steel Gr.30 as per IS 2429 (part 1)
c)	Wheel	
i)	Number of pairs of wheel	Two in each trolley/bridge
ii)	Flange	Single flanged
iii)	Wheel material	Cast Iron Gr. FG 200 as per IS:210
iv)	Type of bearings need	Antifriction
d)	Gears	
i)	Type	Spur / helical
ii)	Material	EN8
iii)	Type of bearings used	Antifriction
e)	Method of lubrication for	
i)	Bearings	Grease
ii)	General	Grease
iii)	Sprockets	Grease
6	Painting	As per manufacturer standard