



TITLE: 2X660 MW ENNORE SEZ STPP	SPECIFICATION NO. PE-TS-412-155A-A001	
	SECTION : I	
	TECHNICAL SPECIFICATION FOR CONDENSATE POLISHING UNIT	
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DATASHEET – A

1.0	DESCRIPTION OF TURBO GENERATOR UNIT (TG) FOR WHICH CONDENSATE POLISHING IS TO BE PROVIDED :	
(i)	No. of units	Two (2)
(ii)	Capacity of each unit	660 MW
(iii)	Total flow in all working service vessels of each units	1548.8 Tons/hr (VWO, 1% Make Up condition) & 1581.5 Tons/hr (for All HP heaters out condition)
2.0	CONDENSATE POLISHER SERVICE VESSELS PER UNIT :	
(i)	No. of condensate polisher service vessel	Three (3X50%)
(ii)	Capacity of each condensate polisher service vessel	50% of total condensate flow per unit
(iii)	Flow through each condensate polisher service vessel per unit	790.75 Tones per hour
(iv)	Operating pressure of each condensate polisher service vessel	30 kg/cm ² (a)
(v)	Design pressure of each condensate polisher service vessel	47 kg/cm ² (a)
(vi)	Design code of each condensate polisher service vessel	ASME Sec VIII div 1 Ed-2010/ IS 2825 as applicable
(vii)	Working Temp.	55 °C
(viii)	Design temperature of service vessel, its internals and accessories	65 °C
(ix)	Type of vessels	Spherical
(x)	Material of construction	
	Shell	Carbon steel plates to SA 516 Gr. 70
(xi)	Inside protection	Inside lined with Natural Rubber [4.5 mm thick in (3) layers]
(xii)	Resin traps at the outlet of each condensate polisher service vessel & rinse outlet	SS-316 with SS 316 Internals
2.2	AIR-BLOWERS FOR RESIN MIXING (SERVICE VESSELS AREA) PER UNIT	
(i)	Number per unit	Two (2x100%)
(ii)	Type	Rotary, Centrifugal /Twin Lobe, oil free, positive displacement
(iii)	Duty	Intermittent
(iv)	Capacity and head	As required
(v)	Noise level	80 dB (A) Max. at one meter
(vi)	Pressure gauge	One per blower
(vii)	Location	Indoor
(viii)	Material of construction	Casing – Cast Iron GR FG 260 to IS 210 Lobe – Cast Iron GR FG 260 to IS 210 Shaft – Carbon Steel to EN 8
(ix)	Drive motor	Energy Efficiency Class IE-3 as per IS : 12615
3.0	EXTERNAL REGENERATION FACILITIES	
3.1	REGENERATION VESSELS	
a.	RESIN SEPARATION AND CATION RESIN REGENERATION VESSEL	
(i)	Number	One (1) no. vessel common for 2 x 660 MW Units
(ii)	Design Temperature	60°C
(iii)	Minimum Design Pressure	10 Kg/cm ² (g)
(iv)	Type	Vertical Cylindrical



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(v)	Material of construction	
	Shell	SA 516 Gr. 60 or 70 / SA 282 Gr. C
	Dished ends	SA 516 Gr. 60 or 70 / SA 282 Gr. C
(vi)	Inside protection	Inside lined with Natural Rubber [4.5 mm thick in (3) layers]
(vii)	Design code	ASME Sec VIII div 1 Ed-2010/ IS 2825 as applicable
b.	ANION RESIN REGENERATION VESSEL	
(i)	Number	One (1) no. vessel common for 2 x 660 MW Units
(ii)	Design Temperature	60°C
(iii)	Minimum Design Pressure	10 Kg/cm ² (g)
(iv)	Type	Vertical Cylindrical
(v)	Material of construction	
	Shell	SA 516 Gr. 60 or 70 / SA 282 Gr. C
	Dished ends	SA 516 Gr. 60 or 70 / SA 282 Gr. C
(vi)	Inside protection	Inside lined with Natural Rubber [4.5 mm thick in (3) layers]
(vii)	Design code	ASME Sec VIII div 1 Ed-2010/ IS 2825 as applicable
c.	MIXED RESIN STORAGE VESSEL	
(i)	Number	One (1) no. vessel common for 2 x 660 MW Units
(ii)	Design Temperature	60°C
(iii)	Minimum Design Pressure	10 Kg/cm ² (g)
(iv)	Type	Vertical Cylindrical
(v)	Material of construction	
	Shell	SA 516 Gr. 60 or 70 / SA 282 Gr. C
	Dished ends	SA 516 Gr. 60 or 70 / SA 282 Gr. C
(vi)	Inside protection	Inside lined with Natural Rubber [4.5 mm thick in (3) layers]
(vii)	Design code	ASME Sec VIII div 1 Ed-2010/ IS 2825 as applicable
d.	Resin traps at the common outlet header of regeneration vessels	SS with SS 316 Internals
e.	Accessories	Operating platforms, ladders, supports, lifting lugs (4 nos. minimum), handhold (1 no. of 150mm dia) & manhole (Minimum-2 nos. of 500mm dia) etc. For each vessel shall be provided.
	The vessels indicated against sr. no. a, b and c above is for reference only. Please note that number and type of regeneration vessels shall be as per supplier recommendation only.	
3.2	BULK ACID AND ALKALI STORAGE TANKS	
(i)	CHEMICAL TANKS	ACID STORAGE TANKS ALKALI STORAGE TANKS
(ii)	Number required	Two (2) Two (2)
(iii)	Design code	-----As per BS-2594 or equivalent-----
(iv)	Dimensions (diameter, length & thickness)	-----As per BS-2594 or equivalent-----
(v)	Location	-----Outdoor-----
(vi)	Useful capacity (each)	30 m ³ 20 m ³
(vii)	Type and Pressure class	-----Horizontal cylindrical with dished (torispherical) ends, atmospheric, above ground-----
(viii)	Material of construction	FRP -----Carbon steel (IS 2062 Gr A/B) with rubber lining inside -----



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(ix)	Protection – Inside	-----	4.5 mm thk rubber lining (in three layers 1.5 mm each)
(x)	Protection – Outside	-----	Chlorinated rubber paint DFT 500 microns.
(xi)	Concentration	30 -33 % HCl	48 % NaOH
(xii)	Accessories	Vent, overflow, Drain, fume absorber, CO2 absorber ,seal pot, sample connection ,spare connection ,Manhole etc.	
(xiii)	Pipe & flanges M.O.C.	CPVC Sch.40	
(xiv)	Valve M.O.C.	CPVC PN 10	
(xv)	Manhole, staircase, operating platforms	Provided	Provided
3.3	ACID AND ALKALI UNLOADING / TRANSFER PUMPS		
(i)	PUMPS	ACID UNLOADING /TRANSFER PUMPS	ALKALI UNLOADING /TRANSFER PUMPS
(ii)	Number required	Two (2x100%) nos. (1W+1S)	Two (2x100%) nos. (1W+1S)
(iii)	Type	-----Horizontal Centrifugal-----	
(iv)	Location	-----Outdoor-----	
(v)	Service	-----Intermittent-----	
(vi)	Pressure gauge	One per pump with Teflon diaphragm seal	
(vii)	Capacity and head	-----10 m3 / hr and 15 MWC (minimum)-----	
(viii)	Liquid to be handled	30 -33 % HCL	45-48% NaOH
(ix)	Material of construction		
	Casing	Polypropylene	Polypropylene
	Impeller	Polypropylene	Polypropylene
	Shaft	BS-970 Hardened Steel EN8	BS-970 Hardened Steel EN8
	Shaft Sleeves	Ceramic	Alloy 20
	Types of shaft sealing	Mechanical seal	Mechanical seal
(x)	Pump speed	1450 rpm	1450 rpm
(xi)	Drive motor	415V, 3Φ, 50 HZ TEFC, Energy Efficiency Class IE-3 as per IS : 12615	
(xii)	Accessories required	Coupling guard, drain plug, vent valve ,suction hoses, isolation valves, y- type strainers etc.	
(xiii)	Type of coupling between motor and pump	Flexible coupling	
(xiv)	Reinforced rubber house with coupling and isolation valve	One (1) No. of each application size 80NB, minimum 20 meter with isolation valve, Reinforced Chemical Resistant Rubber.	
(xv)	MOC for piping, valves & fittings in acid/alkali handling	For valve -CPVC PN10, For piping, flanges & fittings –CPVC Sch. 40	
3.4	CHEMICAL HANDLING, PREPARATION & DOSING SYSTEM		
a)	ALKALI TRANSFER CUM RECIRCULATION PUMPS WITH MOTOR		
(i)	Nos. required	Two (2x100%) (1 W+ 1 S)	
(ii)	Type	Horizontal, centrifugal	
(iii)	Service	Intermittent	
(iv)	Location	Outdoor	
(v)	Pressure gauge	One per pump with Teflon diaphragm seal	
(vi)	Maximum Pump Speed	1500 rpm	
(vii)	Type of Coupling between pump & motor drive	As per manufacturer’s standard practice	
(viii)	Type of Sealing	Mechanical Seal	



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(ix)	Type of Suction Strainer	Y- Type		
(x)	Concentration of working media.	5-48% Sodium Hydroxide (NaOH)		
(xi)	Capacity & head of each pump	10 m3/hr & Head as per system requirement		
(xii)	Suction condition	Flooded		
(xiii)	Materials of construction			
a.	Casing, impeller	Stainless Steel – 316		
b.	Shaft & shaft sleeve	Stainless Steel -410		
(xiv)	Drive motor	415V, 3Φ, 50 HZ TEFC, Energy Efficiency Class IE-3 as per IS : 12615		
(xv)	Accessories required	Coupling guard, drain plug, vent valve , isolation valves, etc.		
(xvi)	Type of coupling between motor and pump	Flexible coupling		
(xvii)	MOC for piping, valves & fittings in acid/alkali handling	For valve -CPVC PN10, For piping, flanges & fittings –CPVC Sch. 40		
b)	CHEMICAL TANKS	ALKALI MEASURING TANK	ALKALI PREPARATION TANK	ACID MEASURING TANK
(i)	Number required	One (1)	One (1)	Two (2)
(ii)	Type	-Vertical Cylindrical Atmospheric with dished bottom and cover at top -		
(iii)	Liquid to be handled	NaOH	NaOH	HCL
(iv)	Location	----- To be designed for outdoor duty -----		
(v)	Useful capacity (each tank)	Adequate to hold quantity of alkali required (48% NaOH) for single regeneration of a condensate polisher mixed bed with 20% overall margin.	2 m3	Adequate to hold quantity of acid required (30-33% HCL) for single regeneration of a condensate polisher mixed bed with 20% overall margin.
(vi)	Material (Shell, Dished end & top cover)	IS 2062 Gr A/B	IS 2062 Gr A/B	FRP
(vii)	Internal protection	-----Rubber lined & minimum 4.5 mm thick in three layers -----	-----Rubber lined & minimum 4.5 mm thick in three layers-----	Not Applicable
(viii)	External painting	-----Chlorinated Rubber Paint -----	-----Chlorinated Rubber Paint -----	Not Applicable
(ix)	Level indicator	Provided	Provided	Provided
(x)	Level transmitter per tank	One (1)	One (1)	One (1)
(xi)	Stirrer per tank	Slow speed stirrer driven by motor drive and reduction gear. Speed of stirrer = 200 RPM Max.	Slow speed stirrer driven by motor drive and reduction gear. Speed of stirrer = 200 RPM Max.	Not Applicable
(xii)	MOC of Agitator	SS – 316	SS – 316	Not Applicable
(xiii)	Drive motor of stirrer	Energy Efficiency Class IE-3 as per IS : 12615	Energy Efficiency Class IE-3 as per IS : 12615	Not Applicable



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(xiv)	Dissolving Basket	Provide (50-60 mesh B.S.)	Provide (50-60 mesh B.S.)	Not Applicable
(xv)	MOC of Basket	SS – 316	SS – 316	Not Applicable
(xvi)	Accessories	Fume absorbers, carbon dioxide absorber, vent, overflow, drain connection, overflow seal pot, sample connection, level transmitter, operating platform, ladders, lifting lugs (4 Nos. minimum), hand hole etc.		
c)	DOSING PUMPS	ACID DOSING PUMPS	ALKALI DOSING PUMPS	
(i)	Number	Two (2x100%) nos. (1 W+ 1 S)	Two (2x100%) nos. (1 W+ 1 S	
(ii)	Type	--Simplex positive displacement hydraulically operated diaphragm type---		
(iii)	Whether suction strainer required	----- Yes -----		
(iv)	Material of construction			
	Liquid End (Pump Head, Valves, Valve housing, valve spring etc.)	Polypropylene	SS-316	
	Diaphragm	-----PTFE-----		
	Packing	-----PTFE-----		
	Shaft	----- Hardened steel EN 8 (BS : 970)-----		
	Worm & worm wheel (if applicable)	-----Manganese Bronze -----		
	Connecting rod	-----Manganese Bronze -----		
	Cross head guide	-----Bronze -----		
(v)	Capacity & head	Capable of meeting regeneration one cation /Anion unit (with 20% margin); head as required (with 20% margin).		
(vi)	Accessories			
	Pressure/Pulsation Dampener	One per pump	One per pump	
	External safety relief valve (in addition to inbuilt safety valve)	Two (One per pump) MOC -Polypropylene	Two (One per pump) MOC- SS-316	
	MOC of safety relief valve	Poly propylene	SS-316	
(vii)	Pressure gauge	----- One per pump with Teflon diaphragm seal -----		
(viii)	Maximum pump stroke speed per minute	----- 100 -----		
(ix)	Accessories required for each pump	Coupling guard, drain plug, vent valve, isolation valves, Y-type strainers, pressure gauges, pulsation dampener etc.		
(x)	Drive motor of pump	The drive motor of each pump will be Energy Efficiency Class IE-3 as per IS : 12615		
d)	Density Meter	Acid	Alkali	
(i)	Number	One (1) at each mixing tee outlet	One (1) at each mixing tee outlet	
(ii)	Type	Density indicator (Hydrometer type)	Density indicator (Hydrometer type)	
(iii)	Indication	Local	Local	
(iv)	Location	Diluted Acid line	Diluted Alkali line	
e)	Non-Nucleonic (Vibration) Type Density Meter/transmitter	One (1) at each mixing tee outlet	One (1) at each mixing tee outlet	
f)	Flow Indicator			
(i)	Number	One in each DM water line	One in each DM water line	



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(ii)	Type	Rotameter	Rotameter
g)	Flow Switch or Flow Transmitter	One in each water line, vane actuated type or DP bellows type /As per P&ID	
3.5	ACTIVATED CARBON FILTER FOR ALKALI		
(i)	Number	One (1)	
(ii)	Type	Vertical cylindrical with dished end bottom	
(iii)	Design Pressure	Design pressure shall be the maximum expected pressure to which the vessel may be subjected plus 5% extra margin. Maximum expected pressure for vessels placed in the discharge line of pumps shall be based on the shut-off head of the pumps plus static head at pump suction or 10 kg/cm2(g) whichever is maximum	
(iv)	Capacity	10 m3/hr or Not less than the design capacity of alkali transfer cum recirculation pump	
(v)	Flow Velocity	12 m/hr (max)	
(vi)	Bed depth	1200mm activated carbon + 300 mm Gravel support	
(vii)	Pressure gauge	As per P&ID.	
(viii)	Number and Location	Two No. (One each at inlet and outlet of filter)	
(ix)	Seal	Teflon diaphragm	
(x)	Material of construction		
	Shell	Carbon steel plates to IS 2062 / SA 515 Gr. 60 or 70 / SA 516 Gr. 60 or 70.	
	Dish ends /Head	Carbon steel plates to IS 2002 Gr. 2A / SA 515 Gr. 60 or 70 / SA 516 Gr. 60 or 70.	
(xi)	Inside protection	Inside lined with Natural Rubber [4.5 mm thick in (3) layers]	
(xii)	Design code	ASME sec VIII div 1 ed.2010 / IS 2825 as applicable	
(xiii)	Influent Distributor Material	SS 316	
(xiv)	Manhole	Two (2) nos. minimum each of Davit type and 500 mm dia.	
(xv)	Sight Windows	One (1) no. in backwash space	
(xvi)	Hand hole	One (1) no. of 150 mm dia for removal of activated carbon	
(xvii)	Accessories	Operating platforms, ladders, supports, lifting lugs (4 nos. min) etc.	
3.6	ALKALI DILLUENT WATER HEATING TANK (HOT WATER TANK)		
(i)	Number	One (1)	
(ii)	Type/Capacity	Vertical Cylindrical with dished end with Electric heater / 120% of water required for regeneration.	
(iii)	Electric heater Qty.	2 nos. Electric heater (2X50%)	
(iv)	Temperature of alkali to be heated	To obtain temp. from 15 ^o C of 50 ^o C at alkali mixing feed out let within 5 hours.	
(v)	Design Pressure	Design pressure shall be the maximum expected pressure to which the vessel may be subjected plus 5% extra margin. Maximum expected pressure for vessels placed in the discharge line of pumps shall be based on the shut-off head of the pumps plus static head at pump suction or 10 kg/cm2 (g) whichever is maximum	
(vi)	Material of construction		
	Shell & dished end	SS-304 adequately insulated	
(vii)	Design code	ASME sec VIII div 1 ed.2010 / IS 2825 as applicable	
(viii)	Temperature gauge,	To be provided by the bidder (as per P&ID)	



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	Temp. transmitters	
(ix)	Burn out protection	To be provided by the bidder
(x)	Accessories	Manhole, vent, drain, sample connection, level transmitter, level gauges -2 nos. (minimum), operating platform, ladders, lifting lugs (4 Nos. minimum) etc.
3.7	CPU REGENERATION CUM RESIN TRANSFER PUMPS	
(i)	Number	Two (2x100%) nos. (1W+1S)
(ii)	Type	Horizontal, centrifugal
(iii)	Operation	Intermittent
(iv)	Liquid to be handled	DM Water
(v)	Capacity & head	As required (with 20% margin)
(vi)	Suction condition	Flooded
(vii)	Material of construction	
	• Casing & impeller	SS 316/ ASTM A 351 CF 8M
	• Shaft	SS 410
	• Wearing rings	As per manufacturer's Standard
	• Shaft sleeve material	SS 410
(viii)	Packing seal	Mechanical type
(ix)	Mechanical Seal	To be Provided by bidder
(x)	Pump Speed	Maximum 1500 rpm
(xi)	Pressure gauge	One for each pump with Teflon diaphragm seal
(xii)	Pressure dampener	One number per pump
(xiii)	Recirculation line with motor actuated butterfly valve	Provided
(xiv)	Accessories required for each pump	Coupling guard, drain plug, vent valve, isolation valves, Y-type strainers, pressure gauges, pulsation dampener
(xv)	Drive motor	The drive motor of each Pump will be Energy Efficiency Class IE-3 as per IS : 12615
3.8	AIR-BLOWERS FOR RESIN MIXING (REGENERATION AREA)	
(i)	Number	Two (2x100%)
(ii)	Type	Centrifugal/Twin lobe type, oil free, positive displacement
(iii)	Location	Indoor
(iv)	Duty	Intermittent
(v)	Capacity and head	As required
(vi)	Noise Level	80 dB (A) Max. at one meter
(vii)	Pressure gauge	One per blower
(viii)	Material of construction	Casing – Cast Iron GR FG 260 to IS 210 Lobe – Cast Iron GR FG 260 to IS 210 Shaft – Carbon Steel to EN 8
(ix)	Drive motor	The drive motor of each air blower will be Energy Efficiency Class IE-3 as per IS : 12615
4.0	NEUTRALISING SYSTEM	
4.1	NEUTRALIZATION PIT	
(i)	Number	One (1) no. Pit with two (2) compartments ,common for 2 x 660 MW Units
(ii)	Type	Necessary air grid arrangement of polypropylene construction shall be provided in each compartment for effective neutralization of the waste effluent for air agitation & venturi mixing
(iii)	Material of Construction	RCC with acid / alkali proof lining bricks
(iv)	No. of compartments	Two compartments
(v)	Capacity of each compartment	Adequate to hold 1.5 X quantity of waste effluent



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		generated during single regeneration of Condensate Polisher Mixed Beds + 1.2 X DM plant waste generation during RO-DM plant for one regeneration (170 M3)	
4.2	NEUTRALIZATION PIT DISPOSAL PUMPS		
(i)	Number	Two nos. (1 working + 1 Standby)	
(ii)	Type	Horizontal, Centrifugal Single stage with priming system	
(iii)	Capacity & head	One section of the neutralization pit in 2 hours (capacity not less than 80 m3/hr) & head as per system requirement.	
(iv)	Duty	Intermittent	
(v)	Number of priming chamber & tank	Two	
(vi)	Suction condition	Suction from priming chamber / submerged (suction from pit)	
(vii)	Pump Speed	1450 rpm	
(viii)	Drive motor	Induction motor 415V, 3 phase 50Hz, TEFC ; Energy Efficiency Class IE-3 as per IS : 12615	
(ix)	Suction condition	Negative, with priming chamber	
(x)	Material of Construction		
	Casing	2.5% Ni Cast Iron IS210 Gr. FG	
	Impeller	Stainless Steel CF 8M	
	Shaft	SS-304/SS-316/SS-410	
	Shaft coupling	SS-316	
	Shaft sleeve	SS-316	
4.3	CHEMICAL TANKS FOR N-PIT	ALKALI MEASURING TANK	ACID MEASURING TANK
(i)	Number required	One (1)	One (1)
(ii)	Type	-----Vertical Cylindrical Atmospheric-----	
(iii)	Useful capacity	Suitable to meet the requirement for neutralisation of excess acid/alkali present in the regeneration waste effluent from CPU & RO- DM plant + 20% margin	Suitable to meet the requirement for neutralisation of excess acid/alkali present in the regeneration waste effluent from CPU & RO- DM plant + 20% margin
(iv)	Material (Shell, Dished end & top cover)	IS 2062 Gr A/B	FRP
	Internal protection	-----Rubber lined & minimum 4.5 mm thick in three layers -----	Not Applicable
	External painting	-----Chlorinated Rubber Paint -----	Not Applicable
(v)	Level indicator	Provided	Provided
(vi)	Level transmitter per tank	One (1)	One (1)
(vii)	Stirrer per tank	Slow speed stirrer driven by motor drive and reduction gear. Speed of stirrer = 200 RPM Max.	Not Applicable
(viii)	MOC of Agitator	SS – 316	Not Applicable
(ix)	Drive motor of stirrer	Energy Efficiency Class IE-3 as per IS : 12615	Not Applicable
(x)	Dissolving Basket	Provide (50-60 mesh B.S.)	Not Applicable
(xi)	MOC of Basket	SS – 316	Not Applicable
(xii)	Accessories	Fume absorbers, carbon dioxide absorber, hand hole, vent, drain, sample connection, level transmitter, operating platform, ladders, lifting lugs (4 Nos. minimum) etc.	



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5.0	PIPING & VALVES	
(i)	Resin Transfer piping (full Port Ball Valves)	ASTM A 312 Gr. TP 304 Sch 40 Minimum pipe Size : NB80 Velocity : 2-3 m/s
(ii)	DM water line	ASTM A 312 Gr. TP 304 Sch 40
(iii)	Piping-Service vessel Inlet	Piping-ASTM A 106 Gr C Ball Valves – SS-(CF8M) BFV – ASTM A 216 Gr. WCB- Body SS-(CF8M) - disc.
(iv)	Piping-Service vessel Outlet	Piping – ASTM A 106 Gr. C BFV – SS-(CF8M) - Body & disc both. Ball Valves – SS-(CF8M)
(v)	Service vessel bypass piping (Globe Valves)	Piping – ASTM A 106 Gr. C Globe valve – SS316/ CF8M Globe valves of the bypass line of service vessels shall be double flanged type.
(vi)	Service vessel rinse piping	CS to ASTM A 106 Gr. C
(vii)	Effluent Transfer Piping	Piping, & Fittings shall be CPVC Sch. 40 only & valves shall be PN 10 rating.
(viii)	Acid & Alkali Regeneration piping (Diaphragm Valves)	All piping, Valves & Fittings in regeneration area shall be CPVC Sch. 40 only & valves shall be PN 10 rating.
(ix)	Acid / Alkali Transfer piping (Diaphragm Valves)	All piping, Valves & Fittings in regeneration area shall be CPVC Sch. 40 only & valves shall be PN 10 rating.
(x)	Instrument Air piping (Full Port Ball Valves)	IS 1239 (Heavy Grade) Galvanized.
6.0	VALVES	
(i)	BUTTERFLY VALVES	Butterfly valves shall be of double flanged type of low leakage rate confirming to AWWA-C-504 class 300 (min.) or EN593/ BS:5155 PN 10 (min.) Condensate polishing plant outlet butterfly valves shall be of stainless steel construction, SS-316 (for body, disc and shaft). Condensate polishing plant inlet butterfly valves shall be of Carbon Steel construction (Body & Disc-CF8M/SS-316 Respectively). All the butterfly valves shall be provided with Hand wheel or lever as per the requirements. For larger sizes i.e. 150 NB and above. Valve provided with motorized or pneumatic actuator shall be provided with a hand wheel for manual operation. All the valves shall be equipped with adjustable mechanical stop-limiting devices to prevent over travel of the valve disc in the open and closed positions. The valve operators (Hand wheel or Gear reduction unit or Motor actuator etc.) shall be designed as per relevant International Standard. All the butterfly valves shall be provided with an indicator to show the position of the disc. Flanges shall conform to ANSI B 16.5 CL300 (min.) used for Service vessel area.
(ii)	ECCENTRIC PLUG VALVE / BALL VALVE	These valves shall be used for resin transfer line. These valves shall be flanged type and of SS 316 construction.



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(iii)	DIAPHRAGM VALVE	The Diaphragm shall conform to following requirement for DM water application: i) Design standard: BS: 5156 or equivalent of required rating / class. (Minimum rating of valves shall be PN 10). ii) Type : Flanged and lined body ends, sealed bonnet, weir pattern, tight shut off type iii) Material of Construction a) Body, Bonnet : Cast iron IS 210 Gr. FG 260 or equivalent or Cast steel ASTM A-216 Gr. WCB b) Body lining : Soft natural rubber(Neoprene), ebonite, Polypropylene c) Hand wheel : Cast Iron d) Compressor : Stainless Steel e) Stem and Bush : Stainless Steel For Acid and Alkali services the valve shall be CPVC PN10/Sch 40 only.
7.0	FLANGES	
(i)	Feed water / Condensate	ASTM 105
(ii)	DM water	ASTM A105 rubber lined (for NB 65 mm to 150 mm) ASTM A 182 F 304 (for NB 50 mm and below)
(iii)	Instrument Air	ASTM A 105 galvanized

TECHNICAL DATASHEET-A FOR 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
6.1	Design standards	IS: 3938, IS: 2266, IS: 4029, IS: 900, IS: 4237, IS: 694, IS: 3043, IS: 1822, IS: 2147, IS: 1554, IS: 325, IS: 15660, IS 9968 Part I etc as per latest revision
6.2	Duty class	Class II duty
7.0	Operating speed	
7.1	Hoisting speed	3 MPM
7.2	Trolley speed	6 MPM
8.0	Type of transmission	Through Electric motor and gear box.
9.0	Wire Rope	
9.1	Construction / core	6 x36 construction, steel core/Fibre core



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SPECIFICATION NO. PE-TS-412-155A-A001

SECTION : I

**TECHNICAL SPECIFICATION FOR
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SUB-SECTION: IA

REV. NO. 00

DATE :

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	
12.1	Wheel	Single flange taper thread
12.2	Wheel conform to (Std. / code)	IS: 3938
12.3	Wheel material	C55Mn75/ En-8/ En-9. (Max hardness 200 BHN)
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	DCEM brakes disc type (fail to safety).
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.



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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	300 starts / hr	
18.3	Voltage , Phase and Frequency	415V ±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	
18.6	Degree of protection provided for enclosure	IP-54/55 (indoor/outdoor)	
18.7	Margin	10% over maximum continuous load demand	
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	1.1 KV grade XLPE power cables shall have compacted aluminium conductor for cables including 10 sq. mm and above and copper conductor for cables below 10 sq.mm, XLPE insulated, PVC inner-sheathed (as applicable), armoured, FRLS PVC outer-sheathed conforming to IS: 7098. (Part-I).	
23.0	Control cable	Control cable shall be multi core, minimum 2.5 sq.mm cross section, stranded copper conductor, PVC insulated, inner PVC sheathed / galvanized steel wire armored and outer sheath made of FRLS PVC compound. In situation where accuracy of measurement or voltage drop in control circuit, warrant, higher cross sections as required	



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		shall be used. 4 sq.mm copper conductors shall be used for CT circuits, all other specification remaining same. In 4 sq.mm conductor impose unacceptable high burden on CTs, higher cross section of conductor shall be used.
24.0	Flexible trailing cable	1.1 KV grade Trailing cables shall have tinned copper (class 5) conductor, insulated with heat resistant elastomeric compound based on Ethylene Propylene Rubber (EPR) suitable for withstanding 90°C continuous conductor temperature and 250 deg C during short circuit, inner-sheathed with heat resistant elastomeric compound, nylon cord reinforced, outer-sheathed with heat resistant, oil resistant and flame retardant heavy duty elastomeric compound conforming to IS 9968
25.0	Control Voltage	110 V

B) MANUAL HOIST (CHAIN PULLEY BLOCK):

DATA SHEET-A

- | | | | |
|---------|---|---|---|
| 1.00.00 | Type | : | Hand operated chain pulley block |
| 2.00.00 | Area | : | As per scope sheet attached |
| 3.00.00 | Design | : | IS: 3832, IS: 2429, IS 15560, IS 210, IS 4367, IS 6216, IS: 4460. (All standards shall be of latest revision) |
| 4.00.00 | Duty Class as per IS:3832 | : | Class –II |
| 5.00.00 | Hoisting Mechanism | | |
| a) | Type | : | Hand operated gear transmission |
| b) | Type of gear | : | Spur / Helical |
| c) | Load Chain | : | |
| | i) Type | : | Link type |
| | ii)Material | : | Alloy steel grade 80 as per IS: 6216 |
| | iii) Conforms to (Std./Code) | : | IS: 6216 |
| d) | Hand Chain | : | |
| | i) Type | : | Link type |
| | ii) Material | : | Mild steel (grade 30) as per IS 2429 Part I |
| e) | Load Hook & Hook Block | : | |
| | i) Type of load hook | : | Plain shank- Trapezoidal section |
| | ii) Load hooks conform to / Material | : | IS: 15560 |
| | iii)Type of hook suspension | : | Swivelling |
| | iv)Type of make of bearing of hook suspension | : | Thrust ball bearing |



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- f) Gears/pinion :
- i) Type : Spur
- ii) Material : Alloy steel / carbon steel (Material confirming to IS 3832)
- iii) Type of bearing used : Antifriction ball bearing / Roller
- g) Sprockets
- i) Type of bearings used : Antifriction ball bearing / Roller
- h) Method of lubrications Used
- i) Bearings : Grease
- ii) Gearing & Pinions : Grease
- iii) Sprockets : Grease
- i) Brakes
- i) Type : Ratchet and pawl arrangement along with screw and friction disc type
- 6.00.0 Trolley & Bridge Drive
- a) Trolley
- i) Type : Geared (Manually operated)
- ii) Material of frame : Rolled structural steel (IS:2062 Grade A or B)
- b) Drive Chain
- i) Type : Link type
- ii) Material : Steel Gr.30
- c) Trolley Wheel
- i) Number of pairs of wheel : Two/four
in each trolley/bridge
- ii) Flange : Single flanged
- iii) Wheel material : Heat Treated Carbon steel/low alloy steel/graded cast iron (Material confirming to IS 3832)
- iv) Type of bearings need : Antifriction
- d) Gears
- i) Type : Spur / helical
- ii) Material : Alloy/ Carbon steel (Material confirming to IS 3832)
- iii) Type of bearings used : Antifriction
- e) Method of lubrication for
- i) Bearings : Grease
- ii) Sprockets : Grease
- f) Load chain wheel
- i) Material : SG iron/ Steel casting/IS 3832
- g) Hand chain wheel
- i) Material : SG iron/ Steel casting/Grey iron Casting./IS 3832