

**VALIDATION REPORT
OF
WATER TREATMENT PLANT**

CAPACITY - 40 MLD

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45%

VALIDATION REPORT - CASCADE AERATOR

➤ **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

➤ **INLET SHAFT**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED
1	Velocity	m/sec	-	0.65 ✓	0.6 to 1.25 m/sec
2	Internal Diameter	m	-	1.1 ✓	1.065
3	Thickness	m	-	0.1 ✓	Minimum 0.100 mm
4	Outer Diameter	m	-	1.3	Calculated
5	Velocity Achieved	m/sec	-	0.609	Calculated

➤ **STEPS AND PLANNERS**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED
1	Area Criteria	m ² /m ³ .hr	-	0.015 ✓	0.015 to 0.045 m ² /m ³ .hr
2	Area of Aerator	m ²	-	32 ✓	31.250 m ²
3	Number of Steps	Nos.	-	5 ✓	4-6 Nos.
4	Rise of step	m	-	0.3 ✓	0.2m to 0.4m
5	Tread of step	m	-	0.6 ✓	0.522 m
6	Diameter of Aerator	m	-	7.3	Calculated
7	Actual Area Criteria	m ² /m ³ .hr	-	0.020	Calculated

➤ **COLLECTION LAUNDER**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED
1	Velocity in Aerator	m/sec	-	0.65 ✓	0.6 to 1.25 m/sec
2	Width of Launder	m	-	0.6 ✓	0.6 - 1.8 m
3	SWD	m	-	0.742	Calculated
4	Free Board	m	-	0.3 ✓	Minimum 0.3 m
5	Depth of Launder	m	-	1.042	Calculated

Values Highlighted	Description
	Calculated for requirement, but designer can enter value accordingly. (Rounding up, Standard dimensions availability, Availability of Space, etc.)
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✓	Correct Input by Designer.
✗	Inorrect Input by Designer. (Value either does not satisfy minimum requirements or CPHEEO manual clauses.)
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	<p><i>* It is possible at times when tendered criterias and designer inputs foul, but designer inputs might be in the permissible ranges of CPEEHO manual. We recommend the approving authority to take the final decision of either relooking at tender values or designer values according to the manual provisions.</i></p>

VALIDATION REPORT - PARSHALL FLUME

➤ **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

➤ **PARSHALL FLUME**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*			
1	Flow for Flume	MLD	-	50 ✔	50 MLD			
STANDARD PARSHALL FLUME DIMENSIONS (Unit = mm)								
W	A	B	C	D	F	G	K	Z
300	1350	1322	600	831	600	900	75	225
* Above values for designed flow are, as per CPHEEO Sewerage and Sewerage treatment Manual (Table No. 5.5)								

➤ **UPSTREAM CHANNEL**

>

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Velocity of flow	m/sec	-	0.65 ✔	0.6 to 0.9 m/sec
2	Ht of water u/s of Hydraulic jump (hu)	m	-	0.916	Calculated
3	Depth of water u/s of Flume (h)	m	-	1.141	Calculated
4	Width of Channel	m	-	0.9 ✔	0.831 m
5	Free Board	m	-	0.3 ✔	Minimum 0.3 m
6	Total Depth	m	-	1.441	Calculated
7	Length of Channel	m	-	2.5 ✔	Minimum 1.5 m

➤ **DOWNSTREAM CHANNEL**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Velocity of flow	m/sec	-	0.65	Same as U/S
2	Hydraulic jump Coefficient		-	0.6 ✔	0.4 to 0.7 h _u
3	Ht of water u/s of Hydraulic jump (hu)	m	-	0.916	Calculated
4	Depth of water u/s of Flume (h)	m	-	0.55	Calculated
5	Width of Channel	m	-	1.65 ✔	1.620
6	Free Board	m	-	0.9 ✔	0.891 m
7	Total Depth	m	-	1.45	Calculated
8	Length of Channel	m	-	2.5 ✔	Minimum 1.5 m

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VALIDATION REPORT - CLARIFLOCCULATOR

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

► **CLARIFIER**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Detention Time	Hours	-	2.5 ✓	Minimum 2.5 Hours
2	Bottom slope of Flocculator	1	in	11 ✓	1 in 10 to 1 in 12
3	Thickness of partition wall	m	-	0.2 ✓	0.1 to 0.25
4	SWD	m	-	3 ✓	< 4.5
5	Diameter of Clarifier	m	-	50 ✓	49.21
6	Actual Slope maintained	1	in	11.667	Calculated
7	Weir Loading	m ³ /d/m	-	300 ✓	300 m ³ /m.d
8	Surface Overflow Rate	m ³ /m ² .d	-	30 ✓	25 - 75 m ³ /m ² .d
9	Actual Detention Time	Hours	-	2.826 ✓	2.5
10	Actual Surface Overflow Rate	m ³ /m ² .d	-	28.00	Ok
11	Actual Weir Loading	m ³ /m.d	-	318.471	Provide Additional Weir Length
12	Provide Additional Weir Length	m	-	9.67	Calculated

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VALIDATION REPORT - CLARIFLOCCULATOR

► NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

► WEIR

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Width of Weir	m	-	0.9	✓
2	Length of Weir	m	-	2	✓
3	Number of Weir	Nos.	-	3	
4	Total Length of Weir provided	m	-	12.00	✓ > 9.67

Values Highlighted	Description
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VALIDATION REPORT - CLARIFLOCCULATOR

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

► **NOTCH**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Discharge Coefficient	m	-	0.6 ✓	0.6 to 0.7
2	Angle of Notch	Degrees	-	90 ✓	
3	Water Head	m	-	0.07 ✓	0.06 to 0.3 m
4	Total Depth of V Notch	m	-	0.1 ✓	
5	Spacing Between Notches	m	-	0.4 ✓	0.300 m
6	Number of Notches	Nos.	-	423*	314.928 Nos

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VALIDATION REPORT - RAPID SAND GRAVITY FILTER

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

► **BACKWASHING**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of Backwash	l/m ² .min	-	600 ✓	600 l/m ² .min
2	Rate of Airwash	l/m ² .min	-	750 ✓	600 - 900 l/m ² .min
3	Pressure of Airwash	kg/cm ²	-	0.35 ✓	0.35 kg/cm ²

► **WASH WATER TROUGHS**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of troughs on either side of gullet	Nos.	-	5 ✓	4 to 6 Nos.
2	Total No. of troughs	Nos.	-	10.000	Calculated
3	Width of trough	m	-	0.3 ✓	0.2 to 0.45 m
4	SWD of Wash water	m	-	0.264	Calculated
5	Free Board	m	-	0.1 ✓	Minimum 0.100 m
6	Clear spacing of troughs*	m	-	1.400	< 2.0 m
7	Total Depth of troughs	m	-	0.364	Calculated

*Correct Validation for Spacing of trough for the value entered by designer being less than or equal to calculated recommended value.

Assumption : Flat bottom through with zero slope and free fall and Provide bottom of Troughs minimum 0.3m above sand.

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VALIDATION REPORT - RAPID SAND GRAVITY FILTER

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Units	Nos.	-	1	-
2	Overloading	%	20	20	-
3	Losses	%	5	5	-
4	Designed Flow	MLD	-	40	Calculated

► **GULLET/GUTTER**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of Backwash	l/m ² .min	-	600	600 lpm/m ²
2	Width of Gullet	m	-	0.5 ✓	0.4 to 0.8 mm
3	SWD of Wash Water	m	-	0.873	Calculated
4	Free Board	m	-	0.3 ✓	Minimum 0.3 m
5	Total depth of gullet	m	-	1.173	Calculated

► **WASH WATER TANK**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of Backwash	l/m ² .min	-	600	600 lpm/m ²
2	Backwash Duration	min	-	10 ✓	10 min
3	Extra quantity of Water	%	-	5 ✓	5 - 15 %
4	Depth of Water	m	-	2 ✓	2.0 to 5.0 m
5	Length of Tank	m	-	15 ✓	
6	Width of Tank	m	-	13 ✓	11.781 m

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VALIDATION REPORT - MECHANICAL DESIGN (RAPID SAND GRAVITY FILTER)

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Filter Beds	Nos.	-	2	Designer Input

► **FILTER INLET**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of flow from each filter	m ³ /hour	-	1,101.399	From Filter Bed
2	Velocity at Inlet	m/sec	-	0.6 ✓	0.6 to 1.2 m/sec
3	Area of opening required	m ²	-	0.510	Calculated
4	Pipe Diameter	m	-	0.85 ✓	0.806
5	Area of opening provided	m ²	-	0.567	Calculated

► **FILTER OUTLET**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of flow from each filter	m ³ /hour	-	1,101.399	From Filter Bed
2	Permissible Velocity	m/sec	-	0.6 ✓	0.6-1.2 m/sec
3	Area of pipe required	m ²	-	0.510	Calculated
4	Diameter of Valve	m	-	0.85 ✓	0.806 m

Values Highlighted	Description
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VALIDATION REPORT - MECHANICAL DESIGN (RAPID SAND GRAVITY FILTER)

► **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	No. of Filter Beds	Nos.	-	2	Designer Input

► **WASH WATER INLET**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of flow from each filter	m ³ /sec	-	0.56	From Filter Bed
2	Permissible Velocity	m/sec	-	1.5	1.5 to 3.0 m/sec
3	Area of pipe required	m ²	-	0.373	Calculated
4	Wash water inlet pipe	m	-	0.85	0.85

► **WASH WATER OUTLET**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Rate of flow from each filter	m ³ /sec	-	0.56	From Filter Bed
2	Permissible Velocity	m/sec	-	1.5	1.5 to 3.0 m/sec
3	Area of pipe required	m ²	-	0.373	Calculated
4	Diameter of Valve	m	-	0.7	0.69

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VALIDATION REPORT - ALUM

➤ **NUMBER OF UNITS, OVERLOADING AND LOSSES**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Designed Flow	MLD	-	40	-

➤ **ALUM SOLUTION TANKS**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Monsoon Season	mg/l	-	70 ✓	70 mg/l
2	Winter Season	mg/l	-	30 ✓	30 mg/l
3	Summer Season	mg/l	-	10 ✓	10 mg/l
4	Purity for Alum Cakes	%	-	75 ✓	75 %
5	Number of Alum Tanks	Nos.	-	3 ✓	Minimum 3 Nos (2 Working + 1 Standby)
6	Duration of tank to serve	hrs	-	8 ✓	Minimum 8 hours

➤ **PREPERATIONS OF SOLUTIONS**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Strength of Solution	%	-	12	
2	SWD	m	-	1 ✓	Minimum 1 m
3	Length of Tank	Nos.	-	4 ✓	
4	Width of Tank	hours	-	4 ✓	-
5	Free Board	%	-	0.3 ✓	Minimum 0.3 m

➤ **ALUM AND TCL SPACE**

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	Weight of 1m ³ Alum	kg/d	-	1700 ✓	Minimum 1700 kgs
2	Extra Volume Added	Nos.	-	5 ✓	
3	Storage/Stack Height	Nos.	-	4 ✓	
4	Total Volume of Chemicals	m ³	-	223.67	Calculated
4	Storage Space Required	m ³	-	56 ✓	55.918 m ²

Values Highlighted	Description
	Calculated for requirement, but designer can enter value accordingly. (Rounding up, Standard dimensions availability, Availability of Space, etc.)
	Calculated for requirement/Conditions, but designer cannot change the value.
✓	Correct Input by Designer.
⊗	Inorrect Input by Designer. (Value either does not satisfy minimum requirements or CPHEEO manual clauses.)
	Tendered criteria and designer Inputs do not match.
*	Recommended values are as per CPEEHO manual clauses/ Calculated as per requirements and conditions/ Values entered by designer.

* It is possible at times when tendered criterias and designer inputs foul, but designer inputs might be in the permissible ranges of CPEEHO manual. We recommend the approving authority to take the final decision of either relooking at tender values or designer values according to the manual provisions.