

ENGINEERING DEPARTMENT

Title: Solution Preparation and Dosing in Purified Water Generation System

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#### 1.0 **OBJECTIVE:**

To lay down a procedure for Solution Preparation and Dosing in Purified Water Generation System.

#### 2.0 SCOPE:

This SOP is applicable for Cleaning, Preparation and Dosing of solution in Purified Water Generation and Distribution System.

#### 3.0 RESPONSIBILITY:

Officer / Executive – Engineering

#### 4.0 ACCOUNTABILITY:

Head - Engineering

#### **5.0 ABBREVIATIONS:**

ADS Antiscalant Dosing System

Conc. Concentration

SMBS Sodium Meta Bi Sulphite

Hr. Hours
Ltd. Limited
Ltr. Liters

NaOCl Sodium Hypo Chlorite

NaOH Sodium Hydroxide (Caustic Soda)

pH Potential of Hydrogen ppm Parts per Million

Qty. Quantity

PPE Personnel Protective Equipment

#### **6.0 PROCEDURE:**

- **6.1** Ensure that the system is in OFF condition / Standby mode.
- **6.2** Drain the left over solution by drain point.
- 6.3 Clean the dosing tank (SMBS, NaOH, ADS) properly with purified water & NaOCl dosing tank with raw water and visually check the tank for its cleanness.
- 6.4 Dosing tank shall clean daily prior to preparation of solution and record the cleaning details in Annexure IV.
- 6.5 While cleaning the tank ensure that the level sensor shall not get disturbed and does not cause to trip the system.
- 6.6 Four Chemicals are used for dosing in Purified Water Generation System which serves the different purpose these are as NaOCl, SMBS, ADS & NaOH.



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**6.7** Prepare the Solution using the given below formula:

$$\frac{\text{Water Quantity X Concentration of the Solution used}}{\text{\% assay of the solution}} = --\text{Kg or Ltr}.$$

Qty. of Purified / Raw water and concentration of chemical solution for Purified Water System is as per the following table:

S.No.	Chemical Name	Water	Concentration of the Chemical taken		
		Quantity	3 KL	5 KL	
1.	NaOCl (Sodium Hypo Chlorite)-1 phase	50 ltrs	1.00 %		
2.	NaOCl (Sodium Hypo Chlorite) -2 phase	20 ltrs	2.00%	2.00%	
3.	SMBS (Sodium Meta Bi-Sulphite)	20 ltrs	2.00%	2.00%	
4.	ADS (Sodium Hexa Meta Phosphate)	20 ltrs	2.00%	4.00%	
5.	NaOH (Sodium Hydroxide)	20 ltrs	4.00%	8.00%	

% assay of the solution is based on QC report as per and as per Annexure -I of SOP.

- 6.8 Calculated quantity of dosing chemical shall be taken and pour in respective dosing tank. Add purified water/ raw water as per above mentioned table and mix it well.
- **6.9** Operator/ Officer / Executive Engineering shall affix the duly filled and signed status label on the dosing tank as per **Annexure-II.**
- **6.10** Use the prepared solution in same days of preparation & if in any case prepared solution quantity is consumed fully then prepared the solution again and same shall be mentioned in prescribed **Annexure I.**
- **6.11** Officer / Executive Engineering shall calculate the dosing rate using the given below formula:

$$\frac{\text{Flow rate of Water in } \left(\frac{ltr}{hr}\right) \text{X required ppm X100}}{1000 \text{ X concentration of Solution taken X 60}} = \underline{\hspace{1cm}} ml/min. \ dosing$$



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Flow rate, required ppm of chemicals in Purified Water System is as mentioned in the table:

S.No.	Chemical Name	Flow rate in ltr./hr.		ppm o solut			ng rate Stroke Rat Formula) %		
		3 kl	5 kl	3 kl	5 kl	3 kl	5 kl	3 kl	5 kl
1.	NaOCl (Sodium Hypo	940	000	1		78 m	/min	9	4
	Chlorite) phase - I								
2.	NaOCl (Sodium Hypo	5200	18000	5 ppm	5	22	75	27	90
	Chlorite) Phase - II				ppm	ml/min	ml/min		
3.	SMBS (Sodium Meta Bi-	5200	8400	10	9	43	63	90	76
	Sulphite)			ppm	ppm	ml/min	ml/min		
4	ADS (Sodium Hexa Meta	5200	8400	5 ppm	5	22	18	27	22
	Phosphate)				ppm	ml/min	ml/min		
5	NaOH (Sodium Hydroxide)	5200	8400	5 ppm	5	11	9	23	19
	Naon (Sodium Hydroxide)				ppm	ml/min	ml/min		

- **6.12** Record the used quantity of purified water, raw water & chemical in **Annexure I.**
- **6.13** Record the chemical consumption quantity and remaining chemical quantity in **Annexure V.**
- **6.14** Set the dosing rate of dosing pump as per above mentioned table (refer point no 6.11).
- **6.15** Use proper PPEs (Hand Gloves, Nose Mask & goggles) at the time of preparation of solution.
- **6.16** Update the status board in respective **Annexure III.**
- 6.17 SMBS, NaOH, ADS chemical shall be measured by weighing balance & NaOCl shall be taken through measuring beaker while preparation of solution & calculated qty. of NaOCl shall be taken upto one decimal point.

#### 7.0 ANNEXURES:

ANNEXURES No.	TITLE OF ANNEXURE	FORMAT No.
Annexure-I	Solution Dosing Log	
Annexure-II	Status Board	
Annexure-III	Dosing Tank Cleaning Record	
Annexure-IV	Chemical Consumption Record	

**ENCLOSURES:** SOP Training Record

#### **8.0 DISTRIBUTION:**

Controlled Copy No. 01 Quality AssuranceControlled Copy No. 02 Engineering

Master Copy
 Quality Assurance



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#### 9.0 **REFERENCES:**

MANUAL

#### 10.0 REVISION HISTORY:

#### **CHANGE HISTORY LOG**

Revision	Change	<b>Details of Changes</b>	Reason for	Effective	Updated
No.	Control No.		Change	Date	By



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#### ANNEXURE – I PREPARED SOLUTION DOSING LOG

Chemical Name:	Block:
Dosing Tank ID:	<b>Location:</b>
<b>Dosing Tank Capacity:</b>	

Date	Time		Qty. of Water (Ltr.)	% Assay of Chemical	Qty. of chemical (Kg or Ltr.)	Prepared By (Sign &	Reviewed By (Sign &	Remarks
	From	To				Date)	Date)	
								1



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		ANNEXUR	E-III		
	S	STATUS BOARD			
		DOS	ING		
TANK I	D.:		DATE:		
% O	F SOLUTION				
DO	SING RATE				
	ROKE RATE				
S	QUENCY OF OLUTION EPARATION				
	TE OF TANK ELEANING				
	DUE DATE OF K CLEANING				
	EPARED BY GN. & DATE)				
	VIEWED BY GN. & DATE)				



# PHARMA DEVILS ENGINEERING DEPARTMENT

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#### ANNEXURE – IV DOSING TANK CLEANING RECORD

Dosing Tank Name: Cleaning Frequency: Daily

**Dosing Tank ID:** 

Date	Time		Tank	Tank Cleaning Next	Done by (Sign &	Reviewed By	D
	From	To	Cleaned on	<b>Due Date</b>	Date)	Reviewed By (Sign & Date)	Remarks
			<u> </u>		1		<u> </u>



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#### ANNEXURE – V CEMICAL CONSUMPTION RECORD

#### **Chemical Name:**

Opening Stock	Received if any	Consumption	Closing Balance	Done By Sign & Date	Review By Sign & Date	Remark
						1
						1