SAHA

STANDARD OPERATING PROCEDURE

Water Treatment for Simple Surface Water Treatment Systems

Sedimentation, filtration and chlorination at the community water treatment centre.

DATE OF UPDATE	DRUM CAPACITY	CHLORINE WAIT TIME
10 April 2026	200 litres	30 minutes minimum

This is Saha's own standard operating procedure for water treatment, used by the Water Service Operators who run its Simple Surface Water Treatment Systems (SSWTS). It is published as an example for partners, district assemblies and practitioners running community water treatment of their own.

01

Introduction

Saha Simple Surface Water Treatment Process

Saha uses a simple yet scalable process for treating water at the community level. This involves three basic steps — sedimentation, filtration, and chlorination — in line with the standard procedures of water production and distribution. Surface water is the predominant source of water for the Saha water treatment centres, and as such turbidity, pH imbalances, and microbial contamination are key things the treatment process seeks to address.

This SOP combines the main components of the Aluminium Sulphate Addition SOP and the Lime Addition SOP.

STEP ONE
Sedimentation

STEP TWO
Filtration

STEP THREE
Chlorination

02

Standards and Specification

WHO / GSA STANDARD

0.2 ppm

The maximum prescribed limit of alum in drinking water.

ALUM SPECIFICATION

17–18% Al_2O_3

Powdered or granular alum, for consistency in chemical composition.

LIME

$Ca(OH)_2$

Used in the treatment process for controlled pH adjustment.

03

Equipment and Supplies

PROVIDED TO WATER SERVICE OPERATORS

- Colour chart infographic (1)
- Tablespoon (1)
- Cotton cloth (2 pieces)
- Scooping bucket (1)

PROVIDED AT A FEE

- Alum (granular)
- Lime (powdered form)
- Chlorine (tablets)

04

Water Treatment Process

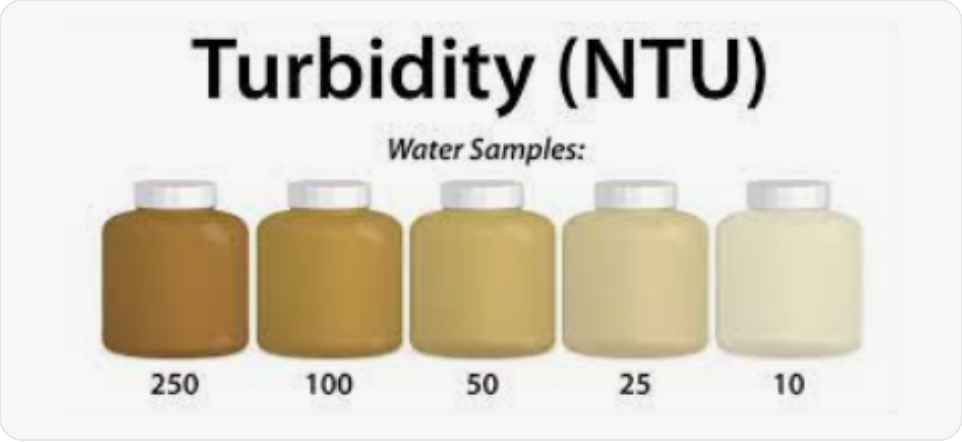
STEP 1 Determine average water turbidity

Turbidity is the measure of the relative clarity of a liquid. Water turbidity is measured in nephelometric turbidity units (NTU). This can be measured using a nephelometric turbidity meter. A turbidity colour chart, a chart that has a colour code and its corresponding turbidity range, can also be used to determine the average turbidity of water. Water Service Operators will use the colour code chart to determine turbidity levels at the centre.

PROCEDURE

- Collect raw water samples into a transparent bottle. This will help determine the colour of the water.
- Place the sample bottle close to the turbidity colour chart provided.
- Observe what colour it matches with. This will indicate what quantities of alum to use.

Take note of the colour match of the sampled water.



Turbidity colour chart and average turbidity range.

STEP 2

Measuring alum

Alum will be measured using a table or a teaspoon. This mode of measurement is used because it makes it easier for the Water Service Operator and does not require any technical assistance. The highest quantity of alum used at any point for each drum should not exceed 3 tablespoons.

WATER TURBIDITY	RANGE (NTU)	WEIGHT	MEASUREMENT
Low turbidity	< 50	11.98 g	**1½ teaspoons**
Medium turbidity	50–100	23.95 g	**1 tablespoon**
High turbidity	100–200	35.93 g	**1½ tablespoons**
Very high turbidity	200–250	47.91 g	**2 tablespoons**
Extreme turbidity	> 250	71.85 g	**3 tablespoons**

For rainwater, the suggested quantity of alum to be added is 1 teaspoon (7.98 g).

PROCEDURE

- Once you have determined the turbidity range and alum quantity to use, fill the measuring spoon with the alum and pour directly into the empty drum.
- Ensure portions of the alum are not carried away by wind or splashed away during the process.

STEP 3

Adding lime

For each tablespoon of alum used, an equal amount of lime is required. Each tablespoon of lime carries 15 g of hydrated lime ($Ca(OH)_2$). This is visualised in the infographic prepared for use by the Water Service Operators — see the appendix.

STEP 4 Fill 200 L drums with water

After alum is applied, the next step is to fill the drums with raw water. Note that as water is poured directly into the drum, the agitation causes the water and alum to mix, increasing the formation of flocs. As the drums are filled completely, you will notice flocs begin to form.

> **Tip.** A steering stick can be used to stir the water and facilitate a uniform settlement.

STEP 5 Settling and flocculation

After alum is applied, water should be left for all debris to settle at the bottom. This may take between 6 and 12 hours, depending on the turbidity of the water. Highly turbid water requires more time to settle. Water Service Operators will find it more convenient to do the alum application overnight or first thing in the morning.

STEP 6 Scooping and filtration

- Once the water is clear, scoop the water from the blue drums (BD) into the polytank (PT) using the small buckets assigned for that.
- Ensure that the white cotton cloths provided have been firmly fixed on the top of the PT so it filters the water that goes through it.
- Scooping must be done carefully in order not to agitate the settled water.
- Only the clear water is to be scooped from the blue drums.
- All residue should be disposed of from the BD after each scooping.

STEP 7 Chlorination

For each number of blue drums of water treated, drop an equivalent number of Aquatabs into the polytank. Each tablet corresponds to 200 L of water, which is equal to the holding capacity of the blue drums.

STEP 8 Wait time

After the addition of the Aquatabs, Water Service Operators are to observe a wait time of **at least 30 minutes** to ensure the efficient breakdown and dispersal of the chlorine into solution. The water is now safe and ready for distribution.

APPENDIX

Alum and Lime Application Guide

Infographics on Alum and Lime Application Guide

Turbidity (NTU)	Alum (Aluminium Sulfate)	Lime
< 25 NTU		
25-50 NTU		
50-100 NTU		
100- 250 NTU		
250+ NTU		

Turbidity range paired with the number of tablespoons of alum and lime, for use by Water Service Operators at the centre.