JAR TEST PROCEDURE

Document approval				
	Name	**Position**	**Signature**	**Date**
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1. PURPOSE

The purpose of Jar tests is used to predict clarification at water works. There are four main factors that can influence clarification performance, namely the raw water quality, mixing conditions, polymer chemistry and dosage rate.

2. SCOPE

This method may be used to determine optimum dose of a coagulant for use as a primary coagulant and for comparing the performance of different polyelectrolytes.

3. APPLICABLE LEGISLATION & REGULATIONS

N/A

4. AUTHORITY & RESPONSIBILITY

Water Services, UGU District Municipality

5. DEFINITIONS AND ACRONYMS

Jar tests are used to predict coagulant performance of a full-scale water works.

6. PROCEDURE

6.1. Jar tests determination methods

6.1.1. Apparatus

- Pipettes
- 6 or 4 paddle jar stirrers
- Tal-form square or round 1 litre beakers
- Standard volumetric glass ware
- pH meter
- Turbidity meter
- Funnels
- 500ml conical flasks
- 24cm Mn 614 filter paper (Whatman no1 equivalent)

6.2 Stock solution preparation

6.1.2. Reagents

- Coagulant to be assessed
- Lime solution: Optional
- All solutions are made up into sterile or distilled water

Coagulant solution

- Weigh out 0.8 g of coagulant solution into a beaker for coagulant use
- Transfer to a 1 litre volumetric flask and dilute to mark.
- Can be stored for 1 week

Lime solution: **optional**

- Weigh out 0.8g of white or brown lime depending what is used in the works
- Transfer to a 1 litre volumetric flask and dilute to mark
- May be stored for 1 week

N.B. the concentration of the above solutions (800mg/l) is such that 1 ml of polymer or lime solution will be equivalent to a dosage of 1mg/l (ppm) in 800ml sample. For aluminium based coagulant; the purity must be used to determine the amount to be weighed to give 0.8 g of the active ingredient.

6.1.3. Analytical procedure

- Obtain a raw water sample from the raw water inlet before addition of any chemicals and excluding filter wash water return.
- Determine the turbidity, pH and temperature on the raw water sample and record results on report sheet.
- Measure out 800 ml aliquots of raw water into the 6 beakers and number them 1-6.
- Set the flash mix speed for 100 rpm or the required setting for the plant and start the stirrer. **(For trial; conduct jar test at 100 rpm and 50 rpm).**
- Add coagulant solution to all the beakers simultaneously, in a range of doses based on previous experience.
- If the product is unfamiliar, commence with a dosage range of 1 – 6 ppm, and adjust for further jar tests if necessary.
- Stir for 2 minutes
- After 2 minutes, reduce the speed to 40 rpm for a further 15 minutes.
- Turn off the stirrer and record the floc size, based on the standard floc sizes shown on the 'Floc comparator'
- Record the settling rate, i.e. slow, moderate, or rapid settling
- After 15 minutes of settling; collect clarified water in each beaker and test turbidity.
- The optimum turbidity should be less than 5 NTU.
- Filter each sample through 25cm MN615 filter papers or Whatmann No 1 or equivalent into 1000 ml conical flasks.
- Collect about 200ml of filtrate in the flask and rinse, discard the washings.
- Filter the remaining sample.
- Determine pH and turbidity on the filtered sample.
- Record the results on report sheets.
- The turbidity should be less than 0.5 NTU, the optimum being approximately 0.40 NTU.
- If the turbidity is greater than 0.50 NTU, repeat the exercise starting at a higher or lower dose, until the optimum turbidity is achieved.

6.1.4. Calculation of results

The optimum dose and most suitable coagulant for the site can be deduced from the jar test results.

7. RECORDS

The jar test results must be stored on manual files.

8. CROSS-REFERENCE TO OTHER POLICIES/PROCEDURES

Manual for testing of water and wastewater treatment chemicals, WRC Report No. 1184/1/04.


Uys District Municipality