

If there is a standard lab (result) sheet, attach a copy to the SOP.

Direct Potable Water Reuse Standard Operating Procedure

Wichita Falls, Texas

Chlorine Species Titration

This SOP supersedes any previous SOP on this topic. Affective on the date signed approved below

INTRODUCTION

This is the Standard Operating for Chorine specific Titration.

OBJECTIVE

The objective of this document is standardize Titration.

Using the existing equipment for standard total titration, you can differentiate between three forms or Species of chlorine. They are as follows:

1. Free Chlorine. Chlorine which is not attached to any other molecule.
2. Monochloramine. Chlorine attached to one Ammonia molecule. (ClNH_2)
3. Dichloramine. Two Chlorine attached to one Ammonia molecule. (Cl_2NH)
4. Total Chlorine. Which is all of the above added together.

usually, this is written as NH_2Cl but this as NHCl_2

isn't this "all detectable species" (as opposed to $4 = 1+2+3 \dots$)

often $4 > 1+2+3$ (at least at some plants)

The Titration has to be done as soon as possible after collecting preferable at the source. The sample must not be agitated before titration. Follow these steps.

- a) Prepare the titrator and the sample and have it ready to start the test. **Do not add any KI or acid to the sample.**
- b) Free Chlorine. Stabilize the needle and begin titration very slowly. If the needle does not deflect, there is no Free Chlorine. If the needle deflects, continue titrating until the needle does not deflect. **Do not over feed phenylarsene oxide (P.O.) solution.** The end point is the free Chlorine residual.
- c) Monochloramine. Add four drop (0.2 mls) of Potassium Iodine (KI) solution. Do not add the acid yet. Continue titrating to an end point. **Do not over feed phenylarsene oxide (P.O.) solution.** This end point minus the Free Chlorine end point is the Monochloramine residual.
- d) Dichloramine. Add one ml of the acid buffer and then one ml of the Potassium Iodine (KI) solution. Finish titrating as you would normally. The end point of the phenylarsene oxide (P.O.) solution minus the end point of the free and the Monochloramine is the Dichloramine residual.

How big is the sample?
What's in the titrator?

to how much sample?

Chlorine Species Titration

- e) The Total Chlorine residual is the final end point and should equal the sum of Free, Mono, and Di.

All results will have to be written down individually in order.

Related SOP: QAQC Graphing DPR SOP and MonoChloramine residual below 1.0 mg at 1J DPR SOP

Prepared By: Bill Thornton

Prepared Date: May 6, 2014

Approved by: _____

Approved Date: _____

Reviewed by: _____

Reviewed Date: _____

*SOP's are to be reviewed and/or updated annually or any time this process has changed.

Sign below and date that you have received training on this SOP. By signing you are stating that you understand and will differ to this SOP when applicable.

Name	Signature	date	Signature	date
David Souilliere			Mark Huggins	
Johnny Chavez			Ron Kendrick	
Katharine DeMars			Rodney Allen	
Paul Blackwell			McIlvanie	
Ian fox			Diana Graham	
Paul Carr			Damon Halper	
Orville Sosebee			Jessie Martin	
Orlando Simpliciano			James Seigler	
Cheryl Chaney				