ENVIROTECH
an Arxada company

CASE STUDY

Determination of Low Level Peracetic Acid (PAA) Demand in Water

Equipment and Reagents

Chlorine, Total (0-2.00 mg/l) – Portable Colorimeter.
Hach Model DR/890

DPD Total Chlorine Powder Pillows for 10 ml sample size.
Hach Product number 21056-69. Sample cell, 10-ml.

Procedure for Total Chlorine (Method 8167)

USEPA approved for reporting water and wastewater analysis (USEPA Standard Method 330.5)

A. DR/890 SETUP

(1) Enter the stored program number for total chlorine (Cl_2) powder pillows.

(2) Press: **PRGM**. The display will show: **PRGM ?**

(3) Press: **9 ENTER**. The display will show **mg/l, Cl_2** and the **ZERO** icon.

B. PAA SOLUTION STANDARD

(1) Fill a 10 ml sample cell with demineralized water. This is the blank.

(2) Cap the blank cell and place it in the cell holder with the diamond mark facing you. Cover the cell compartment with the instrument cap to shield from stray light interferences and then press: **ZERO**.

(3) The instrument will turn on and the display will show: **0.00 mg/l CL_2**.

(4) Remove the blank cell.

(5) Prepare a 750 ppm solution of PAA (0.5 ml 15% Peragreen WW in 99.5 ml of demineralized water).

(6) Dilute the 750 ppm sample to achieve approximately 1.875 ppm (0.25 ml 750 ppm PAA solution into 99.75 ml water).

(7) Fill a second cell to the 10-ml mark with the activated 1.875 ppm PAA sample.

(8) Add the contents of one DPD Total Chlorine Reagent Powder Pillow to the cell (prepared sample). Cap and swirl the sample cell vigorously to dissolve the powder. (It is not necessary that all the powder dissolves)

(9) Insert the known 1.875 ppm PAA sample cell into the meter with the diamond mark facing you. Cover the cell compartment with the instrument cap to shield from stray light interferences.

(10) Immediately Press: **READ**. The cursor will move to the right. The result in mg/l total chlorine (Cl_2) will be displayed.

(11) This is the ppm total Cl_2 value. To calculate PAA, use the following formula:

PAA CALCULATION

ppm PAA = 1.07 x (ppm total Cl_2 PAA value)

Multiply ppm total Cl_2 PAA value by 1.07 to express the result as ppm PAA based on the weight ratio of PAA to Cl_2 (76/71 = 1.07).

This is the starting dosage and Solution for use in PAA demand testing

C. SAMPLE TESTING

(1) Fill a 10 ml sample cell with the water sample. This is the blank.

(2) Cap the blank cell and place it in the cell holder with the diamond mark facing you. Cover the cell compartment with the instrument cap to shield from stray light interferences and then press: **ZERO**.

(3) The instrument will turn on and the display will show: **0.00 mg/l CL_2**.

(4) Remove the blank cell.

(5) Prepare a 750 ppm solution of PAA (0.5 ml 15% Peragreen WW in 99.5 ml of demineralized water).

(6) Add 0.25 ml or the 750 ppm PAA solution into 99.75 ml of sample water and mix.

(7) Immediately fill a second cell to the 10-ml mark with the PAA activated water sample.

(8) Add the contents of one DPD Total Chlorine Reagent Powder Pillow to the cell (prepared sample). Cap and swirl the sample cell vigorously to dissolve the powder. (It is not necessary that all the powder dissolves).

(9) Insert the sample cell into the meter with the diamond mark facing you. Cover the cell compartment with the instrument cap to shield from stray light interferences.

(10) Immediately Press: **READ**. The cursor will move to the right, then the result in mg/l total chlorine (Cl_2) will be displayed.

(11) This is the ppm total Cl_2 value. To calculate PAA, use the following formula:

PAA CALCULATION

ppm PAA = 1.07 x (ppm total Cl_2 PAA value)

Multiply ppm total Cl_2 PAA value by 1.07 to express the result as ppm PAA based on the weight ratio of PAA to Cl_2 (76/71 = 1.07).

This is the initial demand for PAA

D. DEMAND TESTING

(1) Empty the sample cell and rinse with demineralized water.

(2) Wait 5 minutes, then refill the 10-ml sample cell with mixed, PAA treated sample. Insert the sample cell and press: **READ**

(3) The cursor will move to the right, then the result in mg/l total chlorine (Cl_2) will be displayed.

(4) This is the ppm total Cl_2 value. To calculate PAA, use the following formula:

PAA CALCULATION

ppm PAA = 1.07 x (ppm total Cl_2 PAA value)

Multiply ppm total Cl_2 PAA value by 1.07 to express the result as ppm PAA based on the weight ratio of PAA to Cl_2 (76/71 = 1.07).

(5) Retest every 5 minutes until the PAA level approaches 0.00 ppm.

(6) Record results and graph.