Problem of the Day
2015.Dec.19

Problem of the Day

The plant dosed 19.7 mg/L of chlorine yesterday. The residual prior to dechlorination averaged 5 mg/L. What was the chlorine demand?

Introduction

This is a very simple calculation if you remember how chlorine dose, demand and residual are related. Notice that the second letter in both d**e**mand and r**e**sidual is the letter e. Use this to remember that demand and residual go together. When they "go together," they are added together. The underlying equation for chlorine problems is:

Dose = Demand + Residual,

or

Do = De + Re

De (demand) and Re (residual) go together; they are added. In these problems you will always be given two of these, or be able to calculate two of them, and you have to calculate the third. Depending on what is given and what needs to be calculated, you have to manipulate the basic equation. Here's how:

- If given demand and residual, you will have to calculate dose:

    Dose = Demand + Residual

- If given dose and residual, you will have to calculate demand:

    Demand = Dose − Residual

- If given dose and demand, you will have to calculate residual:

    Residual = Dose − Demand

Today's Problem of the Day gives dose and residual so we use the second of these to calculate demand. It is a simple problem of subtraction.

Solution

Keep in mind that the concentrations given in the problem statement are in units of mg Cl_2/L:

- Dose = 19.7 mg Cl_2/L
- Residual = 5 mg Cl_2/L

All we do is subtract to get the answer.

> **Problem of the Day**: The plant dosed 19.7 mg/L of chlorine yesterday. The residual prior to dechlorination averaged 5 mg/L. What was the chlorine demand?

Demand = Dose − Residual = 19.7 − 5 = **<u>14.7 mg Cl_2/L</u>**.

Discussion

Keep in mind when preparing and taking certification exams that although the demand is what is actually used up in the chlorination reaction, it is the dose (demand + residual) that is important. This is because the regulators want to make sure the demand has been met by maintaining a residual. Keep in mind, too, that the absolute measure of the effectiveness of chlorination is not exceeding your permit bacteriological requirements whatever they are.

As just demonstrated, these calculations are very straightforward. So straightforward, in fact, that a lot of operators get these questions wrong on certification exams because they are so sure they know how to do it, they blow through the problem with little thought and are constantly getting tripped up by the authors of the certification exams. Read each and every question very, very carefully. We hear all the time from the operator who failed an exam, "I got it wrong because I didn't read the question."

Happy calculating! Let us know, by leaving a comment, if you want us to do a specific problem, if you see a mistake, or if you have a question on any of the Problems of the Day you are looking at.