# Certification Boulevard

**Roy Pelletier**

## *Test Your Knowledge of Disinfection*

1. Given the following data, calculate the chlorine demand:
   - Total daily pounds used is 1,400 lbs/day
   - The plant flow is 13.5 mgd
   - The effluent chlorine residual is 2.5 mg/l

   A. 6,305 lbs/day B. 1,118 lbs/day
   C. 1,681 lbs/day D. 281 lbs/day

2. Fumes from which chemical are used to identify a chlorine leak?
   A. Sulfur Dioxide
   B. Sodium Hydroxide
   C. Ammonia
   D. Sulfuric Acid

3. Given the following data, calculate the required capacity of this chlorine contact chamber:
   - Average daily flow is 5.7 mgd.
   - Peak flow is 9.9 mgd.
   - Required detention time at ADF is 30 minutes.
   - Required detention time at peak flow is 15 minutes.

   A. 13,787 cubic feet
   B. 103,125 gallons
   C. 12,367 cubic feet
   D. 118,750 gallons

4. What does this formula best represent?

$$\frac{\text{Tank Volume, ft}^3}{\text{Flow, mgd x 92.84 cfm/mgd}}$$

   A. Chlorine residual
   B. Contact chamber detention time in minutes
   C. Contact chamber detention time in hours
   D. Tank volume in gallons

5. Other than sulfur dioxide, what chemical can be used for dechlorination?
   A. Bleach
   B. Ferric Chloride
   C. Sodium Bisulfite
   D. Sodium Hydroxide

6. Why should liquid chlorine never be trapped between two closed valves?
   A. Liquid chlorine may turn to gas, contract, and implode the pipe.
   B. Liquid chlorine may turn to gas, expand, and explode the pipe.
   C. The pressure will drop too rapidly.
   D. Trapping liquid chlorine is not a problem.

7. *True or False*: Leaking chlorine gas will tend to collect near the ceiling of a closed room.

8. Match the following emergency repair kits to their respective containers:
   - Kit A — Tank cars and trucks
   - Kit B — 150 pound cylinders
   - Kit C — Ton containers

9. What concentration of chlorine can kill in a few short breaths?
   A. 15 ppm B. 50 ppm
   C. 100 ppm D. 1000 ppm

10. Which position should you rotate a ton container if a leak develops?
    A. With leak at bottom.
    B. With leak at top.
    C. With leak on the side.
    D. It does not matter.

**ANSWERS ON PAGE 66**

### SEND US YOUR QUESTIONS FOR CERTIFICATION BOULEVARD

Do you have a question or an exercise you would like to feature in "Certification Boulevard?" We'll be glad to publish it. Just send your question (with the answer) or your exercise (with the solution) to:

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There is no limit to the number of questions or exercises you may submit. Please include your name, city, and organization or company so we can give you credit.

# Certification Boulevard Answer Key

**From page 32**

1. B. 1,118 lbs/day
   *Supply - Demand = Residual or*
   *Demand = Supply - Residual*
   *• Supply is given at 1,400 lbs/day*
   ***Residual***
   *= 13.5 mgd x 2.5 mg/l x 8.34 lbs/gal*
   *= 281.47 lbs/day*
   *= 1,400 lbs/day - 281.5 lbs/day*
   *= 1,118.5 lbs/day*

2. C. Ammonia
   *Only the fumes from ammonia should be used to identify chlorine leaks. Liquid ammonia sprayed directly onto valves and fittings will cause corrosion and pits to develop.*

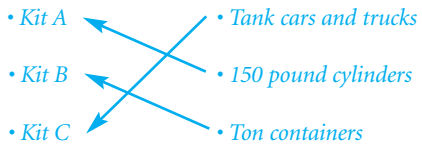
3. D. 118,750 gallons
   *• **D.T. @ ADF***
   *= 5.7 mgd x 92.84 cfm/mgd x 30 minutes*
   *= 15,876 cu.ft. x 7.48 gal/cu.ft. = 118,750 gals*
   *• **D.T. @ Peak***
   *= 9.9 mgd x 92.84 cfm/mgd x 15 minutes*
   *= 13,787 cu.ft. x 7.48 gal/cu.ft. = 103,125 gals*
   *• **ADF using 103,125 gals would only be about 26 minutes D.T.***
   *• **Answer is 118,750 gals capacity to meet both flow/time requirements***

4. B. Contact chamber detention time in minutes

5. C. Sodium Bisulfite

6. B. Liquid chlorine may turn to gas, expand, and explode the pipe.
   *The expansion ratio of liquid chlorine to gas is about 457 times. This is why liquid chlorine should never be trapped in a pipeline between two closed valves ... big bang!*

7. False
   *Because chlorine gas is 2.5 times heavier than air, it will settle in the space. Leak detectors should always be located about 6 to 12 inches from the floor.*

8. 


9. D. 1000 ppm
   *1000 ppm is a deadly concentration in just a few short breaths.*

10. B. With leak at top
    *Because liquid chlorine will expand about 460 times, it is important to locate the leak "gas side up." With the leak located at the top of the container, the least amount of chlorine will escape.*