



# Certification Boulevard

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## Test Your Knowledge of Various Collection & Distribution Topics

- Which may be the most appropriate chemical to use in a wet scrubber treating high levels of hydrogen sulfide?
  - Sodium hydroxide
  - Sulfuric acid
  - Unchlorinated water
  - Polymer
- True or False:** Water seeping out of a collection system pipe is called exfiltration.
- Given the following data, what is the capacity of this wet well?
  - The wet well diameter is 16 feet.
  - The bottom elevation of the wet well is 82.5 feet.
  - The top elevation of the wet well is 103.4 feet.
  - 177,563 gallons
  - 31,416 gallons
  - 332,043 gallons
  - 24,391 gallons
- Which condition typically is the least likely to be present in the air space of a sewer collection system?
  - Explosive gases
  - Hydrogen sulfide
  - Methane

D. Oxygen

- If the velocity in a sanitary sewer pipeline is about 1 fps, what may happen to the debris in the pipeline?
  - The debris will dissolve.
  - The debris will be carried forward.
  - The debris will settle.
  - Velocity has nothing to do with debris in a pipeline.
- Of the gases listed here, which hazardous gas typically will be located at the lowest point of a manhole?
  - Carbon monoxide
  - Hydrogen sulfide
  - Methane
  - None – they will all be at high levels.
- What does it mean when there is a lack of any odor coming from a lift station manhole?
  - Dangerous gases may be present because some gases do not emit an odor.
  - The oxygen level may still be too low for entrance.
  - Some gases deaden the sense of smell.
  - All of the above.
- How should manhole covers be lifted?
  - With your fingers.
  - With a manhole hook.
  - With a screw driver.
  - With a hammer.
- Which of the following materials commonly is not used in the construction of a collection system?
  - Vitrified clay
  - Aluminum
  - Ductile iron
  - Precast concrete

- What procedure should be performed before you enter a manhole that has been classified as a permit-required confined space?
  - Wear a body harness.
  - Test the air with a gas detector.
  - Complete a confined space entry permit.
  - Have a trained attendant with you.
  - Use a tripod for fall protection.
  - Use a tripod for retrieval purposes.
  - All of the above.

ANSWERS ON PAGE 58

## Looking for Answers?

### Check the Archives

Are you new to the water and wastewater field? Want to boost your knowledge about topics you'll face each day as a water/wastewater professional?

All past editions of *Certification Boulevard* back through the year 2000 are available on the Florida Water Environment Association's Web site at [www.fwea.org](http://www.fwea.org). Click the "Site Map" button on the home page, then scroll down to the Certification Boulevard Archives, located below the Operations Research Committee.

## SEND US YOUR QUESTIONS

Readers are welcome to submit questions or exercises on water or wastewater treatment plant operations for publication in *Certification Boulevard*. Send your question (with the answer) or your exercise (with the solution) by e-mail to [roy.pelletier@cityoforlando.net](mailto:roy.pelletier@cityoforlando.net), or by mail to:

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# Certification Boulevard Answer Key

From page 17

- A. Sodium hydroxide**  
*Sodium hydroxide is typically used when a wet scrubber is treating odorous air high in hydrogen sulfide (H<sub>2</sub>S). This chemical reaction increases the pH within the scrubber liquid and absorbs, or drives, H<sub>2</sub>S from the air into the solution.*
- True**  
*Water leaking out of a collection system pipe is called exfiltration ... meaning it is exiting the pipe. Water seeping into a collection system pipeline is called infiltration. Water entering a collection system through manhole covers and cleanouts is called in-flow.*
- B. 31,416 gallons**  
**Gallons Capacity**  
 $= 0.785 \times \text{diameter}^2 \times \text{depth, ft.} \times 7.48 \text{ gal per ft}^3$   
 $\text{Or } \pi r^2 \times \text{depth, ft.} \times 7.48 \text{ gal per ft}^3$   
**Liquid depth in wet well**  
 $= 103.4 \text{ feet} - 82.5 \text{ feet} = 20.9 \text{ feet}$   
 $= 0.785 \times 16 \text{ feet} \times 16 \text{ feet} \times 20.9 \text{ feet} \times 7.48 \text{ gal per ft}^3$   
 $= 31,416.5 \text{ gallons}$
- D. Oxygen**  
*It is not common to find oxygen in the air space of a sewer collection system, but if oxygen is present in the air space, it could cause damage to the crown of the pipe from oxidation.*
- C. The debris will settle.**  
*Sanitary sewer pipelines are typically designed and constructed to maintain a minimum velocity of 2 fps (feet per second) to prevent settling of solids and debris. So, a velocity in a pipeline of 1 fps will cause debris to settle.*
- B. Hydrogen sulfide**  
*Since Hydrogen Sulfide (H<sub>2</sub>S) gas is heavier than air, with a specific gravity of 1.1763, its concentration is greatest near the bottom of enclosed spaces. Death can occur when people enter poorly ventilated spaces such as deep wells, underground tanks, or sewer systems.*
- D. All of the above.**
- B. With a manhole hook.**  
*The right tool for the right job! A manhole hook is designed to lift and remove a manhole cover safely; it should be the only tool used to perform this task.*
- B. Aluminum**  
*Forms of clay, iron, or concrete (and PVC) are all materials of construction for various pipes. Aluminum is not a common material for collection system pipes.*
- G. All of the above.**  
*All of these tasks are important and required to enter a permit-required confined space safely.*