



Certification Boulevard

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Test Your Knowledge of Topics Related to Pipe Maintenance

Thanks to Roger M. Cimborra Sr., general manager of Professional Piping Services Inc., for providing these questions and answers—Roy

1. What are the expected results of pigging a wastewater force main?
 - A) A decrease in wet well evacuation time
 - B) An increase in fluid velocity
 - C) A decrease in operating pressures
 - D) A decrease in pump usage and energy costs
 - E) All of the above
2. How long will it take for a pig to travel through two and half miles of a piping system at an average velocity of 3 FPS?
 - A) 37 minutes
 - B) 73 minutes
 - C) Two and half hours
 - D) 1 hour and 20 minutes
3. Requiring a newly installed piping system to be cleaned before it is put into service can:
 - A) remove any possible construction oriented debris.
 - B) check and confirm that the system valving is properly operational.
 - C) enhance the effectiveness of chlorination or other chemical treatments.
 - D) purge the system of any air that may impact hydrostatic testing.
 - E) accomplish all of the above.
4. When designing the rehabilitation of a piping system using a pigging procedure, special consideration must be given to:
 - A) the number of 90-degree and 45-degree fittings in the system.
 - B) elevation changes.
 - C) interior diameters.
 - D) the supply and disposal of the flow volume to be used.
 - E) the age and history of the system.
5. Locating and tracking subaqueous and underground piping systems using a pig containing an electronic signaling device:
 - A) can not be done.
 - B) won't work in cold weather.
 - C) can be achieved with the system online.
 - D) requires special fittings and valving.
6. The distance that a pig can travel through a piping system while cleaning or detecting is:
 - A) limited to 1,000 feet.
 - B) unlimited.
 - C) limited by pipe size and flow.
 - D) limited to a mile.
7. A wastewater force main while being cleaned requires:
 - A) that the system come off line.
 - B) that the valving is changed.
 - C) that the system remain in normal service.
 - D) extensive collection and disposal procedures.
8. Which of the following is the type of valve that a pig can not navigate through?
 - A) Horizontal and vertical check valves
 - B) Plug valves
 - C) Gate and ball valves
 - D) None of the above
9. As is typical of many systems, the diameter of the piping changes per design. To clean this piping would require:
 - A) opening the system at every point where the diameter changes.
 - B) using multi-dimensional pigs.
 - C) increasing the pressure and flow volume supplying the system.
 - D) modifying the physical or chemical components of the flow in the system.
10. The site preparations for an oxygen production plant's piping are necessarily extremely stringent. To ensure that these preparations are done properly and safely:
 - A) pigs in conjunction with chemical treatment are required to be used.
 - B) chemical treatment solely is sufficient to be used.
 - C) pigs can not be used because their use is stymied by the many turns and multi-dimensional sections of the piping system.
 - D) high-pressure air is connected to the system and its contents are blown out.

ANSWERS ON
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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, or by mail to:

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Certification Boulevard Answer Key

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1. **E) All of the above**

2. **B) 73 minutes**

$2.5 \text{ miles} \times 5,280 \text{ ft per mile} = 13,200 \text{ ft}$
 $13,200 \text{ ft} \div 3 \text{ ft/second} = 4,400 \text{ seconds}$
 $4,400 \text{ seconds} \div 60 \text{ seconds per minute equals } 73 \text{ minutes}$

3. **E) accomplish all of the above.**

A properly cleaned, newly installed system will have its inline and connecting valving checked and have its interior cleaned with the air in it removed, thereby allowing for the effective application of hydrostatic testing and chlorination.

4. **D) the supply and disposal of the flow volume to be used.**

Though all of these factors have to be evaluated, the supply and disposal of the volumes of fluid to be used is typically the most critical because it can sometimes be measured in the millions of gallons for a large-diameter system.

5. **C) can be achieved with the system on line.**

Detector pigs can be used readily in systems with no special requirements, other than entry and exit ports.

6. **B) unlimited.**

A big advantage of a pig is that the distance it can travel through a piping system is unlimited and affected only by practical considerations.

7. **C) that the system remain in normal service.**

The only change occurring while a force main is being cleaned is that the accumulated and deposited materials that are reducing its flow capacity and C Factors are being removed incrementally while the system remains in its normal operating mode.

8. **E) None of the above**

Properly designed and applied pigs can be used successfully to clean piping systems that have all these types of valving used to control the flow in them.

9. **B) using multi-dimensional pigs.**

Pigs can be designed to be multi-dimensional, and they can be effectively and safely used in systems where up to 70 percent of their cross-sectional area may be reduced or expanded.

10. **A) pigs in conjunction with chemical treatment are required to be used.**

The effective way to clean an oxygen production plant's piping is to use the pipe-cleaning ability of a pig in combination with chemical treatment, thereby ensuring a clean, oil-free, pristine interior.