

Tribal Drinking Water Training Series, Course 7: Chemical Feed Pumps and the Disinfection Byproducts Rule

Drinking water operators need a baseline understanding of all the requirements of the Disinfection By-Products Rule (DBPR) and how to minimize these in their drinking water systems. This also relates closely to chemical feed pump operation, maintenance, and troubleshooting. This course will provide that baseline understanding and will give them opportunities to learn the ways to minimize DBPs in their distribution systems while properly configuring, operating, and maintaining their chemical injection equipment.

Chemical Feed Pumps and the Disinfectant Byproducts Rule (6-hour block)

Training Objectives and Learning Outcome:

This 6-hour course will cover chemical feed pumps and the Disinfectant By-Products Rule (DBPR). Attendees will learn about the different types of chemical feed pumps used in drinking water operations including positive displacement vs peristaltic pumps. Chemical feed pump applications, selection and components will be shared. The ins and outs of calculating dosage will be reviewed. Discussion of positive displacement pump and peristaltic pump calibration, maintenance and troubleshooting will provide attendees what they need to know in field situations. Attendees will learn the basic chemistry of DBPs and how to control and minimize their formation in the distribution system. Attendees will have hands-on learning opportunities, calculating dosage and calculating stroke and speed of positive displacement pumps.

Attendees will learn:

- Application of the disinfection process using chlorine and hypochlorite
- Understanding of the breakpoint chlorination process
- Identify the points of disinfectant application and select the proper dosage
- Sample calculations: Chlorine feed rate, dose, and demand versus residual
- Best management practices to manage chlorine residual throughout the distribution system
- Disinfectant By-Product Rule (DBPR) requirements including monitoring, trihalomethanes and haloacetic acids and calculating compliance
- Methods for mitigating DBP exceedances in the distribution system

Agenda:

- 08:30-08:45: Introduction and agenda
- 08:45-09:00: Pre-test
- 09:00-09:30: Why do we disinfect?
 - History of drinking water disinfection
 - Pathogens
 - Disease outbreaks
 - Intrusion of contaminants into distribution systems
- 09:30-10:00: Disinfectant overview
 - Types of disinfectants
 - Disinfection chemistry
- 10:00-10:15: Break
- 10:15-10:45: Introduction to the disinfection byproduct rule
 - Requirements and timeline

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- DBP chemistry and health effects, why we don't want them in our water
 - Exercise 15 min
- 10:45-11:15: Disinfection byproduct rule monitoring requirements
 - MCLs
 - DBP precursor treatment
- 11:15-11:30: Break
- 11:30-12:30: Managing DBPs in drinking water systems
 - TTHM and HAA5 formation control strategies
 - LRAA calculations
 - Methods for DBP mitigation and control
 - Managing chlorine residuals in the distribution system with DBPs in mind
- 12:30-13:30: Lunch
- 13:30-14:30: Intro to chemical injection pumps and equipment
 - Diaphragm pumps
 - Peristaltic pumps
 - Installation considerations
 - Setup and installation
 - Calibration cylinders
 - Communications and control strategies
- 14:30-14:45: Break
- 14:45-15:30: Chemical feed pump operations and maintenance
 - Calibration
 - Priming
 - Common maintenance practices
 - Troubleshooting scenarios
 - Chemical dose calculations exercises
- 15:30-15:45: Break
- 15:45-16:15 Troubleshooting exercises
- 16:15-16:30: Posttest, session wrap-up, evaluations
- 16:30: Adjourn, 6 hours of content excluding breaks and lunch