HYDRAULICS FOR FIRE PROTECTION

This one-day program is designed to concentrate on one portion of the design phase of water based fire protection systems, the hydraulics. This seminar discusses theory and application of hydraulic calculations, the various decisions that can affect them, and how to prove the design of the system will meet the water supply available as describe in NFPA 13 by using actual problems. The program also offers various alternatives to solving a problem and shows the comparison among them, and offers some basic methods to check the accuracy of hydraulic calculations.

PARTICIPANTS WILL NEED A COPY OF NFPA-13 (Current Edition)

PARTICIPANTS WILL NEED A CALCULATOR WITH A $(y)^{x}$ FUNCTION KEY

This is an intermediate level class.

Overview – Provides the attendees with a basic knowledge of the various principles involved in the specific part of sprinkler design dealing with hydraulic calculations and the things that can affect them. The course is specifically designed to incorporate actual problems into the course material. The course emphasizes gaining familiarity with the principles involved by using practical application problems that build in to an overall understanding of the entire process. The program uses a step by step approach to continually build upon and broaden the participants’ understanding of the entire design process.

Goals – To familiarize the participants with hydraulic principles so they may feel comfortable in applying their knowledge and understanding to actually developing and/or reviewing calculations for water based fire protection system.

Learning objectives for participants:
- Understand the basic theories, principles & definitions used in hydraulics
- Understand the basic mathematic principles used in hydraulic calculations
- Understand basic causes for pressure losses & how to determine the amount of those losses
- Become familiar with the variables that can affect hydraulics
- Understand how to determine the size & location of a design area
- Understand the principles involved in evaluating water supplies
- Understand how to actually solve a hydraulic calculation problem by hand
- Understand how different approaches to the same problem can affect the hydraulics of system
- Become familiar with several methods of spot checking hydraulic calculations

Course Outline
- Basic theory of hydraulics
- Definitions used in hydraulics
- Types of pressure losses w/examples & problems
- Basic math relationships used in hydraulics
Hydraulic principles used in sprinkler calculations
Evaluating water supplies
Decisions that affect hydraulics of a system
Basic steps for hydraulic calculations
Step by step actual hand calculation problem
Comparative analysis of different hydraulic approaches to a problem
Tips for checking hydraulic calculations

Experience Level – INTERMEDIATE: This seminar is well suited for participants who are:
- Code Officials (Building/Fire/Mechanical)
- Plan Reviewers
- Designers/Layout Technicians/Contractors
- Design Professionals (Architects/Engineers)
- Building Owners/Managers
- Insurance Representatives

Prerequisites – For attendees who:
- Know and apply the codes/standards
- Have one to two years in code enforcement
- Possess a basic knowledge in construction
- Can read and understand basic construction drawings/technical documents

Hydraulics for Fire Protection Syllabus

8:00 - 8:30 Introduction and Course Overview
8:30 - 9:15 Hazard and Commodity Classifications
9:15 - 9:45 Theory of Hydraulic Calculations for Fire Protection System
Selection of the Hydraulic Most Demanding Area
Number of Sprinklers to Operate based on Spacing
Charting the Water Supply Information.
9:45 - 10:00 Break
10:00 - 11:00 Basic Math and Basic Hydraulics
The K-Factor
Determining Flow in GPM
Determining Required Pressures
Determining Friction Loss
11:00 - 12:00  Design Options for Hydraulically Calculating Fire Sprinkler systems
   Area Density Method
   Room Design Method
   Residential Method
   Large Drop Method
   ESFR Method
   Dry System Method
   Quick Response Method
   Storage Methods

12:00 - 1:00  Lunch

1:00 - 2:30  Sizing the Remote area
   Hydraulic Calculations Step by Step

2:30 - 2:45  Break

2:45 - 4:30  Hydraulic Calculations Step by Step