Earn 35 PDH's / 3.5 CEU's*

EMERSON SWAN

# ASHRAE Fundamentals of Water System Design

**Training Location: Taco Inc., 1160 Cranston St, Cranston, RI 02920**
**Training Dates: 11/30/15 – 12/03/15**
**Training Times: 8:00am – 5:00pm**
**Cost *With* Hotel: $502 (lunch, dinner, training materials and hotel accommodations included)**
**Cost *Without* Hotel: $175 (lunch, dinner and training materials included)**
**Training Registration: www.emersonswan.com/ashrae.html**

## What You Will Learn

You will develop an understanding of the basic concepts of hydronic system operation and design including piping systems, pipe materials and fittings, centrifugal pumps, terminal units, expansion tanks and water chillers. After completing the course, you should know:

- The components of closed and open hydronic systems.
- The basic concepts of piping system design.
- The different types of pipe used in hydronic systems.
- How centrifugal pumps operate.
- How to match pumps to systems.
- What variables are involved in terminal unit control.
- How to optimize water chiller operation.

## Class Content

**Monday, November 30th | 8:00am – 5:00pm**

- Water System Design Components: Introductory concepts, basic system components, heat transfer in hydronic systems and load systems.
- Piping System Design: Basic considerations, design philosophy, sizing piping, and flow rate measurement.
- Pipe Materials and Fittings: Pipe materials, corrosion, valves and fittings, backflow-prevention devices, and pipe selection.

**Tuesday, December 1st | 8:00am – 5:00pm**

- Centrifugal Pumps: Types of pumps, pump selection and system design considerations.
- Terminal Unit Performance and Control: Types of terminals, performance and control, system control characteristics, and system control configurations.

*More>>*

## Class Content (continued)

**Wednesday, December 2nd | 8:00am – 5:00pm**

- Expansion Tanks and Air Elimination: Open and closed water systems, hydronic accessories, and sizing expansion tanks.
- Piping System Development: Piping system design, direct return analysis, primary-secondary analysis, types of pumps and valves, primary-secondary application study, antifreeze solutions for low temperature applications, and pumping design factors.

**Thursday, December 3rd | 8:00am – 5:00pm**

- Matching Pumps to Systems: Matching the pump to the system, parallel pumping, series pumping, standby pumps, trimming pump impellers, two-speed pumping, variable speed pumping and source distribution pumping.
- Water Chillers and Load Control: Basic water chiller components, refrigeration cycle, heat transfer chiller, refrigeration power, chiller types and control, chiller piping arrangements, chiller energy performance and thermal storage.

## Who Should Enroll in this Course?

- Recent engineering graduates working in the HVAC&R industry;
- Experienced engineers who have entered the HVAC&R industry from other engineering fields; or
- Other professionals who want to increase their knowledge of water system design

## Registration Details

Everyone who registers for this four day training event will receive printed training materials and video from the class. Lunch and dinner will also be provided each day. You have the option to register with hotel accommodations ($502) or without ($175). Please visit www.emersonswan.com/ashrae.html to register for this event. We accept Visa, Master Card, Discover or American Express.

**Training Accommodations**

The training will be held at Taco, Inc: 1160 Cranston St, Cranston, RI 02920. Directions and other information can be found on their website www.taco-hvac.com.

**Hotel Accommodations (optional)**

Hotel accommodations will be made for you at The Hilton Garden Inn for three nights (Monday, Tuesday & Wednesday) and will include shuttle transportation to and from the training at Taco. Directions and other information can be found on their website http://hiltongardeninn3.hilton.com/en/hotels/rhode-island/hilton-garden-inn-providence-airport-warwick-PVDGIGI/index.html.

*Those who complete the course receive a certificate designating continuing education credits. Each individual earns continuing education credits corresponding to the number of course hours attended. Individuals are responsible for contacting their relevant governing body to determine whether an activity qualifies for that body's continuing education credits.

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