



COURSE GUIDE



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GREENHECK EDUCATIONAL OPPORTUNITIES

Course Description

Professional Development Hours

COR-001 Applying State-of-the-Art Engineering Technology in Manufacturing

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This course will introduce you to state-of-the-art engineering technology for designing and manufacturing world class HVAC equipment. You will observe and tour an AMCA Air chamber and rapid prototyping.

CAP-001 Increasing Design Efficiency Using Software

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This course discusses how to be more efficient in the design process using Greenheck's software. It covers three major software; eCAPS®, CAPS, and Revit integration. Included is a demonstration on how to size, apply, specify, schedule and generate AutoCAD® or Revit® drawings for fans, energy recovery, packaged rooftop units, louvers, and dampers. Energy recovery payback analysis and other time-saving features are included.

FAN-001 Non-invasive Airflow Measurement for Fans

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Invasive airflow measurement devices create turbulence at the fan inlet resulting in a system effect causing greater energy use and higher noise. This course will discuss how a non-invasive airflow management system works without increased energy consumption or higher sound levels, along with the applications that may require airflow monitoring.

FAN-002 Energy Codes and Their Impact on Fan Selection

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This course will introduce fan energy efficiency metrics and how they are used for compliance with building and energy codes such as ASHRAE 90.1. Recent activities and future changes to efficiency metrics will be presented, providing up-to-date information needed for proper fan selection to minimize energy consumption.

FAN-003 Replacing Large Centrifugal Blowers in Retrofit Applications

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Building renovation presents a significant challenge, especially when existing large centrifugal blowers need to be replaced due to age, or simply to reduce energy. Design and application challenges of fan replacement shall be discussed along with the benefits of applying fan arrays as a replacement.

FAN-004 Specifying Proper Bearings for Fan Systems

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Proper bearing design and specification ensures long, trouble-free fan operation. This course reviews bearing nomenclature, proper bearing selection and specification for the application, bearing lubrication, and minimizing bearing failure on motors used with variable frequency drives.

FAN-006 Understanding Vibration; Properly Specifying Fans to Meet Vibration Requirements

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Many HVAC applications require minimizing structural vibration. This course reviews the definitions and source of mechanical vibration and solutions to minimize it, along with proper vibration specification. A review of AMCA / ANSI 204 and observation of an actual fan vibration test is included.

FAN-007 Selecting and Specifying Equipment for Seismic Applications

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Many geographic areas require mechanical HVAC equipment to withstand seismic events of various magnitudes. This course will discuss the requirements for applying equipment in a seismic zone, codes and standards and how to specify equipment to meet a project's seismic requirements, seismic testing, certification, and the California Office of Statewide Health Planning and Development (OSHPD) criteria.

FAN-009 System Effect Demonstration

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This course demonstration will identify the common causes that result in deficient fan performance. You will observe how "system effect" is caused by poor duct configurations on the fan inlet or outlet which affects catalogued performance. The four AMCA test methods to understand correct installation related to fan installation will also be discussed.

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FAN-010 Cost Effective Ways to Protect Fan Motors

.75

This course discusses how to reduce project costs and ensure that fan motor starters are properly sized and supplied, simply by changing your project specifications. This session will review motor starter technology along with the benefit to the customers and engineers by having the motor starter supplied with the fan. Included are detailed sample specifications.

FAN-011 Laboratory Fume Exhaust

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This course is aimed at familiarizing participants with the basics of laboratory ventilation and emphasizing the importance of codes and standards for laboratory design. AMCA's Induced Flow Ratings Seal will be explained along with a discussion on airflow measurement and controls. The differences between constant and variable volume systems will be discussed, energy recovery considerations for laboratories, and reducing fan energy in demand-based laboratory exhaust systems.

FAN-012 Motor Technology in the HVAC Industry/EC Motor Demonstration

.75

This course examines new and existing motor technology in the HVAC industry. A comparison of traditional AC induction motors, permanent magnet (PM) and electronically commutated (EC) motor technology is presented. The interactive demonstration illustrates the controllability, energy efficiency, reliability and payback of using EC motors in single phase applications. The demonstration will also introduce you to additional systems and applications for variable fan flow based upon pressure, temperature, humidity, volatile organic compounds (VOC), and carbon dioxide space control.

FAN-013 Understanding Air and Sound; Properly Specifying Fans to Meet Performance Requirements

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Understanding and meeting air performance and acoustical criteria for HVAC applications are critical project requirements. This course reviews the fundamentals of air performance including nomenclature, reading fan curves and proper fan selections. Information regarding acoustical terminology will be presented along with the differences between sound power and sound pressure and how manufacturers acoustically test equipment.

FAN-014 HVLS Fan Design, Application, and Specification

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This course covers the proper selection and specification of high volume, low speed (HVLS) fans for different applications. An overview of HVLS performance testing, performance data, safety and industry standards is included.

DPR-001 Life Safety Dampers

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Developed to provide basic information on life safety dampers, this course discusses fire, fire smoke, smoke and ceiling radiation dampers and their UL testing requirements, application, and installation. Ease-of-use methods for installation as well as control options that can be supplied for life safety dampers will be presented.

DPR-003 Heavy Duty/Industrial Dampers

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An overview on heavy duty/industrial damper types and functions will be discussed in this course. Proper selection of damper types and specification imperatives (i.e. pressures, temperatures, flows, etc.) for various applications shall be reviewed along with critical construction features and accessories. Designs for special applications will also be introduced.

DPR-004 Selecting and Specifying Control Dampers for Energy Efficiency

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This course discusses how to improve your specifications and schedules to minimize energy and sound in duct-mounted damper systems. This course will assist you in the selection and application of dampers for flow control resulting in lower system energy and sound.

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KVS-001 Kitchen Ventilation Systems: Meeting Codes and Standards

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Based on good kitchen design principles, this course focuses on products and concepts that promote energy efficient kitchen ventilation design. The value of demand ventilation (variable volume) systems and strategies regarding the application and selection of the right system configuration for various applications is discussed. Other topics include payback analysis, the integration with building management systems, and electronically commutated (EC) motors.

LVR-001 Specifying Equipment for Surviving Hurricane Wind Forces

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Equipment located in coastal applications are required to survive substantial wind loads, flying debris and/or wind-driven rain. This course will define equipment application criteria and review the current applicable standards and codes. Proper specification verbiage to meet Hurricane Prone Region applications will be presented, as well as a review of present and proposed future International Building Codes and the Florida Building Code.

LVR-002 Understanding AMCA 500-L Louver Weather Testing and FEMA 361 Tornado Shelters

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This course focuses on the different louver weather test procedures within AMCA 500-L while providing valuable louver application guidelines. FEMA 361 dictates stringent construction guidelines for FEMA funded Tornado Safe Rooms or Shelters. This course will provide you with an understanding of FEMA 361 along with an understanding of the type(s) of louver products required for compliance.

LVR-003 Understanding AMCA 500-L Louver Weather Testing and Louvers for Specific Market Segments

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This course focuses on the different louver weather tests procedures within AMCA 500-L while providing valuable louver application guidelines. Additionally this course will provide you with an understanding of most commonly applied louver types for specific market segments, such as data centers and warehouse/distribution center projects.

TAP-001 Air-to-Air Energy Recovery

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This course discusses the benefits of air-to-air energy recovery applied to ventilation systems and energy recovery technology (devices), pros and cons of available technology, psychrometrics, payback analysis, and the latest energy standards and code mandates. An overview of typical energy recovery applications and design considerations such as frost protection, bypass, and controls is included.

TAP-002 Make-Up Air Ventilation

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This course discusses make-up air systems used in commercial kitchens and industrial applications. Topics include heating and cooling technologies, energy reduction strategies, direct and indirect gas heating technology, controls, UL requirement for cooling in kitchens, demand-based ventilation for saving energy, processing make-up air, and building pressurization. Applications for 80/20 vs. 100% outdoor air, the benefits of direct-fired gas heat vs. other heating systems for warehouses, and codes and standards..

TAP-003 Conditioning High Percentages and 100% Outdoor Air

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This course discusses common HVAC systems found in commercial and institutional applications and the methods used to condition high percentages of outdoor air with an overview and comparison of Single Zone Variable Air Volume (VAV), Multi-Zone Variable Air Volume (VAV) and Dedicated Outdoor Air Systems (DOAS). Significant reduction of energy use can be achieved by applying different equipment schemes. The benefits of applying total heat energy recovery, decoupling latent and sensible loads, different compressor technologies, economizer options modulating head pressure control, and high turndown furnaces are reviewed in detail. New codes and efficiency standards are also reviewed that apply to dedicated outdoors air systems.