58th
1958-2015

North Carolina Industrial Ventilation Course

Receive the **28TH EDITION** INDUSTRIAL VENTILATION MANUAL

May 4-8, 2015

Holiday Inn Downtown Raleigh, Raleigh, NC

TWO OPTIONAL WORKSHOPS-MAY 8

Ventilation Issues & Answers

HVAC for the Industrial Environment

Industrial Ventilation Design or Industrial Ventilation System Diagnosis & Troubleshooting Certificate Programs Included!

North Carolina Industrial Ventilation Course in cooperation with

University of North Carolina-Chapel Hill, School of Public Health
North Carolina Occupational Safety & Health Education & Research Center

NC Department of Labor, Division of Occupational Safety & Health

Visit www.ncindustrialventilation.com

Who should attend?

- Engineers and Designers
- Safety Personnel
- Industrial Hygienists
- Consultants
- Maintenance Personnel

58th Annual North Carolina Industrial Ventilation Course

May 4-8, 2015 • Holiday Inn Downtown Raleigh Hotel • Raleigh, NC

ELEMENTS OF THE PROGRAM

CLASSROOM SESSIONS — MAY 4-7

The problems represent real world situations and are sequenced in a manner to take advantage of skills that the students acquire.

In order to facilitate computations in the problem sessions, students are required to bring a calculator.

TWO OPTIONAL CONCURRENT WORKSHOPS–MAY 8

Workshop I—Ventilation Issues & Answers

This optional full day workshop, on modern issues in workplace ventilation will bring together experts from all the respective disciplines in order to give the student perspectives on the following areas:

- What Suffices as a PHA
- Lab Hood Testing
- PM 2.5
- PELs, OELs, and TLVs

Workshop II-HVAC for the Industrial Environment

This full day workshop will address the critical area of Heating, Ventilation, & Air Conditioning (HVAC) in the Industrial Environment. The instructor, a registered Professional Engineer, has been a designer of both Industrial and Commercial HVAC systems throughout his career. He has been an Instructor on the North Carolina Industrial Ventilation Conference staff for more than 40 years. The Workshop will include the following:

- HVAC System Development
- HVAC Fundamentals – Nomenclature, H/C Loads, Etc.
- Ventilation
- Applied Psychrometrics
- Commercial & Industrial HVAC Equipment & System Applications

A question and answer session will follow each workshop.

VENTILATION SYSTEM LABS

The Course has several ventilation systems that are used for demonstration purposes. These systems consist of ductwork, various hoods, variable speed centrifugal fan, stackcaps, and sound attenuators. These 'hands-on' exercises to measure flow and pressure are key to the program. Measurement capability with each system includes: pitot tube traverse to determine flow rate, hood static pressure, duct pressure drop, and simulation of fan and system curves. The Diagnosis and Troubleshooting Section also uses a demonstration lab to learn and apply basic troubleshooting skills.

FOUNDERS BANQUET

Is held Tuesday evening after classes and is an opportunity to meet people early in the week. Dinner will be served on the 20th floor of the Holiday Inn Downtown Raleigh, overlooking the city.

INDUSTRIAL VENTILATION CERTIFICATE COURSE

The North Carolina Industrial Ventilation Course in collaboration with the University of North Carolina, Occupational Safety and Health Research Center has established two Certificate courses in Industrial Ventilation. Upon completion of the course individuals will be awarded a **Certificate in Industrial Ventilation Design** or **Certificate in Industrial Ventilation System Diagnosis & Troubleshooting,** and a plaque from the University of North Carolina, Occupational Safety and Health Education and Research Center.

Program requirements:

- Successfully complete two levels of courses offered at the North Carolina Industrial Ventilation Course. Each level will be four days in length.
- The first (Basic) level is a four day course in applied industrial ventilation techniques including Hood & Duct Design, Fan Basics, Introduction to Air Control Devices (Baghouses, Scrubbers, ESP's, etc.) and Basic Industrial Hygiene Issues and how they affect exposure and ventilation system design.

  The student has a choice in the second year to continue with more detailed course in system design (leading to a **Certificate in Industrial Ventilation Design** from the University of North Carolina-Chapel Hill) or to pursue a course of System Diagnosis and Troubleshooting (leading to a **Certificate in Industrial Ventilation System Diagnosis and Troubleshooting** from the University of North Carolina-Chapel Hill).

The certificate program is included in the cost of the program. For more information about the Certificate Program please contact Connie McElroy-Bacon at (919) 233-8400 or go to the North Carolina Industrial Ventilation Course web site at www.ncindustrialventilation.com.

PLAN OF INSTRUCTION

Basic Industrial Ventilation Skills (8 Modules)

Basics of Ventilation and Industrial Hygiene I

Requires some basic algebra skills to solve problems. Includes an introduction to flow and pressure in a duct system and how they can be measured and provides an introduction to the effects of density of the air stream and how it affects duct sizes and selection of proper fans and motors. It also includes a primer on Industrial Hygiene in the workplace.

Hood Design

The first in-depth course of its type looking at: hood classifications and types, capture velocities, air distribution over a large area, hood "losses", air volume requirements for different hood designs includes simple problem sets to calculate hood flow requirements and losses and how this impacts the horsepower and energy in a system.

Duct Component Design

An in-depth look at the primary components (elbows, fittings, ductwork) that define the system size including the effects of static, velocity and total pressure, hood static pressure, hood and duct losses and a lab demonstration.

System Design I

Building on the skills taught in the first three modules, this course introduces the attendee to the use of the ACGIH Calc Sheet to design and predict the operation of a system, how to size a fan and calculate horsepower.

System Design II

A second module of system calculations looking at temperature and other density effects and the design of system duct and fans.

System Components - Fans and Collectors

Introduces the student to the basic concepts of Air Control Device and Fan Design; includes nomenclature to specify equipment and the parameters needed for proper design.

System Design III

Combining all of the building blocks of the system, the student will begin to look at Industrial Ventilation design as a whole. This includes more detailed use of the ACGIH calculation sheet and Manual to solve practical problems from the workplace.

Industrial Ventilation Design Courses (Eight Modules required for Certificate)

Prerequisite: for certificate program in Industrial Ventilation Design: Completion of Basic Level taken at N.C. Industrial Ventilation Course. Participants should be able to:

- Utilize *ACGIH Industrial Ventilation Manual*
- Understand the Velocity Pressure Method of design
- Utilize the ACGIH calculation sheet

Basics of Ventilation II
An intense review of the Basic (First Year) course, this module does a quick revisit of basic formulae of system design (Q=VA, Hood Static Pressure, Effects of Density), sizing of duct, system pressure, and calculation sheet review. This module is intended for attendees who have completed basic modules or have over five years ventilation design experience.

Basics of Ventilation III
This course covers basic psychrometrics, the perfect gas equation and sample problems explaining both concepts. Subjects include dry bulb and wet bulb temperature, dew point, enthalpy.

System Design IV
This module focuses on using the calculation sheet and techniques to solve problems involving non-standard air and mixing of hot and cold or dry and wet air streams.

Fans 201
This segment is a continuation of information provided in the Basic Course module and focuses on system effects and issues that may improve or impede operation. The module includes demonstration and practical problems to solve.

System Design V
This module adds more detailed design issues including the implementation of system effects losses, adiabatic cooling and stack design.

Energy and Cost
Systems use large amounts of horsepower to convey dust and gases. This module provides the attendee with tools to calculate both the initial system costs as well as operating costs (power, maintenance, replacement air, etc.) and includes sample problems.

System Design VI (8 hours - two modules)
Includes a "real world" problem to combine all of the techniques found in the course. This will use all of the tools and techniques taught previously in the week.

Diagnosis and Troubleshooting Courses (Eight Modules required for Certificate)

Prerequisite: for the Certificate Program in Industrial Ventilation System Diagnosis and Troubleshooting: completion of Basic Level taken at N.C. Industrial Ventilation Course

- Utilize System Diagnosis and Troubleshooting Manual
- More practical applications with less math
- Requires calculator and some problem solving

Measuring and Monitoring System Performance
Provides the basic insight into requirements including documentation, use of fan performance curves and system measurements to monitor operations. Minimal math required.

Measuring and Monitoring System Performance II
This module builds on the basic data gathering methods to provide hands on experience on system data comparing baseline information with changes that may occur over the life of the system.

Monitoring & Maintenance I
This module will cover extensive lab procedures to evaluate fan operation (fan and system curves) as well as effects of varied pressures during operation (i.e. baghouse delta-P, etc.) and an introduction to effects of changes in density on results of measurements.

Practical System Troubleshooting I
In this module, the participant will look at comparison data to evaluate the changes to a system over operation.

Practical System Troubleshooting II (8 hours - two modules)
This module is a continuation of the practical problem solving as systems are altered over their operational life.

Registration/pick up course materials:
Monday, May 4 | 7:30-8:00 AM | Hotel Lobby
Lunch: Monday - Friday | 12:00-1:00 PM

	Monday*	Tuesday	Wednesday	Thursday
Basic Ventilation Skills				
8:00 – 12 noon	Basics of Ventilation & IH	Duct Component Design	System Components - Fans and Collectors	System Design III
1:00 – 5:00 PM	Hood Design	System Design I	System Design II	System Design III
Advanced Design				
8:00 – 12 noon	Basics of Ventilation II	Fans 201	Energy & Cost	System Design VI
1:00 – 5:00 PM	Basics of Ventilation III	System Design IV	System Design V	System Design VI
Diagnosis and Troubleshooting				
8:00 – 12 noon	Basics of Ventilation II	Measuring & Monitoring the System II	Monitoring & Maintenance I	Practical System Troubleshooting II
1:00 – 5:00 PM	Measuring & Monitoring System Performance I	The Fan and System	Practical System Troubleshooting I	Practical System Troubleshooting II

*** 7:00 PM Monday:** Math Terminology Update

TWO OPTIONAL WORKSHOPS (Held Concurrently)

FRIDAY: 8:00 AM–4:00 PM

Workshop I-Ventilation Issues & Answers.
It's difficult to keep up with everything in this field. Regulations, focus on certain industries, technologies, controls-always in continuous flux.

Topics to Include:

- What suffices as a PHA per NFPA combustible dust standards
- Lab Hood Testing
- PM 2.5
- PELs, OELs, and TLVs

Workshop II-HVAC for the Industrial Environment.
Heating, Ventilation, & Air Conditioning is indeed a critical element of the Industrial Environment

Topics to Include:

- HVAC SYSTEM DEVELOPMENT
- HVAC FUNDAMENTALS – NOMENCLATURE, H/C LOADS, ETC.
- VENTILATION
- APPLIED PSYCHROMETRICS
- COMMERCIAL & INDUSTRIAL HVAC EQUIPMENT & SYSTEM APPLICATIONS

PROGRAM STAFF

*Planning committee member

ACKERSON, ROSS, Air Solutions, Inc., St. Louis. MO
BOSTON, KIRT, Donaldson Co., Minneapolis, MN*
CURRAN, PAT, NC Division of Public Health (Retired), Raleigh, NC*
GODBEY, THOMAS, Donaldson Co. (Retired), Jeffersontown, KY*
GUNNELL, DOUGLAS L., Gunnell Engineering Services, Winston-Salem, NC*
GRESHAM, NEIL, Saint-Gobain Corp., Oxford, NC*
GRUBB, GREGG, MIOSHA, Lansing, MI. *
HALE, JONATHAN, Air Systems Corp., Clemmons, NC*
HERRING, ROMIE, RH Consulting LLC, Raleigh, NC*
HOWARTH, BILL, Illinois Blower Company, Cary, IL
HUNTER, RAYMOND B., Ray Hunter & Associates, Birmingham, AL
JOHNSON, GARY, Workplace Exposure Solutions, LLC, Cincinnati, OH
LANHAM, GERRY, KBD/Technic, Inc. (Retired), Cincinnati, OH*
LEHNER, LORI, Donaldson Co., Minneapolis, MN
LOWE, ERIC, RL Kunz, Raleigh, NC
MALETICH, DAVID, New York Blower, Willowbrook, IL
MANNING, CHRIS, Materials Processing Solutions, Inc., Boston MA
MARSHALL, BRIAN, The Kelly Group, Decatur, IL
MCELROY-BACON, CONNIE, McElroy-Bacon Consulting, Cary, NC*
RAVERT, ED, CLARCOR Industrial Air, Cincinnati, OH
SHEARER, ROBERT, KBD/Technic, Inc. Cincinnati, OH
STALLINGS, JEFF Stallings Engineering, Winston-Salem, NC
STROHSCHEIN, SUSIE, Air Systems Corp., Clemmons, NC
SULLIVAN, PAUL, NC-OSHA, Charlotte, NC*
TRAMM, LEO, TRC Environmental Corp., Milwaukee, WI*

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Industrial Ventilation Course
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Visit our Website:
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Industrial Ventilation Design or
Industrial Ventilation System Diagnosis & Troubleshooting

TWO OPTIONAL WORKSHOPS–MAY 8
Ventilation Issues & Answers
HVAC for the Industrial Environment

GENERAL INFORMATION

This Course was established to promote good ventilation practices and design techniques throughout industry and will help you learn to evaluate and/or design a ventilation system.

Classroom problems will be solved using the Velocity Pressure Method of calculation.

Classroom sessions and morning registration on May 4, will be held at the Holiday Inn Downtown Raleigh, 320 Hillsborough St., Raleigh, NC. with the first session beginning at 8:00 am. The two optional workshops will be held concurrently on Friday, May 8, 8:00 AM.

TUITION

The cost for Level I Basics of Ventilation, Level II Advanced Ventilation Design OR Level II System Diagnosis and Troubleshooting is $1,395 per person. The three levels are taught concurrently May 4-7.

Tuition for either of the two optional workshops on Friday, May 8, is $295 per person.

Please call about company discounts for 3 or more Course registrants.

Course registration fees include the 28th edition ACGIH Industrial Ventilation Manual or System Diagnosis & Troubleshooting Manual, all course materials (problems, calculations sheets), breaks, four continental breakfasts, four lunches, and the Founders Dinner on Tuesday, May 5. The Friday workshop registration fee includes handouts, continental breakfast, lunch and breaks.

The two year Certificate Program is included in the cost of the course.

MAINTENANCE POINTS —The NC Ventilation Course contains 30 hours of technical contact time and is eligible for an estimated 4.0 ABIH CM Points. The optional workshop contains an additional 7 hours of technical contact time and is eligible for an estimated 1 ABIH CM Credit.

PROFESSIONAL DEVELOPMENT HOURS (PDHs) — The Industrial Ventilation Course (S-0213P) is an approved sponsor of continuing competency activities for North Carolina Professional Engineers and Registered Land Surveyors (30 Contact Hours).

ACCOMMODATIONS — Rooms have been set aside at Holiday Inn Downtown Raleigh for participants of this Course, but their availability cannot be guaranteed past April 20. Lodging is NOT included in your registration fee. Please make your own reservation directly with the Holiday Inn Downtown Raleigh. To receive your special rate of $79/night (plus tax), please state that you will be attending the **Industrial Ventilation Course**.

HOLIDAY INN DOWNTOWN RALEIGH HOTEL
320 Hillsborough St., Raleigh, | NC 27603 919-832-0501

PARKING — On-site parking is available for Holiday Inn Downtown Raleigh guests and Course attendees at no charge.

CANCELLATION — **The full registration fee or an organization purchase order is due at the time of registration. In the event the participant cancels, a written notice is required. A twenty-five dollar ($25.00) fee will be charged for cancellation. No reimbursement can be made if cancellation occurs within 7 business days of the program, or if the participant fails to attend.**

OTHER VENTILATION COURSES

The **Birmingham Industrial Ventilation Conference** will be held October 2015. For information please call (520) 548-8446.

The **65th Annual Michigan Industrial Ventilation Conference** will be held in Michigan in February 2016. For information please call (517) 322-1133.

58th N.C. Industrial Ventilation Course Registration Form

Holiday Inn Downtown Raleigh Hotel , Raleigh, NC | May 4-8, 2015

Register Online: www.ncindustrialventilation.com
OR fill out this form and mail to address below.

Name _____

Job Title _____

Firm/Org. _____

Work Phone _____

Address _____

City _____ State _____ Zip _____

E-mail _____

Please choose one level. Sign me up for:

☐ Level I-Basics of Industrial Ventilation $1,395
☐ Level II Advanced Vent Design $1,395
☐ Level II System Diagnosis & Troubleshooting $1,395

Enroll me in a Friday, May 8 workshop (choose one below).

☐ Ventilation Issues & Answers $295
☐ HVAC for the Industrial Environment $295

Total $ _____

PLEASE CALL ABOUT PRICE BREAKS FOR 3 OR MORE REGISTRANTS!

Payment must accompany registration

Payment Method:

☐ Visa ☐ MasterCard ☐ AmericanExpress

☐ Check (Make check(s) payable to: Industrial Ventilation Course) ☐ PO

Card Account # _____

Exp. Date _____

Three (or four) Digit Security Code on Back of Card _____

Amount $ _____

Signature _____

Cardholder's Name (please print) _____

Credit Card Billing Address _____

City _____ State _____ Zip _____

Mail to: Industrial Ventilation
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Attn: Connie McElroy-Bacon

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