69th
1958–2027

North Carolina Industrial Ventilation Conference

Receive the 31st Edition Industrial Ventilation Manual

May 3-7, 2027

Hilton Raleigh North Hills, Raleigh, NC

OPTIONAL WORKSHOP–May 7

Current Issues in Industrial Ventilation

Space is Limited

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

Visit www.ncindustrialventilation.com

Who should attend?

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

69th Annual North Carolina Industrial Ventilation Course

May 3-7 • Hilton Raleigh North Hills • Raleigh, NC

ELEMENTS OF THE PROGRAM

CLASSROOM SESSIONS – MAY 3-6

The problem delivered in the classroom sessions will present real world situations and are sequenced in a manner to take advantage of skills the students acquire.

In order to facilitate computations in the problem sessions, students are required to bring a calculator. Students may find a laptop or other device with Excel software useful in class.

OPTIONAL WORKSHOP – MAY 7 (8 AM-12 NOON)

Current Issues in Industrial Ventilation

Each year our planning committee builds a half day optional workshop which addresses current issues in industrial ventilation.

Please see the agenda on the following page for specific topics to be addressed in the the workshop. The workshop is optional and a separate registration fee applies.

VENTILATION SYSTEM LABS

The Course has several ventilation systems that are used for demonstration purposes. These systems consist of ducts, hoods, variable speed fans, stackcaps, and sound attenuators. These systems are used to deliver 'hands-on' exercises to measure flow and pressure and are a key to the program. Measurement 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 system to practice basic troubleshooting skills.

FOUNDERS BANQUET

Is held Tuesday evening after classes and is an opportunity to meet people early in the week.

INDUSTRIAL VENTILATION CERTIFICATE COURSE

The North Carolina Industrial Ventilation Course has established three Certificate courses in Industrial Ventilation. Upon completion of the course individuals will be awarded a **Certificate in Industrial Ventilation Design, Industrial Ventilation for IHs** or in **Industrial Ventilation System Diagnosis & Troubleshooting**.

Program requirements:

- Successfully complete two levels of courses offered at the North Carolina Industrial Ventilation Course. Each level will be four days in length.
- Step One: Complete the first (Fundamentals) level, 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 Fundamental Industrial Hygiene Issues and how they affect exposure and ventilation system design.
- Following the completion of the fundamentals course the student has a choice in the second year to continue with more detailed system design (leading to a Certificate in Industrial Ventilation Design or System Diagnosis and Troubleshooting (leading to a Certificate in Industrial Ventilation System Diagnosis and Troubleshooting, or Applied Industrial Ventilation for EHS and IH.

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

Fundamentals of Industrial Ventilation Course

(8 Modules) Requires basic algebra skills to solve problems. Level I Participants: You may find a laptop or other device with Excel software useful in class.

Ventilation I: Fundamentals of Ventilation and Industrial Hygiene

Starts the discussion of Industrial Ventilation design with a primer on Industrial Hygiene in a workplace and introduces fundamentals on fluid flow and pressure in ventilation systems. This first module begins illustrating how to measure system conditions and provides an introduction to the effects of air properties on the selection of system components.

Hood Design

The second module expands on the concepts from first module by looking at the fundamental of hood design and performance. This module covers: hood classifications and types, capture velocity, and air pattern control over large hood areas. This module also starts discussions on predicting energy and equipment requirements. The student will perform calculation sets on hood "static pressure / losses", and hood air volume requirements with a goal of predicting requirements for horsepower and energy in a system. The module includes hands-on demonstrations of the principles discussed to help students confirm the foundational concepts.

Duct Component Design

The third module in this series explores the variety of duct components in a system and how they work together. This includes in-depth discussion on elbows, fittings, and ducts that define the system and will provide guidance on predicting the effects of components on energy requirements. The discussion will include influences on static, velocity, and total pressure, as well as further refinement of hood static pressure calculations. These foundational concepts are demonstrated through a hands-on lab activity.

System Design I

This module builds upon the skills introduced in the prior modules. This module explores more complex systems and students will explore how to achieve a balanced systems which achieves desired

performance. This module also introduces the ACGIH Calculation Sheet which students will use to practice system design including early predictions of fan and horsepower requirements.

System Design II
This module continues to build on skills from the prior modules, with design considerations for more complex systems involving multiple hoods. The students will explore how to balance complex systems to achieve desired performance at each hood. This module also includes practice on predictions of fan size and horsepower requirements.

System Components - Fan and Air Cleaning Devices
This module provides students with an overview of general Air Cleaning Devices and Fan Designs; including nomenclature and specify parameters students should consider for proper system design.

System Design III
This module combines foundational skills from prior modules with some additional hood design considerations. Students will look at Industrial Ventilation design as a whole and will design detailed practical systems with the ACGIH calculation sheet and Manual.

Advanced Industrial Ventilation Design Course (Eight Modules)
Prerequisite: for certificate program in Industrial Ventilation Design: Completion of Fundamentals 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

Module I: Review of Fundamentals
An intense review of the Fundamentals (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 the Fundamentals Course or have over five years of industrial ventilation design experience.

Module II: Physics of Non-Standard Conditions
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.

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

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

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

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

Module VII/VIII: System Design VI (8 hours - two modules)
Includes "real world" examples to combine the techniques in the course. This will use all the tools and techniques taught previously in the week.

Diagnosis and Troubleshooting Course (Eight Modules)
Prerequisite: for the Certificate Program in Industrial Ventilation System Diagnosis and Troubleshooting: completion of Fundamentals Level taken at N.C. Industrial Ventilation Course

- Utilize System Diagnosis and Troubleshooting Manual
- More practical applications with an emphasis on evaluation of existing systems rather than system design theory
- Requires calculator and some problem solving

Measuring and Monitoring System Performance I
Provides 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.

Applied Industrial Ventilation Course for Environmental Health/Safety people and Industrial Hygienists (Not for System Designers)
Applied course material designed for Environmental Health and Safety and Industrial Hygienists. This course will teach you:

- A quick review of the Basics of Air Physics and helpful equations that are likely to be found on the CIH exam and how to apply them.
- Basics of Local Exhaust Ventilation System (LEV) testing with emphasis on booth hoods (such as lab hoods, paint spray booths) and local exhaust hoods. Emphasis on Ce, Fan Laws, Fan noise and hood proof-of-performance.
- Up to 1/3 of the class will be spent on LEV proof-of-performance with participants in a laboratory setting with a full duct system.
- How to conduct a Combustible dust compliance audit.
- Special section on „meeting Microgram per Cubic Meter Standards in your facility"
- General Ventilation strategies from the Chapter on Dilution Ventilation
- Engineering ventilation strategies for Covid and other Pandemic vectors.

- The use of laminar replacement air as a means of controlling contaminants in the breathing zone
- Controlling Manganese exposure from welding operations per the section of the Industrial Ventilation Manual for Design

Registration/pick up course materials: MONDAY, MAY 3 | 7:30-8:00 AM |
LUNCH: MONDAY - THURSDAY | 12:00 -1:00 PM

	Monday	Tuesday	Wednesday	Thursday
FUNDAMENTAL VENTILATION SKILLS				
8:00am - 12:00pm	Fundamentals of Ventilation & Industrial Hygiene	Hood Design (Static Pressure)	System Components - Fans and Collectors	System Design II & III
1:00-5:00pm	Hood Design (Flow)	Duct Component Design	System Design I & II	System Design III
ADVANCED VENTILATION DESIGN				
8:00am - 12:00pm	Ventilation II: Review of Fundamentals	Fans 201	Energy & Cost	System Design VI
1:00-5:00pm	Ventilation III: Physics at Non-Standard Conditions	System Design IV	System Design V	System Design VI
DIAGNOSIS & TROUBLESHOOTING				
8:00am - 12:00pm	Ventilation II: Review of Fundamentals	Measuring & Monitoring System II	Monitoring & Maintenance I	Practical System Troubleshooting II
1:00-5:00pm	Measuring & Monitoring System Performance I	The Fan and System	Practical System Troubleshooting I	Practical System Troubleshooting II
APPLIED VENTILATION FOR ENVIRONMENTAL HEALTH & SAFETY & INDUSTRIAL HYGIENISTS				
8:00am - 12:00pm	• Intro • Physics of Air and Principles of Industrial Ventilation	Testing Hood Performance	Review of Helpful equations and problems for CIH exam	Laminar Replacement Air Meeting Microgram per Cubic Meter Standards
1:00-5:00pm	Fan Laws & Noise	• Hood Entry Coefficient Entry, Ce • Hood Proof of Performance	Engineering ventilation stategies for Pandemic vectors	Controlling Manganese exposure from welding operations
Monday Evening: Initial Concept Tutorial / Wednesday Evening: Stump-the-Staff				

OPTIONAL WORKSHOP - Current Issues in Industrial Ventilation | Friday: 8:00AM - 12 Noon

- Combustible Dust Mitigation
- General Ventilation
- CFD Applications to LEV Ventilation
- Infectious Disease Ventilation

GENERAL INFORMATION

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

Classroom problems are solved using the Velocity Pressure Method of calculation as outlined in the Industrial Ventilation Manual published by the ACGIH.

Classroom sessions and morning registration on May 4 , will be held at the Hilton Raleigh North Hills, Raleigh, NC. with the first session beginning at 8:00 am. The half day optional concurrent workshops will be held on Friday, May 8, 8 AM – Noon.

TUITION

The cost for Level I Fundamentals of Ventilation, Level II Advanced Ventilation Design, Level II System Diagnosis and Troubleshooting or Level II Applied Industrial Ventilation for Industrial Hygienists is $2,695 per person. The four levels are taught concurrently May 3-6.

Tuition for the optional half day workshop on Friday, May 7, is $395 per person.

Please call about company discounts for 3 or more registrants.

Course registration fees include the 31st edition ACGIH Industrial Ventilation Manual or System Diagnosis & Troubleshooting Manual (depending on course selected), all course materials (problems, calculations sheets), breaks, four breakfasts, four lunches, and the Founders Dinner on Tuesday, May 4. The Friday workshop registration fee includes handouts, breakfast and break.

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

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 4 hours of technical contact time and is eligible for an estimated .5 ABIH CM Credit.

PROFESSIONAL DEVELOPMENT HOURS (PDHs) — The Industrial Ventilation Course offers continuing competency activities for North Carolina Professional Engineers and Registered Land Surveyors (30 Contact Hours).

ACCOMMODATIONS — Rooms have been set aside at the Hilton Raleigh North Hills for participants of this Course, but their availability cannot be guaranteed past April 2. Lodging is NOT included in your registration fee. Please make your own reservation directly with the Hilton Raleigh North Hills. To receive your special rate of $164/night (plus tax).

Reservations may be made here.

Hilton Raleigh North Hills.
3415 Wake Forest Road Raleigh, | NC 27609
919-872-2323

Free parking is available for Industrial Ventilation Course participants who are overnight guests at the Hilton as well as for those who drive in.

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 two hundred dollar ($200.00) 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. Substitutions can be made at any time.

OTHER VENTILATION COURSES

The **Annual Michigan Industrial Ventilation Conference** will be held in Michigan in February. For information please call **517-204-3687.**

The West Coast Industrial Ventilation Conference. For information, call **714-960-0684.**

PROGRAM STAFF

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*Planning committee member

69th N.C. Industrial Ventilation Course Registration Form

Hilton Raleigh North Hills Raleigh, NC | May 3-7, 2027

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 (May 3-6) **Sign me up for:**

- ☐ Level I-Fundamentals of Industrial Ventilation $2695
- ☐ Level II Advanced Vent Design $2695
- ☐ Level II System Diagnosis & Troubleshooting $2695
- ☐ Level II Applied Industrial Vent for EHS & IH $2695

Optional Workshop, (May 7)

- ☐ Current Issues in Industrial Ventilation $395

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
P.O. Box 37492
Raleigh, NC 27627-7492
Attn: Connie McElroy-Bacon

For Information:
Phone 919-608-1606

E-mail: cbacon@mindspring.com

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Industrial Ventilation Design or
Industrial Ventilation System Diagnosis & Troubleshooting
Industrial Ventilation for Industrial Hygienists & EHS Professional

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Current Issues in Industrial Ventilation