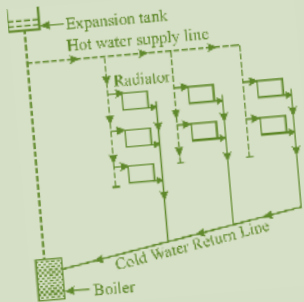




# PRACTICAL FUNDAMENTALS OF HEATING, VENTILATION AND



V Narasimhan is a mechanical engineer with about 38 years experience in **E P C project execution** of all equipment and piping systems for heavy industries, including water, oil, utility piping, HVAC systems and power plant right from concept to commissioning including making techno economic feasibility studies and Detailed project report involving all stages of tendering, purchasing, design & engineering.



## Free Reference Manual

Our delegates don't just receive photocopied notes!

You will receive a comprehensive fully illustrated reference manual filled with hundreds of pages of tables, charts, figures and handy hints.

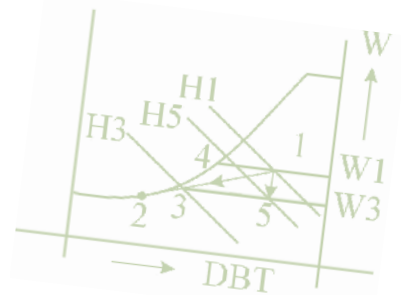
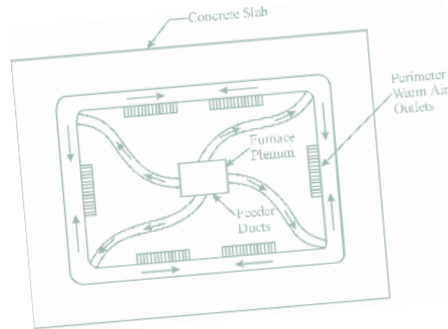


## The Workshop

This workshop is designed for engineers and technicians from a wide range of abilities and backgrounds and will provide an excellent introduction to the fundamentals of heating, ventilation and air-conditioning. It commences with a review of psychrometric charts and then examines the factors that influence design choices, indoor air quality, load calculations and heating/ventilation and air-conditioning systems. Numerous tips and tricks throughout the course make it very practical and topical to your applications.

### Pre-requisites

Fundamental knowledge of basic mechanical plant and operation thereof.



## Who Should Attend

- Maintenance engineers, technicians and staff
- Plant engineers
- Operation, inspection and repair managers, supervisors and engineers
- Mechanical engineers and technicians
- Design engineers
- Electrical engineers and technicians
- Consulting engineers

## Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

**To gain full value from this workshop, please bring your laptop/notebook computer.**

## DISCOUNT OFFER

**SAVE 10%**

Register three people on a public 2-day workshop and receive 10% off the total.

\* discounted and free registration to be used for the same workshop in the same venue

## Best of the Best Technical Library

The Best of the Best Technical Library is comprised of 15 essential technical manuals covering all aspects of engineering, including:

- Data Communications and Networking
- Instrumentation
- Mechanical
- Electrical Engineering

For more information on the Best of the Best Technical Library please contact us on [books@idc-online.com](mailto:books@idc-online.com)

## On-Site Training

**SAVE MORE THAN 50% OFF**  
the per person cost!

**CUSTOMISE** the training to **YOUR WORKPLACE!**

All IDC Technologies training workshops are available on an on-site basis, presented at the venue of your choice, saving delegates travel time and expenses, thus providing your company with even greater savings.

For more information or a **FREE** detailed proposal contact:

R. Gokul at +91 44 3061 8525  
or e-mail [india@idc-online.com](mailto:india@idc-online.com)

# AIR-CONDITIONING (HVAC) FOR ENGINEERS AND TECHNICIANS

## The Program

### DAY ONE

#### INTRODUCTION TO HVAC

- General
- Principles of thermodynamics
- Laws of thermodynamics
- Fundamentals of heat transfer
- Fundamentals of fluid flow
- Temperature and its measurement
- Pressure and temperature relationship

#### PSYCHROMETRY

- Introduction to psychrometry
- The properties of air
- Psychrometric charts
- Air conditioning and psychrometric systems
- Psychrometric charts as a tool for analysis for A/C performance

#### REQUIREMENTS OF COMFORT AIR CONDITIONING

- Thermodynamics of the human body
- Air purification methods
- Role of clothing
- Temperature and humidity in high heat load
- Inside and outdoor design criteria
- Ventilation and ventilation standards
- Design of ventilation systems
- Air distribution systems
- Air diffusion and performance
- Air purification methods

#### HEATING AND COOLING LOAD CALCULATION PROCEDURE

- Design considerations
- Load components
- Design criteria – indoor and outdoor
- Heat/load components
- Miscellaneous heat sources
- Fresh air loads
- Design of air-conditioning systems
- Heat gains: transmission, solar, infiltration

#### HVAC SYSTEMS

- All air, all water, air water systems
- Heat systems
- Steam heating systems
- Electric heat systems
- Components of the air conditioning systems in practice

#### CONSTANT VOLUME SYSTEMS

- System concepts
- Different configurations

#### VARIABLE AIR VOLUME SYSTEMS

- System concepts
- Different Variable Air Volume (VAV) systems

### DAY TWO

#### DUCT DESIGN, AIRFLOW AND ITS DISTRIBUTION

- Pressure gradient diagrams
- Duct sizing and design

#### INSULATION OF AIR-CONDITIONING SYSTEMS

- Properties of insulating materials
- Factors affecting thermal conductivity
- Heat transfer through insulation
- Economical thickness of insulation
- Insulated systems
- Importance of relative humidity for the selection of insulation

#### AIR-CONDITIONING EQUIPMENT

- Packaged units
- Split systems
- Chillers
- Boilers
- Pumps
- Cooling towers
- Adiabatic coolers
- Capacity assessment and selection
- Air filters
- Humidifiers
- Dehumidifiers
- Fans and blowers
- Grills and registers

#### REFRIGERATION

- Methods of refrigeration
- Air refrigeration systems
- Vapor compression and absorption refrigeration systems
- Refrigerants
- Refrigeration equipment

#### CONTROLS AND INSTRUMENTATION

- Definitions
- Sensors and elements
- Pneumatic and hydraulic controls
- Electrical and electronic controls
- Two position control
- PID control
- Parameters to be controlled (temperature supply and return air)

#### TYPICAL CONTROL SYSTEMS

- Preheat and humidification control (winter air-conditioning)
- Cooling, dehumidification and reheat control (summer air-conditioning)
- Face and by-pass control
- All year round air-conditioning system
- Zone control system

#### INSTALLATION, COMMISSIONING OPERATION, TESTING AND MAINTENANCE

- HVAC equipment
- Duct work and air outlets
- Electrical and controls
- Insulation and commissioning process
- Other service operations
- Economics
- Operational activities
- Do's and don'ts

### DAY TWO CONT.

#### FAULT FINDING AND TROUBLESHOOTING FAULTS

- Improper adjustments and settings
- Poor design and installation
- Equipment failure
- Limitations in operation
- Troubleshooting tools

#### TROUBLESHOOTING TOOLS (ELECTRICAL AND MECHANICAL)

- DOE (Design Of Experiments)
- FTA (Fault Tree Analysis)
- Cause and effect diagrams

#### GREEN HOUSE EFFECT AND FUTURE REFRIGERANTS

- Applications
- Smart buildings

#### ENERGY CONSERVATION AND ENERGY MANAGEMENT

- Costs of fuels
- Typical rate schedules
- Effects on total fuel bill
- Cost-in-use
- Energy performance
- Contracts and incentive programs

#### SUMMARY, OPEN FORUM AND CLOSING

## About IDC Technologies

With a portfolio of over 300 workshops specialising in the fields of industrial data communications, telecommunications, automation and control we have trained over 300,000 engineers, scientists and technicians over the last 16 years.

We have an enthusiastic team of professionals in offices conveniently located around the world, who are committed to providing the highest quality of engineering and technical training.

Visit our **WEB SITE**

**[www.idc-online.com](http://www.idc-online.com)** to download **FREE** software and technical information

## Technical Writing Required?

**Let us write your next engineering training course/manual or customise for you.**

With our tens of thousands of pages of engineering manuals and e-learning resources; we can do this extremely cost effectively at a fraction of the cost of alternatives.

email: [india@idc-online.com](mailto:india@idc-online.com)  
for a no obligation quotation

The fee for each workshop covers all materials including workshop manual, lunches and refreshments

# FUNDAMENTALS OF HVAC

August 27th & 28th, 2013 in Chennai

## DELEGATE DETAILS

Contact: \_\_\_\_\_ Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Suburb: \_\_\_\_\_ State: \_\_\_\_\_ Post Code: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Attendees: Mr/Ms: \_\_\_\_\_ Job Title: \_\_\_\_\_

Mr/Ms: \_\_\_\_\_ Job Title: \_\_\_\_\_

Mr/Ms: \_\_\_\_\_ Job Title: \_\_\_\_\_

Should you have more people interested in attending this workshop please contact Gokul via india@idc-online.com.

Areas of Interest: (please tick)

- Instrumentation, Automation & Process Control
  Data Communications & Networking
  Project & Financial Management
  Information Technology
  Mechanical Engineering
  Electronics
  Electrical
  Civil Engineering
  Chemical Engineering

## NEW DISCOUNT OFFER

**BUY Three, Get 10% Off**

Register three people on a public two day workshop and receive a 10% Discount

\* discounted and free registration to be used for the same workshop in the same venue.

Where?

*IDC Technologies*

*Royal Building  
No.23 Anna Salai,  
Chennai,  
T.N. 6000015*

## PAYMENT DETAILS

Note: Prices are INCLUSIVE of ServiceTax

Please Note: Full payment is required prior to the commencement of the workshop.

**BOOKING FOR ONE DELEGATE:** INR 13,484

**BOOKING FOR THREE DELEGATES:** INR 40,449  
With Three Participants You Receive a 10% discount

Early Bird Offer discount of 5% if You Register on or Before the 30th of July, 2013

I wish to pay by  Cheque, made payable to IDC Technologies Pvt. Ltd.  
 Demand Draft made payable to IDC Technologies Pvt. Ltd.

## WORKSHOP DETAILS

- Workshops start at 8:30am and finish at 5:00pm daily.
- Registration is from 8:00am on the first day.
- The workshop fees are per delegate and include a reference manual, handouts, lunches and all refreshments.
- Full payment is required prior to the commencement of the workshop.

## EARLY BIRD BOOKING OFFER

Please note that the Early Bird Booking Offer is only available to those registrations received by 30 July 2013 and paid prior to the commencement of the workshop.

## CANCELLATION

A fee of 20% will apply for written cancellations received 7 to 14 days prior to the commencement of the workshop. Cancellations received less than 7 days prior to the workshop are not refundable however substitutes are welcome.

## CONFIRMATION

Confirmation will be sent upon receipt of registration. Full details and workshop instructions will be sent to you prior to the workshop date.

## PLEASE NOTE

Venues to be confirmed upon registration. Instructors may change without notice. IDC Technologies has no affiliation with suppliers or manufacturers and therefore presents a completely unbiased factual view of the industry.

## PRIVACY INFORMATION

If your address details are incorrect, or you wish to remove your name from our mailing list, please contact us by phone, fax or e-mail.

At times we make use of lists that cannot be cross-checked against our own database and you may receive a duplicate. If so, please pass this on to an interested colleague.

## HANDS-ON APPROACH TO TRAINING

IDC Technologies' instructors understand the value of combining theoretical learning with practical application. All IDC Technologies workshops include practical, hands-on sessions where the delegates are given the opportunity to apply in practice the theory they have learnt.

## CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

This program is designed to meet your continuing professional development requirements. A certificate documenting your attendance will be awarded at the end of the workshop. This serves as important evidence of your continuing professional commitment to your career.

[www.idc-online.com](http://www.idc-online.com)

**BOOKING CODE: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z**