

# HVAC TECHNICAL SERVICE TRAINING 2012 Contractor Course Offerings



Held at US Air Conditioning Distributors  
City of Industry & San Diego Branch Locations



**Air Conditioning Training Specialists, Inc.**  
is pleased to provide advanced technical training courses for HVAC dealers, contractors, and end user customers. Select courses are NATE approved.



## Refrigeration – Technical Service & Troubleshooting Course (4.75 Days) \$1,095.00

NATE approved 40 CEU's 1712-0001

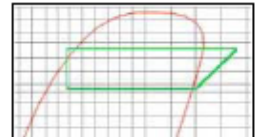
This NATE approved course is designed to teach the principles of the mechanical refrigeration process. Students will gain an understanding of the basic skills necessary to properly service, troubleshoot and maintain modern HVAC systems. Studies of adult education have identified that the majority of adults learn by doing and our state of the art lab does just that. Technical lecture material taught in the classroom is reinforced in our supervised lab where students will work on actual equipment and put to practice what was just learned in the classroom. Attendees will be taught practical service procedures and troubleshooting techniques that will enhance their performance back on the job. This course was developed for equipment operators, maintenance personnel and service technicians who maintain, troubleshoot, and service residential and commercial HVAC.



### Topics to include -

- Identification of essential system component parts and accessories
- Review of ARI system classifications
- Thermodynamic mechanical refrigeration cycle analysis
- Pressure enthalpy diagrams and practical applications
- Direct and indirect cooling systems
- System troubleshooting to include – identifying refrigerant over/under charge, low air flow

- evaporator/condenser, restricted liquid line and system non-condensables
- Superheat and subcooling determination for common refrigerant types
- Proper system evacuation and dehydration techniques
- Machine room guidelines and refrigeration safety concerns
- Basics of heat transfer methods and measurement
- Identifying refrigeration system irregularities and proper use of refrigerant data logs
- Refrigerant charging procedures
- EPA concerns and guidelines per section 608 US Clean Air Act
- Single component and blended refrigerant mixture service considerations
- HVAC service practices and procedures
- System performance factors and design considerations
- Common compressor types, operation, service and troubleshooting
- Compressor and system capacity control methods
- Air and water cooled condenser types, operation, service and troubleshooting
- Common evaporator types, operation, service and troubleshooting
- Various metering devices, operation, service and troubleshooting
- Effective system cleanup after mild and sever burnouts



## Electrical – Technical Service & Troubleshooting Course (4.75 Days) \$1,095.00

NATE approved 40 CEU's 1712-0002

The majority of field problems in the HVAC industry are the result of electrical system malfunctions. Properly identifying and correcting these malfunctions in a timely manner represents the greatest challenge to the skills of service technicians. This NATE approved course was specifically designed to address these concerns and give attendees the "technical tools" and confidence necessary to fix the problem right the first time and reduce costly callbacks. The course takes a logical and practical approach in teaching wiring diagram interpretation and the application of time proven troubleshooting procedures and techniques. Studies of adult education have identified that the majority of adults learn by doing and our state of the art lab does just that. Technical lecture material taught in the classroom is re-enforced in our supervised troubleshooting lab where students will work on actual equipment and put to practice what was learned in the classroom by troubleshooting actual systems with electrical faults. Attendees are taught practical service procedures and troubleshooting techniques that will enhance their performance back on the job. This course was developed for maintenance personnel and service technicians who maintain, troubleshoot, and service residential and light commercial HVAC equipment.



### Topics to include -

- Reading and interpretation of various electrical schematics for residential and light commercial heating and cooling systems – determining the sequence of operation
- Applying factual ladder schematics and component location diagrams to various systems
- Use and application of common electrical meters in electrical troubleshooting
- Developing a logical approach to troubleshooting and timely correction of system malfunctions – prevention of repeat failures
- Troubleshooting common electromechanical safety and operating controls
- Troubleshooting various printed circuit boards and solid state controls – identifying function of boards and testing inputs/outputs
- Develop safe electrical troubleshooting practices and procedures – hopscotch method of troubleshooting
- Troubleshooting single phase motor starting gear – hard and soft start kits
- Single and three phase motor theory and construction
- Troubleshooting common single and three phase motors
- Three phase voltage and current imbalance determination
- Motor testing and replacement guidelines
- Determining root cause and failure analysis



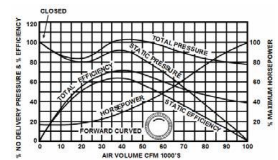
## Air Side Fundamentals – Psychrometrics and Air Measurement (4.5 Days) \$1,095.00

This course will provide a practical approach to the understanding and application of psychrometrics and the methods and procedures for field measurement of air flow for residential and commercial HVAC equipment. The course will discuss the psychrometric treatment of air for both process and comfort cooling applications. During the hands on lab students will perform air flow measurement and calculations utilizing common field procedures and instruments such as pitot tubes, anemometers, temperature rise, external static pressure and measurement of cooling coil static pressure drop methods. This course was designed specifically for service technicians who maintain, troubleshoot, and service residential and commercial HVAC equipment and are knowledgeable on the refrigeration and electrical aspects of air conditioning systems but wish to expand their knowledge of the air side of the business. In too many cases existing HVAC systems do not perform to their design expectations due to improper air flow which goes undetected. HVAC systems will not produce the design efficiency, performance or reliability with improper air flow. This course will give the service technician the skills necessary to diagnosis and correct air side problems.



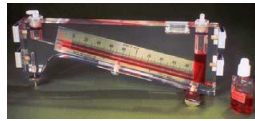
### Topics to include -

- Discussion of human comfort to include:
  - Metabolic Rate
  - Body's heat rejection methods
  - Conduction, convection and evaporation
  - Thermal equilibrium
  - Wind chill factor
  - Humidity index
  - Psychrometric chart
  - Comfort zones
  - Summer/winter
- Discussion of the earth's atmosphere to include:
  - Barometric pressure
  - Pressure measurement scales
  - Various altitudes & temperature psychrometric charts
  - Ideal gas laws of Charles, Boyle and Dalton
  - Dry/wet air composition, gas constants & specific heat
  - Definition of standard air conditions
- Psychrometric chart overview
- Properties of air (8)
- Plotting state points and psychrometric chart interpretation
- History and development of the psychrometric chart
- Birth of air conditioning industry and historical milestones
- World's first scientific air conditioning unit
- Psychrometric chart construction
- Dew point discovery
- Sling & electronic psychrometers
- Adiabatic saturators
- Air spray washers
- Evaporative cooling
- Cooling & dehumidification process
- Total heat formula, sensible heat formula and latent heat formula
- Sensible heating & cooling processes
- Rational psychrometric formulae
- Dew point, vapor barriers & IAQ issues – avoid equipment over sizing
- Heating & humidification processes
- Direct refrigerant expansion coil design
- Row split, face split and intertwined circuitry
- Cooling coil bypass factors and typical applications



## Air Side Fundamentals – Psychrometrics and Air Measurement Continued

- Ventilation & mixed air processes
- Setting outside air dampers for ventilation
- Hospital operating room considerations
- Calculating % outside air & room air changes
- Chemical dehydration
- Humidification processes & setting humidistats
- Cooling towers
- Air moving devices – fan rating points
- Centrifugal & axial fan types
- Fan curves and practical interpretation
- Duct system pressures – static, velocity & total
- Velocity profiles and pressure measurement points
- Sources of system resistance to air flow
- System effect concerns and recommendations
- Air flow measurement methods & procedures
- Inclined manometers & magnehelics
- Pitot tubes, anemometers, temp rise, external static pressure, cooling coil pressure drop calculations
- Individual room CFM requirements
- Altitude correction factors
- Fan laws and practical applications



**Student Evaluation:** Student progress incorporates various classroom worksheets for psychrometric plotting and problem solving including a hands on lab incorporating methods and procedures for performing air measurement checks.

**Suggested Prerequisite:** Students should have a minimum of three years of field experience in the installation, startup, service and maintenance of residential or commercial air conditioning and refrigeration systems coupled with appropriate levels of vocational and/or HVACR technical education.

## EPA Refrigerant Certification Training & Testing Program - Section 608 (1 Day) \$290.00

This course is designed to review the technical subject areas necessary to prepare HVACR technicians to take and pass an EPA approved refrigerant transition and recovery certification program administered by Ferris State University. The objective of the course is to have attendees achieve an Universal certification rating pursuant to the U.S. Clean Air Act (Section 608) Title VI, 40 CFR Part 82, Subpart F.



### Topics to include -

- EPA exam expectations
- General HVACR systems
- Basic refrigeration
- Refrigerant chemistry
- Refrigerant oils
- Ozone depletion
- Global warming
- Montreal Protocol
- United States legislation and regulations
- Recovery, recycling and reclaiming refrigerants
- Safe handling and transportation of refrigerants
- Conservation - servicing and testing of systems
- Waste oils
- High and low pressure chillers
- Exam rules, regulations and structure



**James P. Curley** is the President of Air Conditioning Training Specialists, Inc. (ACTS), a company that provides specialized training and services to the HVACR industry. Prior to starting this company, Jim was a Master Instructor and Instructional Designer with over 35 years

experience for the Commercial Systems and Services Division of Carrier Corporation, a United Technologies Company. Jim's career at Carrier involved assignments based from Syracuse NY, Los Angeles CA and Phoenix AZ. Jim grew up in the air conditioning business as his father was a successful contractor in central New York specializing in commercial refrigeration and air conditioning. Jim majored in heating, ventilation, air conditioning and refrigeration at Hudson Valley Community College and upon completion was hired by Carrier Corporation's headquarters in Syracuse, NY. His first assignment was a technician for the engineering test laboratories from 1969 to 1974. It was in these laboratories that concepts on a piece of paper for equipment design became a reality. Prototype machines were developed and built in a model shop and then tested to meet rigorous manufacturing and industry standards to ensure compliance. This assignment gave Jim the insight to component and system design to add to his practical and theoretical knowledge of air conditioning. From 1974 until his retirement from Carrier in January 2005, Jim was responsible for instructional course development, computer based training programs, scheduling, marketing and implementation of the factory training operations throughout the United States for the North American Operations of Carrier, Bryant, Day & Night and Payne divisions of Carrier Corporation. Jim was also Carrier's Director of Customer Assurance for the Western United States for the Commercial Unitary Division. This position gave him responsibilities for service engineering and warranty administration on a variety of commercial products. He has designed and managed custom on-site training programs for diverse applications of cooling systems ranging from applications for nuclear power plants, coal mines, oil rigs, submarines, inter-continental ballistic missiles, the federal penitentiary system, water treatment and pumping plants, minesweeping ships and various industrial complexes. He has developed specialized training programs for technician development in air conditioning service, psychrometrics, heat pumps, gas heating, refrigerant management, and chilled water systems. He has conducted several hundred classes and trained several thousand people around the world. Jim has taught on four continents spanning 24 countries. Jim is dedicated to and has extensive training obligations for the United States military bases located throughout the world for the US Air Force, US Army and the US Coast Guard. He has written and published training books for Carrier Corporation on product specific equipment, solar energy, air measurement, psychrometrics, and advanced heat pump systems. Jim is the author of a technical publication titled "Air Flow Measurement" for the Refrigeration Service Engineers Society's SAMS manual. Jim has developed technical training programs for colleges, trade schools, unions, government agencies, end user customers, trade associations, utilities and air conditioning distributors throughout the United States and is committed to training excellence.

*On a personal note, Jim is the father of five daughters and the proud grandfather of 13 grandchildren and 5 great grandchildren. Jim and his wife Joyce reside in Mesa, Arizona.*



Please note that Air Conditioning Training Specialists, Inc. is an active and registered company with the United States Department of Defense under the Central Contractor Registration (CCR) as listed with the Defense Logistics Agency. The CAGE code number for Air Conditioning Training Specialists, Inc. is 1JMV9 and the DUNS number is 045259616. All ORCA representations and certifications are current and up to date. The Federal Identification number for Air Conditioning Training Specialists, Inc. is 20-3185963. James P. Curley is the instructor for these courses and is a certified proctor for the Ferris State University Refrigerant Transition and Recovery Program (FSU Registration: F000948). Mr. Curley is also an approved electrical continuing education instructor for the State of Washington and Oregon Department of Labor & Industries Electrical Program and has over 40 years of HVACR industry experience.



**GENERAL INFORMATION:**

Instructors: Courses are taught by experienced and industry recognized professionals.

NATE: All week long courses are NATE recognized and approved for 40 hours for recertification.



Lodging: Rooms and meals are available at hotels, motels and restaurants and are within driving distance of course locations. Tuition fee covers cost of the course and related materials. It does not include meals, housing or transportation. These arrangements are the responsibility of the student.

Hours: Courses begin promptly and run from **7:30 am – 5:00 pm.**

What to Wear: Comfortable work clothes and shoes. Classrooms are air conditioned and at times may be cool for some, so dress accordingly.

Acceptance: We will confirm your registration with a confirmation letter and provide information on local lodging and reporting instructions to class. **Important - Please do not make travel arrangements until you receive confirmation from us that the class is confirmed.** All tuition fees are in US dollars. We reserve the right to change class dates or cancel classes as deemed necessary at which point you may elect to be rescheduled or receive a full tuition refund.

Student Cancellation Policy: Cancellations or rescheduling received **16 or more** working days prior to the class start date will be refunded in full, **11-15** working days prior to class start date will be **charged 50%** of the class fee. Cancellations made **10 or less** working days prior to class start date **no refund** will be issued and the full class fee will be charged, you will receive a 1 year tuition credit to attend any class of equal value. There will be **no tuition credit** issued for **NO SHOWS**.

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All pricing is valid through December 31, 2012

**Air Conditioning Training Specialists, Inc.**

Air Conditioning Training Specialists, Inc. (ACTS) is a provider of quality technical training solutions for the HVACR industry. We designed our skills related training programs based on an underlying philosophy that “adults learn by doing.” ACTS reinforces this approach to learning through a delicate balance of classroom lecture applied with “hands on” troubleshooting labs. *The goal of ACTS is to offer cost effective HVAC training that exceeds the expectations of the learner.*

Air Conditioning Training Specialists, Inc. 2012



All one week long classes listed are NATE recognized and approved for 40 hour's of CEU's.

NATE Approved Training Organization

# HVAC Technical Service Training Registration Form



(Please print clearly and fill in completely. List student name as you want it to appear on your certificate)

Student Name

Company Name

PO Box/Street

City State Zip Code

Point of Contact Name Telephone ( ) Fax ( ) Email

**Course Preferences – Please Check Desired Course(s)**

Selection	Course	Location	Date	Tuition
1. <input type="checkbox"/>	Refrigeration – Technical Service & Troubleshooting Course	Industry	02/13/12 – 02/17/12	\$1,095.00
2. <input type="checkbox"/>	EPA Refrigerant Certification Training & Testing (Section 608)	Industry	02/18/12	\$290.00
3. <input type="checkbox"/>	Electrical – Technical Service & Troubleshooting Course	Industry	02/27/12 – 03/02/12	\$1,095.00
4. <input type="checkbox"/>	Air Side Fundamentals – Psychrometrics & Air Measurement	Industry	03/12/12 – 03/16/12	\$1,095.00
5. <input type="checkbox"/>	Air Side Fundamentals – Psychrometrics & Air Measurement	San Diego	04/16/12 – 04/20/12	\$1,095.00
6. <input type="checkbox"/>	Refrigeration – Technical Service & Troubleshooting Course	San Diego	12/03/12 – 12/07/12	\$1095.00
7. <input type="checkbox"/>	Electrical – Technical Service & Troubleshooting Course	San Diego	12/10/12 – 12/14/12	\$1,095.00

Credit Card

Card Number: \_\_\_\_\_

Signature: \_\_\_\_\_

Expiration Date: ( ) / ( ) mm/yy Credit Card Code Number \_\_\_\_\_



Fax, email or mail this registration form and payment to:

**Marie Rohde**  
**Fax: (626) 854-6840**  
**Email: [m.rohde@us-ac.com](mailto:m.rohde@us-ac.com)**

**US Air Conditioning Distributors**

**Attention: Marie Rohde**

**PO Box 1111**

**La Puente, CA. 91749-1111**

**Questions ? Contact Marie at (626) 854-6833**

- Purchase Order - copy of **PO MUST** accompany registration form  
PO Number: \_\_\_\_\_
- Checks – Please make payable to **US Air Conditioning Distributors**  
Payment **MUST** accompany registration form
- US Government Orders Please Apply GSA Schedule #GS-02F-0070S*  
PLEASE INQUIRE WITH MARIE ROHDE



James P. Curley of Air Conditioning Training Specialists, Inc. is proud to be a GSA Schedule partner with the Federal Supply Service and registered with the US Department of Defense under Central Contractor Registration (CCR) 1JMV9.