

Understanding **Air Conditioning & Refrigeration** Systems™

For a schedule of open enrollment classes or to bring this training to your plant or facility, contact us @

1-877-97-TRAIN

www.AmericanTrainco.com

Specifically designed for Maintenance Personnel in Plants, Facilities and Commercial Buildings

College Credit & Testing Available with this Course

This course now carries American Council on Education (ACE) College Credit Recommendations.

"This class by far achieved and exceeded my expectations"

Jason Callis – Facility Manager
Household International

EPA Section 608 Certification Study Guide

Free EPA Certification Testing & Study Guide

Day 1 - Principles, Components & Systems
Day 2 - Troubleshooting, Maintenance & Operating Efficiency

- New Convenient Format - Attend either one or both days!
- This seminar can also be presented at your facility for larger groups
- Reserve Your Space Now! **CALL 1-877-97-TRAIN**
- Check us out online at **www.AmericanTrainco.com** for a complete listing of all seminars coming to your area

Understanding Air Conditioning & Refrigeration Systems™

▶ *"Having been disappointed by other seminars I've attended, I was pleasantly surprised by this outstanding presentation by American Trainco."*

Tom Onuschak – Eastwood Printing

PURPOSE OF TRAINING

Being able to understand, operate, maintain and troubleshoot your own air conditioning and refrigeration system is what this course is all about. It is perfect for anyone who is involved with HVAC&R systems in their building or facility.

And because we know time is money, this seminar is designed to have immediate impact! We approach our students as if they were our own employees. We give them real world, practical knowledge they can use today. And they are expected to go back to their workplace and immediately apply what they have learned. Now that's "Real World" training!

ABOUT OUR INSTRUCTORS

American Trainco instructors are seasoned veterans with many years of real world work experience. In addition, they are required to have a formal education and need to be true leaders in their field. We don't hire field people without teaching experience, and we don't hire teachers without field experience. As a result, students who attend our seminars often get more from a couple days with our instructors than from years of reading books, watching videos, or even working on the job. How do we know? They tell us.

Anyone can teach theory, but there simply is no substitution for experience. What sets American Trainco apart is our ability to communicate that experience to our students. As one attendee told us at the end of his two-day training course, "I think I can go back to work now and teach the veterans a thing or two."

Mission accomplished.

HIGH QUALITY PRESENTATIONS

From the start, we've demanded that all our presentations would be lively, attractive, crisp and clear. Our instructors use state-of-the-art computers, projection equipment and software to bring you a high quality visual experience.

▶ *"Instructor is very knowledgeable and puts things in terms that are easy to understand."*

Rodney Miller – Maintenance Supervisor - TG Missouri

TRAINING OUTCOMES

Upon completion of this course students will receive a personalized Certificate of Completion and .8 CEU's (Continuing Education Units) approved by the Maintenance Training Association of the Americas for each day attended (1.6 credits for two days), indicating that the student has learned to:

(After Day 1)

1. Understand the fundamentals of heat transfer
2. Identify system problems by understanding the refrigeration cycle
3. Recognize system components and understand their purpose
4. Know refrigerant classifications and how to handle the new blended refrigerants
5. Realize the necessity to maintain system oil quality
6. Recognize the hazards in working with refrigerants
7. Be familiar with Federal EPA Certification requirements

(After Day 2)

1. Legally attach service gauge manifold and measure system pressures and temperatures
2. Determine the proper pressures and temperatures for your system to maximize efficiency
3. Understand preventive maintenance procedures and their impact on system efficiency and longevity
4. Recognize electrical and mechanical system components and understand their use
5. Troubleshoot problems before they lead to system failures
6. Understand the properties of air – and how it affects your AC system
7. Be prepared to take the EPA Section 608 Certification Exam (optional, test given at end of class)

UNAFFILIATED & NON-COMMERCIAL

Unlike some training experiences, you won't get a sales presentation at an American Trainco seminar - all you get is an honest, commercially unbiased education. We do not engage in the sales or promotion of industrial suppliers' products, so you know that by attending one of our seminars, your time and money is well spent.

FREE EPA CERTIFICATION TESTING

Testing for EPA certification is optional. Students may take the test administered by our instructor at the end of Day 2. While we cover all necessary material for taking the test and make every attempt to help our students pass this exam, we cannot guarantee individual success. Therefore it is recommended that students who want to take the test attend both days and plan time to study before attending the class.

CERTIFICATES-TESTING-COLLEGE CREDIT

After completion of this seminar students will receive a Certificate of Completion and 1.6 CEUs (Continuing Education Units) approved by the Maintenance Training Association of the Americas. Students may also elect to take the MTAA Certification test associated with this topic. Those seeking college credit recommendations must attend both days of this course and successfully pass the MTAA Certification test. This course is recommended by ACE for 1 college credit hour. Transcripts are available through American Trainco.

Some of the other training topics we can bring to your site include:

- Basic Electricity for the Non-Electrician™
- Electrical Troubleshooting
- Air Conditioning & Refrigeration
- Boiler Operation, Maintenance & Safety™
- Arc Flash Protection & Electrical Safety™
- 2008 National Electrical Code®

And 20+ other courses in the following areas:

- Electrical / Electrical Controls
- HVACR
- Mechanical
- Facility & Plant Management
- Fluid Power
- Pumps / Piping
- Codes / Standards / Safety

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C O U R S E O V E R V I E W

Day 1

Principles, Components & Systems

In Day 1 of this seminar students are provided a broad introduction to Air Conditioning and Refrigeration – a great overview for apprentice technicians, multi-craft trades people, building managers, or anyone who wants to understand the general principles and concepts of A/C and Refrigeration. In addition to understanding these general principles, students will learn about the primary components and accessories used in air conditioning systems, how they work, and where and how these components and accessories are used in HVAC&R systems. **Providing the student a well-rounded introduction to Air Conditioning and Refrigeration is the goal for Day 1.** Discussions about refrigerants & oils, and accompanying regulatory laws will also be included in this first day.

DISCUSSION TOPICS – DAY 1

Fundamentals of Air Conditioning and Refrigeration

- Air Conditioning Versus Refrigeration
- Laws of Thermodynamics and Heat Transfer
- Types of Air Conditioning Systems

Regulation, Codes, and Standards

- New Energy Efficiency Standards (S.E.E.R.)
- Section 608 of the Clean Air Act of 1990 Regulations
- ASHRAE, ASME
- Technician Licensing and Certification

Compression Refrigeration Cycle

- Basic System Design
- Follow-the-Heat™

Refrigerants

- CFCs, HCFCs, HFCs, Inorganics
- Zeotropic and Azeotropic Refrigerant Mixtures
- Refrigerant Safety
- Working With New Blends Including R-410a
- EPA Significant New Alternative Policy

Refrigerant Oils

- MO, AB, POE, PAG, PAO Oils
- Oil Properties
- Maintaining Oil Quality In Your System

Major ACR System Components

- Evaporator
- Compressor
- Condenser
- Metering (Expansion) Device

Day 2

Troubleshooting, Maintenance & Operating Efficiency

Students that have attended Day 1, or already have a good understanding of A/C and Refrigeration components and systems, will enjoy this second day as they are taught common practices (and some “tricks-of-the-trade”) for general operation and maintenance of their A/C and Refrigeration systems.

Achieving maximum performance for energy efficiency is the aim of Day 2. To achieve this, students will learn about maintenance schedules and servicing, system diagnostics, troubleshooting techniques, and fine tuning to gain maximum efficiency. An introduction to commercial and industrial chillers will be covered in Day 2 of this seminar, as well as regulatory laws and energy conservation.

DISCUSSION TOPICS – DAY 2

Auxiliary System Components

- Crankcase Heater
- Suction Accumulator
- Receiver
- Filter-Drier
- Sight Glass With Moisture Indicator
- Oil Separator
- Service Valves
- Muffler
- Refrigerant Controls, and More...

Electrical Control Circuit Fundamentals

- Electrical Controls and Components
- Relays and Contactors
- Thermostats

Refrigeration Systems

- Commercial Refrigeration
- Ice Machines
- Refrigerated Air Dryers

System Diagnostics, Servicing & Troubleshooting

- Service Tools and Equipment
 - Manifold Gauge Set
 - Recovery Machine
 - Vacuum Pump
 - Micron Gauge
 - Leak Detection Equipment
- Recovering Refrigerant
- Charging the System
- Troubleshooting System Problems
- Energy Conservation & Peak Operating Efficiency

Air Handling Systems

- Psychrometrics – the Study of Air
- Fans and Filters
- System Maintenance

Heat Pumps and Chillers

- Air, Water, and Ground-Source Heat Pumps
- Heat Pump Operation and Troubleshooting
- Chilled Water System Design and Operation



SEMINAR AGENDA

7:30 am	Registration
8:00 am	Class Begins
12:00 -1:00 pm	Lunch (on your own)
4:30 pm	Class Ends

SEMINAR FEE

\$490 Each Day
\$980 Both Days

NO RISK REGISTRATION & MONEY-BACK GUARANTEE

If you're not yet sure you'll be able to attend this seminar, you can still make a reservation to hold your space in class. While payment is due prior to the start of the seminar, you may choose a full refund or credit for cancellations made at least 24 hours in advance. Student substitutions can also be freely made at any time prior to the start of the seminar. Refunds will not be issued for registered attendees who fail to show up and have not given a notice of cancellation. In the rare event that you do not receive the expected value after attending our seminar, simply notify us in writing of your reasons and your money will be promptly refunded.

IN-HOUSE TRAINING

You can bring this or any other maintenance training program directly to your plant or facility. Simply call us and tell us what you're looking for. In addition to our own American Trainco seminars and instructors, we have established relationships with literally hundreds of other expert instructors and consultants who conduct training in virtually all areas of maintenance; and our custom training staff is among the most experienced in the industry. Chances are good we will be able to meet your needs.

Call **1-877-97-TRAIN** and ask for Dan or Adam, or email AdamC@AmericanTrainco.com. You may also visit us on the web at www.AmericanTrainco.com to view a listing of courses and to request a quote.

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“This course was the most informative I have ever been to.”

Dan Legge – Maintenance Manager
Colorcon

Free EPA Technician Certification Exam
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Real World Training...for Real World Needs™



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▶ **“One of the best instructors I’ve had in the 20 years of being in the field.”**
John Frascas - President CJJT Consulting

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\$980 Both Days

FIVE EASY WAYS TO REGISTER:

- 1) **Internet** www.AmericanTrainco.com
- 2) **Fax** (303) 531-4565
- 3) **Phone** Toll Free 1-877-97-TRAIN 1-877-978-7246 or (303) 531-4560
- 4) **Mail** this form to: American Trainco, Inc. P.O. Box 3397 Englewood, CO 80155
- 5) **E-mail** the information requested on this form to: Sales@AmericanTrainco.com

Primary Contact/Authorizing Supervisor: Name _____

Title _____ Company Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____ Email _____

Seminar Attendees:	Name	E-Mail	Seminar City	ATTEND		
				Day 1	Day 2	Both Days
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Billing Information: (Please fill out this section only if the "Bill To" name and address is different than the Primary Contact above.)

Individual's Name _____ Title _____ Company Name _____

Address _____ City _____ State _____ Zip _____

Phone _____ Fax _____ Email _____

Other Seminars Coming To Your Area!

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- Fluid Power
- Pumps / Piping
- Codes / Standards / Safety

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Payment Method:

- Visa MasterCard Discover American Express

Card Number: _____

Expiration Date: _____

Name on Card: _____

Signature: _____

Check Enclosed (Make payable to: American Trainco, Inc.)

Bill Purchase Order #: _____



PO Box 3397
Englewood, CO 80155



PROMOTION CODE

X05