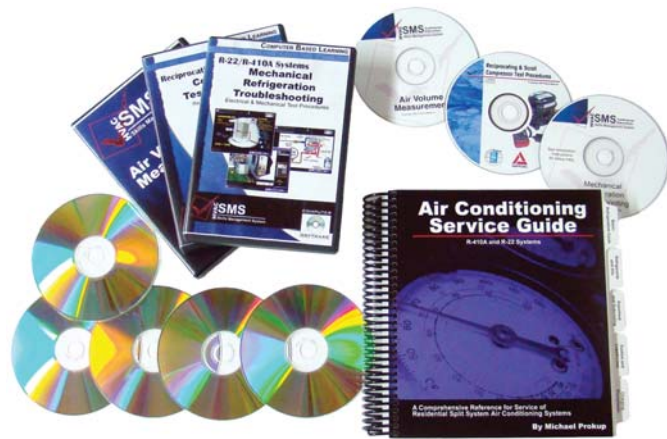


**What You Get for Attending...**



- R-410A Mechanical Refrigeration Troubleshooting CD-ROM Software
- Air volume measurement procedures CD-ROM Software
- Compressor test procedure DVD
- 4 interactive learning programs on electrical troubleshooting procedures CD-ROMS
- RSES Air volume distribution CD-ROM Software
- IMPACK Gas electric interactive CD-ROM Software with cooling system simulator
- Technician Skill Test Software CD-ROM
- Course workbook
- Service Truck Reference Guide

**Biography**



Speaker Mike Prokup

Michael Prokup is the owner of Prokup Media, a leader in the production of training and technical books for the HVAC industry.

Since 1994, Mike has been a featured training event speaker at many HVAC distribution centers across the US and Canada. Training seminars presented by Michael include refrigeration circuit troubleshooting, compressor diagnostics, gas furnace service, troubleshooting causes of low air volume, heat pump service, servicing R410A systems, and training for parts counter personnel.

Industry audiences who attend his programs include factory technical personnel, distributor personnel, dealer owners, dealer managers, and service technicians.

Companies that Michael produces training programs for include Trane, American Standard, Nordyne, Rheem, ICP, Johnstone Supply, United Refrigeration, RSES, and Schwank Heaters and others.

In 2010, he is releasing three new training programs that help HVAC Dealer owners, managers, and service technicians improve the efficiency of their service departments. These programs include: Solving air volume problems: Residential duct systems, Complete A/C Service, and Advanced Gas Furnace Service. All of these new programs will feature diagnostic test procedures that are universal across all product lines.

Date/location specific details area

# COMPLETE A/C SERVICE TRAINING

- Stock the right parts in your service trucks**
- Know what tools you need**
- Improve the performance of your service department**



**Featuring Speaker Michael Prokup**

# 2010 SEMINAR

## Complete A/C Service Training

### The Benefits of this Program...

In today's world, you better be good at what you do or face some really tough times. In our programs, we give our attendees the information they need to improve their business performance. These performance gains are in diagnostic speed, better customer service, streamlined service parts inventory, and recognition of system sales opportunities.

For example, in the air conditioning program, attendees learn how compressor displacement and evaporator selection may result in huge losses of cooling capacity. When this condition is encountered at a residential home, participants will know how to identify the problem and recommend to the consumer a solution.

Another example is compressor starting requirements that will cause problems if they are out of acceptable limits. Attendees learn the causes of compressor starting failure by learning the foundational limits of operation of single phase compressors including maximum charge limit allowances and starting voltage limits. When a compressor doesn't want to start, attendees will know the operating characteristics of the compressor, the application limits that affect the ability to start, and will know how properly test to confirm their diagnosis.

### Pre-Qualification Quiz...

Every single one of these questions are very important to your customers. Go ahead and test yourself and your employees!

Questions:

1. When a scroll compressor does not start when it should, the starting voltage may be below the minimum starting voltage of \_\_\_\_ Volts.
2. Every 1 PSIG of suction pressure lost in an R-22 suction line results in a total system capacity loss of \_\_\_\_%.
3. Every 1 PSIG of suction pressure lost in a R-410A suction line results in a total system capacity loss of \_\_\_\_%.
4. R-410A uses POE oil. POE oil will begin to break down into organic acid when the moisture content of the system reaches \_\_\_\_\_ ppm. A sight glass can warn a technician prior to the acid forming. (True False) circle one
5. For every 1 foot liquid R-22 is lifted via a liquid line to the evaporator coil, there is a corresponding pressure loss of \_\_\_\_ PSIG which could cause flash gas to form in the liquid line.
6. When air volume is lower than it should be, a piston metering device equipped evaporator coil will have a suction vapor superheat level that is too \_\_\_\_\_.
7. If the temperature of a compressor discharge line is measured within 6 inches of the compressor shell, the line temperature considered to be danger or at a level where oil breakdown could occur is \_\_\_\_\_ F.
8. ECM Motors always deliver the air volume they were programmed to deliver if the green light is blinking the proper sequence. (1 blink per 100CFM.) (True False) Circle one
9. When measuring external static pressure on a gas furnace system where there is an A coil located on top of the furnace, the high port of the differential manometer should be positioned\_\_\_\_\_.
10. If the system is using R-22 refrigerant and the liquid line pressure is 220 PSIG with a 100F liquid line, the liquid subcooling level is \_\_\_\_\_ F.

Answers: Go to [www.prokupmedia.com/seminars.html](http://www.prokupmedia.com/seminars.html)

### Discussion Topics...

#### Refrigeration Circuit Topics

- The relationship between refrigerants and total system capacity
- Compressor displacement versus evaporator saturation temperature
- Design limits of systems and total system capacity
- What it takes to achieve peak efficiency and capacity
- Causes of low system capacity
- Application differences between R-22 systems and R-410A systems
- Three things to avoid on the suction side of the system
- Three things to avoid on the condensing side of the system
- Operating performance of mismatched systems
- Identifying mismatched systems during clean and checks and emergency service

#### Suction Line Design Limits

- Capacity and efficiency loss due to suction lines
- Identifying size problems: R-22 systems
- Identifying size problems: R-410A systems
- Proper sizing procedure for residential suction lines R-22 and R-410A
- Re-using existing R-22 lines when changing out to R-410A
- Line set length versus total system charge and compressor charge level limits
- Recommended line tap components for trucks
- Recommended temperature probes for technicians
- Flush kits and line clean up
- Oil refractometers

#### Evaporator circuits

- Evaporator performance using Fixed Metering
- Evaporator performance using TXV
- Causes of TXV failures
- Suction vapor superheat levels and diagnostics
- 5 common evaporator conditions used to diagnose system problems
- Superheat and compressor oil breakdown
- Diagnostic practice: Using superheat to identify system malfunctions

#### Compressors

- Scroll compressor operating characteristics
- Requirements for crankcase heat
- Starting characteristics
- Voltage limits at start and run
- How to identify internal bearing damage
- Identifying causes of starting problems
- Start kit use and scroll compressors
- Start kit use and reciprocating compressors
- Oil breakdown and proper correction
- Unloading 2 step scroll compressor test procedures
- Common cause of internal solenoid failure on 2 step unloading scrolls
- Important safety information regarding compressor service
- Recommended compressor accessories for trucks
- Recommended tools

#### Condenser circuits

- Condenser circuit design with and without subcooling loops
- Liquid subcooling levels versus charge
- Diagnosing non-condensing gas problem or mixed refrigerant problem
- Diagnosing restrictions in the condenser coil
- Liquid line pressure loss versus liquid subcooling limits

#### Liquid line sizing

- Using liquid line sizing tables
- Sizing R-22 liquid lines to avoid flash gas
- Sizing R-410A liquid lines to avoid flash gas
- Liquid line lift versus pressure loss
- Subcooling loss when exposed to direct sunlight or hot attics
- Flash gas and affect upon system capacity and reliability
- Oil sight glasses and POE oil systems
- When liquid lines should be insulated

#### Moisture, driers, evacuation, acid testing

- POE Oil breakdown due to moisture in system
- Evacuation and needed tools to make the pumps perform
- Proper drier selection for debris, moisture, or burn outs
- Acid testing made easy
- Burn-out clean up procedure
- Truck burn out kit
- Recommended Acid test kits and acid neutralizers

#### Condenser Fans

- PSC Type test procedure
- ECM Type test procedure
- Selecting a universal replacement guidelines
- Universal replacement motors for trucks

#### Air volume requirements for cooling systems

- Measuring air volume using temperature rise
- Measuring air volume using external static pressure method
- Measuring air volume with a traverse of the duct system
- Common causes of low air volume
- Using static pressure measurement to identify causes of low air volume
- Refrigeration circuit conditions when air volume is too low
- Recommended tools for trucks

#### ECM Motor tests

- How circuit boards control motor speed command
- Identifying cause of ECM Motor Malfunction
- Motor quick test
- Using TecMate Pro to test ECM Motors
- X13 Constant Torque Motor Test Procedure
- Recommended tools for trucks

#### Complete A/C Clean and Check

- Putting it all together