The Indoor Environment & Energy Efficiency Association
2800 Shirlington Road, Suite 300, Arlington, VA 22206
www.acca.org and 703-575-4477

EDU – 4

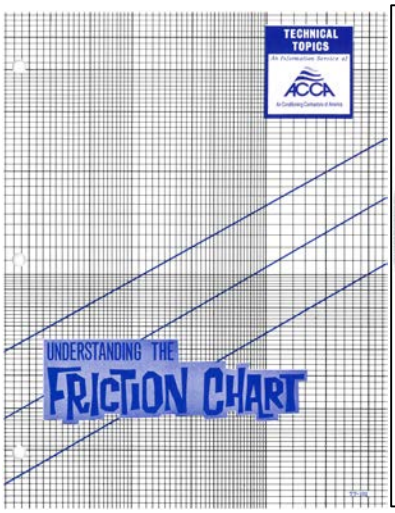
Jan. 2016

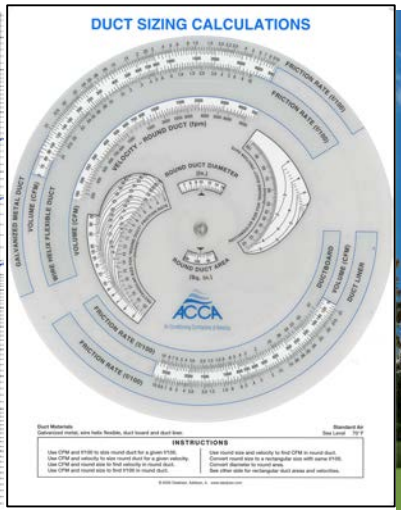
INSTRUCTORS' LESSON PLAN

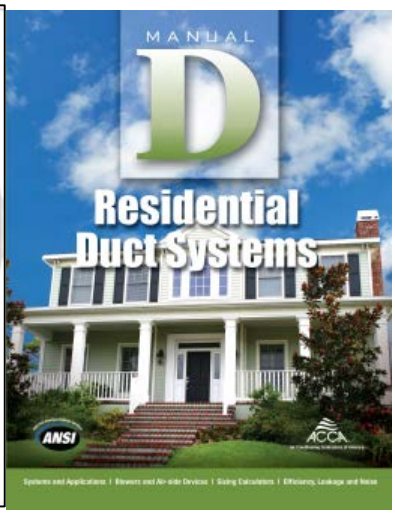
For:

Duct Design Basics

Friction Chart – Commercial/Residential
ACCA Duct Slide Rule – Commercial/Residentia
Manual D Speedsheet – Residential Duct Systems







Instructors may customize any of the materials in this 1 day course to enhance their student's learning experience.

2800 Shirlington Road, Suite 300
Arlington, VA 22206
www.acca.org

RECOMMENDED LESSON PLANS FOR ACCA DESIGN MANUALS

The lesson plans included in this document are intended for use by HVAC instructors at vocational schools, community colleges, and other HVAC training venues, as a method of introducing their students to industry-accepted procedures for HVAC system design described in the code-cited ACCA design manuals. It introduces duct design in four modules that cover the duct design basics for sizing and selecting the proper ducting in the air distribution system, and concludes with a fifth module that walks students through a Manual D Speedsheet application. Thus, providing the means for doing a Manual D compliant duct design (The prerequisite major steps in HVAC design are: Manual J load, Manual S equipment selection, zoning, air grille selection).

The course has a total of five modules. The first four modules are broken down by topic into between 3 and 5 presentation sections. The fifth module covers one topic: properly implementing a Manual D Speedsheet. The entire lesson plan is laid out as a one day 8 hour program with a half hour for lunch and two 15 minute breaks. The outline format allows the instructor to expand or contract the actual lesson to suit the needs of their students, available materials, or pre-existing course requirements.

At the end of the four modules, a student will be able to:

1. Conduct an accurate duct sizing calculation using duct friction sheets or the duct slide rule,
2. Size the ducts in the distribution system to ensure that the proper amount of air reaches each room utilizing ACCA's duct slide rule.
3. Conduct an accurate duct sizing calculation using the free ACCA Excel™- based Speedsheet.

The sections in the course build upon each other. Thus, if one part is not understood it is difficult for a student to catch up. ACCA recommends that the instructor encourage the students to use the ACCA's three tools; *Understanding the Friction Chart*; *ACCA's duct slide rule* and their computer/laptop to download and complete a Manual D Speedsheet so they can solve/mirror the examples presented in order to reinforce the individual portions of each lesson. Taking time to make sure everyone has the correct answer on their friction chart, duct slide rule, and Speedsheet reinforces the lesson and positions students for success on the subsequent steps.

In securing a better understanding of the material or for the creation of a lesson plan, ACCA offers the following additional resources for instructors:

- HVAC Essentials: Understanding Manual J
- Residential HVAC Design for Quality Installation (online, in-person, host classes)
- ACCA introduction on mechanical system design for code officials – Manual J module

TABLE OF CONTENTS

PART 1: DUCT DESIGN BASICS CURRICULUM OUTLINE

Module 1 – Friction Chart Primer (60 minutes)

Class content:

- Duct Design Basics Introduction (23 PP Slides)
  - Introduction
  - Overview of the course
- 1.1 Friction Chart Primer (17 PP slides)
  - Background for terminology used in airflow calculations
  - Airflow basics
- 1.2 Friction Chart Primer (19 PP slides)
  - Friction chart characteristics
  - Understanding the charts values
  - Using the chart to find basic values
- 1.3 Friction Chart primer (21 PP slides)
  - Adjusting for longer ducting
  - Adjusting for shorter ducting
  - Adjusting for Altitude
  - Adjusting for temperature
  - Adjusting for temperature and altitude

Module 2 – Duct Slide Rule Basics (90 minutes)

Class content:

- 2.1 Duct Slide Rule (17 PP slides)
  - Background on types of duct slide rules
  - Introduction to ACCA's duct slide rule
- 2.2 Duct Slide Rule (20 PP slides)
  - Reading CFM and Friction Rates
  - Converting Friction rates and CFM into a round duct size
  - Converting Friction rates and CFM into rectangular duct size options
- 2.3 Duct Slide Rule (19 PP slides)
  - Velocity pressure calculations
  - Altitude adjustments
  - Temperature adjustments
  - Adjusting for temperature
  - Temperature and altitude adjustments
  - Friction rate & Pressure drop relationships

Module 3 – ACCA Duct Slide Rule for Design (90 minutes)

Class content:

- 3.1 Calculations (21 PP slides)
  - Sample Commercial design on ACCA Duct Slide Rule
  - Flow rate & CFM values
  - Design Friction Rate
  - Duct Slide rule Auxiliary Calculations for velocity, CFM and duct size
  - Converting to round duct
  - Commercial duct sizing calculations

- 3.2 Calculations (20 PP slides)
  - CFM flow rates
  - Blower performance
  - Duct performance
  - Recommended maximum velocities
- 3.3 Calculations (18 PP slides)
  - Residential example on ACCA Duct Slide Rule
  - Friction rate
  - Duct area conversions
  - Duct sketch review
- 3.4 Calculations (13 PP slides)
  - Fitting losses
  - System Effect
  - Field CFM adjustments

Module 4 – Manual D Primer (90 minutes)

Class content:

- 4.1 Types of duct slide rules (16 PP slides)
  - Background on knowledge needed to do a Manual D duct design
  - Friction Rate explained
- 4.2 ACCA's Friction Chart (20 PP slides)
  - Reading CFM and Friction Rates
  - Converting Friction rates and CFM into a round duct size
  - Converting Friction rates and CFM into rectangular duct size options
- 4.3 ACCA's Friction Chart (32 PP slides)
  - Duct Sketch
  - Fitting Effective (equivalent length)
  - Manual J load
  - Diffuser and Grille pressure drops
- 4.4 ACCA's Friction Chart (21 PP slides)
  - Pressure drop for air side components
  - Available static pressure
  - Introduction to the Manual D speedsheet
  - Introduction to Manual D contents
- 4.5 ACCA's Friction Chart (31 PP slides)
  - Equivalent length reference velocity calculations
  - Equivalent length reference friction rate calculations
  - Advanced math formulas and concepts

Module 5 – Manual D Primer (120 minutes)

- 5.0 Manual D Speedsheet Primer (36 PP slides)
  - Total Equivalent Length (Effective Length)
  - Manual D Fitting Groups
  - Sample Manual D Speedsheet instructions
  - Duct Sizing Layout

PART 2: SAMPLE QUIZ AND ANSWER SHEET

Duct Design Basics Quiz
(16 Sample Questions-one from each section)

1.1 Friction Chart Primer Basic HVAC Airflow

Which of the following statements is not true?

a. Sharp corners in ducting decrease the turbulence.

b. Duct friction forms in thin layers or air films near the walls.

c. Airflow in a duct system does not move in straight lines.

d. The highest pressure drop in an HVAC system is across the blower.

1.2 Friction Chart Primer Measurements

If you have two of the needed values which of the following cannot be found on an ASHRAE friction chart?

a. Duct area in square inches or the SI equivalent.

b. Duct velocity in feet per minute or the SI equivalent.

c. Duct Friction loss in inches of water column.

d. Cubic feet per minute going through the duct can be found or calculated from the SI equivalent.

1.3 Friction Chart Primer & TEL

Given, *friction loss per 100 ft = SDP x 100 ÷ TEL of duct:* calculate the friction loss for a duct system with a total equivalent length of 250 ft and a system design pressure of 0.03 and select the correct answer from the following:

a. 0.012

b. 0.12

c. 0.0012

d. 1.2

2.1 Duct Slide Rule Basics

Which of the following statements is not true?

a. Duct slide rules can be found that have metric units.

b. All duct slide rules slide vertically to be read.

c. Duct sizing calculations can be done using a duct slide rule.

d. Many duct slide rules include round and rectangular duct sizing conversions.

2.2 Using the Duct Slide Rule

Which of the following duct types is not found on the ACCA duct slide rule?

a. Galvanized Metal duct

b. Wire Helix Flexible Duct

c. Ductboard

d. Flat oval duct

2.3 Duct Slide Rule Velocities, Pressures & Temperature

Which of the following calculations cannot be done directly on an ACCA duct slide rule?

a. Velocity Pressure to Velocity in fpm

b. Total Pressure to velocity pressure

c. Friction rate corrected for Altitude

d. Friction rate corrected for temperature

3.1 Duct Slide Rule Sizing Duct

According to Manual Q which of the following would not be an appropriate air velocity inside of a low velocity duct system?

a. Residences supply in main trunk 1000 fpm

b. Industrial Main supply trunk 3000 fpm

c. Library Main supply trunk 2000 fpm

d. Theater Main supply trunk 1500 fpm

3.2 Duct Slide Rule Evaluating Designs

What does TEL Stand for in Manual D?

a. Total Effective Length

b. Time Effective Length

c. Total Efficient Length

d. Time Efficient Length

3.3 Duct Slide Rule Residential Example

Which data set is not needed to use a duct slide rule to calculate residential duct sizes?

a. Total Effective Length

b. Diffuser Design CFM

c. Blower Capacity in CFM

d. Available Static Pressure

3.4 Duct Slide Rule Fitting Losses

From the list below, identify the formula that is not correct and cannot be used for field adjustments:

a. $(CFM_{beginning} \div CFM_{final})^2 = (SP_{beginning} \div SP_{final})$

b. $(CFM_{beginning} \div RPM_{beginning}) = (CFM_{final} \div RPM_{final})$

c. $(CFM_{beginning} \div CFM_{final})^3 = (BHP_{beginning} \div BHP_{final})$

d. $(CFM_{beginning} \div RPM_{beginning}) = (CFM_{final} \div RPM_{final})^3$

4.1 Manual D Basics Background

From the list below, identify the correct calculations used to find the duct size:

a. Calculate the sone value

b. Calculate Equivalent/Effective length

c. Calculate Available Pressure

d. Duct Diameter and Duct Length

4.2 Manual D Basics TEL

What TEL is used to calculate the friction rate for a system?

a. The longest Supply Run.

b. The Longest Return Run

c. The longest Supply Run plus the Longest Return Run

d. The longest Supply Run minus the Longest Return Run

4.3 Manual D Basics Duct Sizing (part 1)

According to Manual D, what are the recommended supply trunk parameters for noise consideration?

a. Maximum 1000 fpm Conservative 600 fpm

b. Maximum 900 fpm Conservative 700 fpm

c. Maximum 900 fpm Conservative 600 fpm

d. Maximum 1000 fpm Conservative 700 fpm

4.4 Manual D Basics Duct Sizing (part 2)

What item below would not be added into the component loss list?

a. Diffuser

b. Grille

c. Duct TEL

d. Humidifier

4.5 Manual D Basics Duct Sizing Fitting Equivalent length

Which of the statements below about fitting equivalent/effective length is false?

a. The fitting equivalent/effective length increases when the friction rate for the fitting is smaller than the Table's friction rate value.

b. The fitting equivalent/effective length increases when the Velocity for the fitting is larger than the Table velocity's value.

c. The fitting equivalent/effective length decreases when the velocity for the fitting is smaller than the Table velocity value.

d. The fitting equivalent/effective length decreases when the friction rate for the fitting is larger than the Table's friction rate value.

5.0 Manual D Basics Manual D Speedsheet Primer

Which of the following is not a tab on ACCA's Manual D Speedsheet?

a. Friction Rate

b. Duct Sizing

c. Duct Velocity

d. Effective Length

Answer Sheet

1.1 a	2.3 b	4.1 a	5.0 c
1.2 a	3.1 d	4.2 c	
1.3 b	3.2 a	4.3 b	
2.1 b	3.3 c	4.4 c	
2.2 d	3.4 d	4.5 c	

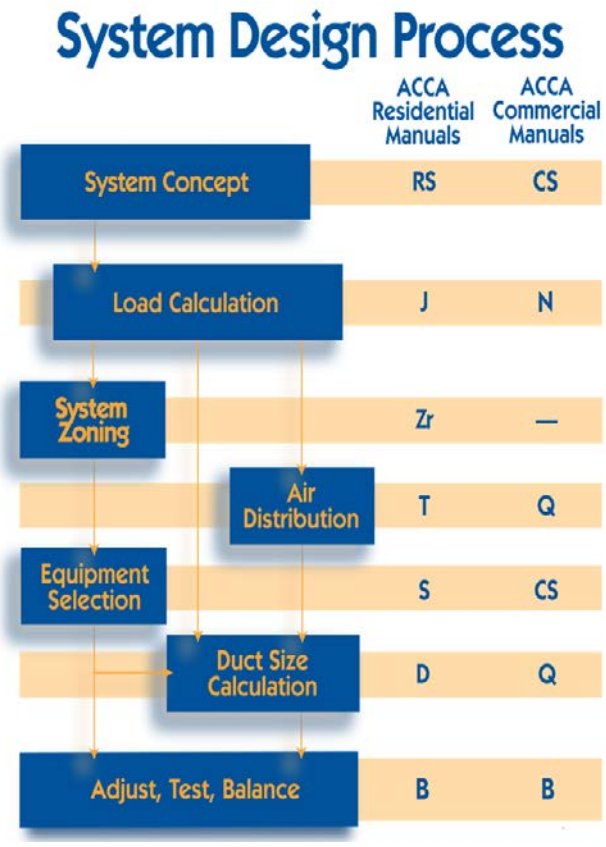
PART 3: OVERVIEW: *ACCA TRAINING OFFERINGS*

ACCA's Educational Offerings for an Evolving Marketplace

Updated 22 October 2015

As a supplier of educational programs in the HVACR industry for well over 50 years, three factors serve as driving forces within ACCA. First and foremost is to make sure ACCA educational programs and services are of the highest quality; second is to stay a step ahead of the emerging industry needs and trends so that ACCA can offer contractors what they need when they need it, and finally be cost effective in developing and delivering educational programs and services to contractors. ACCA's Standards have been widely recognized and accepted by all sectors of the HVAC industry and several have become code requirements. The chart on the right provides a snapshot view of how ACCA Manuals combine to cover the Design Process.

In advancing its training mission, ACCA avails itself to a number of approaches, from face-to-face training, to video/CD training solutions, to the online certificate program, to webinars, to ensuring its manuals/standards/guides are on the cutting edge of industry good practices, to develop educational plot forms for A) Contractors, B) Technicians, C) Consumers, D) Instructors, and E) Code Officials [see attached sheets for specifics on each].



FACE-TO-FACE TECHNICAL EDUCATION ('Classroom Setting')

(For more information, contact www.acca.org, or call 703-575-4477)

- **Residential Design For Quality Installations (RDQI):** A journeyman or higher level, three-day course covering Residential Design for Quality Installations includes: Manual J8® (Load Calculations), Manual D® (Duct Design), and the ANSI/ACCA 5-QI-2014 (HVAC Quality Installation Specification). Also included are: Manual T® (Air Distribution Basics), Manual S® (Equipment Selection), and ACCA's Duct Slide Rule, that provides the students with all of the tools needed to properly design and supervise the installation of an HVAC system to meet code as well as Energy Star® requirements.
- **Educational Program Instructor Certification (EPIC):** Residential EPIC is a master or expert level course that covers the residential design process in depth and requires the use of a Windows-based lap top computer. Material provided and covered includes the following: Manual J8® (load Calculations), Manual

S® (Equipment Selection), Manual D® (Duct Design), Manual H® (Heat Pump Systems), Manual P® (Psychrometrics), Manual T® (Air Distribution Basics), Manual TT-102® Understanding the Friction Chart), and Manual 4® (Perimeter Heating and Cooling).

Commercial EPIC parallels the residential EPIC course covering ACCA's commercial design materials: Manual CS® (Commercial Applications, Systems and Equipment), Manual N® (Commercial Load Calculation), Manual H® (Heat Pump Systems), Manual P® (Psychrometrics), Manual T® (Air Distribution Basics), and Manual Q® (Commercial Low Pressure, Low Velocity, and Duct System Design)

- **Seminars at ACCA meetings, conferences, and councils:** ACCA's continues to evolve its seminar classroom opportunities that are made available in conjunction with various meetings and other events. These draw a large number of people where it is cost-effective to offer multiple learning modules:
  - ACCA Conference and IE3 Indoor Air EXPO.
  - Building Performance Forum (a two-day learning experience for contractors co-sponsored by ACCA and BPI).
  - National HVACR Service Managers Forum (a two-day learning experience exclusively for service managers in contracting businesses).
  - Commercial Contracting Roundtable (the leading educational and networking experience for commercial HVACR contractors).
  - Numerous sessions provided at monthly local ACCA chapter meetings.

INDIVIDUALIZED STUDY

Embracing what ACCA sees as an important part in the education of the future, ACCA has developed individualized training so it can be used when and where the user wants. Individualized study materials are available in several formats designed to meet individual needs: CDs, Videos, recorded webinars, and Manuals/Guides. ACCA's material provides high quality training and reusable training materials at an affordable price so contractors can train employees when it is convenient.

- **Quality Assurance Accreditation Programs:** ACCA now offers an online training course with testing that allow contractors to receive accreditation for the Energy Star New Homes program (QA), ACCA's Existing Homes – Residential Service & Installation (RSI), and the RSI Verifier Program.
- **Energy and Home Performance Programs:** ACCA offers online training courses with testing that allow contractors to become program members. The programs include the Quality Assured (QA) program and the Residential Service & Installation (RSI) program.
- **Webinars for ACCA Members:** ACCA provides members with access to the latest business practices and technology implementations through webinars. Webinars are seen as a hybrid methodology that allows those who want to participate to have access to very specific topics when it is more convenient for them.
- **qTech Online Training (CEU) Programs:** ACCA offers online 6 hour video QI and QH training courses with a pdf copy of the selected guide & workbook and online testing that allows a technician to receive a certificate that is recognized for CEUs by BPI, ESCO, NATE, RESNET, and RSES.

INDUSTRY TRAINING COLLABORATIONS

- **North America Technician Excellence (NATE):** ACCA is committed to NATE certification as a mark of distinction and a way for consumers and contractors to gain a true comfort level with the professionalism of HVAC technicians.
- **Instructor Workshops:** ACCA has been working with the Council of Air Conditioning and Refrigeration Educators (CARE), and to develop and disseminate the information HVACR instructors want and need.
- **Building Performance Forum:** ACCA forum for HVAC contractors and raters involved in the home performance industry held in conjunction with the Building Performance Institute, Inc. (BPI).

ACCA values collaborative partnerships with business entities and allied associations to advance the goal of quality education in a cost effective manner.

CONTRACTOR: *ACCA Training Offerings*

ACCA's Educational Offerings for an Evolving Marketplace

Updated 4 November 2015

Contractor To Contractor

For access to member benefits:
http://members.acca.org/home

- ACCA Conference
- Mixed Groups
- Code of Professional Conduct
- ACCA Blogs
  - Federal Affairs
  - State Affairs
  - Conference & Expo
  - Industry News & Opinion
  - Service Managers Forum
  - Building Performance

QA & RSI Training

Access to all contractors:
http://www.acca.org/qa/resources

- QA Contractor Elements
- Participation Requirements
- Outdoor Load Calculation Design Conditions
- QA Sample Policy Template
- ENERGY STAR Checklists
- RSI HVAC Verifiers

Free To Members Video Training

Watch: http://members.acca.org/acca/watch

1. Performance Reviews For Success
2. Stress in Service Contracting
3. 10 Easy Steps to Handling the Poor Performer

Plus, ACCA has an additional 133 additional Videos covering contracting management and employee relationship issues.

Safety Downloads

Risk Management Library:
http://www.acca.org/members/downloads

- A SIR Program – It's Just the Ticket!
- Who Are You Insuring?
- Who Pays for Errors?
- Conduct a "Safety" Interview
- Don't Risk a Lot to Save a Little
- Distracted Driving: At What Cost?
- First Impressions Work Both Ways
- Set Driving Expectations
- Workers' Compensation Fraud
- How Much Is a Good Name Worth?
- Two to Hire, Two to Fire!
- Preparing for a Flu Pandemic
- Concentrate On Safety
- Real Value or Paper Value?
  - Winter Driving Woes
  - Battling Mother Nature
  - Business Interruption
  - Add TLC to Workers' Comp
  - Back to Back Safety

Free Member Downloads

Keeping contractors up to date:
http://members.acca.org/home

- Residential HVAC Design for Quality Installation (Jack Rise Course)
- Technical Bulletins
- Customizable Brochures
- Comfor Tools (to be customized for distribution to customers)
- Q&A Section
- Forms and Templates
- ACCA Annual Report
- Hurricane Last Minute Essentials Guide
- Sample Emergency Management Plan
- Open for Business Planning Package

Contractor Focused CD's & DVDs

Training Library:

http://www.hvacessentials.com

- Contractor Soft Skills DVD
- Convert Phone Calls into More Sales DVD
- LEED, Follow or Get Out of the Way (Book and/or CD)

Forums & Annual Meeting

Live Training & Information:
http://members.acca.org/home

- ACCA Conference & IE3 Expo
- Service Manager Forum
- Building Performance Forum
- Radiant & Hydronic Forum

Free To Members Audio Training

Listen: http://members.acca.org/acca/listen/

- The Price Is Right! How To Properly Price Commercial Services
- The Next Generation of HVAC
- Private Label Products: Are They Worth It?

Plus, 30 Additional Audio Programs addressing business related issues.

Political Action Committee

Legislation Tracking, Grassroots Action Center and Federal affairs updates on the following items brings the latest information on in following areas of interest to contractors:
http://www.capwiz.com/acca/home/

- Tax Legislation
- Regional standards
- Copper & Metal Theft
- Healthcare
- Labor
- Commercial Energy Eff. Incentives
- Residential Energy Eff. Incentives
- Refrigerants
- Regional Standards
- Regulatory reform
- Small Business Capital Investment
- Transportation

Breaking News

IE3 Media: http://www.ie3media.com/

- IE3
- Insider Emails
- Special Interest Council News Letters:
  - Building Performance
  - Radiant and Hydronics

ACCA Town Hall

Town hall discussions and issues discussed.
http://www.acca.org/members/videos

Why Join ACCA?

To become part of the leading edge in the HVACR industry and grow your business. Learn what ACCA has to offer Contractors:
http://www.acca.org/join/

- Free Training
- Free Technical & Legal Support
- Free Downloads
- Connect with:
  - Customers
  - Contractors
  - Job Seekers

TECHNICIAN: *ACCA Training Offerings*

ACCA's Educational Offerings for an Evolving Marketplace

Updated 4 November 2015

Video and CD Training

ACCA on line store: **www.acca.org/store**

HVAC Essentials

- Understanding Manual J: Heat Gain & Heat Loss in the Real World
- Understanding Manual D: Airflow & Duct Design in the Real World
- Understanding Section 608: refrigerant Handling in the Real World
- Understanding Manual N: Commercial Load Calculation in the Real World
- Understanding Quality Installation
- Understanding Electricity
- Understanding Manual Q: Low Pressure, Low Velocity Duct Design in the Real World
- Understanding Manual Zr
- HVAC Essentials Understanding 608
- Tips for Residential HVAC Installation CD
- Control System Basics for HVAC Technicians CD
- Refrigeration and Air Conditioning 7th Edition CD set

Nate Training CDs

- Mastering Core Service CD
- Mastering Heat Pump Service CD
- Mastering Core Installation CD
- Mastering Air Conditioning Inst. CD
- NATE Air Conditioning and Heat Pumps CD
- NATE Air Distribution CD
- NATE Gas and Oil Heating CD
- NATE Hydronics CD

Mobile App

https://www.calcunow.com
Duct Wheel for iPad

Qtech Online Course CEU's

Available at: **http://www.acca.org**

- Quality Installation
- NATE Essentials
- Understanding Section 608
- Technician's Guide & Workbook for Quality installations
- Technician's Guide & Workbook for Home Performance Improvements

Training Books and Materials

ACCA on line store: **www.acca.org/store**

- Study Guide for EPA Section 608 (English, Spanish, and Italian)
- Training Manual for EPA Section 608 (English, and Spanish)
- Section 608 Refresher Manual (English, and Spanish)
- EPA 609 Certification and Training Manual
- Calculator/Pocket Card Set
- Careers In the HVAC Industry
- Control System Basics for HVAC Technicians
- Customer Service Handbook For HVACR Technicians
- Airflow In Ducts
- Blueprints and Plans For HVAC
- Commercial System Quick Reference (CSQR)

- Digital Controls for HVAC Technicians
- Duct Calculation Slide Rule
- Energy Efficiency Manual
- Fans and V-Belt Drives
- Geothermal HVAC: Green Heating and Cooling
- Good HVAC Practices for Residential and Commercial Buildings (ACCA)
- Green Guide
- HVAC Equations, Data, and Rules of thumb, 2nd Edition
- HVAC Licensing Study Guide
- HVAC Spanish
- Math for the Technician
- Refrigeration and Air Conditioning 7th
- Modern Refrigeration and Air Conditioning, 19th Edition
- Refrigeration for HVAC Technicians How Refrigeration Works
- Troubleshooting HVAC-R Equipment
- Building Science Principles Reference Guide
- Geothermal HP Training Manual
- Tech to Tech
- How Come?
- Modern Hydronic Heating
- Pumping Away, and other really cool piping options for hydronic system
- Residential Hydronic Heating, Installation and Design
- The Lost Art of Steam Heating
- Refrigeration for HVAC Technicians
- Bob's House
- Duct Diagnostics and Repair
- HVAC Installation Procedures Handbook
- HVAC Maintenance Procedures Handbook
- HVAC Service Procedures Handbook
- Layout for Duct Fittings

- Manual 4 Inst. Techniques for Perimeter heating and Cooling
- Tips for Residential HVAC Inst.
- HVAC Servicing Procedures Handbook
- HVAC Installation Procedures Handbook
- HVAC Maintenance Procedures Handbook
- Installing Residential Forced Air Furnaces
- Layout For Duct Fittings

NATE Training Manuals

ACCA on line store: **www.acca.org/store**

- NATE A/C & Heat Pumps Manual
- NATE Air Distribution
- NATE Essentials Manual
- NATE Gas and Oil Heating
- NATE Hydronics
- Mastering Air Distribution Service
- Mastering Hydronics – Gas Service
- Mastering Gas Furnace installation
- Mastering Gas Furnace Service
- NATE Core Essentials
- NATE Air Conditioning and Heat Pumps
- NATE Air Distribution
- NATE Gas and Oil Heating
- NATE Hydronics

Course Related Text and Work Books

ACCA online store: **www.acca.org/store**

- Technician's Guide & Workbook for QI
- Manual B Balancing and Testing Air and Hydronic Systems
- Manual H Heat Pump Systems and Applications
- Controls – Level 1 Fundamentals
- Life Cycle Costing for HVAC SYS.
- Principles of Mechanical Refrigeratio

Consumer: *ACCA Training Offerings*

ACCA's Educational Offerings for an Evolving Marketplace

Updated 4 November, 2015

ACCA develops innovative consumer education materials for light commercial and residential customers. Tools are designed to help consumers locate and evaluate HVACR contractors. They help consumers recognize contractors who have differentiated themselves by offering standards-based quality installation services. Extensive web information on how to:

1. Find a contractor
2. Select a contractor
3. What questions to ask a contractor
4. What the QI is
5. Contractor proposal evaluation checklists
6. Commonly asked questions and answers
7. Texts that explain basic HVAC design and installation principles in non-technical language

Consumer Videos

Animated Videos:

- *Comfort Health Safety* http://www.acca.org/homes/
- *When Is The Best Time To Ask These Questions?* http://www.acca.org/homes/

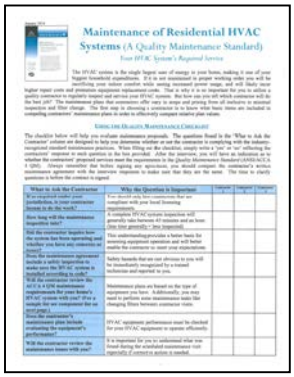
Videos:

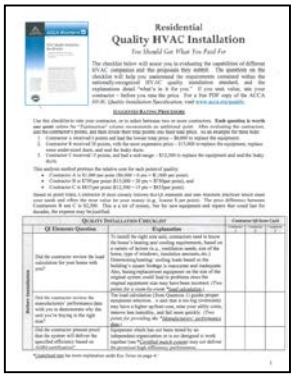
- *A Guide For Home Heating and Air Conditioning* http://www.acca.org/homes/
- *A Guide For Business Heating AND Air Conditioning Services* http://www.acca.org/buildings/

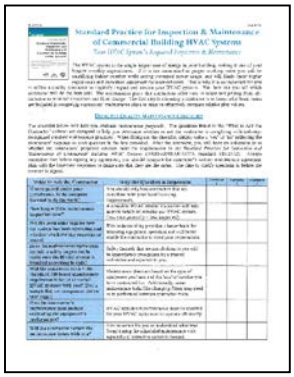
Consumer Checklists

Quality Installation Checklist (*English & Spanish)* http://www.acca.org/homes/

Quality Maintenance Checklist (*Residential and Commercial Versions)* http://www.acca.org/homes/







Frequently Asked Questions & The Right Questions To Ask

Found at: **http://www.acca.org/homes/**

- **Are your technicians NATE certified?** NATE certification is the industry's standard for technician excellence. You should never accept anything less.
- **Do you offer continuing education to your employees?** This industry changes rapidly. Ask the contractor to describe their training program.
- **Can you provide local references?** Get the names of neighbors who have used the company's services, and then follow up with them.
- **Do you offer a service agreement plan?** Well-maintained equipment runs more efficiently and lasts longer.
- **Are you properly licensed?** Unfortunately, every state, city, or county could have different contractor licensing rules. Ask for proof!
- **Do you follow the industry standards?** Make sure your contractor knows what "Manual J" and "Quality Installation" are, just for a start. Scroll down on this page to find out what these standards are and why they are important to you!

Texts Designed For End Users

Found at: http://www.acca.org/store

Bob's House, a case study for understanding the residential HVAC design process and Manual RS-Comfort, Air Quality, & Efficiency by Design are designed to be used by those who want a basic understanding of HVAC design practices.

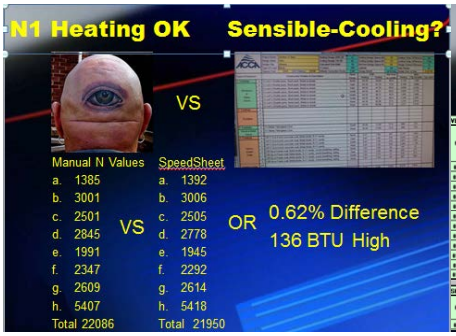
INSTRUCTOR: *ACCA Training Offerings*

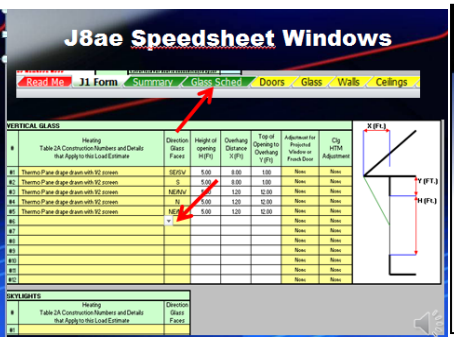
ACCA's Educational Offerings for an Evolving Marketplace

Updated 4 November 2015

ACCA participates in HVACR Instructor Work Shops and develops education materials for light commercial and residential training. ACCA helps instructors provide the training that contractors need today's technicians to have. The net result of using ACCA's HVACR training materials is to provide students with market place skills based on the HVACR industry's good practices and procedures.

Free Downloads From The ACCA Website





Manual N Speedsheet video | Manual Jae Speedsheet video | QI Standards

Speedsheet Videos available at: www.acca.org/speedsheet

Other Supporting Resource Materials Available as Free Downloads:

Standards available at: www.acca.org/standards/quality :

- HVAC Quality Installation Specification (English)
- HVAC Quality Installation Specification (Spanish)
- Home Performance Evaluation & Improvement
- HVAC Quality Installation Protocols
- Quality Maintenance of Residential HVAC Systems
- HVAC System Cleanliness & Restoration

ACCA Instructor's Lesson Plans

ACCA has lesson plans for Instructors available on the educator's page on the website. Lesson plans are available for:

- EDU 1-9/2015 Instructor's Lesson Plan for Manuals J, D, and S.
- EDU 2-9/2015 Instructor's Lesson Plan for *Technician's Guide & Workbook for Quality Installations*
- EDU 3-9/2015 Instructor's Lesson Plan for *Technician's Guide & Workbook for Home Performance Improvement.*

North American Technical Excellence Instructor's CDs

- NATE A/C & Heat Pumps Manual
- NATE Air Distribution
- NATE Essentials Manual
- NATE Gas and Oil Heating
- NATE Hydronics

NATE CDs available at: www.acca.org/store

Instructor Power Point Presentations on CD's

Cd's developed for Instructor Use In the Classroom

Power points available at: www.acca.org/store

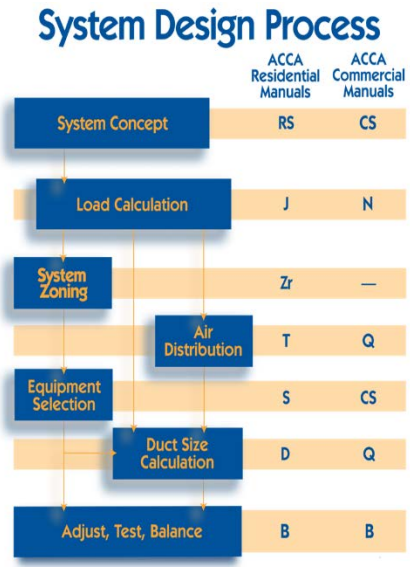
- Controls – Level 1 Fundamentals
- Life Cycle Costing for HVAC Systems
- Principles of Mechanical Refrigeration
- Simutech –Simuair- Air Conditioning Simulator Training System
- Water Piping and Heat Pumps- Instructor
- Residential Design Instructor Power point
- Commercial design Instructor Power Point
- 608 Certification Program (Refrigerant Transition and recovery Certification Instructor Manual includes lesson plans and *overhead* masters) Procter Sign Up: http://www.acca.org/for-contractors/
- Understanding Section 608

ACCA's Educational Program Instructor Certification (EPIC)

ACCA's Educational Program Instructor Certification (EPIC) is a 4 day course designed for those instructors with a master's level experience in HVAC systems. Participants must supply their own windows-based computer system. The following Manuals and materials are provided by ACCA:

Residential EPIC available at:
www.acca.org/education/epic/

- Manual D (Duct Design)
- Manual J (Load Calculation)
- Manual H (Heat Pump Systems)
- Manual P (Psychrometrics)
- Manual S (Equipment Selection)
- Manual T (Air Distribution Basics)
- Manual 4 (Perimeter Heating & Cooling)
- Manual TT-102 (Understanding the Friction Chart)



Apprenticeship Program

ACCA developed a training series of Manuals designed to teach what contractors need entry level technicians to know. Designed to be a two or four year program, the books are available with an Instructor's Guide CD. The following Courses are designed to build upon one another:

- HVACR 101 Book and Instructor's Guide on CD
- HVACR 201 Book and Instructor's Guide on CD
- HVACR 301 Book and Instructor's Guide on CD
- HVACR 401 Book and Instructor's Guide on CD

Available at: www.acca.org/store

Instructor's Training Certification Manual

ACCA has a Geothermal Heat Pump Training Certification Instructor Manual available for those who wish to teach the basics of Geothermal Heat Pump design and installations. Available at: www.acca.org/store

CODE OFFICIALS: *ACCA Training & Resources*

ACCA's Educational Offerings for an Evolving Marketplace

Updated 4 November, 2015

ACCA develops education materials for light commercial and residential Code Officials. Tools are designed to help them understand the basic requirements for HVACR designs. Additionally, ACCA is available as a trusted unbiased HVACR industry expert to answer Code Official's questions one on one when they call in.

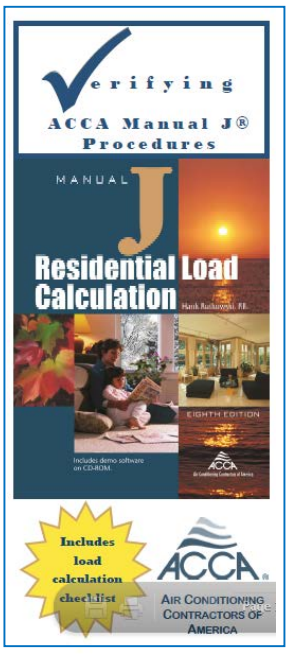
Building Code Requirements for ACCA Manuals

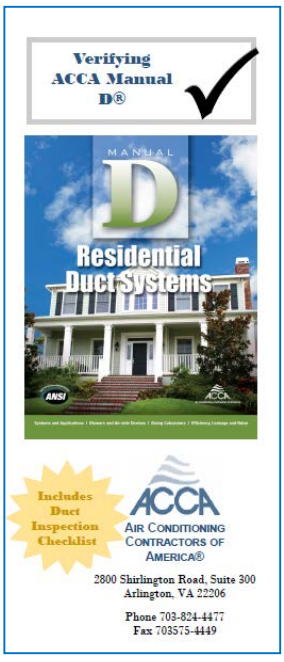
The following national codes make reference to specific ACCA procedures in order to comply. Jurisdictions that adopt these codes require the use of ACCA procedures as outlined in our technical manuals.

- The **IAPMO's Uniform Mechanical Code** requires the use of Manual J (Residential Load Calculation), Manual N (Commercial Load Calculation), Manual D (Residential Duct Systems), and Manual Q (Commercial Duct Systems).
- The **ICC's International Mechanical Code** requires the use of Manual D (Residential Duct Systems).
- The **ICC's International Residential Code** requires the use of Manual J (Residential Load Calculation) and Manual S (Residential Equipment Selection), Manual D (Residential Duct Systems).
- The **ICC's International Energy Conservation Code** requires the use of Manual J (Residential Load Calculation) and Manual S (Residential Equipment Selection).

Codes Verification Brochure's for Manuals J, D, and S

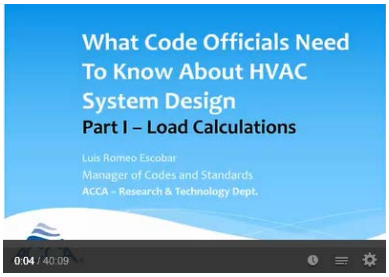
Available at: http://www.acca.org/standards/codes/

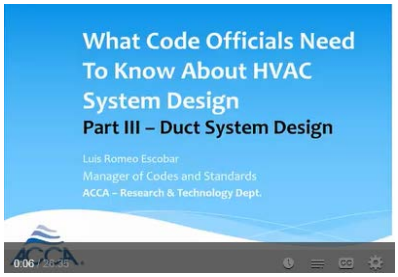




Videos for Code Officials

Available at: https://www.acca.org/standards/codes/



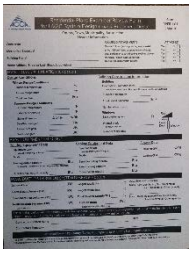


Residential System Design Review Forms

Available at: https://www.acca.org/standards/codes/

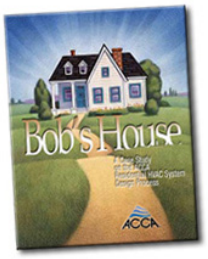
Illustrated examples and review form downloads are made available for free to Code Officials

- ICC Residential System Review Form
- UMC Residential System Review Form
- Understanding & Using the System Review Form



Bob's House

A Manual designed to walk Code Officials through the whole design process on a typical home.



Guidance on Approved Software Meeting Code Requirements

A brochure designed to provide guidance on approved software providers
http://www.acca.org/standards/software/