



ENERGY STAR HVAC Quality Installation

CEE Winter Program Meeting

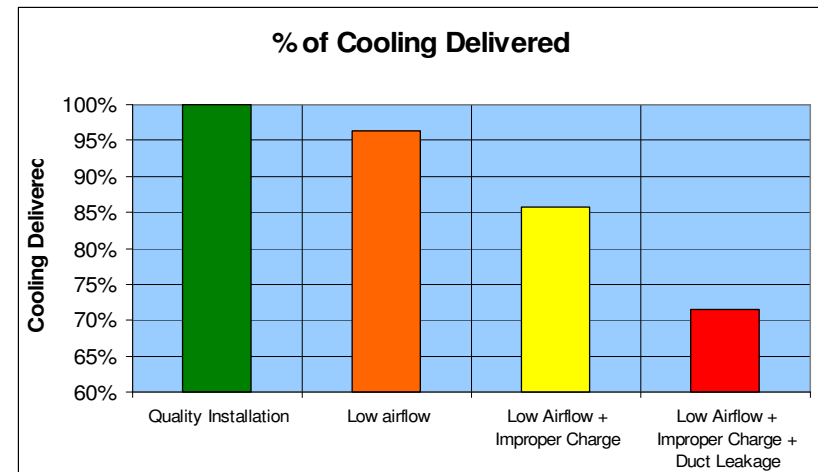
Thursday, January 17 2007

Potential Losses per Installation



- **Air Flow over Indoor Coil**
(70% inadequate)
- **Refrigerant Charge**
(62% improperly charged)
- **Equipment Sizing**
(50% oversized)
- **Duct Leakage is significant (Total leakage averaged 35% in the pilots)**

Source: C. Neme, J. Proctor, S. Nadel, *National Energy Savings Potential from Addressing Residential HVAC Installation Problems*, 1999



Installation issues can add up to a 30 percent reduction in the rated capacity!

Or put another way...

a SEER 13 performs like a SEER 10

Program Strategy



Stakeholder	Market Barrier	Strategy
Contractor/technician	<ul style="list-style-type: none">- Lack of qualified technicians- Rule of thumb practices- Extra time and cost to perform QI	<ul style="list-style-type: none">-Training is a program entry requirement-Proper measurement and reporting will help with system evaluation and minimize call backs
Customer	<ul style="list-style-type: none">- Lack understanding of HVAC installation and its relation to efficiency and comfort	<ul style="list-style-type: none">-Use ENERGY STAR as a trusted 3rd voice during sales call-Working with ACCA and CEE to improve consumer education

How HVAC QI Meets Utilities' Goals



➤ Average estimated savings from HVAC QI

Homes	Annual per-house savings	
	North (Indianapolis, IN)	South (Jackson, MS)
Existing	1300 kWh	1900 kWh
	National	
New	1000 kWh	

Assumptions:

New system corrects typical install problems

- Duct leakage reduced from 35% to 20%
- Duct insulation increased from R2 to R6
- Proper charge
- Proper airflow
- Proper sizing

➤ Estimated peak electricity demand savings

Location	Per-house peak AC demand savings
Fort Worth, TX	1.3 KW
Jacksonville, FL	1 KW

Stakeholder Roles in ES HVAC QI



- **Utility**
 - Credibility through verification
 - Provide training to contractors
 - Safeguard integrity on ES mark
 - Possible incentives to consumers and/or contractors
 - Issue certificates to consumers
- **Contractor**
 - Commit to program specs
 - Market program to customers
 - Collect data
 - Train technicians
- **Verifier**
 - Provide QA
 - Provide feedback to contractors
- **EPA**
 - Provide 3rd party voice
 - Assist with training development
 - Provide technical support
 - Work with stakeholders to improve installation practices

ENERGY STAR HVAC QI Guidelines



- Minimum requirements for installations under the program must meet the ANSI/ACCA HVAC Quality Installation Specification
- The QI Specification identifies consensus requirements associated with quality installations, acceptable procedures for measuring or verifying the attainment of those requirements, and acceptable forms of documentation to show compliance to the requirements.

The image shows the front cover of the ACCA Standard HVAC Quality Installation Specification. The cover is primarily blue and white. At the top left is the ACCA logo (Air Conditioning Contractors of America). Below it is the contact information for ACCA. The main title "ACCA Standard" is in large white letters on a blue background. Below that is the standard number "ANSI/ACCA 5 QI-2007". The title "HVAC Quality Installation Specification" is in large black letters, followed by the subtitle "Residential and Commercial Heating, Ventilating, and Air Conditioning (HVAC) Applications". At the bottom, there is a paragraph of text explaining the development process of ACCA standards and how to purchase or order them. The ANSI logo is at the bottom right.

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ACCA Standard

STANDARD NUMBER: ANSI/ACCA 5 QI-2007

HVAC Quality Installation Specification

Residential and Commercial Heating,
Ventilating, and Air Conditioning (HVAC)
Applications

The Air Conditioning Contractors of America Educational Institute (ACCA-EI) Standards Task Team (STT) develops standards as an American National Standards Institute (ANSI) accredited standards developer (ASD). ACCA develops voluntary standards as outlined in the ACCA Essential Requirements and the ANSI Essential Requirements. ACCA standards are developed by diverse groups of industry volunteers in a climate of openness, consensus building, and lack of dominance (e.g., committee/group/team balance). Essential requirements, standard activities and documentation can be found in the standards portion of the ACCA website at www.acca.org. Questions, suggestions, and proposed revisions to this standard can be addressed to the attention of the Standards Task Team, ACCA, 2800 Shirlington Road, Suite 300, Arlington, VA 22206.

ACCA Standards are updated on a five-year cycle. The date following the standard number is the year of approval release by the ACCA-EI Standards Task Team. The latest copy may be purchased from the ACCA online store at www.acca.org or ordered from the ACCA bookstore via toll-free telephone at 888.290.2220.
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ANSI
American National Standards Institute
www.ansi.org

Verification



Level 1 Verification:

Data review of Manual J calculations and commissioning report. The data review will include confirming that all required installation elements were performed using an approved method and check for data inconsistencies

Level 2 Verification:

In-field verification of the installation that follows established protocols.

ACCA has established a committee that is currently working on HVAC QI verification protocols

**ENERGY STAR in Cooperation with TXU Electric Delivery
Installation Pilot Commissioning Report**

Date: _____ Time: _____

Site Information

Address 1: _____
Address 2: _____
City: _____ State: _____ Zip: _____

Design

Heat Gain Method: Manual J v7 Manual J v8 None Other (specify): _____
Duct Design Method: Manual D None Other (specify): _____
Equipment Specification method: Manual S OEM Recommendation Other (specify): _____

Latent Heat Gain: _____ BTUh Sensible Heat Gain: _____ BTUh
Total Heat Gain: _____ BTUh Design Airflow: _____ CFM
Duct Design Static Pressure: _____ IWC
Type of Installation: Replacement New System - Existing Home New System - New Home
Square Feet of Zone: _____ sqft

Equipment

Condenser: Manufacturer: _____ Model: _____
Serial Number: _____
Evaporator: Manufacturer: _____ Model: _____
Serial Number: _____

System

Metering Device: TXV Fixed Orifice Other (specify): _____
Refrigerant: R-22 R-410a Other (specify): _____
Refrigerant Charge Goal (for TXV): _____ Subcooling _____ Approach (for Lennox only)
Fan Motor Type: Fixed Speed (e.g. PSC) Variable (e.g. GE - ECM)
Latent Capacity: _____ BTUh Sensible Capacity: _____ BTUh
Total Capacity: _____ BTUh
ARI EER/SEER: _____ (14 or higher) ARI Ref #: _____

Air Flow Tests

Static Pressure: Return Static _____ IWC Supply Static _____ IWC
Measured Air Volume @ evaporator: _____ CFM
Volume Measurement Method Used: TrueFlow Anemometer Pressure Matching (w/ Duct Blaster) Other: _____

Evaporator/Air Handler Fan Power: Pre: _____ Amps _____ volts _____ watts
Post: _____ Amps _____ volts _____ watts
Condenser Fan Power: Pre: _____ Amps _____ volts _____ watts
Post: _____ Amps _____ volts _____ watts
Compressor Power: Pre: _____ Amps _____ volts _____ watts
Post: _____ Amps _____ volts _____ watts

Speed Setting: Fixed: Low Med-Low Med Med-High High CFM (for setting): _____
OR
Speed Setting: Variable: Fan set for: _____ CFM

Please mail completed forms to: Siobhan Steyn at The Cadmus Group Inc., 57 Water St, Watertown, MA 02472
or fax: (617) 673-7310 or email: ssteyn@cadmusgroup.com

To Learn More



1:30 – 3:00

Breakout Session I - Residential/Small Commercial HVAC
Committee: Three Critical Components of Quality Installation

Or

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