

A Standards Based Framework for Obtaining / Verifying HVAC QI

*[Maintaining HVAC system performance via
industry-established, ANSI-recognized, installation standards]*

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on Market Transformation
(Arlington, VA)

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Without an emphasis on
ensuring quality installation (QI)

**HVAC Systems do not properly perform
and ...**

***Homeowners Don't Get What they
Paid For !!***

Advancing a *Standards-based Approach* [aka: A Decade of “Supporting the Quality Bar”]

Quality
Installation
(ACCA 5 QI)



QI Verification
Protocols
(ACCA 9 QIvp)



Free PDF downloads:
www.acca.org/quality

Industry-developed,
ANSI-recognized Standards.

Established with Extensive Expertise

Utilities

Allied Industry Associations

Equipment Manufacturers (OEMs)

HVAC Contracting Businesses

State / Federal Entities

Equipment Distributors

Industry Training Companies

Other Interested Parties



ANSI/ACCA 5 QI – 2015 Standard

[Minimum design / installation requirements]

Design Aspects

- Ventilation
- Load Calculations
- Equip Capacity Selection
- Geothermal Systems
- Matched Systems (per AHRI)

Distribution Aspects

- Duct Leakage
- Airflow Balance
- Hydronic Balance

Equip. Installation Aspects

- Airflow Across Coil
- Hydronic Flow
- Refrigerant Charge
- Electrical Requirements
- On-rate (fuel-fired)
- Combustion Venting
- System Controls

Doc. & Education Aspects

- System Documentation
- Owner Education

Endorsed by leading industry organizations:





ANSI/ACCA 9 QIvp – 2016 Standard [Minimum Programmatic Req'ments for QI Verification]

2016 Update Includes

- Streamlining of requirements for program administrators
- Establishes two levels of verification:
 - Level 1: “Installation Checklist Verification”
 - Level 2: “Field Verification” + Level 1 Installation Checklist Verification
- Allows for the use of *automated validation systems (AVS)*

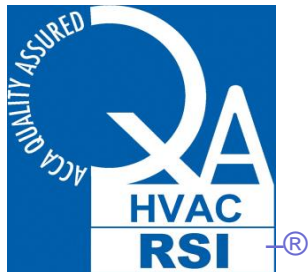
Basis for ACCA QA Contractor Accreditations ACCA 5 QI / ACCA 9 QIvp



New Homes

Started in 2011

800+ accredited contractors nationwide



Residential Service and Installation

Refocused in 2016

200+ (and growing) contractors nationwide

EPA EnergyStar™ Programs

New Homes

- EnergyStar Certified New Homes (v3; Jan2012)
 - Recognizes ACCA's QA New Homes Program

Existing Homes

- Energy Star Verified HVAC Installation (ESVI; May2016)
 - Recognizes ACCA's RSI Program



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Program Overview – Existing Home

- **A standards based approach for QI**
 - Addressing all elements in ACCA 5 QI
 - Verification per ACCA 9 QIvp (Level 1)
- **Open to all professional HVAC businesses**
 - Observe ACCA 5 QI
 - Observe required *contractor elements*
- **On-line Application Process**
 - Application information
 - Insurance certificate
 - State / local licenses
 - Program Orientation
- **Annual license / insurance review**

Benefits to Efficiency Programs

- **Focuses beyond simple nameplate efficiency**
 - Offsets ‘declining benefits’ of incremental efficiency gains
 - Recognizes that the HVAC industry is topping out at “max tech”
 - Goes after the “low-hanging fruit” ... installation faults
- **Insulates Utility Programs from Disgruntled Participants**
 - ACCA maintains the list of qualified contractors
 - ACCA is accountable for ‘de-listing’ non-performing contractors
- **Streamline efficiency program operations**
 - Homeowners receive ESVI Certificate
 - Contractor pays program participation fee

Recommended by NASEO

NASEO resolution (Feb 2017) encourages State Energy Offices to link “HVAC industry-recognized quality installation practices with state programs and policies.”

No Need to Purchase ...

- extra gadgets
- other gizmos
- more software

However ... possibility to tie into “smart tools” that are gaining industry traction.

Fieldpiece Test Tools HVACR Pros Trust

 **iManifold**[®]
DRIVEN BY iCONNECT[®]

 **Parker**

retrotec


 **ETEC**[®]
The Energy Conservatory

We measure it.  **testo**

USEI
TEST INSTRUMENTS[™]

 **BACHARACH.**
Leaders in HVAC-R Instrumentation

Verifying ACCA 5 QI for Existing Homes



ACCA Standard 5

2800 Shirlington Road
Suite 300
Arlington, VA 22208
703.575.8177
Fax 703.575.8107
www.acca.org

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 22208.

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 888.260.2220. © 2009 ACCA.



www.ansi.org



ACCA Standard 9

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www.acca.org

STANDARD NUMBER: ANSI/ACCA 9 QI-V-2009

HVAC Quality Installation Verification Protocols


Establishes Minimum Requirements for Verifying That Residential and Light Commercial HVAC Systems Meet the ANSI/ACCA 5 QI - 2007 (HVAC Quality Installation Specification) Standard.

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www.ansi.org

Appendix A



QA Program Quality Installation Contractor Checklist



HVAC Designer Responsibilities:

- Complete the Administrative and Design portion for each system that is installed!
- Visit www.aaccontractors.org/qa/existing-homes for more information.

1. ADMINISTRATIVE		
1.1 Home Address	<input type="checkbox"/>	NA
1.2 City	<input type="checkbox"/>	
1.3 State	<input type="checkbox"/>	
1.4 Zip	<input type="checkbox"/>	
1.5 Area Served: <input type="checkbox"/> Whole house, <input type="checkbox"/> Bonus Room, <input type="checkbox"/> Master Suite, <input type="checkbox"/> Upstairs, <input type="checkbox"/> Downstairs, <input type="checkbox"/> Other	<input type="checkbox"/>	
1.6 Permit number	<input type="checkbox"/>	
1.7 Authority Having Jurisdiction (AHJ)	<input type="checkbox"/>	
1.8 Recognition: <input type="checkbox"/> RES HVAC, <input type="checkbox"/> Certificates, <input type="checkbox"/> ENERGY STAR Certified Home?	<input type="checkbox"/>	
1.9 Certificate Distribution: <input type="checkbox"/> Certificate to Homeowner?	<input type="checkbox"/>	
1.10 Equal Address	<input type="checkbox"/>	
1.11 Builder/Client Name	<input type="checkbox"/>	
1.12 HVAC Design report corresponding to this system has been collected from designer or builder?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Yes
1.13 House Plan, per Item 1.6 of HVAC Design Report	<input type="checkbox"/> Yes <input type="checkbox"/> No	Bluh
1.14 Site-specific design	<input type="checkbox"/> Yes <input type="checkbox"/> No	Bluh
1.15 Group Design	<input type="checkbox"/> Yes <input type="checkbox"/> No	Bluh
1.16 Certificate Distribution: <input type="checkbox"/> Certificate to Homebuilder?	<input type="checkbox"/>	
1.17 Equal Address	<input type="checkbox"/>	
1.18 Documentation Confirmation Statement: Documents for this installation, if applicable, are available for review. Manual J load log, gain calculations, ECM reported performance data, OEM Blower, Filter, duct leakage measurements, and TAB records. (Signature) <input type="checkbox"/>	<input type="checkbox"/>	Yes
2. DESIGN		
2.1 Heat Loss/Gain		
2.1.1 Conditioned Floor Area Served by Unit	Sq. Ft.	
2.1.2 Design Total Heat Load	Btuh	
2.1.3 Design Sensible Heat Gain	Btuh	
2.1.4 Design Latent Heat Gain	Btuh	
2.1.5 Design Total Heat Gain	Btuh	
2.2 System Configuration		
2.2.1 Installed Equipment <input type="checkbox"/> Forced Air, <input type="checkbox"/> Split System, <input type="checkbox"/> Package Unit, <input type="checkbox"/> Ductless, <input type="checkbox"/> Geothermal, <input type="checkbox"/> Hydronic		
2.2.2 Split system: <input type="checkbox"/> Condenser and coil, <input type="checkbox"/> Condenser and Fan Coil Unit		
2.2.3 Ductless: <input type="checkbox"/> One indoor unit, <input type="checkbox"/> Two indoor units		
2.3 Heating Equipment (if applicable)		
2.3.1 Primary Heat Source: <input type="checkbox"/> Furnace, <input type="checkbox"/> Heat Pump (w/ Coil or Fan Coil Unit), <input type="checkbox"/> Electric Furnace, <input type="checkbox"/> Boiler		
2.3.2 Brand		
2.3.3 Model		
2.3.4 Serial		
2.3.5 Output Capacity (Furnace, highest stage; Heat Pump - all design, ODT) ¹	Btuh	
2.3.6 AHRI Reference Number ²		
2.3.7 Heating Electricity: Furnace (boiler) <input type="checkbox"/> Heat Pump		
2.3.8 Burner Stages: <input type="checkbox"/> Single-Stage, <input type="checkbox"/> Two-Stage, <input type="checkbox"/> Multi-Stage		
2.3.9 Fan: <input type="checkbox"/> Normal Duty, <input type="checkbox"/> Liquid Permeant (LPC), <input type="checkbox"/> Oil		
2.3.10 Blower Motor: <input type="checkbox"/> Permanent Split Capacitor (PSC), <input type="checkbox"/> Variable-Speed ³		
2.3.11 Venting Type: <input type="checkbox"/> Sealed Combustion, <input type="checkbox"/> Atmospheric/Vented, <input type="checkbox"/> One-Pipe (fan powered exhaust)		
2.3.12 Secondary Heat Source ⁴ : <input type="checkbox"/> Furnace, <input type="checkbox"/> Supplemental Electric Resistance Heat		
2.3.13 Brand		
2.3.14 Model		
2.3.15 Serial		
2.3.16 Output Capacity (highest stage) ¹	Kw / Btuh	
2.3.17 AHRI Reference Number ²		

Checklist v.1.0 26 AUG 2015

2.3.1 Single-stage heat / 1 no-stage cool, Multi-stage heat / multi-stage cool

2.3.2 Variable-Speed

2.3.3 Fan the blower fan permission

Checklist v.1.0 26 AUG 2015

2.3.4 Fan the blower fan permission

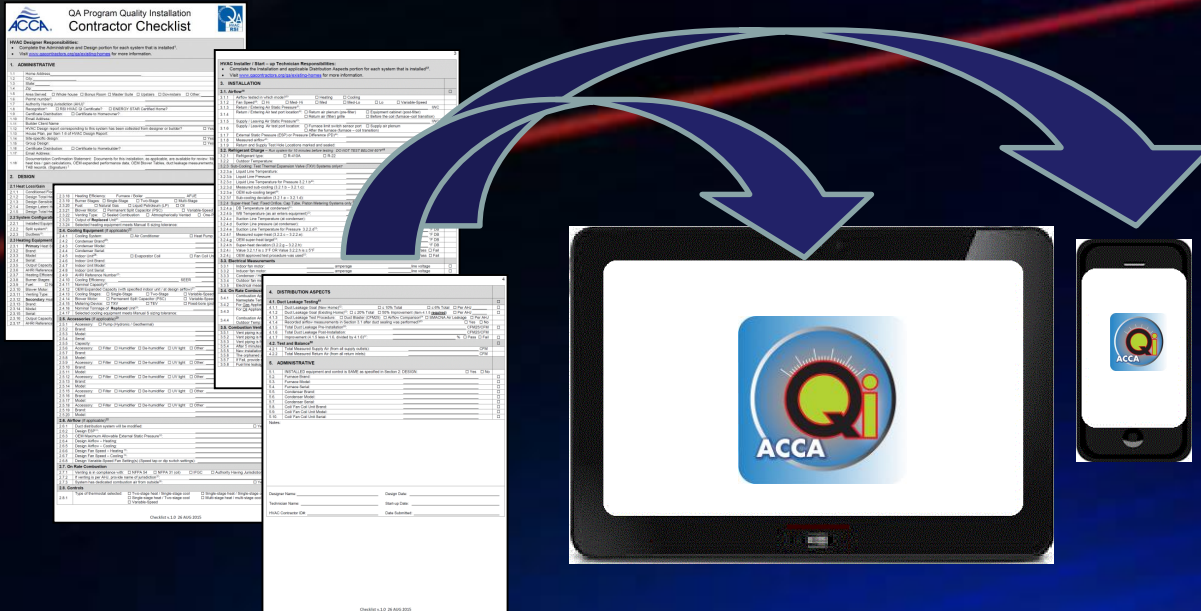
Checklist v.1.0 26 AUG 2015

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HVAC QI App – Verifying ACCA 5 QI Commissioning App & Management Database Tool



Cx App and
Management
Database tool

Built-in review of *Design* elements

- Equipment sizing per ACCA Manual S
- Confirms regional efficiency requirements
- Design airflow (ESP, CFM)

Built-in review of *Installation* elements

- Required fields are completed
- Proper input type / format (alpha, numeric, date)
- Values are within specified ranges
- 'Validators' check for reasonableness

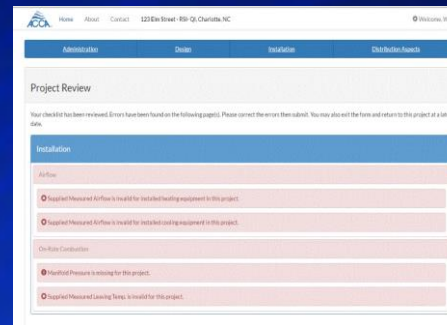


HVAC QI App – Verifying ACCA 5 QI Commissioning App & Management Database Tool

RSI Contractor Designs / Installs system
RSI Contractor submits project via QI app

Immediate
feedback /
confirmation

Installation
receives
ESVI Certificate





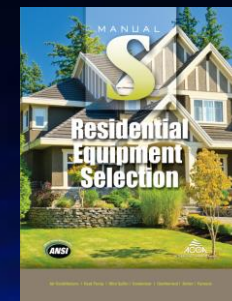
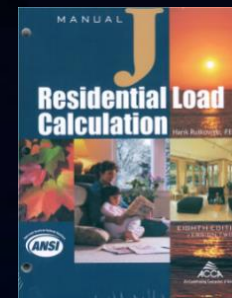
Educational: Designer Training & Certification

Residential HVAC Design for QI

- ✓ Load calculations (*Manual J*)
- ✓ Equipment Selection (*Manual S*)
- ✓ Duct Design (*Manual D*)

Offered via:

- Online training (18 hours of videos, plus assessments)
- Offline DVDs
- In-person training (3-day class)



5-year certificates provided for successful passage of final exam



Educational: Technician Training & Certification

On-line learning

- *Technician Field Practices for Quality Installation*
- *Home Evaluation and Performance Improvement*
- *Friction Rate Primer and Duct Design Fundamentals*
- *Duct Diagnostics & Repair*



Convenient ... affordable ... on-demand training focused on quality HVACR installation, maintenance, home performance, and more.

Opportunity for Utility Pilots

- Accrediting HVAC Contractor Businesses
- Recognizing HVAC systems installed to the ACCA 5 QI Standard



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