

ACCA Quality Assured Program (& the HVAC Quality Installation Standard)

Wes Davis

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Air Conditioning Contractors of America

ENERGY STAR
Program Managers
Conference 2011
Baltimore, MD



The Air Conditioning Contractors of America (ACCA)

The only nationwide association representing the technical, educational and policy interests of U.S. businesses that design, install and maintain indoor environmental systems

Antecedents

- National Warm Air Heating and Air Conditioning Assn. (1914)
- Air Conditioning and Refrigeration Contractors of America (1946)
- National Environmental Systems Contractors Assn. (1968)
- Air Conditioning Contractors of America (1969)

Mission Statement

“To assist and enable
HVACR contractors
to acquire, serve and
satisfy their customers.”

Approach

- Contractor Support
- Consumer Assistance
- Government Relations
- Industry Relations
- Technical Expertise

Membership

- About 5,000 Members
- In all 50 States and 12 foreign countries
- 43 Chapters across America

ACCA QA Program

- QA Program Introduction
- QA Program and QI Standard
- QA Program
 - How to get in
 - How to stay in
 - What happens if there are problems
- Conclusion

The Checklist requirements remain true to the QI Standard



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703.575.4477
Fax 703.575.8107

www.acca.org

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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www.ansi.org

ACCA Standard 5

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.



Quality Assured (QA)

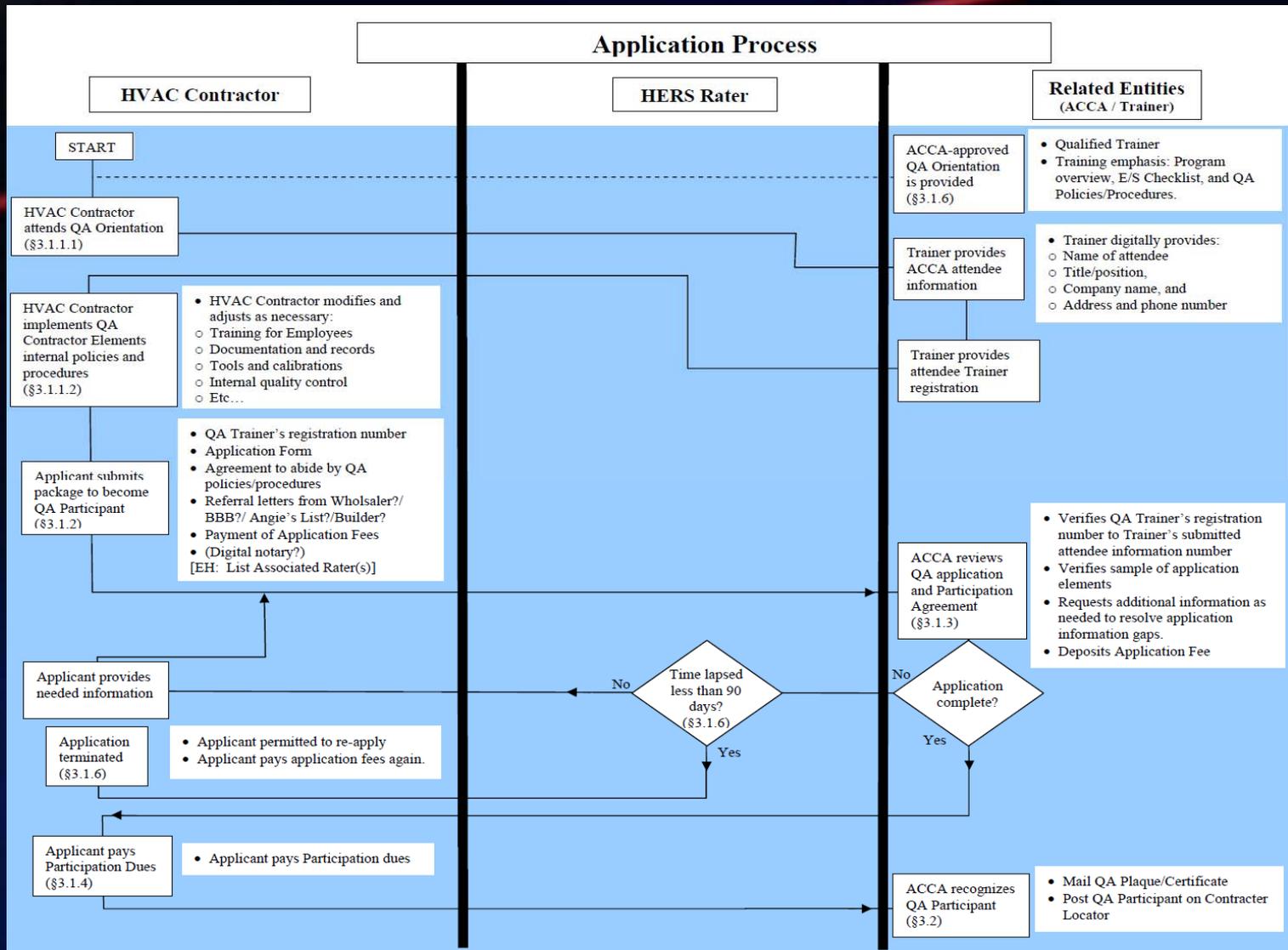
- Steering Committee of Leading HVAC Contractors
- Developed:
 - QA Elements (ACCA QI Appendix)
 - QA Requirements
 - QA Agreement
 - www.acca.org/qa
- Approved by ACCA HVAC Contractors



ENERGY STAR v.3 and ACCA QA

- ENERGY STAR adopts ACCA 5 QI Standard (free PDF download at www.acca.org/quality)
- Checklist development
- HVAC QI Training and Oversight (HQITO) organization
 - Train HVAC Contractors
 - Certify / Accredit HVAC Contractors
- Market driven approach

Gaining Recognition



ACCA QA Program

- **Gaining Recognition:**
 - Orientation
 - Application
 - Participation Agreement
 - Review
 - Recognition

ACCA QA Program

- Gaining Recognition:
 - Orientation
 - Overview of Energy Star
 - Overview of Checklists (Contractor and Rater)
 - Overview of the QA Program
 - Training...NOT
 - Application
 - Participation Agreement
 - Review
 - Recognition

ACCA QA Program

Orientation Delivery

- Online
- Instructor Certification
- Bulk orders

ACCA QA Program

Orientation Delivery

– Online

- www.acca.org/qa
- Available 24 / 7
- Short exam (10 questions) at the end of each session
- Final exam at the end
- \$59 list price (\$39 ACCA Member price)

ACCA QA Program

Orientation Delivery

– Instructor Certification

- Potential instructors inform ACCA of their experience
- If accepted, they then sign an instructor agreement
- ACCA provides the PowerPoint presentations (same as those used in online version)
- Student must still pay for and pass the online exam (price is the same)

ACCA QA Program

Orientation Delivery

– Bulk orders may be purchased

- The bulk purchase of QA Program Orientation sessions may be purchased at the ACCA Member rate.
- The bulk purchases in groups of 10 or 20(+)
- There is a \$100 processing fee added to bulk orders of 10 (\$150 for orders of 20)
- All sales are final, no refunds. The coupons are non-transferrable to another utility. A coupon that is not used by an employee or HVAC Contractor may be used by another employee or Contractor.

ACCA QA Program

- Gaining Recognition:
 - Orientation
 - Application
 - Name, address, phone number...
 - Business information
 - Licenses
 - Insurance
 - Self-attest to QA Elements
 - Participation Agreement
 - Review
 - Recognition

ACCA QA Program

- **Gaining Recognition:**
 - Orientation
 - Application (QA Elements)
 - **Business Prerequisites**
 - **Business Operations**
 - **Training and Certification**
 - **Consumer Interaction**
 - Participation Agreement
 - Review
 - Recognition

ACCA QA Program

- Gaining Recognition:
 - Application: QA Elements
 - Business Prerequisites
 - Licensing or Registration
 - Insurance
 - Code Requirements
 - Refrigerant Certifications, Training Equipment
 - Hazardous Materials Regulations



ACCA QA Program

- Gaining Recognition:
 - Application: QA Elements
 - Business Operations
 - Employment
 - Safety Programs
 - Fleet Management
 - Quality Installation
 - Quality Maintenance
 - Quality Restoration
 - Instrumentation/Measurement Tools



The QI Standard



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Free PDF www.acca.org/quality



Quality Installations Elements

Design Aspects

- Ventilation
- Load Calc
- Equip Capacity Selection
- Geothermal HP Ground Heat Exchanger
- Matched Systems (ARHI)

Installation Aspects

- Flow through Heat Exchanger (Air or Water)
- Refrigerant Charge
- Electrical Requirements
- On-rate (fuel-fired)
- Venting
- System Controls

Distribution Aspects

- Duct Leakage
- Flow Balance (Air or Water)

Doc. / Education Aspects

- System Documentation
- Owner Education

Well recognized practices that quality contractors embrace when delivering quality installations



Equipment Design Elements

- Ventilation
- Building heat gain/loss load calculations
 - For NEW buildings/ducts: *Room-by-room* loads
 - For EXISTING buildings/ducts: *Block* loads



Equipment Design Elements

• E

XYZ Air Conditioners – Detailed Cooling Capacities
Model AC-30 with Coil AC-030

Evaporator Air		Condenser Entering Air Temp – DB (F)					
CFM	EWB (F)	85		95		105	
		Capacity		Capacity		Capacity	
		Total	Sensible	Total	Sensible	Total	Sensible
875	72	34,610	18,190	33,100	17,620	31,520	17,020
	67	31,400	22,240	30,000	21,650	28,520	21,040
	63	28,620	26,290	27,350	25,680	26,020	25,040
	57	27,840	27,840	26,820	25,740	25,740	25,740
1000	72	35,250	19,090	33,680	18,500	32,030	17,890
	67	31,990	23,660	30,530	23,060	29,000	22,440
	63	29,020	29,020	28,020	26,560	26,770	26,770
	57	29,020	29,020	27,930	27,930	27,930	27,930
1125	72	35,720	19,920	34,110	19,920	32,500	19,920
	67	32,430	25,010	30,930	25,010	29,320	25,010
	63	29,970	29,970	28,850	28,850	27,640	27,640
	57	30,000	30,000	28,850	28,850	27,640	27,640

This A/C unit's capacities vary (from the nominal 30,530 Btu/h) based on the operating conditions inside and outside of the home.





Equipment Design Elements

Geothermal Heat Pumps Ground Heat Exchanger

- **Ground heat exchangers designed:**
 - The ground interface heat exchanger fluid temperatures [extremes] and flow rates used as the basis for design equipment capacity are within the range specified in OEM guidelines
 - The ground heat exchange design methodology incorporates:
 - building loads and total installed equipment capacity
 - ground heat exchanger type, materials, and geometry
 - soil thermal characteristics
 - climatic characteristics of the project location



Equipment Design Elements

- **Matched system (per AHRI or CEE Directory)**
 - AHRI – www.ahridirectory.org
 - CEE – follow links from www.cee1.org



Certificate of Product Ratings

AHRI Certified Reference Number: 3369333 Date: 11/6/2010

Product: Split System: Heat Pump with Remote Outdoor Unit-Air-Source
Outdoor Unit Model Number: ABC 36S41S1
Indoor Unit Model Number: FC2036B
Furnace Model Number: T60000
Manufacturer: ABC Co. UNITARY PRODUCTS GROUP
Trade/Brand name: DLUX SERIES

Manufacturer responsible for the rating of this system combination is ABC Co. UNITARY PRODUCTS GROUP

Rated as follows in accordance with AHRI Standard 210/240-2006 for Unitary Air-Conditioning and Air-Source Heat Pump Equipment and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (Btuh):	35800
EER Rating (Cooling):	12.00
SEER Rating (Cooling):	14.50
Heating Capacity(Btuh) @ 47 F:	36000
Region IV HSPF Rating (Heating):	8.50
Heating Capacity(Btuh) @ 17 F:	24600





Equipment Installation Elements

- **Airflow (& H₂O Flow) through the heat exchanger**
 - *Within ±15% of design / equipment selection*
 - *Supported by OEM product data*
- **Refrigerant charge**
 - *Superheat method: w/in 5°F*
 - *Subcooling method: w/in 3°F*
- **Voltage/amps/grounding**
- **On Rate (Combustion)**
 - *On-rate (w/in 5% of nameplate)*
 - *Temperature rise*
 - *Nozzle selection and pump pressure (oil)*
 - *Combustion analysis OEM*
- **Venting (*comply with code requirements*)**
- **System controls (*per OEM recommendations*)**



Duct Distribution Elements

- Duct leakage
 - NEW residential / commercial buildings:
 - *Ducts located inside conditioned space: $\leq 10\%$ total leakage*
 - *Ducts outside thermal envelope: $\leq 6\%$ total leakage*
 - Or per EnergyStar™ guidance (new homes)
 - EXISTING residential / commercial buildings:
 - *$\leq 20\%$ total leakage, or*
 - *50% reduction of existing airflow leakage*
 - Or per local code requirement (if meet/exceed above)



Duct Distribution Elements

- Airflow (& H₂O Flow) balance
 - For new or modified ducts: Room airflow is the greater of:
 - Residential: $\pm 20\%$ or ± 25 CFM of design / application requirements
 - Commercial: $\pm 10\%$ or ± 25 CFM of design / application requirements
 - Unmodified existing ducts: *No requirements*

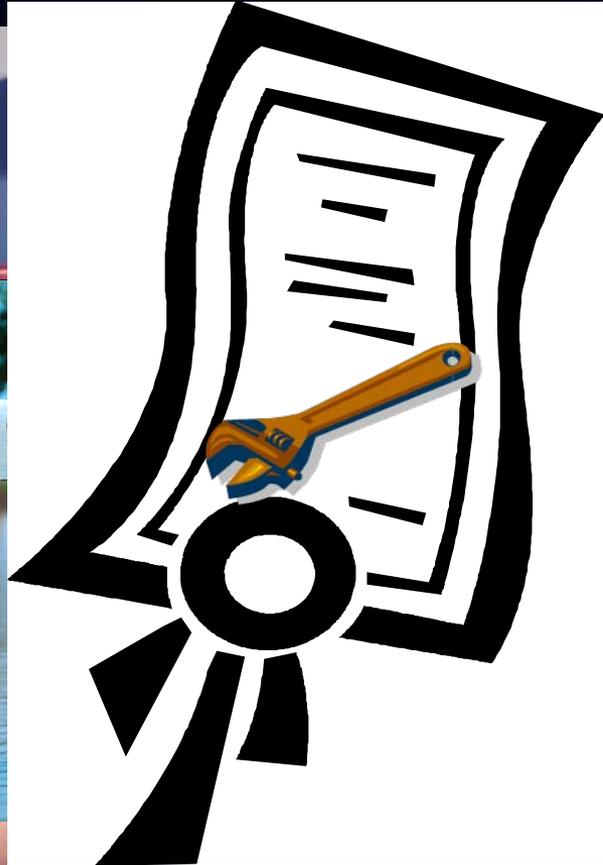


System Documentation & Owner Education Elements

- Placing copies of required system documentation with the customer:
 - Calculations
 - Measurements
 - Other records from Acceptable Documentation
- Owner / operator education on pertinent operation, maintenance, and warranty issues.

ACCA QA Program

- Gaining Recognition:
 - Application: QA Elements
 - Business Operations
 - Employment
 - Safety Programs
 - Fleet Management
 - Quality Installation
 - Quality Maintenance
 - Quality Restoration
 - Instrumentation/Measurement



ACCA QA Program

- Gaining Recognition:
 - Application: QA Elements
 - Training and Certification
 - Continuing Education (6 hours / 12 hours)
 - Certification



ACCA QA Program

- Gaining Recognition:
 - Application: QA Elements
 - Consumer Interaction
 - Interactions with Building Owners and Homeowners
 - Warranties
 - Service Agreements



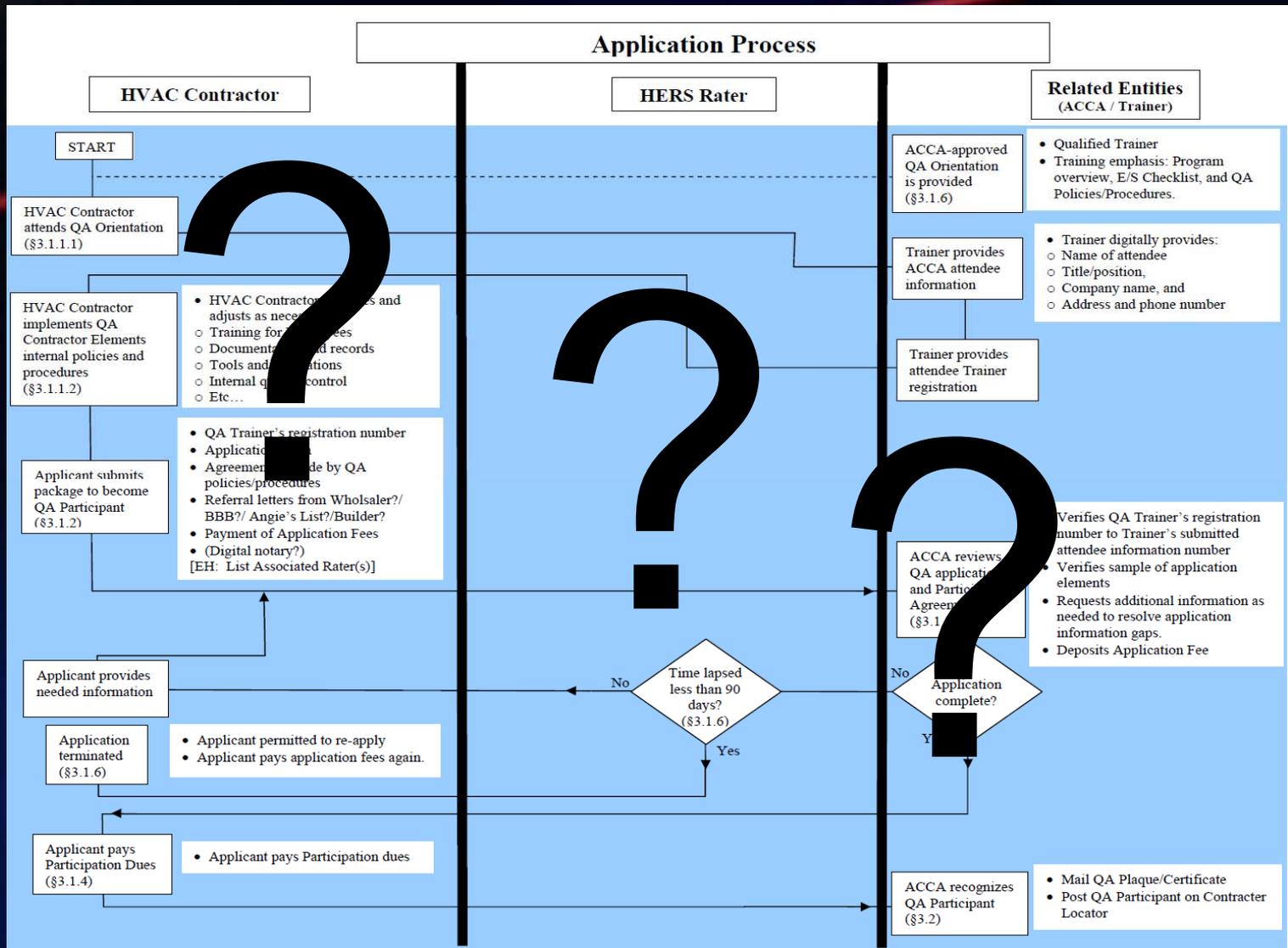
ACCA QA Program

- Gaining Recognition:
 - Orientation
 - Application
 - Participation Agreement
 - Contractual
 - Spells out requirements
 - Outlines duties and responsibilities
 - Review
 - Recognition

ACCA QA Program

- **Gaining Recognition:**
 - Orientation
 - Application
 - Participation Agreement
 - Review – About 3-4 weeks
 - Recognition: Posted on QA Directory (www.acca.org/qa)

Gaining Recognition



ACCA QA Program

- **Maintaining Recognition:**
 - Participants Requirements
 - Third-Party Reports
 - Rater Validation of Installation
 - Compliance Reviews and Site Visits
 - Annual Reevaluation and Renewal

ACCA QA Program

- **Maintaining Recognition:**
 - Participants Requirements:
 - QA Elements
 - ENERGY STAR Checklists (ACCA 5 QI Standard)
 - Third-Party Reports
 - Rater Validation of Installation
 - Compliance Reviews and Site Visits:
 - Annual Reevaluation and Renewal:

ACCA QA Program

- **Maintaining Recognition:**
 - Participants Requirements
 - Third-Party Reports
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ACCA QA Program

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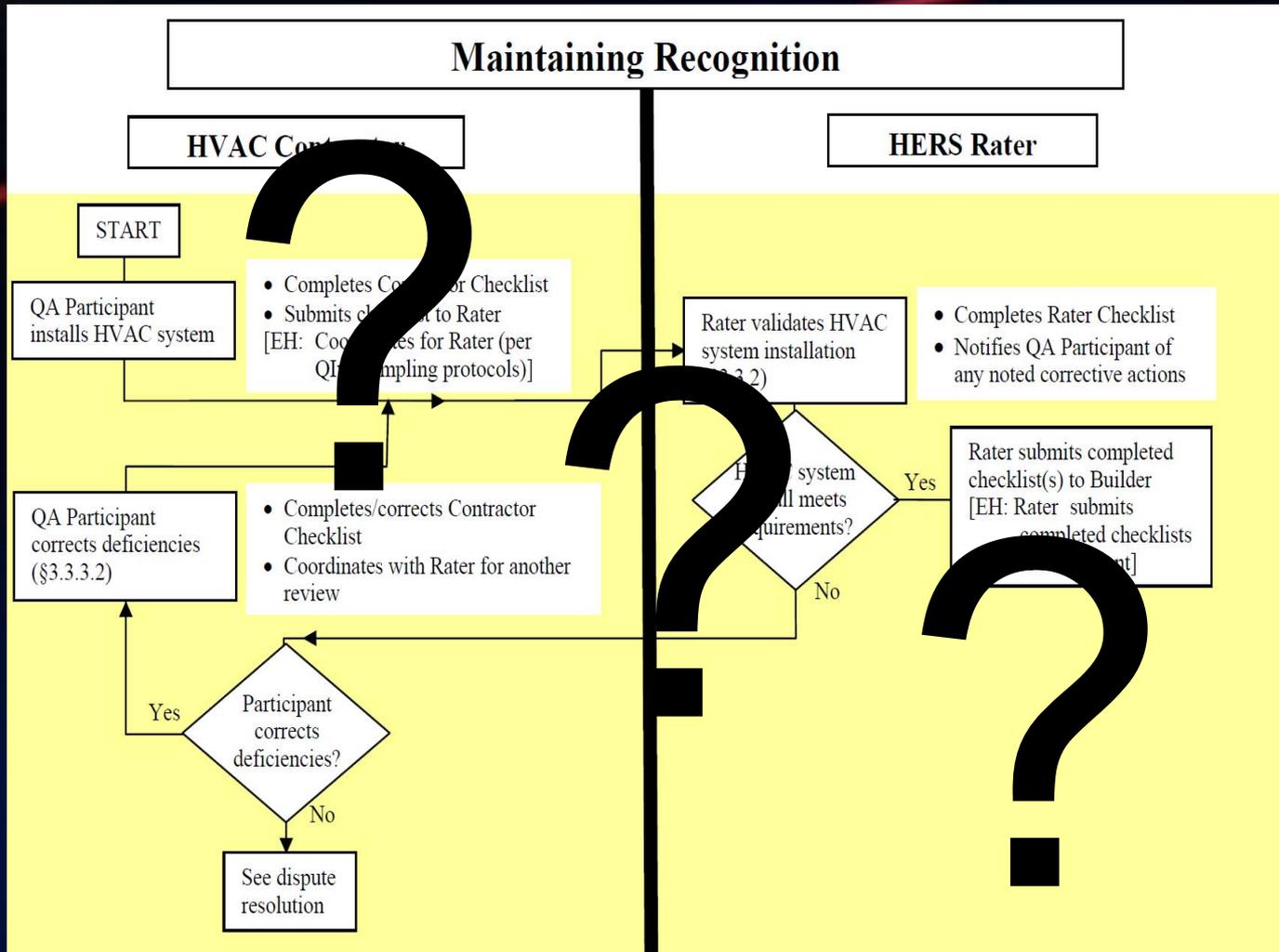
ACCA QA Program

- **Maintaining Recognition:**
 - Participants Requirements
 - Third-Party Reports
 - Rater Validation of Installation
 - **Compliance Reviews and Site Visits:**
 - **Administrator Review**
 - **Provide requested documentation, and/or access to requested information**
 - **Reasonable access to the QA Program Participant's office(s) or installation site(s)**
 - **Failure to comply may result in disciplinary action**
 - Annual Reevaluation and Renewal

ACCA QA Program

- **Maintaining Recognition:**
 - Participants Requirements
 - Third-Party Reports
 - Rater Validation of Installation
 - Compliance Reviews and Site Visits
 - Annual Reevaluation and Renewal

Maintaining Recognition



ACCA QA Program

What if...mistakes happen....



ACCA QA Program

Corrective Actions:

- **Review Process:**

- Process of Review:
- Clarification or Rejection of a Report:
- Participant Notice and Response.
- Review of Participant Response:

- **Actions Upon Finding of Noncompliance**

- First Notice – Opportunity to Address Deficiency:
- Second Notice – Probation:
- Third Notice – Dismissal:

ACCA QA Program

Corrective Actions:

- Review Process:

- Process of Review:

- QA Element (including E / S checklists)
- Passage of time
- Substantiation

- Clarification or Rejection of a Report

- Participant Notice and Response

- Review of Participant Response

ACCA QA Program

Corrective Actions:

- Review Process:

- Process of Review
- Clarification or Rejection of a Report:
 - Additional substantiation
 - 30 Day time limit
 - Can resubmit
- Participant Notice and Response
- Review of Participant Response

ACCA QA Program

Corrective Actions:

- Review Process:

- Process of Review
- Clarification or Rejection of a Report
- Participant Notice and Response
 - Request a response (30 days)
 - Fully address the report
 - If late, considered an admission of guilt
- Review of Participant Response

ACCA QA Program

Corrective Actions:

- Review Process:

- Process of Review
- Clarification or Rejection of a Report
- Participant Notice and Response
- Review of Participant Response
 - If late, issue non-compliance
 - Complaint resolved
 - Complaint un-resolved

ACCA QA Program

Corrective Actions:

- **Review Process:**
 - Process of Review:
 - Clarification or Rejection of a Report:
 - Participant Notice and Response.
 - Review of Participant Response:
- **Actions Upon Finding of Noncompliance**
 - First Notice: Opportunity to Address Deficiency
 - Second Notice – Probation
 - Third Notice – Dismissal

ACCA QA Program

Corrective Actions:

- **Actions Upon Finding of Noncompliance**
 - First Notice: Opportunity to Address Deficiency
 - Training
 - Tool
 - Policy/Procedure corrected
 - 12 month clock...starts
 - Second Notice – Probation
 - Third Notice – Dismissal

ACCA QA Program

Corrective Actions:

- **Actions Upon Finding of Noncompliance**
 - First Notice – Opportunity to Address Deficiency
 - Second Notice – Probation
 - Corrective actions taken
 - Off the QA Directory for 30 days
 - 12 month clock...starts
 - Third Notice – Dismissal

ACCA QA Program

Corrective Actions:

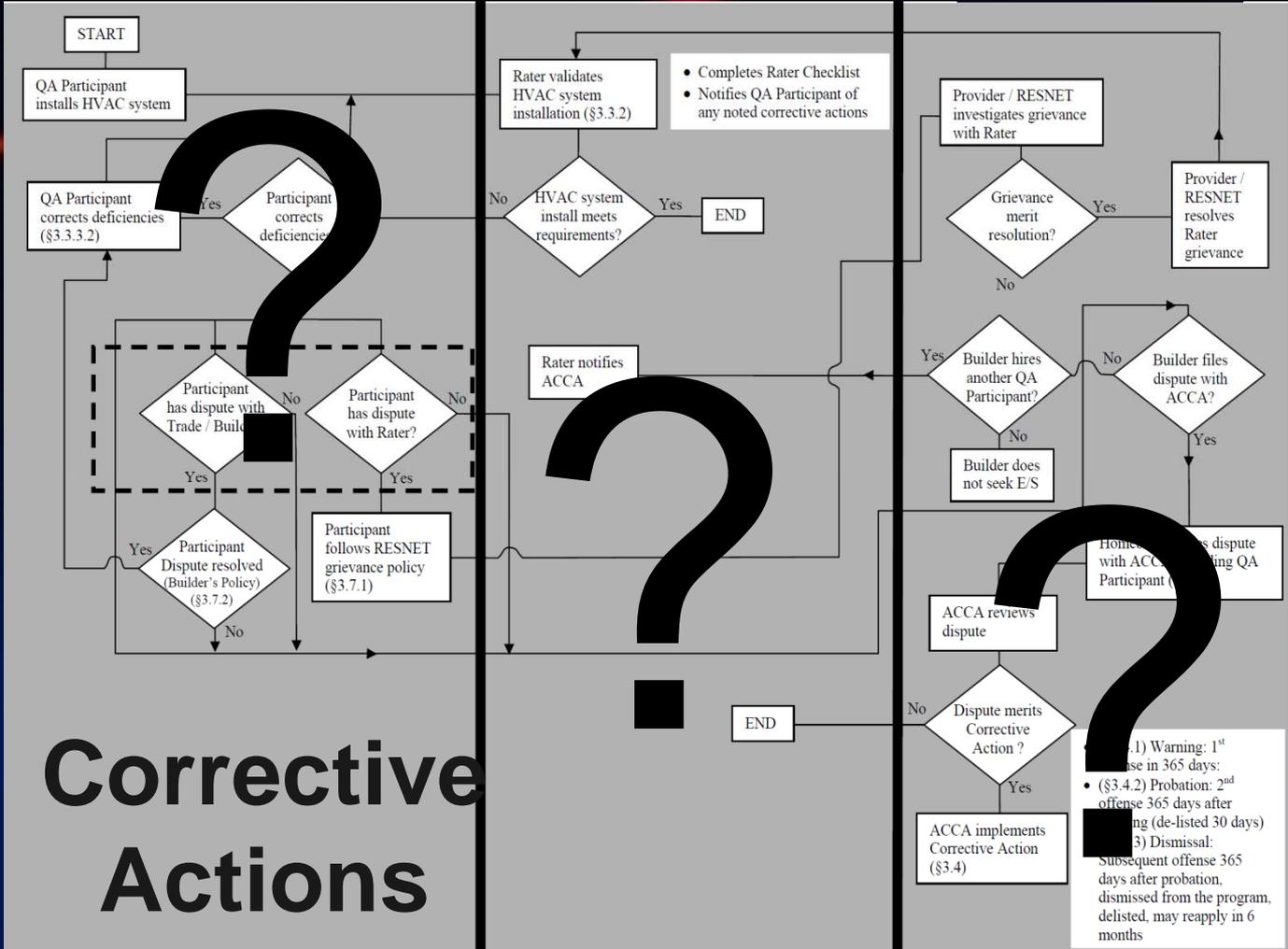
- **Actions Upon Finding of Noncompliance**
 - First Notice – Opportunity to Address Deficiency
 - Second Notice – Probation
 - Third Notice – Dismissal
 - Removal from the program for 6 months (at least)
 - Dependent on corrective actions taken

ACCA QA Program

- Re-application
 - May re-apply after 6 months if:
 - Corrective actions have been implemented and
 - Corrective actions have been reviewed
- Appeals and Dispute Resolution
- Dispute Resolution Outside of the QA Program

Avoiding Disputes with Builders

- **Appropriate Contract Language**
 - Review your current contracts
- **Include a timeline for resolution of issues**
 - Installers can make mistakes
- **Provide adequate supervision**
 - Train, check, train, check, train, check



Corrective Actions

(1) Warning: 1st offense in 365 days;
 • (§3.4.2) Probation: 2nd offense 365 days after warning (de-listed 30 days)
 (3) Dismissal: Subsequent offense 365 days after probation, dismissed from the program, delisted, may reapply in 6 months

ACCA QA Program

Rater Checklist (ACCA sought modifications)

- Load calculation
- Equipment sizing
- AHRI Certificate
- Airflow (through heat exchanger)
- Refrigerant charge
- Controls
- Duct leakage
- Balancing

ACCA QA Program

Questions

????

Answers

ACCA QA Program Overview

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