

Residential HVAC Quality Maintenance

Build America Experts Meeting Briefing

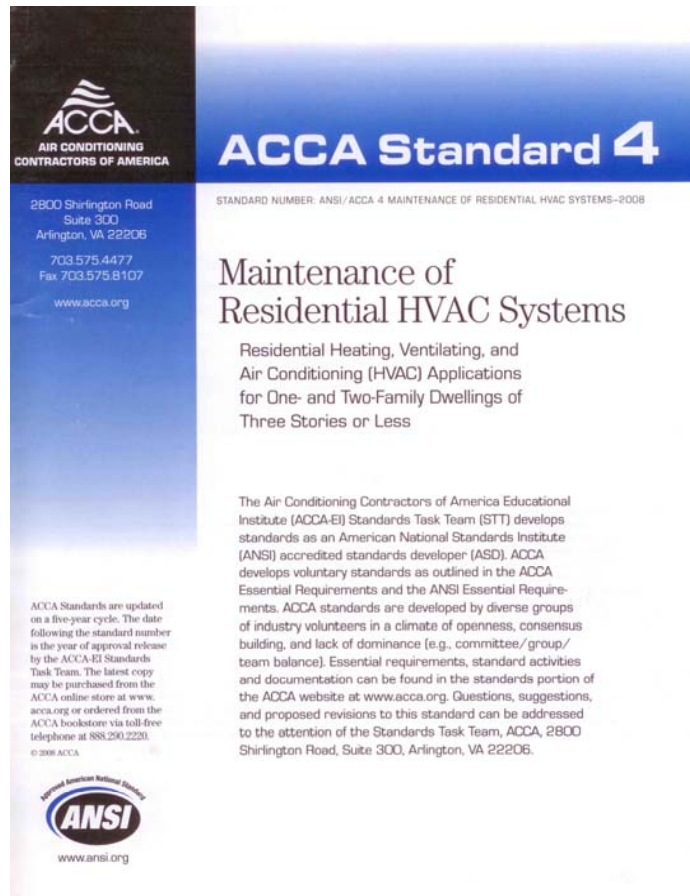
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Introducing the New Residential QM Program



ACCA
AIR CONDITIONING
CONTRACTORS OF AMERICA

ACCA Standard 4

STANDARD NUMBER: ANSI/ACCA 4 MAINTENANCE OF RESIDENTIAL HVAC SYSTEMS-2008

Maintenance of Residential HVAC Systems

Residential Heating, Ventilating, and Air Conditioning (HVAC) Applications for One- and Two-Family Dwellings of Three Stories or Less

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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Couples Standard 4-based QM Service Agreements with

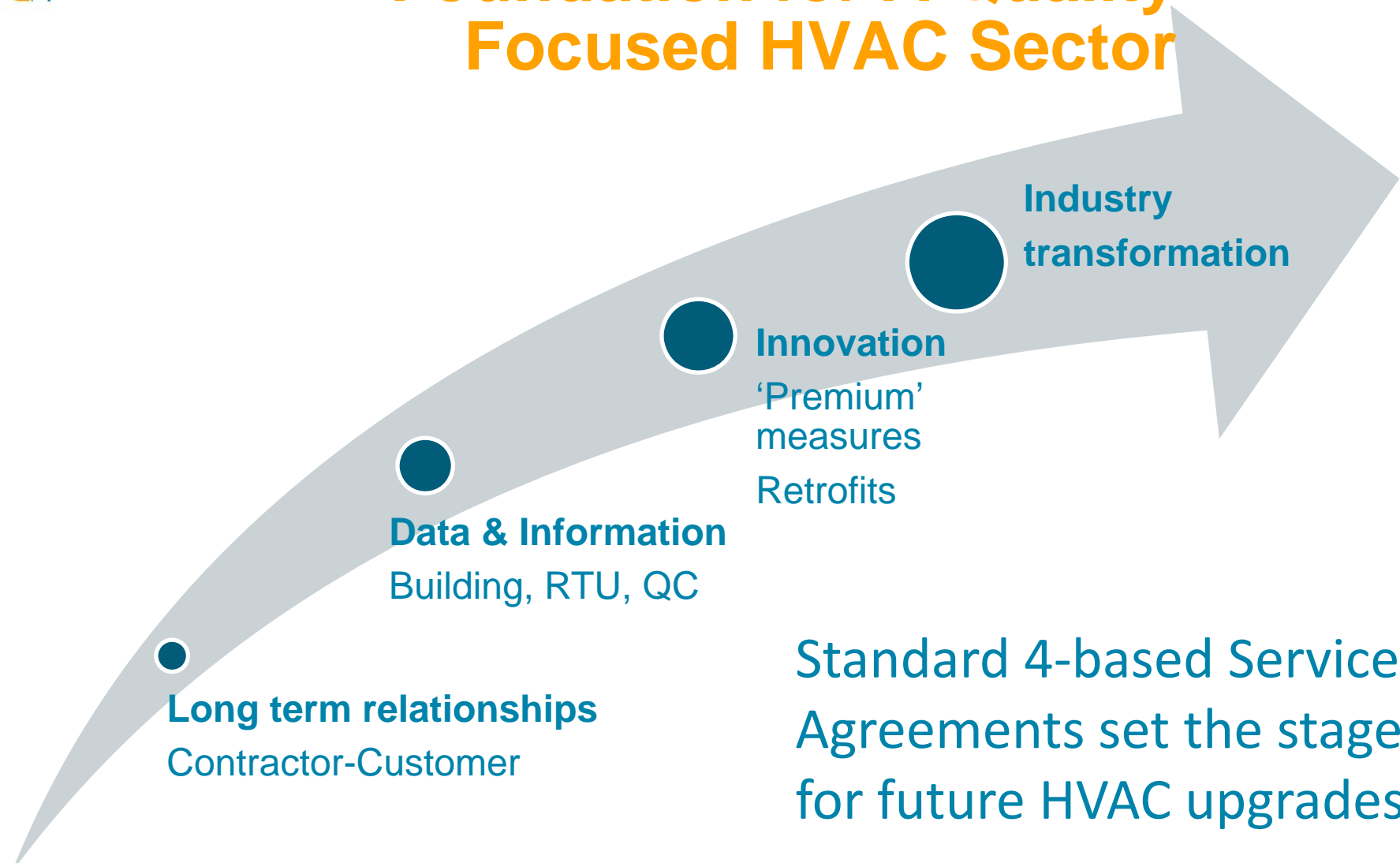
Treatments are presented in a composite package

Initially targets single-family detached and duplex homes

Includes a comprehensive suite of program elements to address market barriers (marketing, IT tools, training, incentives, etc.).



Foundation for A Quality Focused HVAC Sector

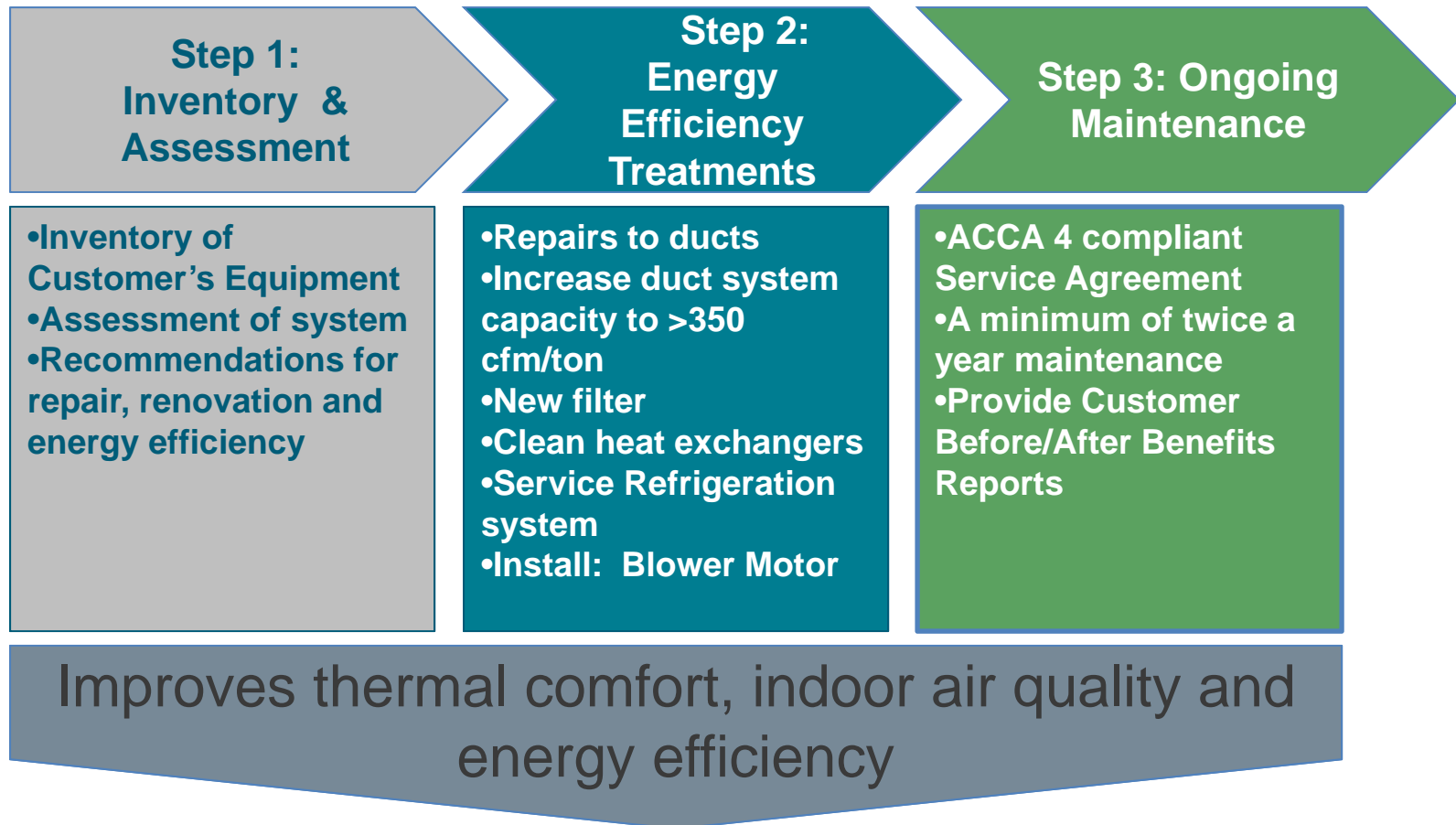


Standard 4-based Service Agreements set the stage for future HVAC upgrades



Residential QM

Fix deferred maintenance. Maintain equipment. Service agreement.





Overcoming Market Barriers

Customer

- HVAC is out of sight and out of mind
- HVAC operating costs are largely “invisible”
- Economic pressure has led to a short- term focus (“run to fail”)
- Lack trust of contractor
- Difficult to compare contractors offers and quality of work
- Benefits of QM not yet quantified

Demand-side

Industry

- Lack of knowledge and tools to comply with Standards 4
- Standards 4 viewed as only task “check-lists”
- Some tasks require additional detail to “operationalize”
- Lack of industry consensus on protocols for RCA and Instrumentation
- Lack of understanding of NGAT
- Unclear career path for technicians
- Benefits of QM not yet quantified

Supply-side



Residential QM Service and Retrofit Treatments

Required initial work

- Air Flow at OEM Minimum cfm/ton, Duct Repair
- Condenser & Evaporator Coil Cleaning, Refrigerant System Test & Service

Optional additional work

- Retrofit of High Efficiency Blower and Condenser Fan Motors



Optional Service Agreement

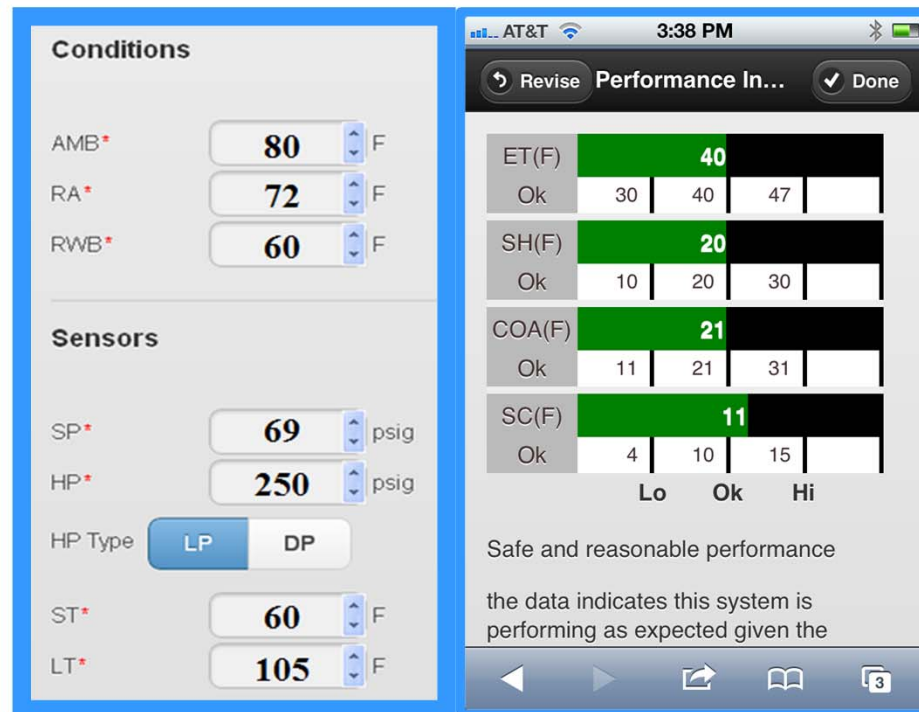
- Semi-annual system check, cleaning, maintenance,



Multiple Fault, Multiple Metric Technician Tool

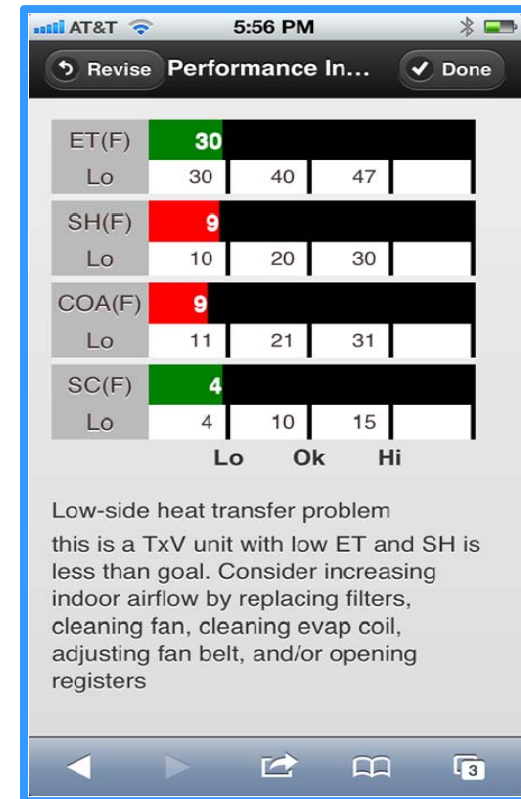
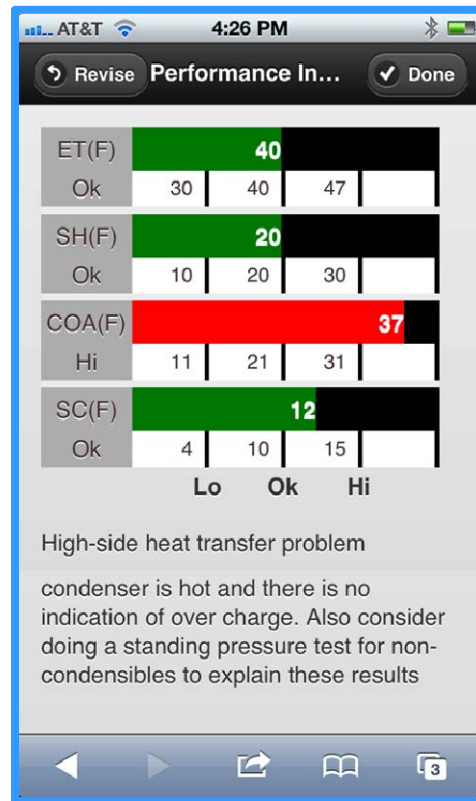
Residential Quality Maintenance Unitary Air Conditioner Fault Detection & Diagnostics

ET Project Number: ET11PGE5261





Refrigeration Cycle Testing



- SA Mobile uses all of the required inputs and calculate four indices used to evaluate a system's performance
- ET = Evaporating Temperature SH = Superheat COA = Condensing Temperature Over Ambient SC = Subcooling



MFMM Recommendations

- 1. The measurement of refrigeration system variables is hampered by inaccuracy. A complete and thorough lab testing program is needed. The testing must be done on operating systems at practical locations using field methods of placement and attachment with field grade instrumentation. Concurrent measurements with low uncertainty lab grade sensors and data capture become the benchmark used to establish best practice field measurement accuracy**
- 2. Multiple Metric Multiple Fault (MMMF) diagnostic software gives correct diagnosis and directions to technicians**
- 3. More laboratory testing of systems with multiple faults in scenarios found in the field is needed**
- 4. Contaminated refrigerant from incorrect installation processes needs additional research**
- 5. The MMMF software SAMobile is an appropriate technician software tool for use in HVAC Quality Maintenance programs**