

Achieving Mainstream Quality Installation, w. 3 Speakers

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Practitioner FIELD Deficiencies

[Shortcut Woes Continue]

- Installation deficiencies
 - Poor installations (charge, airflow, controls)
 - Poor ducts ($\uparrow \Delta P$, leakage, thermal, noise)
- Inadequate commissioning
- Maintenance deficiencies

SENSITIVITY ANALYSIS OF INSTALLATION FAULTS ON HEAT PUMP PERFORMANCE

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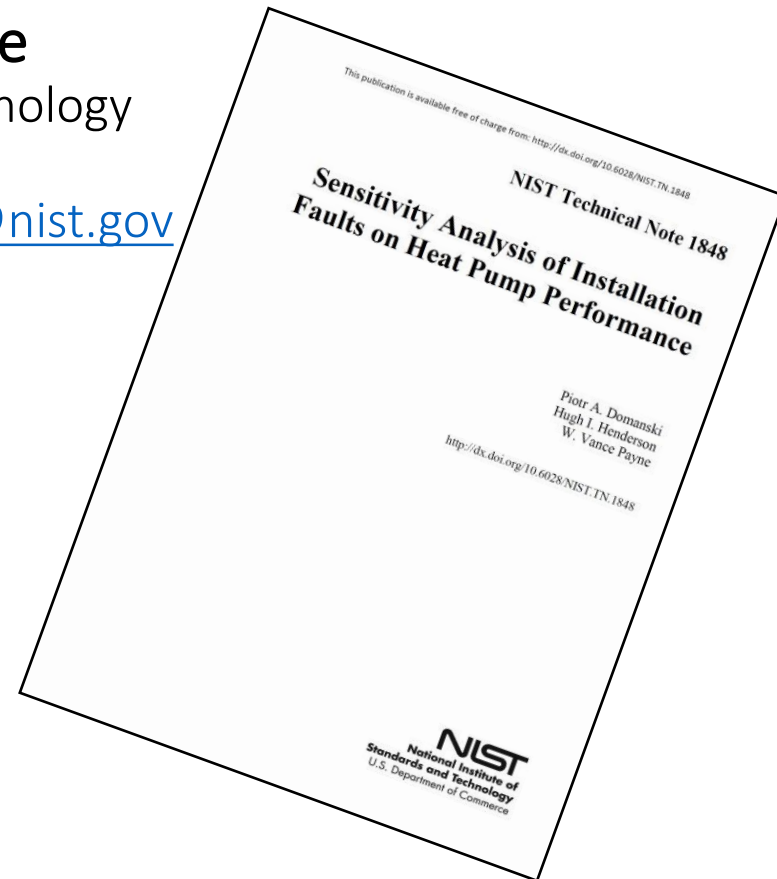
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Report can be downloaded from:

www.acca.org/quality



Landmark Simulation!

- Quantifies efficiency losses (>30%)
- Losses are additive for multiple faults (>>30%)
- Applies to Unitary Equipment
 - Residential and Commercial
 - Split Systems and Packaged

Most influential faults

- duct leakage
- refrigerant undercharge
- oversized equipment
- low indoor air flow
- refrigerant overcharge



Why does it matter?

I: SEER delivered to the customer

Base = 13 SEER, NO QI		
SEER	Installed	
Lab Value	Field, No QI	Field w. QI
13	9.75	12.4
16	12	15.2
19	14.25	18.1
Multipliers:	0.75	0.95

Why does it matter?

II: Energy Use by the Customer

Base = 13 SEER			
SEER	incremental energy reduction	Energy Use, no QI	Energy Use, with QI
13	0%	100	75
16	14%	86	64
19	10%	76	57
Multiplier:	0.75	Energy use w. QI	