PIER Research for the 2008 Residential Building Standards

Revision to the Residential ACM Calculation for Furnace Fan Modeling

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Agenda

- Background
- Field Survey Data
- Proposed Heating Fan Model
- Impact with Defaults
- Performance Option
Background

- The Residential ACM specifies the rules and algorithms to be used in compliance Calculations

- 2005 ACM says fan energy is fixed at .005 x heating output

- No credit for efficient fan/duct system
Field Survey

- 60 furnace systems in new homes
- 55 in production homes, 5 custom
- All measured with dry coil
- Measured air flow and fan watts by mode
- Measured pressure by mode and component
Furnace in attic with flex ducts
Heating CFM Function of Cooling CFM (default PSZ Motor)
Heating W/CFM
Function of Cooling W/CFM (default PSZ Motor)
Proposed Heating Fan Model

- CFM Heat = 0.93 * CFM Cool
- W/CFM Heat = 0.88 * W/CFM Cool
- Cap Heat = 1.08 * CFM Heat * 40
- W/BtuHeat =

- \((\text{CFM Heat} \times \text{W/CFM Heat}) / \text{Cap Heat}\)
Default Increases Annual Heating TDV 1%

![Default Increases Annual Heating TDV 1% chart]

TDV/ft²-yr

Climate

0 10 20 30 40 50 60 70

2005 2008

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Ave CIRB

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Performance Option

- Builder specifies heating (and cooling) CFM and W/CFM
- Performance TDV credit for compliance
- Post construction test by builder
- 3rd party verification required