CALIFORNIA ENERGY COMMISSION

2013 Building Energy Efficiency Standards

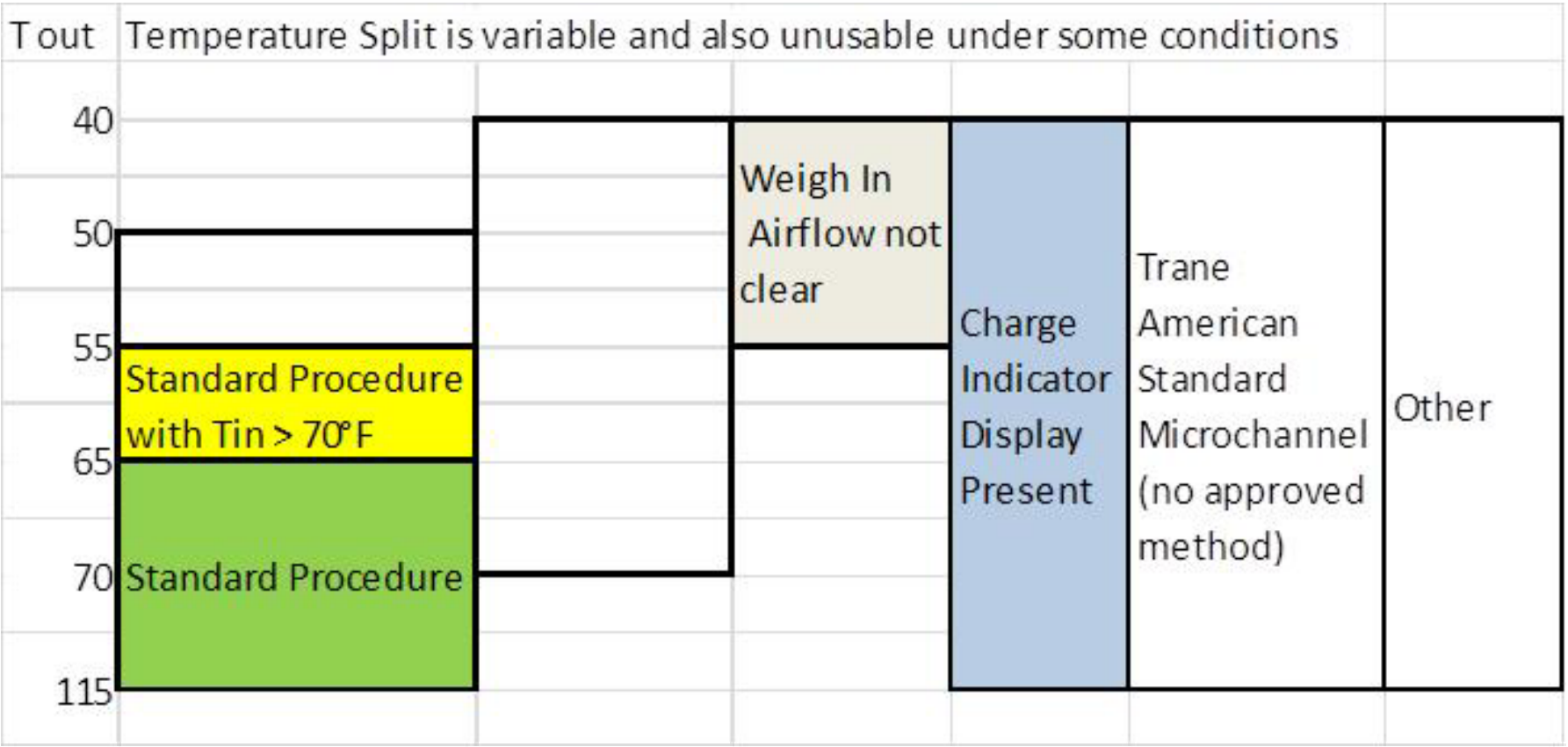
Residential AC Discussion

August 23, 2011

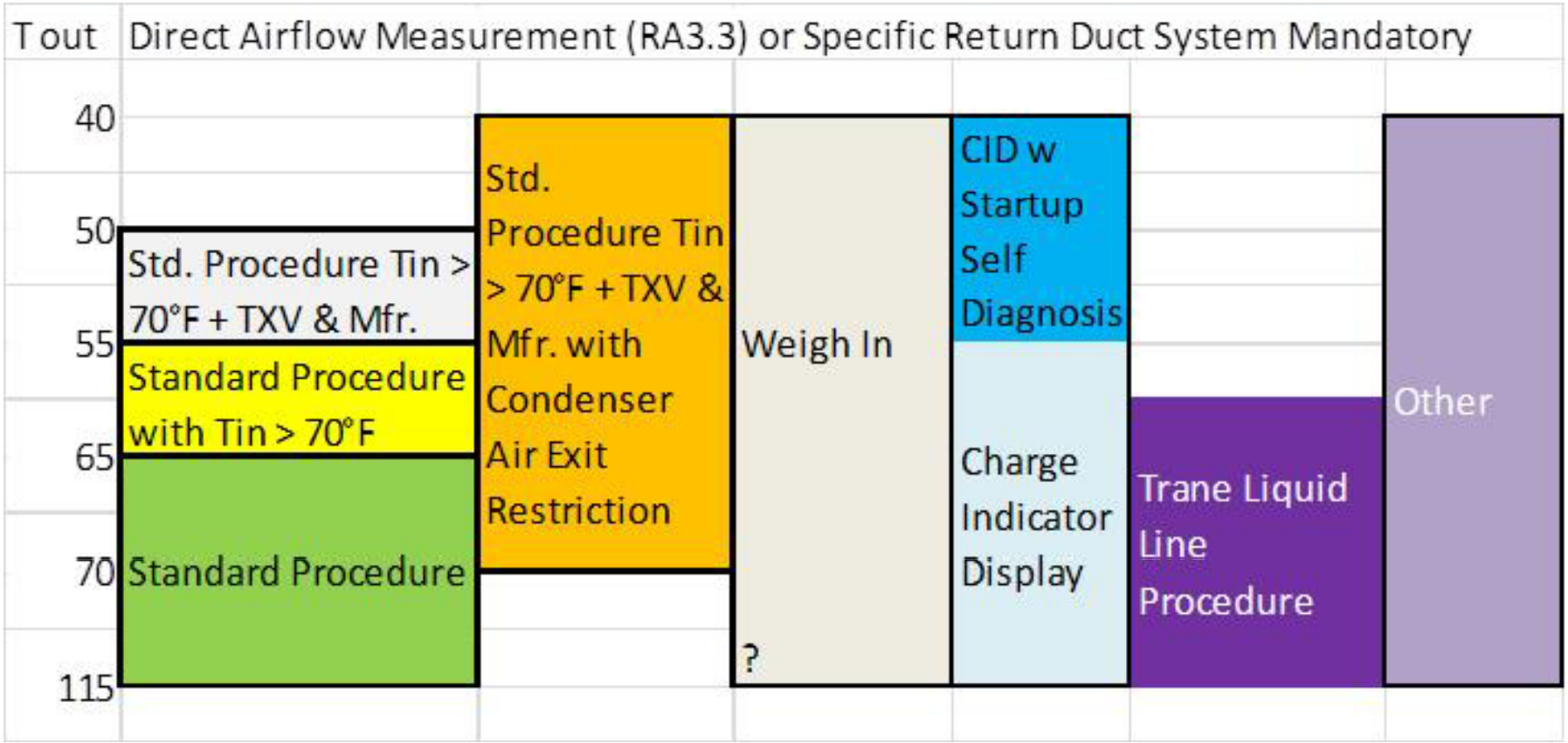
Air Conditioning Proposal

- CEC Staff Proposal
- Originally sponsored by the California Statewide Utilities Codes and Standards Program as a Codes and Standards Enhancement (CASE) study
- CASE study authors
  - Bruce Wilcox, P.E.
  - John Proctor, P.E. Proctor Engineering Group, Ltd.
  - Rick Chitwood, Chitwood Energy Management, Inc

Refrigerant Charge Verification Today



Refrigerant Charge Verification Proposal



Refrigerant Charge
Airflow Covered Elsewhere – Eliminate Temperature Split

- Reduces variability and uncertainty
- Four options available
  - Prescriptive Return Duct System (no HERS)
  - Flow Grid
  - Pressure Matching
  - Flow Hood

Refrigerant Charge
Add Alternative Methods

- For TXVs:
  - Use Standard Procedure to 50°F with Mfr. Approval
  - Use Standard Procedure at low temperatures with Condenser Outlet Restrictor and Mfr. Approval
  - Use Liquid Line Procedure for appropriate Trane / American Standard units
  - Make approval of other Manufacturers' appropriate methods easier to approve and the industry develops
  - Allow CID with self diagnostics to be used at all temperatures
- For Fixed Metering Devices:
  - Allow CID with self diagnostics to be used at all temperatures

Refrigerant Charge
Expand Range of Use for Existing Methods

- For TXVs:
  - Use Standard Procedure to 50°F with Mfr. Approval
  - Allow use of Weigh-in Method up to 115°F
- For Fixed Metering Devices:
  - Allow use of Weigh-in Method up to 115°F

Refrigerant Charge
HERS Verification

- Widen acceptance range to allow for differences in conditions and instrumentation variability
  - For superheat variance from target change ± 6°F to ± 8°F
  - For subcooling variance from target change ± 4°F to ± 6°F
    (subcooling always > 2°F)

Refrigerant Charge
Improve the Specification of Instrumentation

- Temperature Sensor Response
  - Better define the test for compliance
  - Increase the allowable time to achieve correct reading from 15 seconds to 90 seconds.
- Pipe Temperature Sensors
  - Better define the test for compliance
- Correct Discrepancies in Hole Sizes for Temperature and Pressure Sensors
- Eliminate Saturation Temperature Measurement Sensors
- Specify Digital Refrigerant Pressure Gauges

Refrigerant Charge
Charge Indicator Display

- Make self diagnosis mandatory

Refrigerant Charge Housekeeping

- Eliminate STMS
- Potentially add Saturation Pressure Measurement Sensors as an Option
- Make Temperature and Pressure Measurement Holes the Same Size and Location