

# Multifamily Guidelines are becoming a Standard!

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# Multifamily Guidelines → Standard

## Session Overview:

- Introduction of Speakers & Multifamily Sub-Committee
- Audience Poll
- Background
- Which Guidelines will be in which Standards?
  - Modeling (ANSI 305 – a new MF Standard, but like ANSI 301)
  - Inspections (ANSI 305, Appendix A)
  - Testing (ANSI 380 – the same as now, but with MF amendments)
  - Sampling (ANSI 305 or 380, Appendix \_\_)

# Introduction of Speakers

## Presenters:

- Thiel Butner, Pando Alliance
- Brian Christensen, NORESO
- Rebecca Hudson, EPA
- Gayathri Vijayakumar, Steven Winter Associates

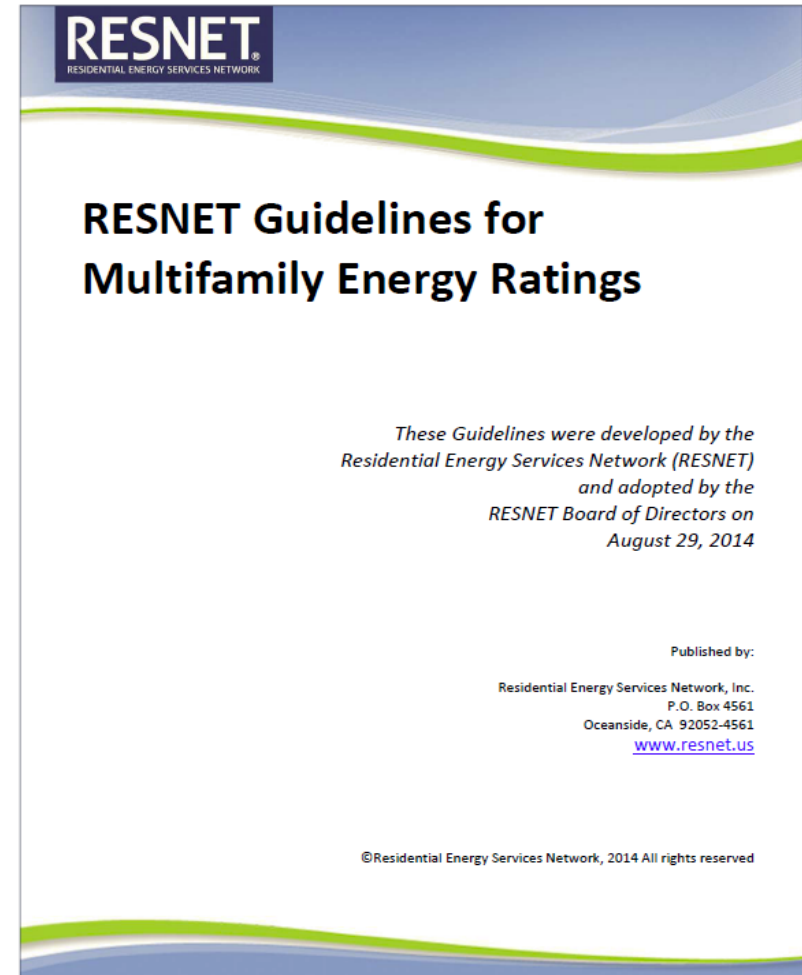
Other members of the RESNET Multifamily Sub-Committee:  
Asa Foss (USGBC), Paul Gay (US Eco-Logic), Bruce Harley,  
Matthew Root (CLEAResult), Brian Stanfill (MaGrann)



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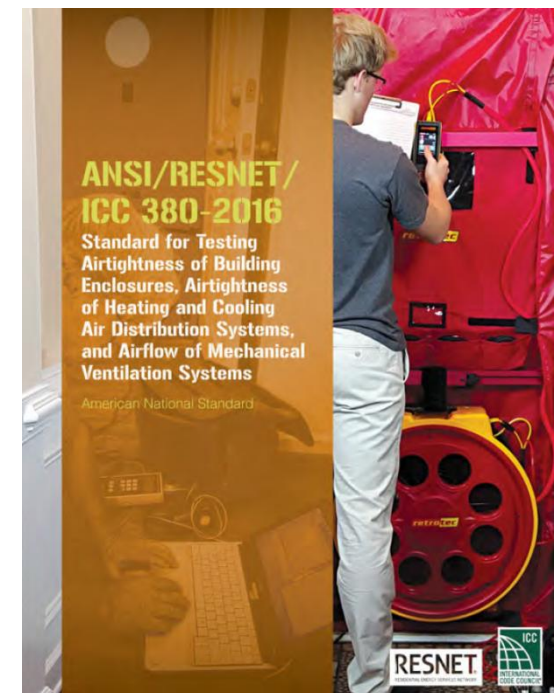
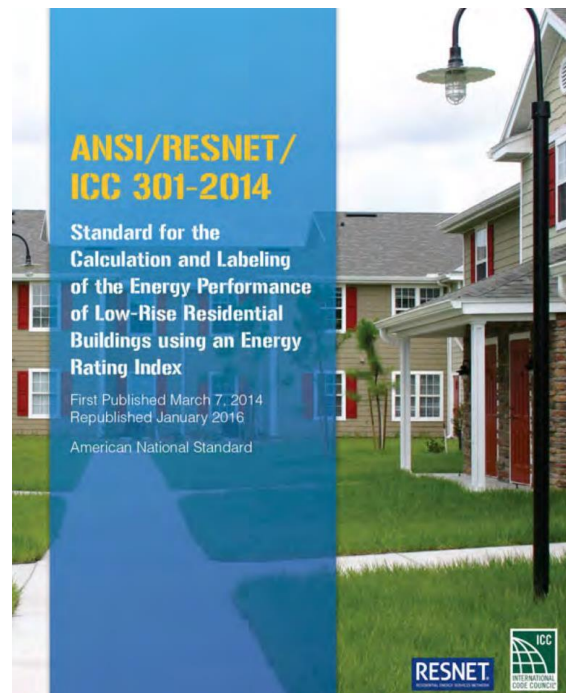
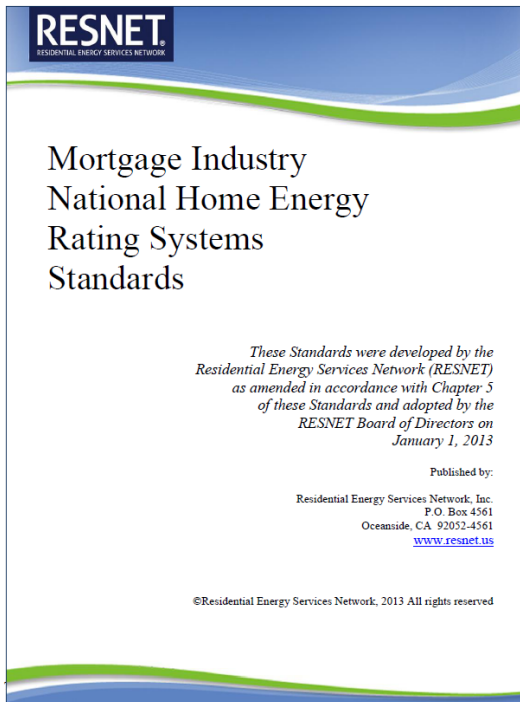
# Audience Poll

- How many of you are HERS Raters?
- Been a Rater for 3+ years?
- Work in Multifamily?
- How many of you are aware of the Guidelines for Multifamily Ratings? Used them?
- What do you struggle with most when it comes to MF ratings?



# Background

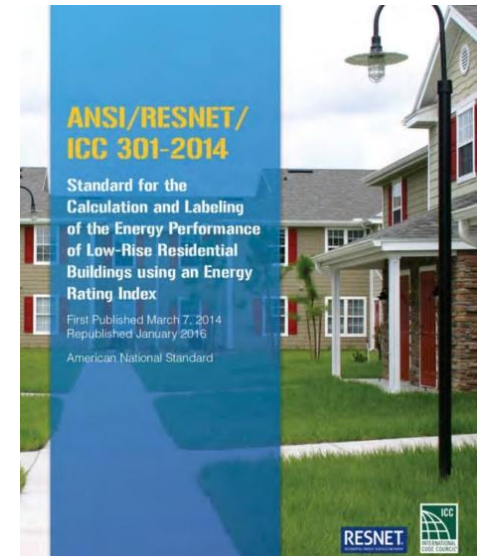
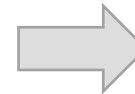
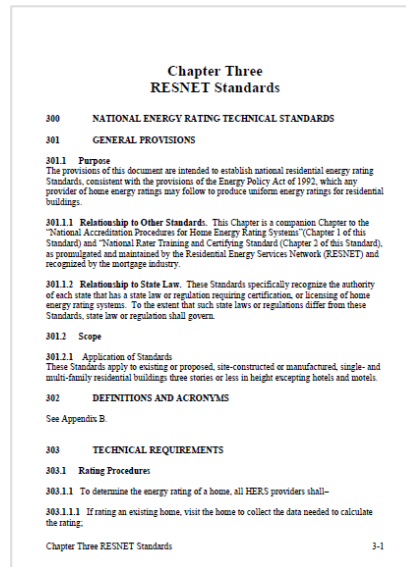
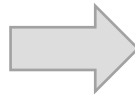
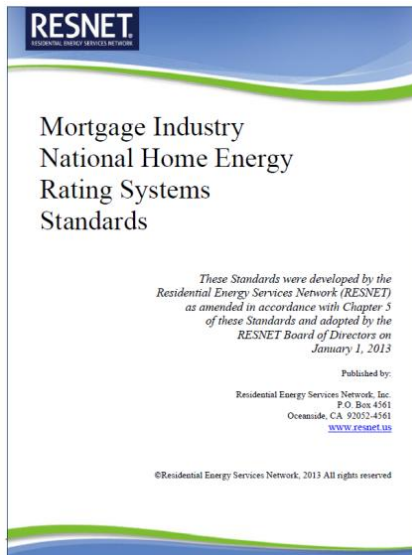
What Standards do we have that affect all Ratings?



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# MINHERS Ch 3 → ANSI 301-2014

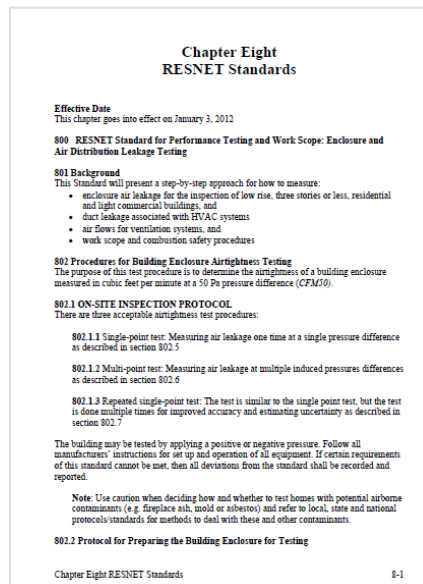
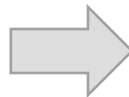
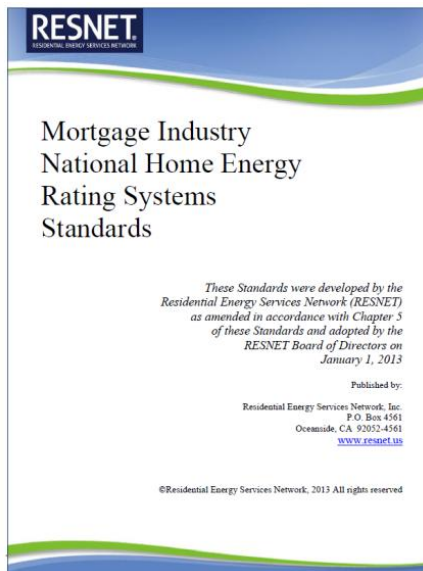
Chapter 3 of MINHERS became *ANSI/RESNET/ICC 301-2014*  
(Standard for the Calculation & Labeling of the Energy Performance using an Energy Rating Index)





# MINHERS Ch 8 → ANSI 380-2016

Chapter 8 of MINHERS became *ANSI/RESNET/ICC 380-2016* (Standard for Testing Airtightness Testing of Building Enclosures & Air Distribution Systems, and Ventilation Airflow)



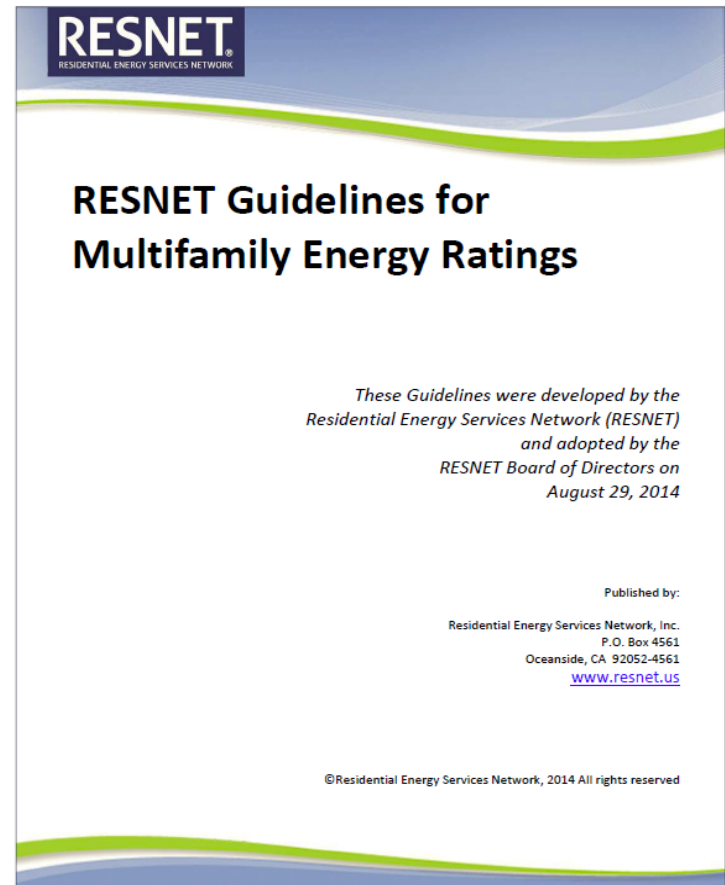
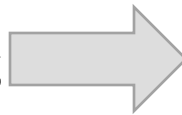
# What Standards affect all Ratings?

- *RESNET Mortgage Industry National HERS Standards (MINHERS)*
  - Chapter 6 addresses Sampling
  - Appendix A addresses on-site inspection procedures
    - Move into *ANSI/RESNET/ICC 301-2014 is in progress!*
- *ANSI/RESNET/ICC 301-2014 (old Chapter 3 of MINHERS)*
- *ANSI/RESNET/ICC 380-2016 (old Chapter 8 of MINHERS)*
  
- So, how do the *Guidelines for Multifamily Ratings* come into play?
  - Presently, not “Standards”, just guidance

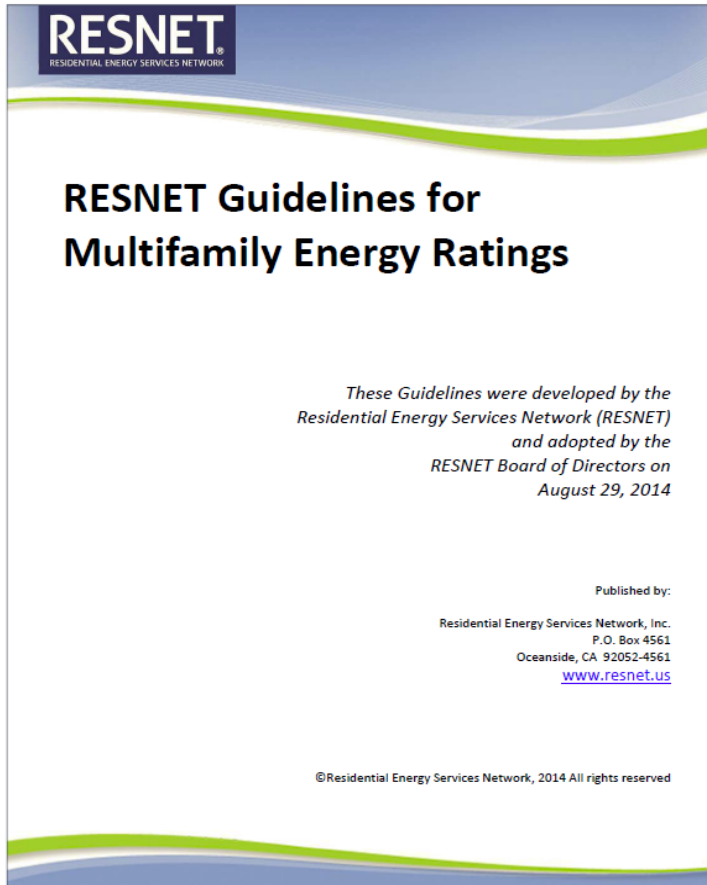


# Guidelines for Multifamily Ratings

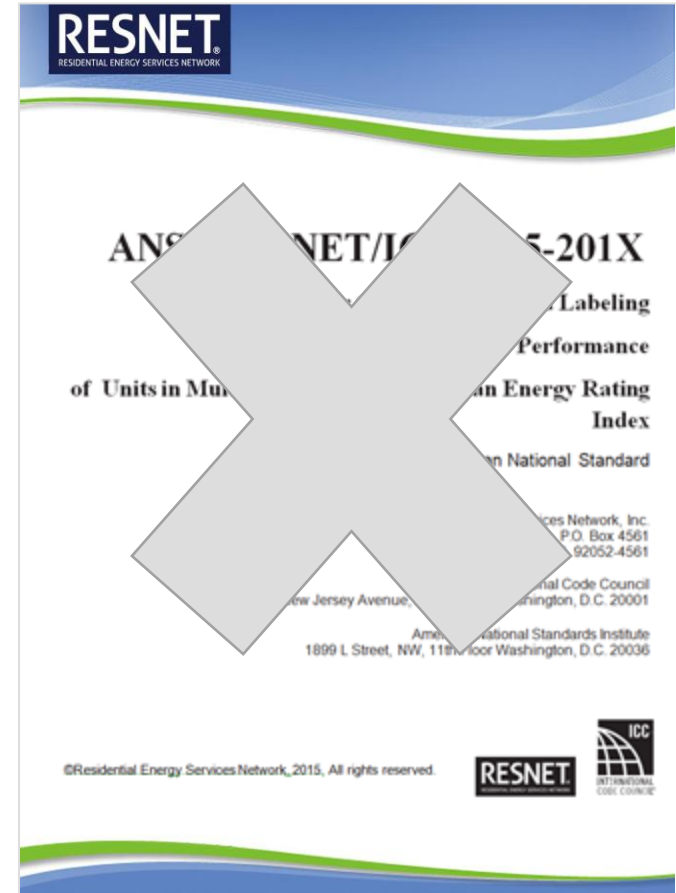
- MF Modeling
  - Provided software work-arounds to model HVAC systems and MF situations not seen in single family
- MF Sampling
  - Modified MINHERS Ch. 6
- MF Testing
  - Modified MINHERS Ch. 8
- MF Inspections
  - Modified MINHERS Appendix A



# Guidelines for MF → 1 Standard for MF?

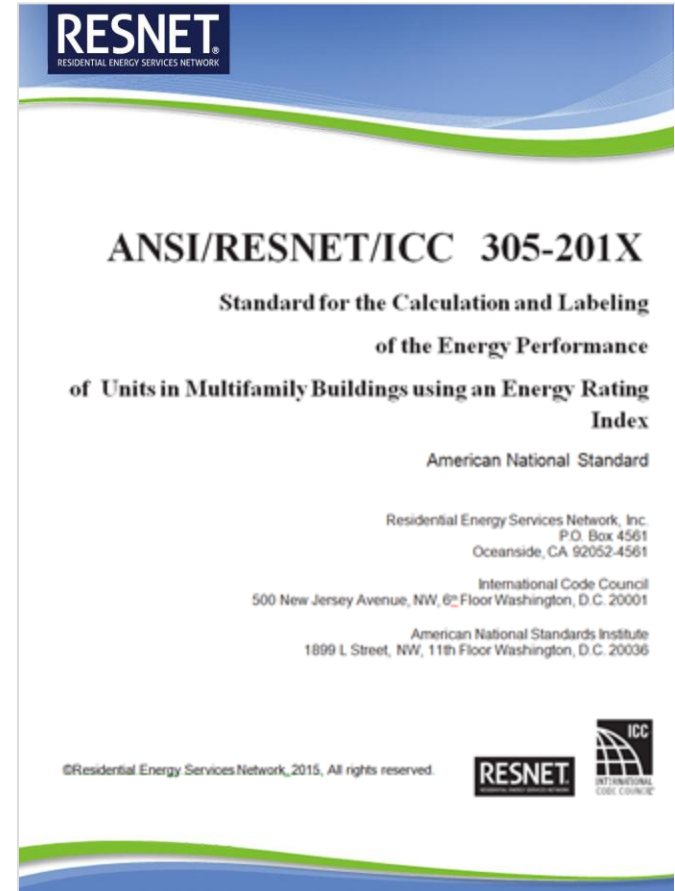
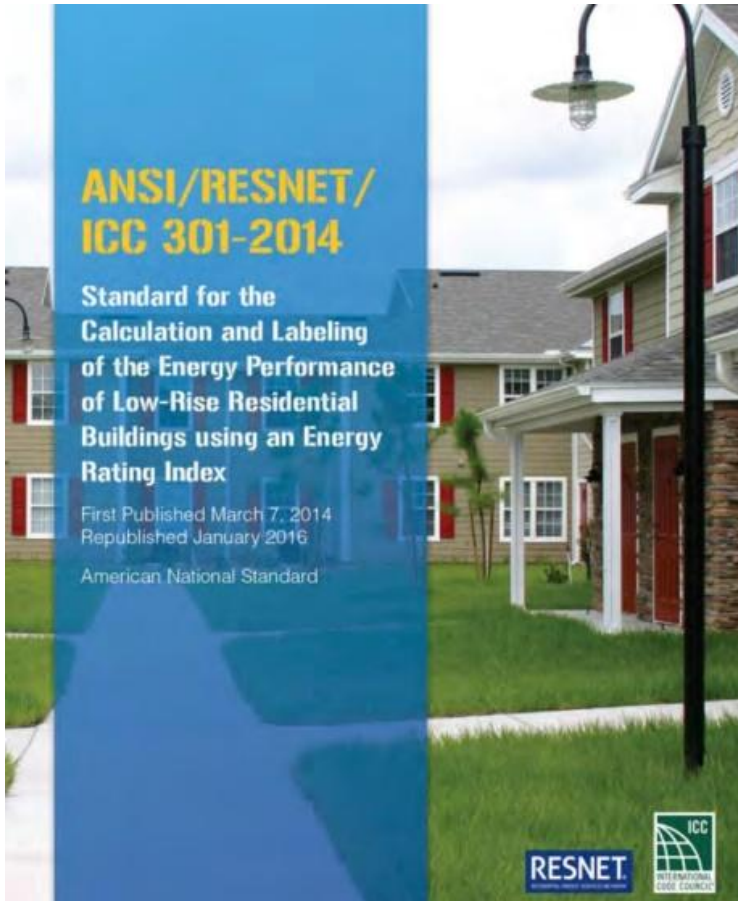


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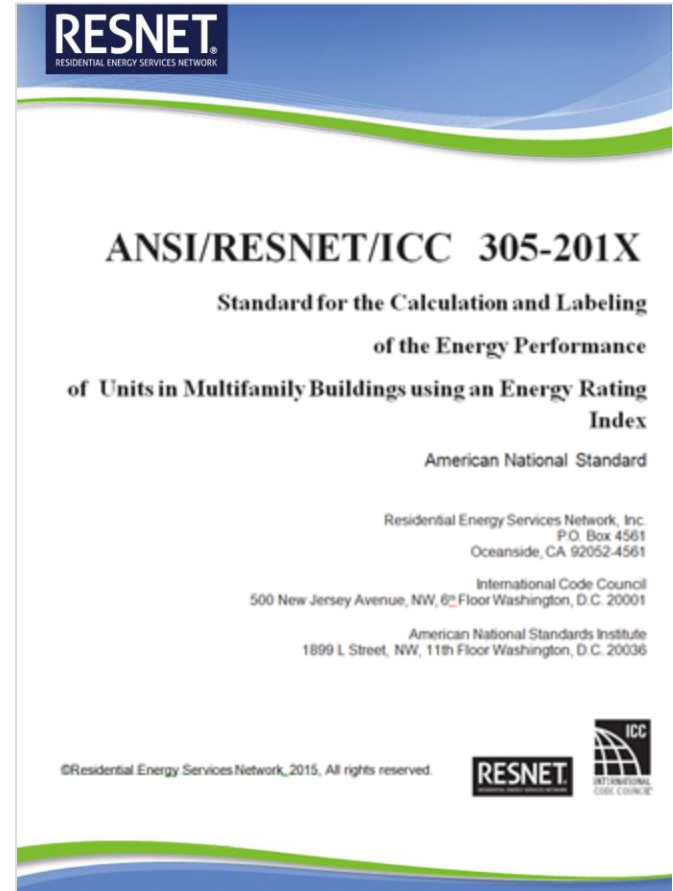
# ANSI 301 (SF) & ANSI 305 (MF)



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# ANSI 301+MF Guidelines → ANSI 305

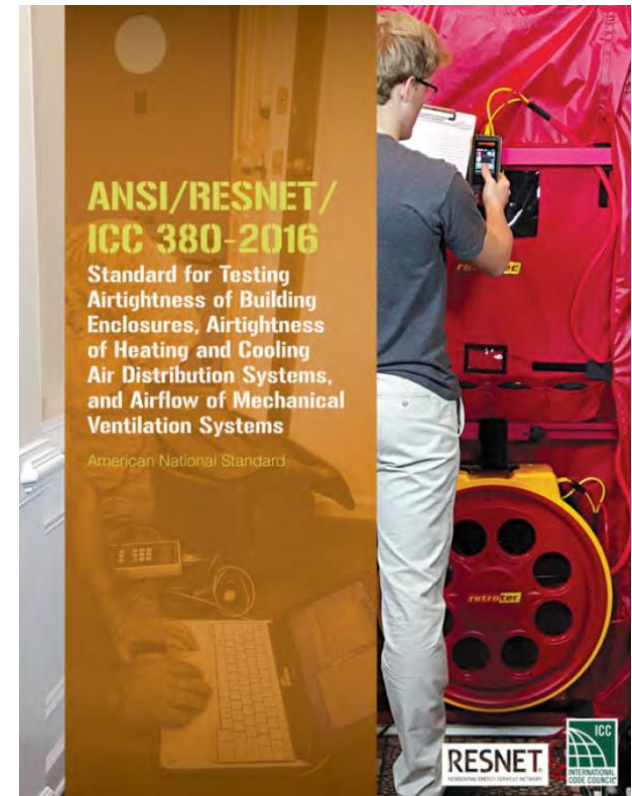
- MF Modeling
  - Guidelines + ANSI 301 = ANSI 305
- MF Inspections
  - ANSI 305 Appendix A →
- MF Sampling for modeling
  - ANSI 305, Section 5
- MF Sampling for testing & inspections
  - ANSI 305 or 380 Appendix



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# Multifamily Testing → ANSI 380

- MF Testing (for ERI & code)
  - Amend ANSI 380 to better address multifamily
    - Blower door
    - Duct blaster
    - Ventilation airflow
  - Additional guidance on MF systems not covered by 380
  - ANSI 305 will reference ANSI 380





# ANSI 301

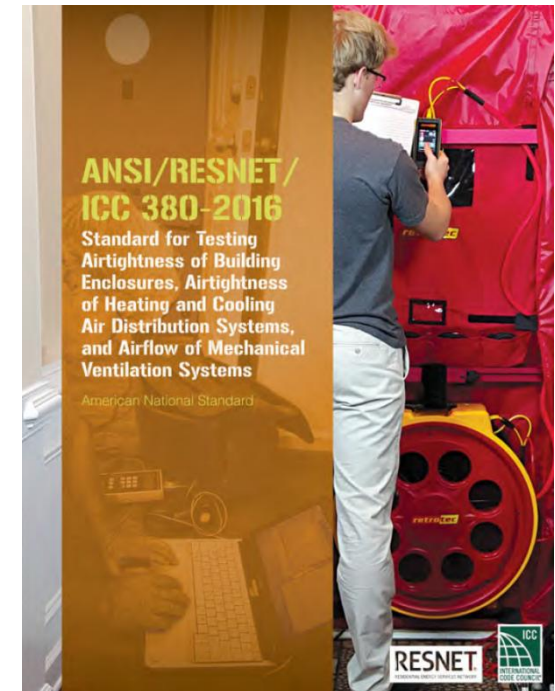
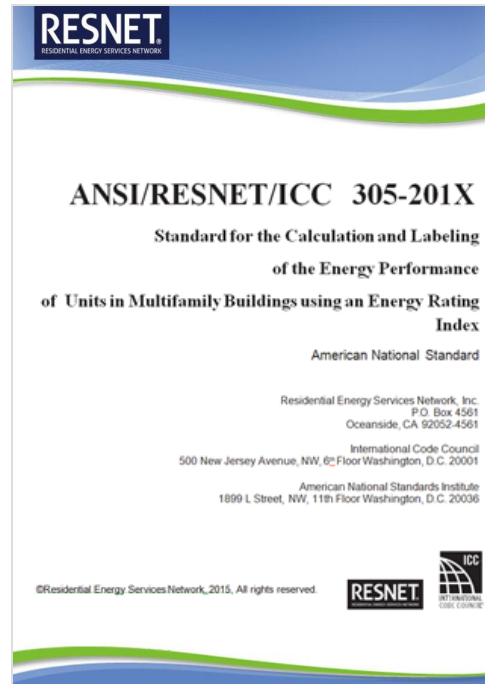
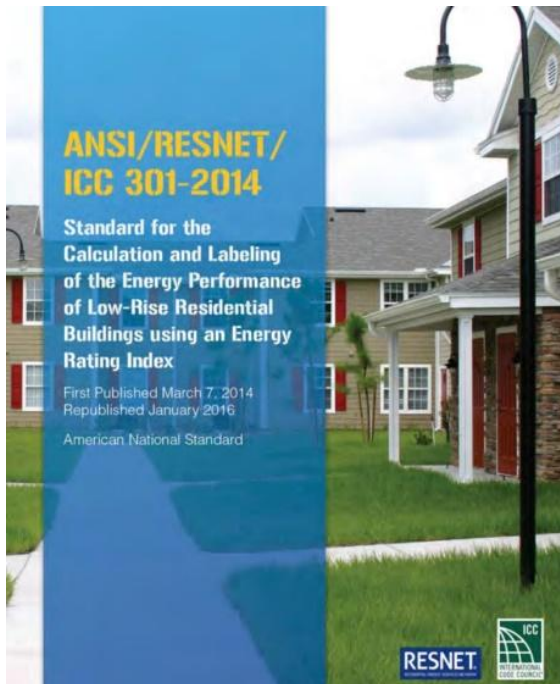
Single Family

# ANSI 305

Multifamily

# ANSI 380

All



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# Multifamily covered under ANSI 305

- Units in Multifamily buildings of ANY height (woohoo!)
- Dwelling Units AND Sleeping Units (yay!)
  - Current scope of ANSI 301 & MINHERS is limited to “dwelling units”. The scope of ANSI 305 will include “sleeping units” which may not have a kitchen or bathroom (ie. student/support housing, but NOT hotels/motels)
- Units NOT Buildings (yay?)
  - Energy ratings only permitted on multifamily units; not buildings.
  - “Building” level ERI approach: the average of all the unit ERIs in a building will be permitted to represent a single ERI for the building

# Great! When will these be published?

- **ANSI/RESNET/ICC 305-201X & 380-2016 Amendment**
  - Summer 2017: Draft to RESNET SDC 300 & Equipment SC
  - **Fall 2017: Draft out for Public Comment**
  - Spring 2018: Revisions & additional Public Comment
  - Summer 2018: Finalized and published
  - Spring 2019: Proposed for inclusion in the 2021 IECC

# Highlights coming in ANSI 305&380

- Modeling (Presented by Brian Christensen)
  - ANSI 305 – a new MF Standard, but like ANSI 301
- Inspections (Presented by Gayathri Vijayakumar)
  - ANSI 305, Appendix A
- Testing (Presented by Gayathri Vijayakumar)
  - ANSI 380 – this Standard will be revised with a multifamily amendment)
- Sampling for Modeling (Presented by Gayathri Vijayakumar)
  - ANSI 305 – Section 5
- Sampling for Testing & Inspections (Presented by Thiel Butner)
  - ANSI 305 or 380, Appendix \_\_\_



# Modeling

# RESNET MF SC Modeling Task Group

## Task Group Members:

Brian Christensen (NORESO)	Troy Maharg (TexEnergy)
Bob Grindrod (CLEAResult)	Brian Stanfill (MaGrann)
Bruce Harley	Gayathri Vijayakumar (SWA)
Joel Williams (TexEnergy)	

- What's new that we'll see in ANSI 305 that wasn't in Guidelines or ANSI 301?
- What's different from Guidelines that we'll see in ANSI 305?

# MF Modeling – big picture

MF HERS frustrations we want to fix:

- Why do apartments get worse HERS than SF homes?
- Why do interior MF units seem to get worse HERS than exterior?

Possible solutions follow...



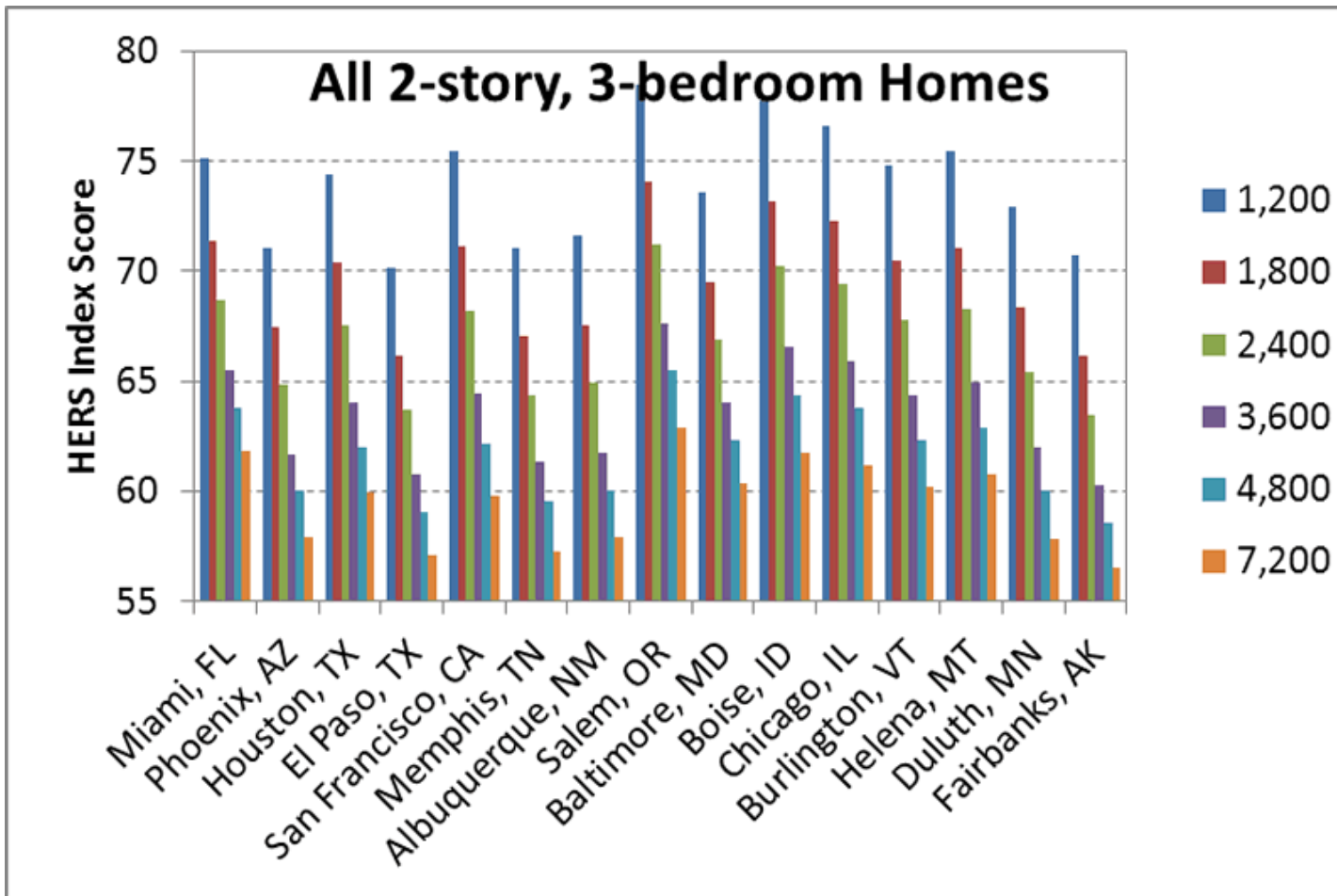
# MF Modeling – big picture

## Consider IAF draft Addendum E to ANSI 301-2014

- IAF (Index Adjustment Factor) is pending
  - RESNET webinar early December 2016
- Reduces the HERS bias for large CFA (among other items)
- Big impact on HERS Index for SF and MF homes!
  - Graphical examples next...

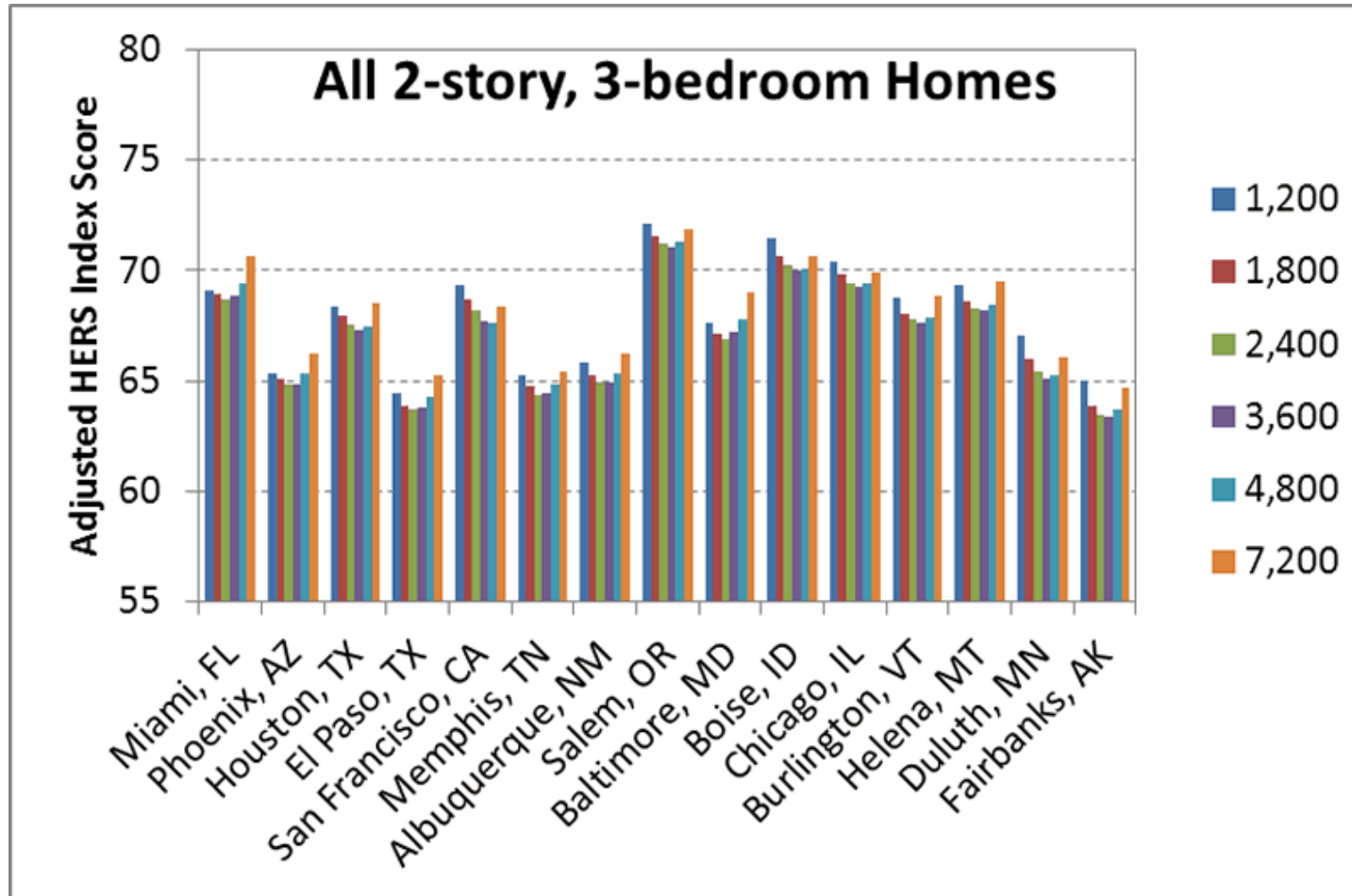
# Raw HERS Index Scores

(provided courtesy of FSEC)



# Adjusted HERS Index Scores

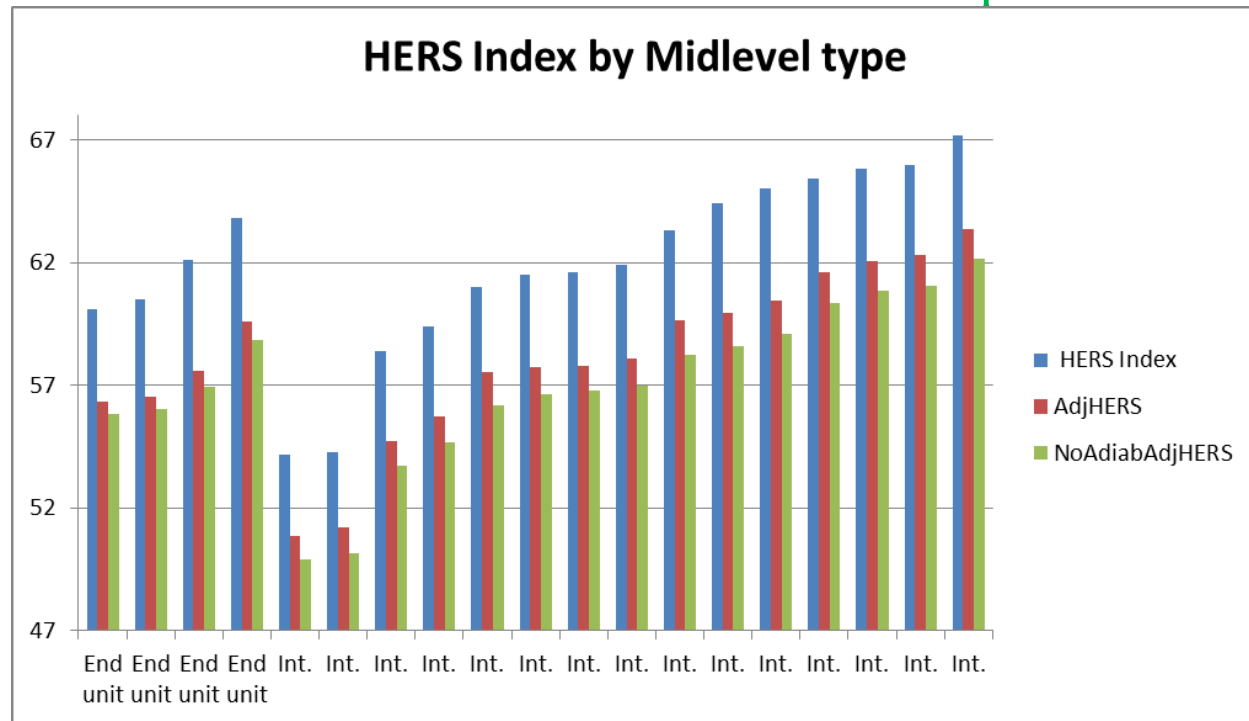
(provided courtesy of FSEC)



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# MF Modeling – big picture

Test of IAF, tweaked for MF: **reduced HERS 4-6 pts**



- CFA bias vs SF – Fixed!

# MF Modeling – big picture

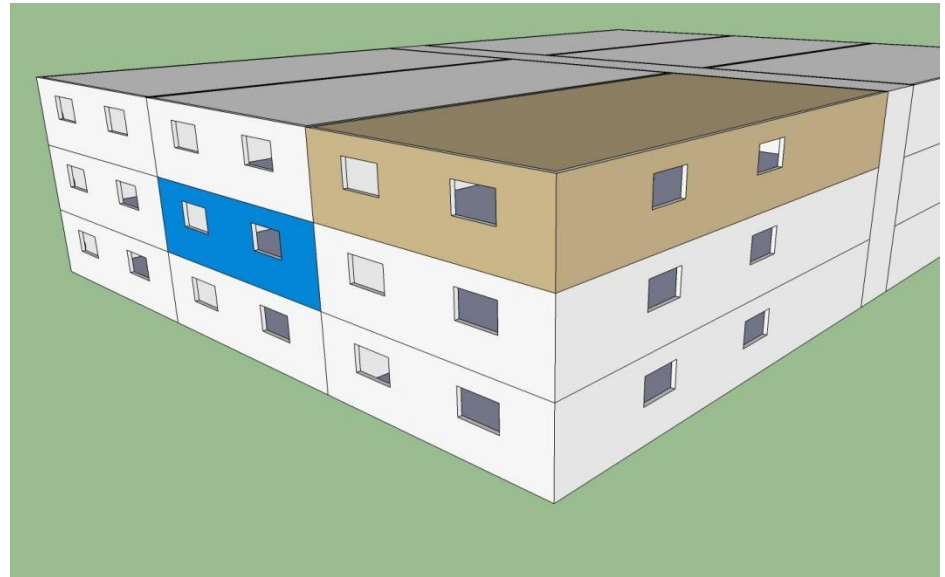
Now, consider HERS bias for interior vs exterior units...

Concept: Infiltration exposure fraction  $A_{\text{ext}}$

for units of 1560 sqft:

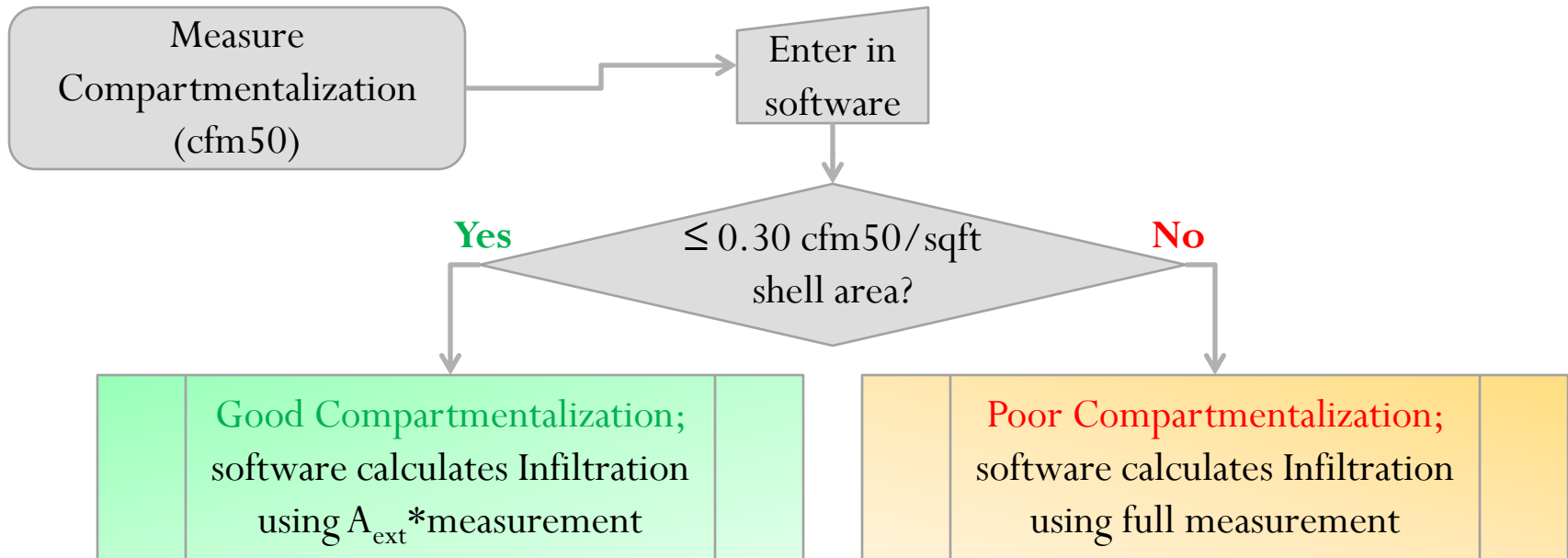
$$\text{Gold } A_{\text{ext}} = 0.5$$

$$\begin{aligned} \text{Blue } A_{\text{ext}} &= 240/4620 \\ &= 0.05 \end{aligned}$$



# MF Modeling – big picture

## Infiltration changes proposed for ANSI 305:



This will help reduce HERS bias against interior apartments, which have smaller values of  $A_{ext}$ .



# MF Modeling – Central Equipment

MF Modeling... Better, Faster, Easier!

Central systems = Complicated in MF Guidelines

- Examples
  - Boiler loop: with radiators, fan coils, or Water-Source HP
  - Chiller loop: with fan coils or WSHP
- ANSI 305: Let the software do the complicated stuff!
  - Make sure the *internal gains* go to the right place
  - Consumption proportional to dwelling unit
  - Standardized ways to represent central systems in software



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# MF Modeling – Central Equipment

## MF Modeling... Better, Faster, Easier!

### Concept:

- “*Remote Heated Space*” is outside of Conditioned Space, and only interacts with the Rated Dwelling via the shared services located within.
- Software shall ensure that heat gains/losses internal to Remote Heated Space are not included in the dwelling unit simulation.

### Examples:

- Shared Laundry
- Shared mechanicals

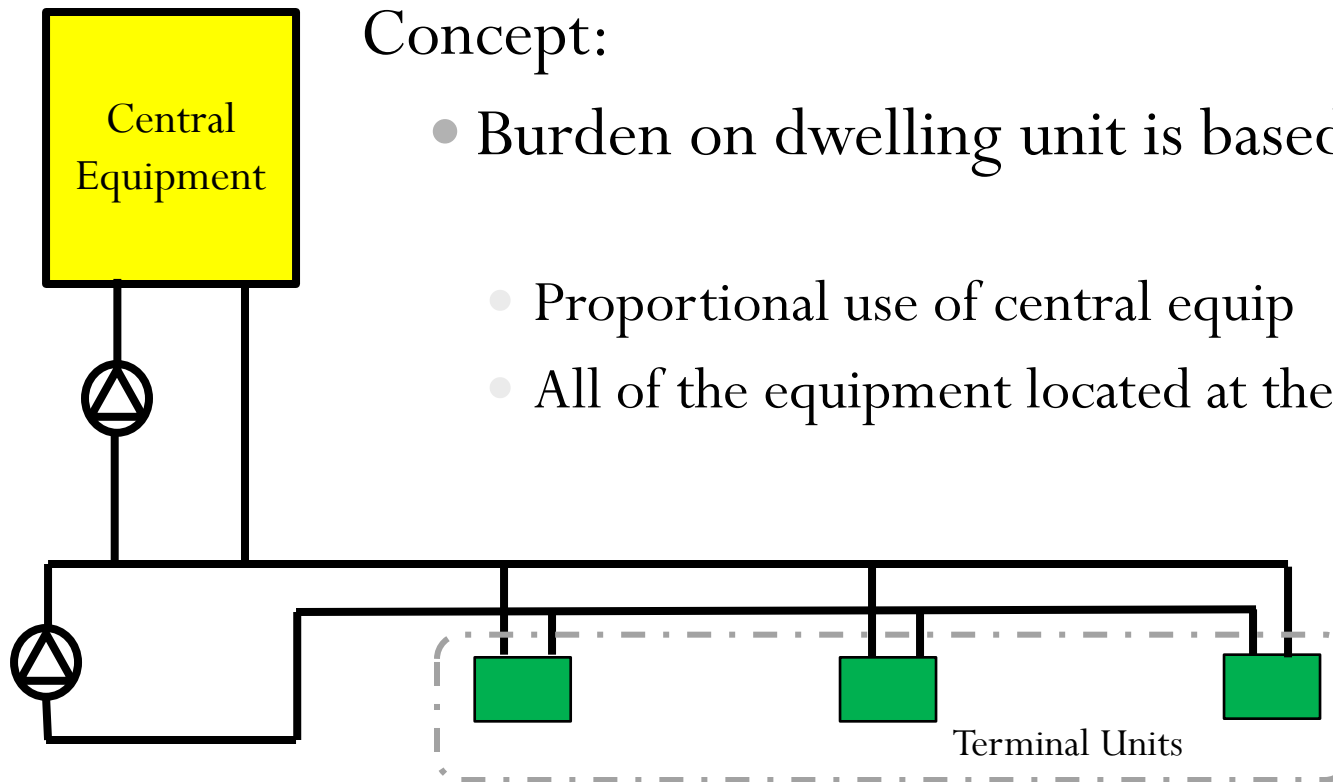


# MF Modeling – Central Equipment

MF Modeling... Better, Faster, Easier!

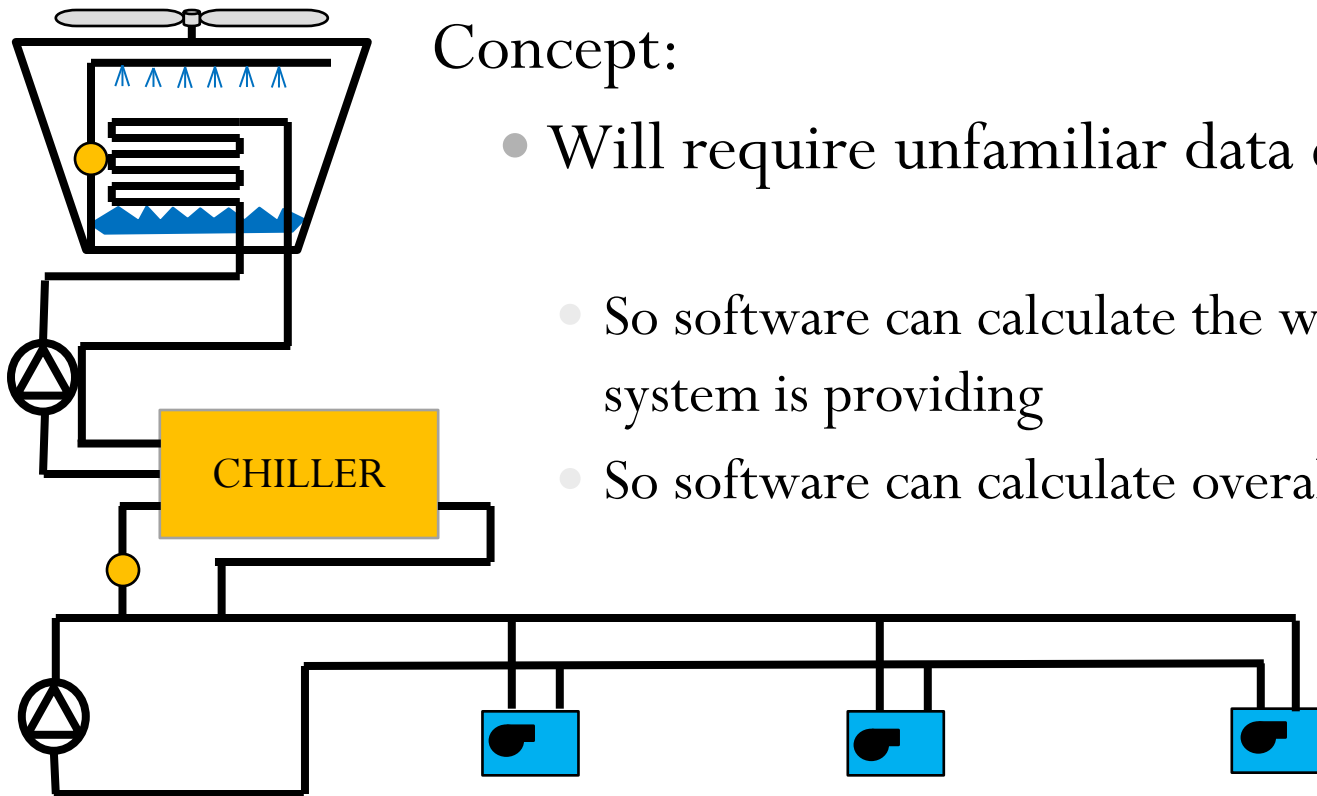
Concept:

- Burden on dwelling unit is based on...
  - Proportional use of central equip
  - All of the equipment located at the dwelling unit



# MF Modeling – Central Equipment

MF Modeling... Better, Faster, Easier!



Concept:

- Will require unfamiliar data collection...
- So software can calculate the work the central system is providing
- So software can calculate overall efficiency

# MF Modeling – Central Equipment

## MF Modeling... Better, Faster, Easier!

Draft Table of parameters needed for modeling central loop systems

	Central portion:	Boiler loop		Chiller w Cooling Twr		Cooling Twr alone
	Dwelling unit portion:	w fan coil	w WSHP	w fan coil	w WSHP	w WSHP
<b>Prorate:</b>	Total floor area served by central equipment	x	x	x	x	x
<b>Load &amp; Eff:</b>	Boiler capacity	x	x			
	Boiler efficiency	x	x			
	Chiller capacity			x	x	
	Chiller efficiency			x	x	
	Building Loop circ pump power	x	x	x	x	x
	Boiler primary loop circ pump power	x	x			
	Cooling Tower fan power			x	x	x
	Chiller/Cooling Tower circ pump power			x	x	
	Aux Chiller & Cooling Tower pumps			x	x	x
	Fan coil power (if present)	x		x		
	Total WSHP power (if present)			x		x
	WSHP Capacity				x	x
	Auxiliary WSHP power			x		x
	WSHP efficiency					x

# MF Modeling – Summary

ANSI/RESNET/ICC 305... Better, Faster, Easier!

- HERS bias from CFA going away
- HERS Int. vs Ext. unit bias reduction
  - (by Infiltration reforms within software)
- MF shared systems modeling inputs simplified
  - (software to do the work, not you!)



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# Next Steps for the Task Group...

Look for more when ANSI 305 goes to public comment!

Other modeling areas being worked on:

- Adapting new hot water features from Addendum A
- Separate water heater option for Shared Laundry
- Central Ventilation systems
- Duct leakage impact
- (Others TBD, such as central VRF systems)

Questions?

Next Up: Inspections



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# RESNET MF SC Inspections Task Group

## Task Group Members:

Brian Stanfill  
(MaGrann)

Asa Foss  
(USGBC)

Paul Gay  
(US Eco-Logic)

- What's different from Guidelines and MINHERS and ANSI 301?
- Where will it live?
  - ANSI 305-201X, Appendix A
  - Updated Minimum Rated Features table




# On-Site Inspection Procedures

Current location: Appendix A of RESNET MINHERS

- Has not been updated in awhile so it does not currently cover all minimum rated features (e.g. ventilation) and not enough inputs for Multifamily...but is moving to ANSI 301-2014

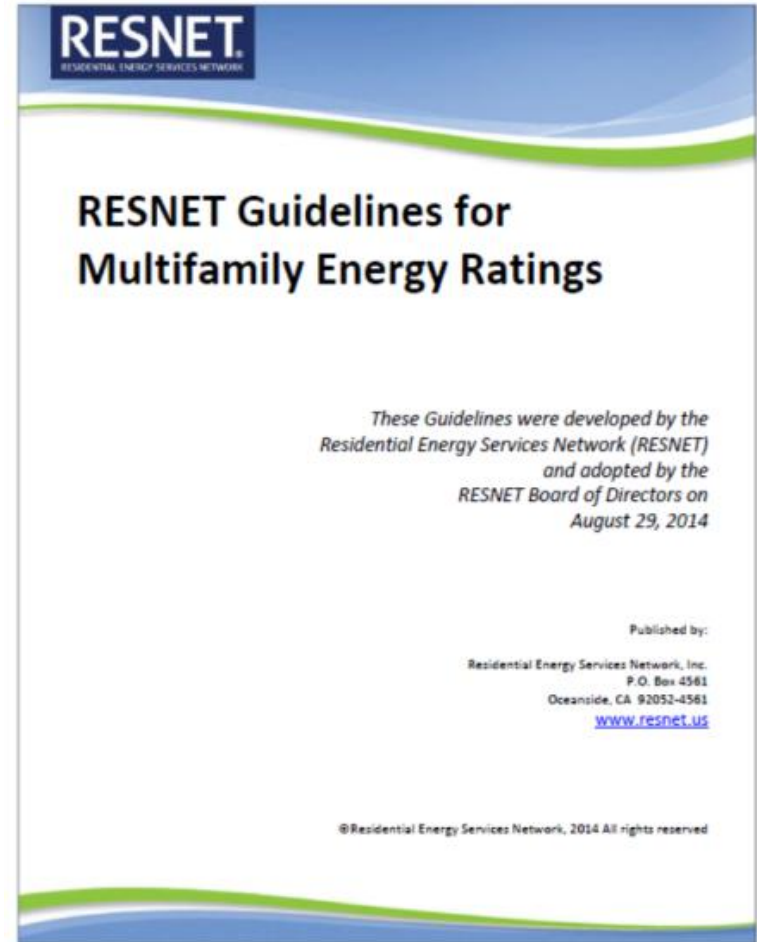
ON-SITE INSPECTION PROCEDURES FOR MINIMUM RATED FEATURES

Building Element: Foundation		
Rated Feature	Task	On-Site Inspection Protocol
Conditioning of space	Determine whether a crawl space or basement is unconditioned, indirectly conditioned or directly conditioned	<p>To determine whether a crawl space or basement is conditioned, assess the insulation placement in the walls or floor/ceiling assembly.</p> <p>A vented crawl space is considered unconditioned regardless of the location or existence of insulation. This is because the ambient temperature of the crawl space is close to the outdoor ambient temperature.</p> <div style="text-align: center;">  <p>The diagram shows a cross-section of a building's foundation. The top part is labeled 'interior' and is enclosed by a roofline. Below the interior is a horizontal line representing the floor/ceiling assembly. Below this line is a rectangular area labeled 'crawlspace (uncond.)'. To the left of the crawlspace is the label 'exterior'.</p> </div> <p>An unvented crawl space or basement may be considered either unconditioned, indirectly conditioned, or fully conditioned, based on the following criteria:</p> <p><i>Unconditioned</i> -Foundation walls are not insulated, floor/ceiling assembly is insulated, and any heating or plumbing distribution systems in the space is insulated. The intention in an unconditioned crawl space or basement is to minimize the heating system losses into the space by means of the distribution and plumbing insulation, and to minimize heat flow through the insulated floor/ceiling assembly.</p> <p><i>Conditioned, indirectly</i> -Foundation walls are not insulated with floor/ceiling assembly insulated and distribution system in the space uninsulated, or foundation walls insulated with floor ceiling assembly insulated or non-insulated and distribution system uninsulated. In an indirectly conditioned crawl space or basement, heating or cooling is unintentionally delivered to the space either through the floor/ceiling assembly or by unintentional losses</p>

# On-Site Inspection Procedures

## Appendix A of Guidelines for Multifamily Energy Ratings

- Took MINHERS Appendix, and added inspection protocols for rated features specific to multifamily that are not included in Appendix A of the RESNET MINHERS
- Also added inspection procedures for non rated features for informational purposes




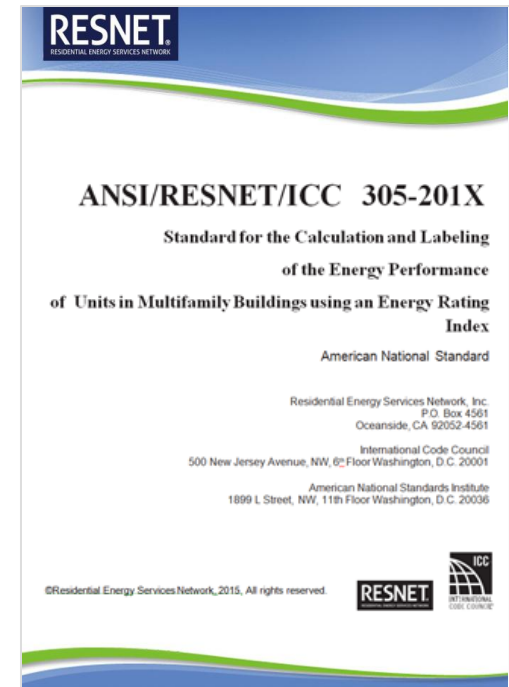
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# On-Site Inspection Procedures

What's the plan? MF Appendix A within ANSI 305-201X

## ON-SITE INSPECTION PROCEDURES FOR MINIMUM RATED FEATURES

Building Element: Foundation		
Rated Feature	Task	On-Site Inspection Protocol
Conditioning of space	Determine whether a crawl space or basement is unconditioned, indirectly conditioned or directly conditioned	<p>To determine whether a crawl space or basement is conditioned, assess the insulation placement in the walls or floor/ceiling assembly.</p> <p>A vented crawl space is considered unconditioned regardless of the location or existence of insulation. This is because the ambient temperature of the crawl space is close to the outdoor ambient temperature.</p> <div style="text-align: center;">  <p>The diagram shows a cross-section of a building's foundation. The top part is labeled 'interior'. Below it is a horizontal line representing the floor/ceiling assembly. Below that is a shaded area labeled 'crawlspace (uncond.)'. The bottom part is labeled 'exterior'.</p> </div> <p>An unvented crawl space or basement may be considered either unconditioned, indirectly conditioned, or fully conditioned, based on the following criteria:</p> <p><i>Unconditioned</i> -Foundation walls are not insulated, floor/ceiling assembly is insulated, and any heating or plumbing distribution systems in the space is insulated. The intention in an unconditioned crawl space or basement is to minimize the heating system losses into the space by means of the distribution and plumbing insulation, and to minimize heat flow through the insulated floor/ceiling assembly.</p> <p><i>Conditioned, indirectly</i> -Foundation walls are not insulated with floor/ceiling assembly insulated and distribution system in the space uninsulated, or foundation walls insulated with floor ceiling assembly insulated or non-insulated and distribution system uninsulated. In an indirectly conditioned crawl space or basement, heating or cooling is unintentionally delivered to the space either through the floor/ceiling assembly or by unintentional losses</p>



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# On-Site Inspection Procedures

- What's in Guidelines that will go into ANSI 305?
  - Procedure for data collection of centralized boiler and chiller systems, domestic hot water systems, and ventilation systems
  - Inspection procedure for verifying roof deck insulation
  - Protocol on how to determine whether or not ceiling plenum above garages is conditioned space or not
  - ...and others...

# On-Site Inspection Procedures

- What additional procedures will go into ANSI 305?
  - Procedure for data collection of central VRF systems
  - Procedure for inspecting centralized hot water distribution systems
  - Inspection protocol for common area laundry equipment

# Next Steps for the Task Group...

- Coordinating with modeling task group to add inspection procedures as rated features get added to ANSI 305
- Coordinating with Envelopes Sub-Committee on their Appendix A for ANSI 301-2014
- Creating the Appendix A for ANSI 305 by Summer 2017



Questions?

Next Up: Testing



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# RESNET MF SC Testing Task Group

Task Group members:

Thiel Butner (Pando Alliance)	Chris McTaggart (The BER)
Asa Foss (USGBC)	Gary Nelson (TEC)
Bruce Harley	Matt Root (CLEAResult)

- Which Testing Guidelines are going into ANSI 380?
- Do they need to be modified?

# Which MF Guidelines go in ANSI 380?

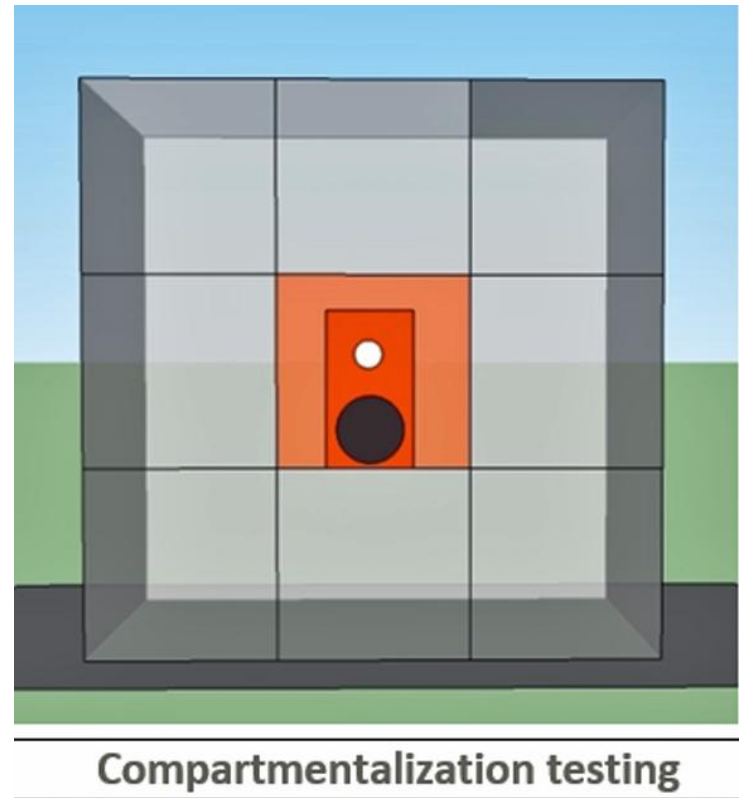
- MF Testing procedures that address:
  - Blower door testing
  - Duct blaster testing
  - Ventilation airflow testing
- MF Testing procedures that are:
  - Not HERS/ERI specific
  - Simple, even if it offers less flexibility



# Blower Door Testing for Multifamily

What Worked in the Guidelines?

- Compartmentalization Test
- Defined unit volume/area
- Leveraged RESNET protocols (now ANSI 380)
- Allow testing with central ventilation running



# Blower Door Testing for Multifamily

What did NOT work in the Guidelines?

- Too complex
- Burdensome
- Too much flexibility
  - 4 test options



Image from Maloney Performance

# Blower Door Testing for Multifamily

## The End Result?

- Mostly follow ANSI 380
  - Some concerns, but not our Task Group's purview to change
- Add two options for Multifamily
  - Unit – Compartmentalization test
  - Full building – single zone or multiple zones (according to Air Barrier Association of America Guidelines)
- Prohibit partially guarded tests

# Blower Door Testing for Multifamily

## Compartmentalization Test Procedures

- Dictate blower door location in entry doorway
  - Between unit and corridor/outside
  - Assess weather-stripping & door sweep
    - Penalty for leaky doors
- Dictate protocols for pressure relief in hallway
  - Minimize window & door opening
    - 3 stories and lower vs. 4 stories and higher
  - Minimize stair travel





# Blower Door Testing for Multifamily

## Compartmentalization Test Procedures (cont'd)

- Keep ceiling access panels open
  - Exceptions
- Open mechanical doors to mechanical closets
  - Exceptions
- Calculate enclosure square footage
- Note, this is the only test result that can be used in an ERI....

# Duct Leakage Testing for Multifamily

- Mostly ANSI 380
- Changed from Guidelines
  - Non-ducted returns
    - Setup on air handler
    - Closet leakage captured in blower door testing
- Kept from Guidelines
  - Testing Exemptions
    - In progress and in coordination with Modeling Task Group

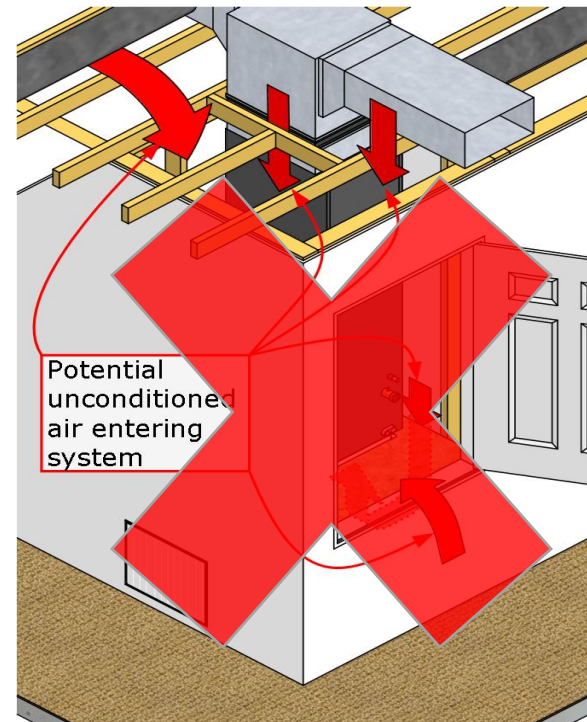
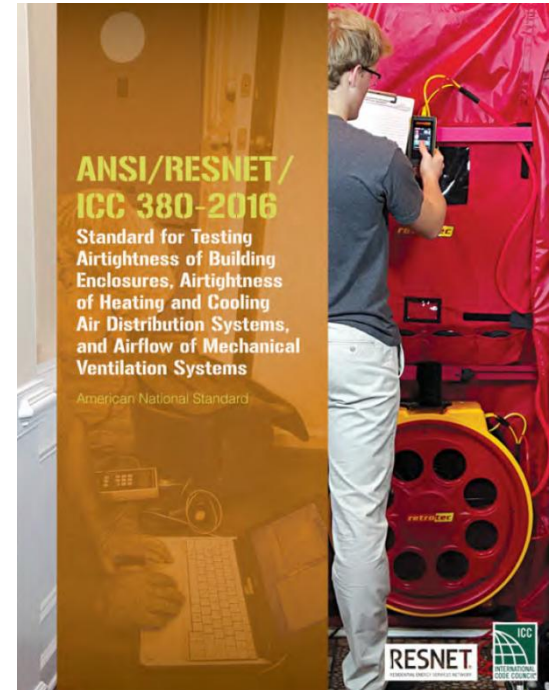


Image from DOE Measure Guideline: Air Sealing Mechanical Closets in Slab-On-Grade Homes

# Next Steps for the Task Group...

- Draft Amendment to ANSI 380:
  - Blower door testing
  - Duct blaster testing
  - Ventilation airflow testing
- TBD
  - Central DHW testing?
  - Central Exhaust Riser leakage tests?



Questions?

Next Up: Sampling



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# RESNET MF SC Sampling Task Group

## Task Group Members:

Thiel Butner (Pando Alliance)

Matt Root (CLEAResult)

Paul Gay (US Eco-Logic)

Gayathri Vijayakumar (SWA)

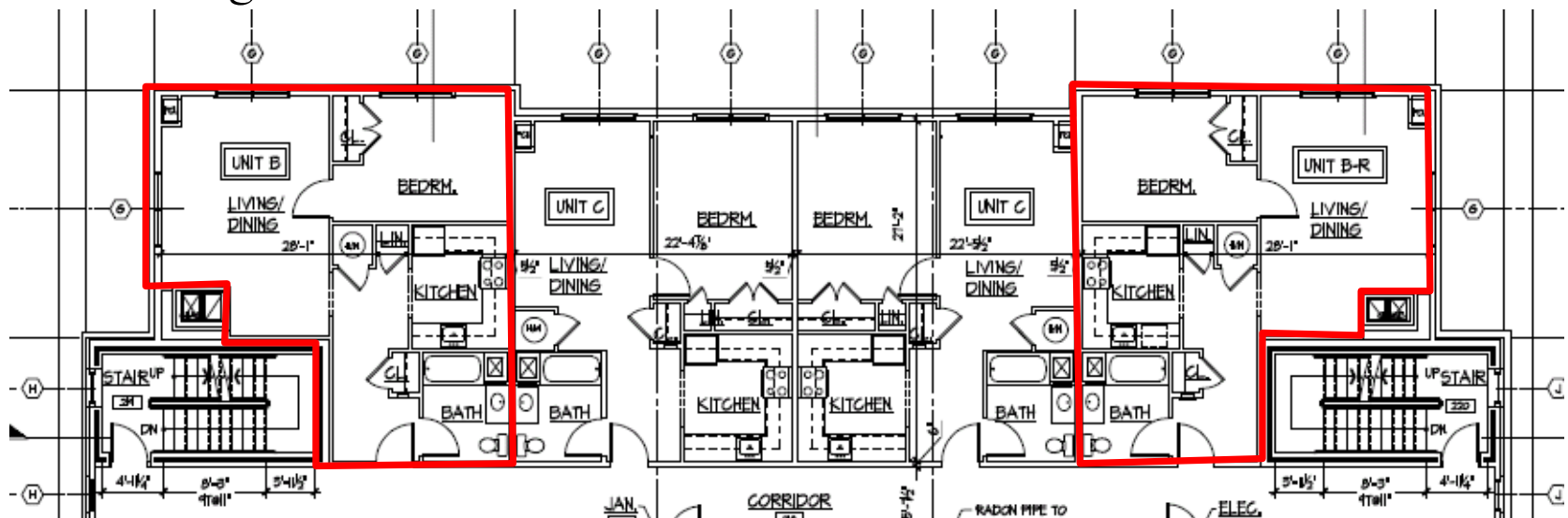
Rebecca Hudson (EPA)

Mentor: Daran Wastchak

- What's different from Guidelines and Chapter 6?
- Where will it live?
- Big Change: Separate Sampling for Modeling from Sampling for Testing & Inspections

# Sampling (for Modeling)

- Where will it live? Section 5 of ANSI 305 (not Ch 6)
- Selecting Unique Unit Types
  - Same envelope, #BR, CFA, #bathrooms, enclosure area, ceiling height, #stories, window area



# Sampling (for Modeling)

- Worst-Case Specifications & Configuration
  - Mid-level, interior units are no longer automatically exempted
- Setting Testing Thresholds
- Application of Field Results
- Assignment of Energy Rating Index (ERI)
- NEW! Confirmed vs Sampled Ratings
  - Can really high performing units use their verified data and upload as “confirmed” ratings?
  - Yes, if they meet all the requirements of a “confirmed” rating



# Sampling (for Testing & Inspections)

- Similarities & Differences: Single Family vs. Multifamily
- Core Sampling Concepts for Inspections and Testing
- Shift from Sampling in Chapter 6
- Shift from Sampling in the Multifamily Guidelines
- Introduction of New Concepts in Multifamily Sampling



# Single Family and Multifamily

## Similarities:

- Residential construction
- Process: Design → Build/Inspect → Analyze/Certify
- Project teams are groups of individuals

# Single Family and Multifamily

Differences:

## Single Family

- Custom options
- Smaller scale (# units)
- Slower construction
- Ongoing timeframe

## Multifamily

- Designed early
- Larger scale (# units)
- Faster construction
- Fixed project size

# Core Sampling Concepts

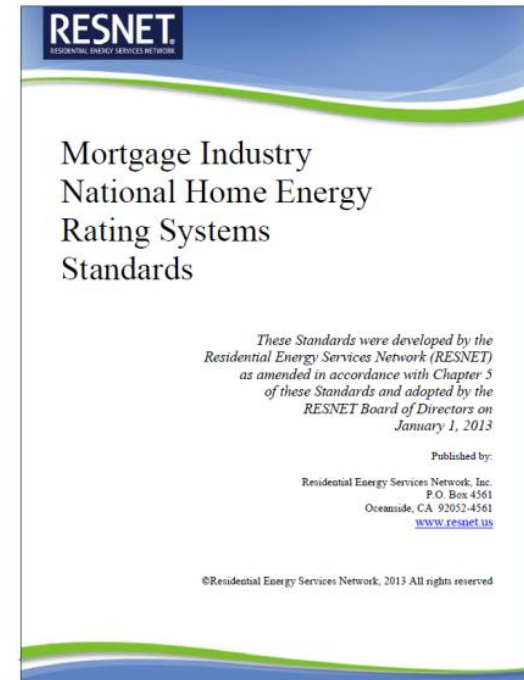
- Consistent construction types
- Consistent project team
- Regular and frequent inspections
- Approximately 7-in-a-row perfect, first
- Approximately 1-in-7 sampling rate
- All minimum rated features not inspected/tested
- Root cause analysis
- General terms and definitions



# Chapter 6 → New MF Sampling

## Similarities:

- Purpose
- Labeling
- Grouped by readiness
- Sampling Controls
- 7-in-a-row, first

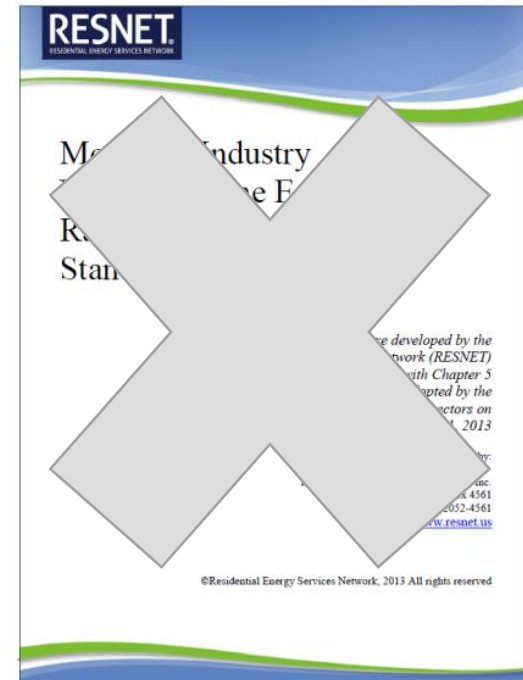


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# Chapter 6 → New MF Sampling

## Differences:

- Application of results
- Assignment of HERS
- Replaced 30-day rule
- Removed 90-day rules
- 1-in-7 (0.143) → 15%
- Recording sample sets
- Failures process

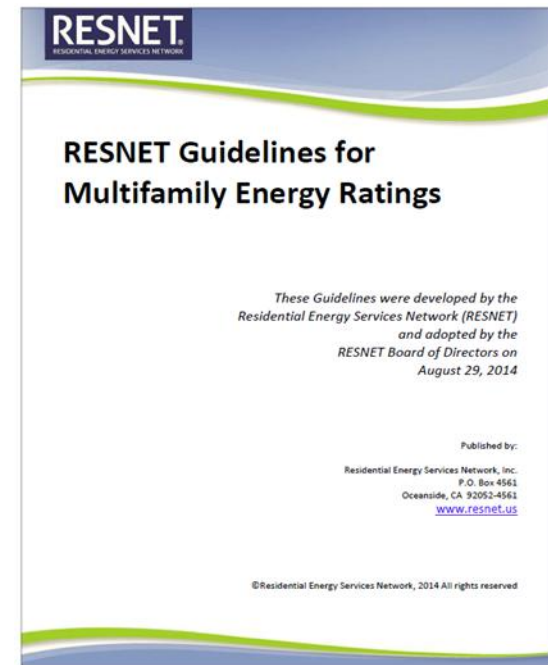


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# Guidelines → New MF Sampling

## Similarities:

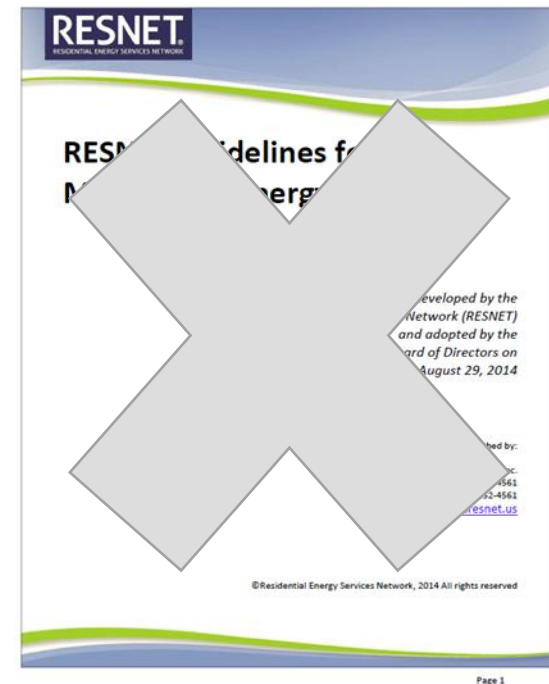
- Sampling cohorts
- Sampling controls
- Distribution of units
  - Types and attributes
  - Location and timing



# Guidelines → New MF Sampling

## Differences:

- Inspections/testing vs. modeling
- “Sampling Providers”
- Res.-assoc. common spaces
- Selecting/grouping
- Failures process
- All units must pass



# New Concepts

## MF Sampling (for Inspections & Testing)

### No Sampling Provider

- Authority Having Jurisdiction (shift toward ANSI)
- Documentation required in project file

### No Sample Sets

- Select units based on attributes
- Measure 15% of project, not 1 out of every 7

### No 30- or 90-day Rules

- Analyze entire project

(1 of 3)



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# New Concepts

## MF Sampling (for Inspections & Testing)

### Sampling Plan

- Define components in detail

### Quality Control Plan

- Assign individual responsibility
- Define sampling controls
- Conduct trades training

### Residential-Associated Common Spaces

- Eligible for all aspects of sampling

(2 of 3)



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# New Concepts

## MF Sampling (for Inspections & Testing)

### Failures Process

- Option to test two additional units
- Elevated Root Cause Analysis (RCA) procedure
- RCA or 100% testing before sampling again
- Up to three RCAs per failed feature
- All failures must be corrected
- Adjustment of performance thresholds

(3 of 3)

# Inspection Process for a Failed Feature

After qualifying for sampling, failures may occur.

Failed Feature

Confirm that it's isolated or assume it's prevalent.

Inspect/  
Test 2  
More Units

Jump to  
Root Cause  
Analysis

Jump to  
Inspect/Test  
100%

Adjust  
threshold

Is it isolated or prevalent?

Both Pass

Additional  
Failed  
Feature

↓

↓

If prevalent, do root cause analysis or inspect/test 100%.

↓

Root  
Cause  
Analysis

Inspect/  
Test  
100%

←

←

Contractor shall fix problems in all cases.

Correct  
Failed  
Feature

Correct  
Failed  
Features

Correct  
Failed  
Features

Reevaluate all failures.

Reinspect  
Failed  
Feature

Reinspect  
Failed  
Features

Reinspect  
Failed  
Features

No unresolved failures permitted.

Failed  
Feature  
Must Pass

Failed  
Features  
Must Pass

Failed  
Features  
Must Pass

Evaluate root cause analysis and return to sampling OR repeat the process.

↓

Inspect/  
Test 2  
More Units

Return to  
Sampling

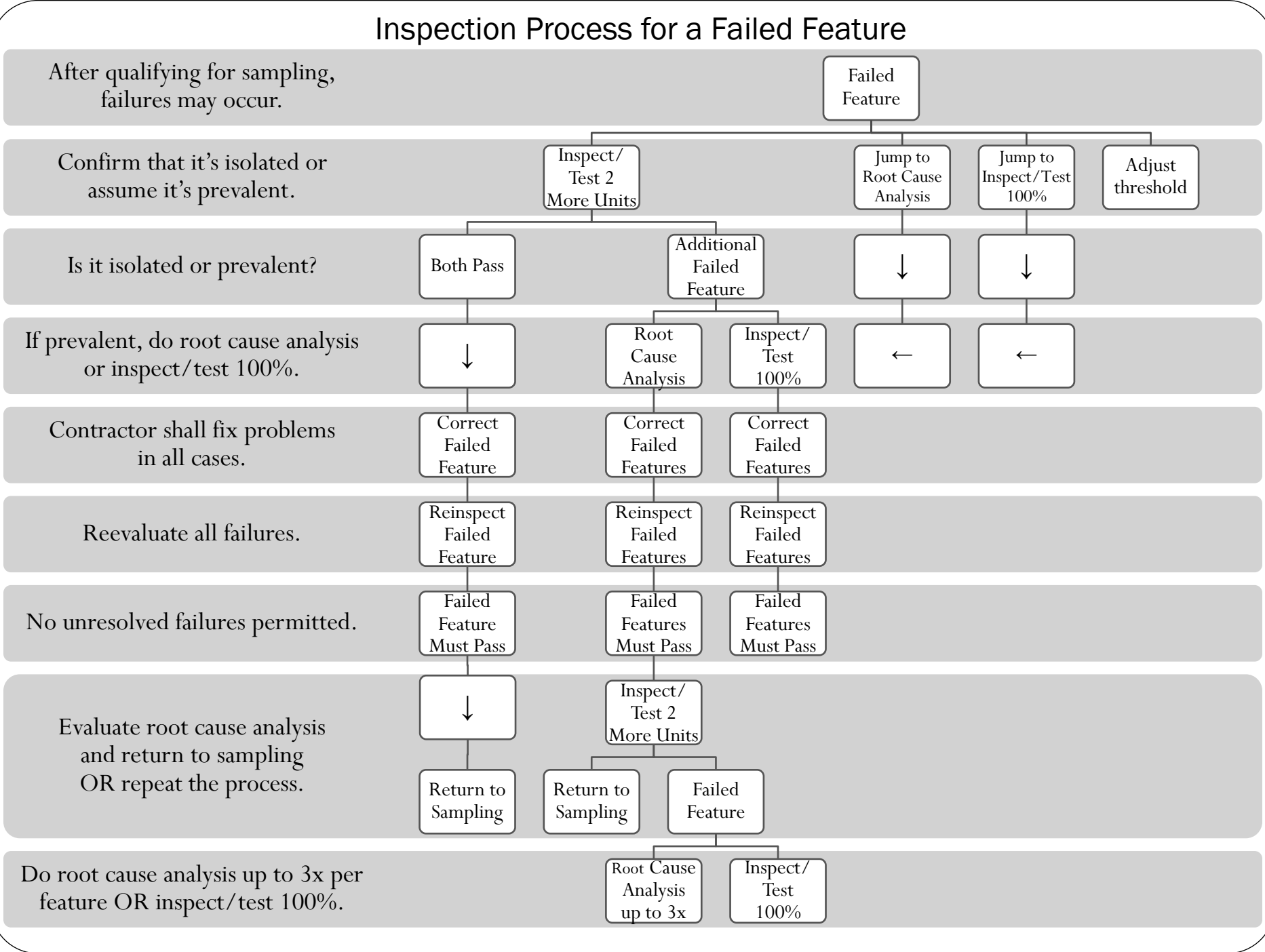
Return to  
Sampling

Failed  
Feature

Do root cause analysis up to 3x per feature OR inspect/test 100%.

Root Cause  
Analysis  
up to 3x

Inspect/  
Test  
100%



# Next Steps for the Task Group...

- Appendix in ANSI 305 or 380
  - Appendix for sampling MF inspections and testing
- MF modeling remains separate
  - ANSI 305 will include sampling for MF modeling
- Two paths for inspections & testing
  - Simplified or detailed

Questions?

Next Up: Wrap-up



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# Highlights coming in ANSI 305&380

- Modeling (Presented by Brian Christensen)
  - ANSI 305 – a new MF Standard, but like ANSI 301
- Inspections (Presented by Gayathri Vijayakumar)
  - ANSI 305, Appendix A
- Testing (Presented by Gayathri Vijayakumar)
  - ANSI 380 – this Standard will be revised with a multifamily amendment)
- Sampling for Modeling (Presented by Gayathri Vijayakumar)
  - ANSI 305 – Section 5
- Sampling for Testing & Inspections (Presented by Thiel Butner)
  - ANSI 305 or 380, Appendix \_\_\_

# ANSI 301

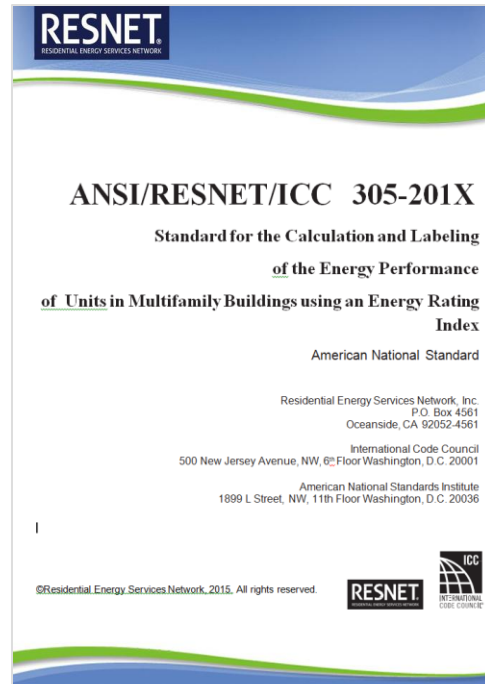
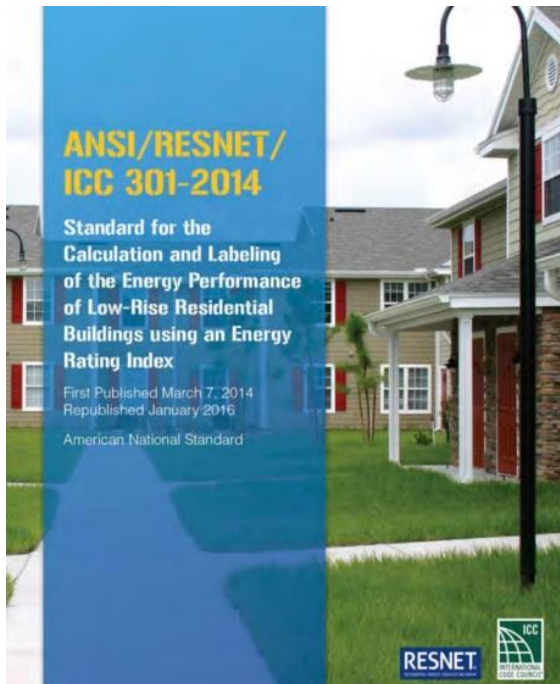
Single Family

# ANSI 305

Multifamily

# ANSI 380

All



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# Next Steps for the Sub-Committee

- **ANSI/RESNET/ICC 305-201X & 380-2016 Amendment**
  - Summer 2017: Draft to RESNET SDC 300 & Equipment SC
  - **Fall 2017: Draft out for Public Comment**
  - Spring 2018: Revisions & additional Public Comment
  - Summer 2018: Finalized and published
  - Spring 2019: Proposed for inclusion in the 2021 IECC



Questions?

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[laurel@resnet.us](mailto:laurel@resnet.us)



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