An overview of what's proposed in the 2019 version of ANSI/RESNET/ICC 301-2014

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Webinar Overview

Part I – Background & Process

- Background on Standards/terminology
- Public Comment process
- Other related activities (inspections, testing)

Part II – Differences between 301-2014 & 301-201x (2019)

- Stuff we won't talk much about
  - Approved interpretations & approved addenda
- Stuff we will talk about
  - Scope, Definitions, modeling changes that address "Multifamily"

Part III - Q&A (but also do type in questions as we go)

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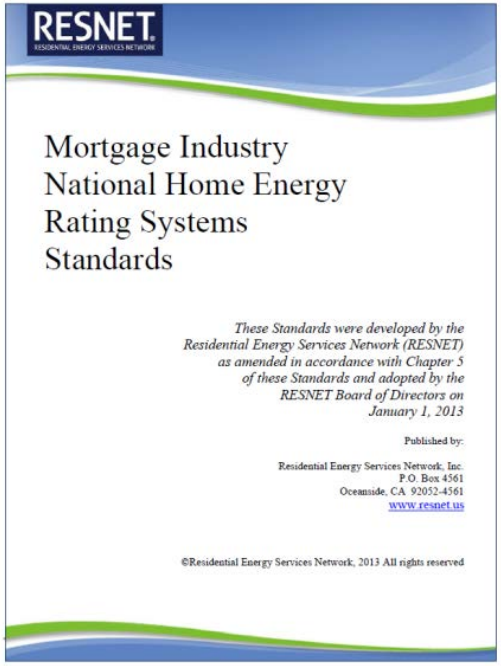
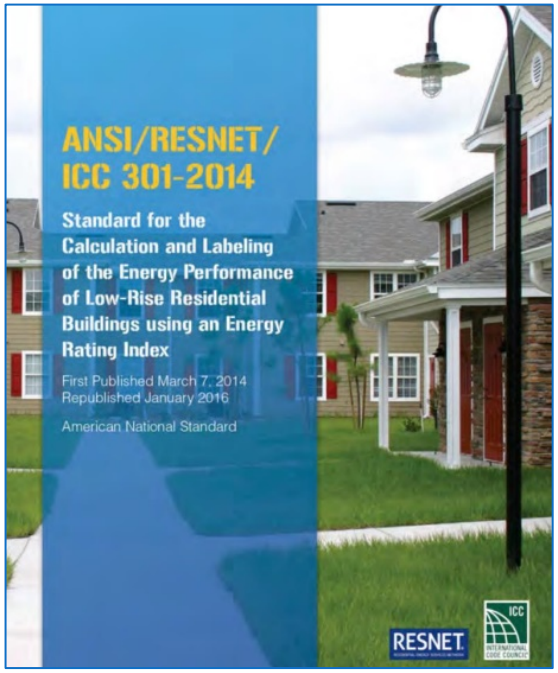
What are the RESNET Standards?

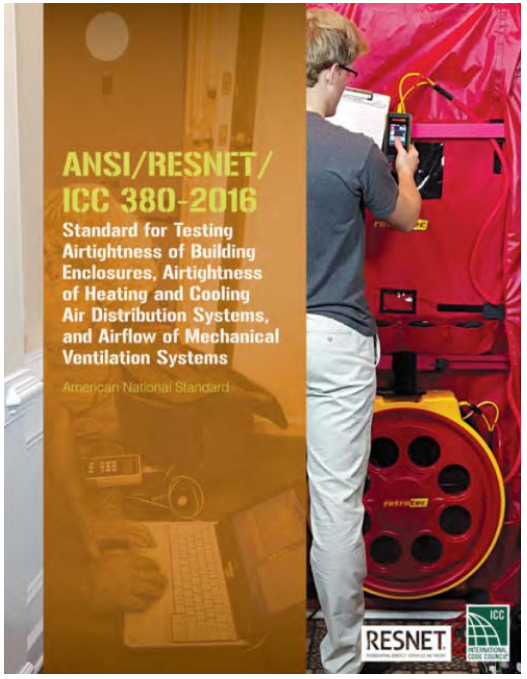
MINHERS



ANSI 301



ANSI 380



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How do the Standards get revised?

- Step 1: A revision is needed (based on a proposed 'amendment') Example: CFL vs LED
- Step 2: The 'amendment' is developed/vetted/revised by RESNET SDC300 or its sub-committees
- Step 3: The amended language, in strikethrough and underline format, is sent out to public comment as a proposed "addendum" to the current Standard (usually dubbed PDS-01)

Example from PDS-01 of Addendum G to 301-2014

Qualifying Tier II Light Fixture – A light fixture located in a Qualifying Light Fixture Location that contains lamps/light bulbs with an average luminous efficacy equal to or greater than ~~50~~ 80 lumens/watt; an integrated solid state lighting fixture, whose light source efficacy is not measurable separately from the fixture, with a luminaire efficacy of 65 lumens/watt;~~or~~ an outdoor light fixture that is controlled by a photocell; or an indoor fixture controlled by a motion sensor.

How do the Standards get revised?

- Step 4: Public comment is taken into consideration and where needed, the "addendum" is revised and re-proposed (PDS-02)
  - "Gosh, that seemed complicated, can't we just call it LED?"
- Step 5: "Addendum" is approved & is part of the Standard, but the Standard isn't reprinted right away to integrate the revised text, so ANSI 301-2014 still looks the way it used to
- Step 6: Every 3-5 years, integrate the approved Addenda

Example of how approved Addendum G to 301-2014 will look in the draft of BSR/RESNET/ICC 301-201x (aka 301-2019)

Qualifying Tier II Light Fixture – A light fixture located in a Qualifying Light Fixture Location that contains LED lamps/light bulbs; an integrated LED fixture; an outdoor light fixture that is controlled by a photocell; or an indoor fixture controlled by a motion sensor.

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Are approved addenda required for HERS?

303.1 Applicable Standards

All RESNET Home Energy Ratings conducted in accordance with this Standard shall comply with the provisions of ANSI/RESNET/ICC 301-2014, “Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using an Energy Rating Index.”

304 Normative References

ANSI/RESNET/ICC 301-2014(Republished January 2016), “Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using an Energy Rating Index.”, **including addenda*** and normative appendices. *approved only, not proposed; effective date TBD

301-2019 Development Timeline

- **March 20:** 2pm webinar on the overall changes in 301
- **March 2 – April 16, 2018:** 1st round of public comment
- **April – June 2018**: Respond & revise draft
- **July - August 2018**: 2nd round of public comment
- **August – October 2018**: Respond & revise draft

If all goes well….

- **December 2018:** RESNET approves 301-2019
- **Spring 2019:** ANSI approves 301-2019; MINHERS adopts & proposes for 2021 IECC; HERS software work to incorporate;
- **January 2020:** Available for use for HERS Ratings
- **January 2021**: Part of 2021 IECC for ERIs

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How the Public Comment process works

Click on this link for the public comment page for 301-201x

- Download the PDF draft to read/review
- Check out the other comments posted
- Click on the link to submit your own comment

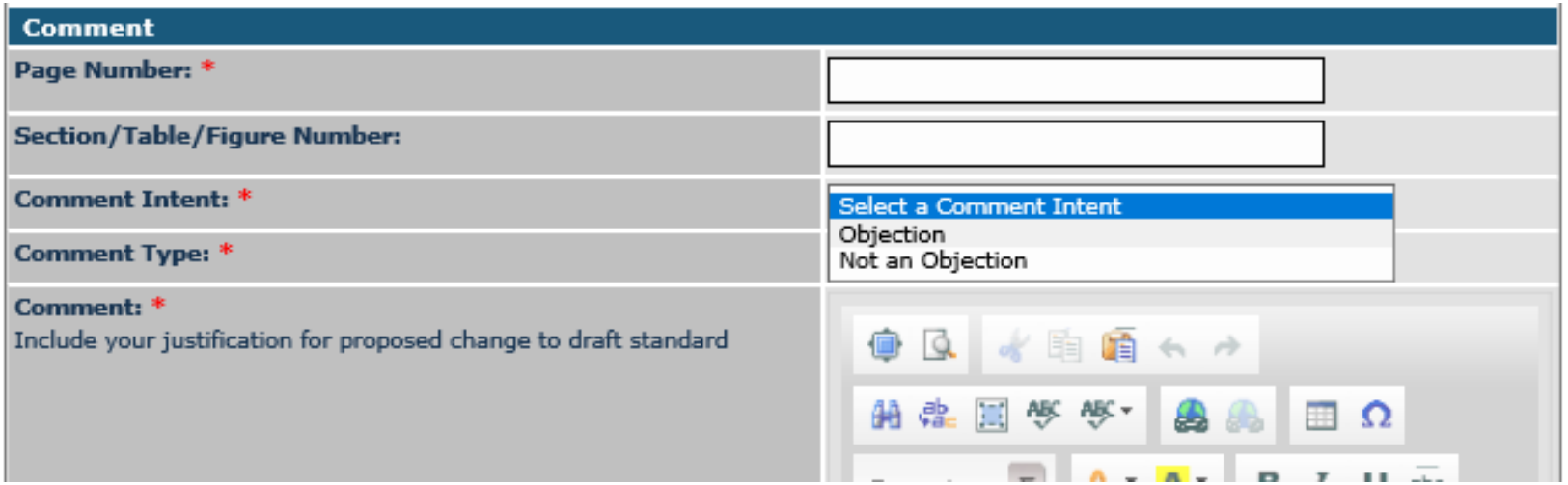
BSR/RESNET/ICC 301-201X DRAFT PDS-01, REVISIONS TO STANDARD ANSI/RESNET/ICC 301-2014

Only comments submitted through this online form will be accepted. Submit your comment below:

Commenter	
First Name: *	
Last Name: *	
Affiliation: * (who you represent)	

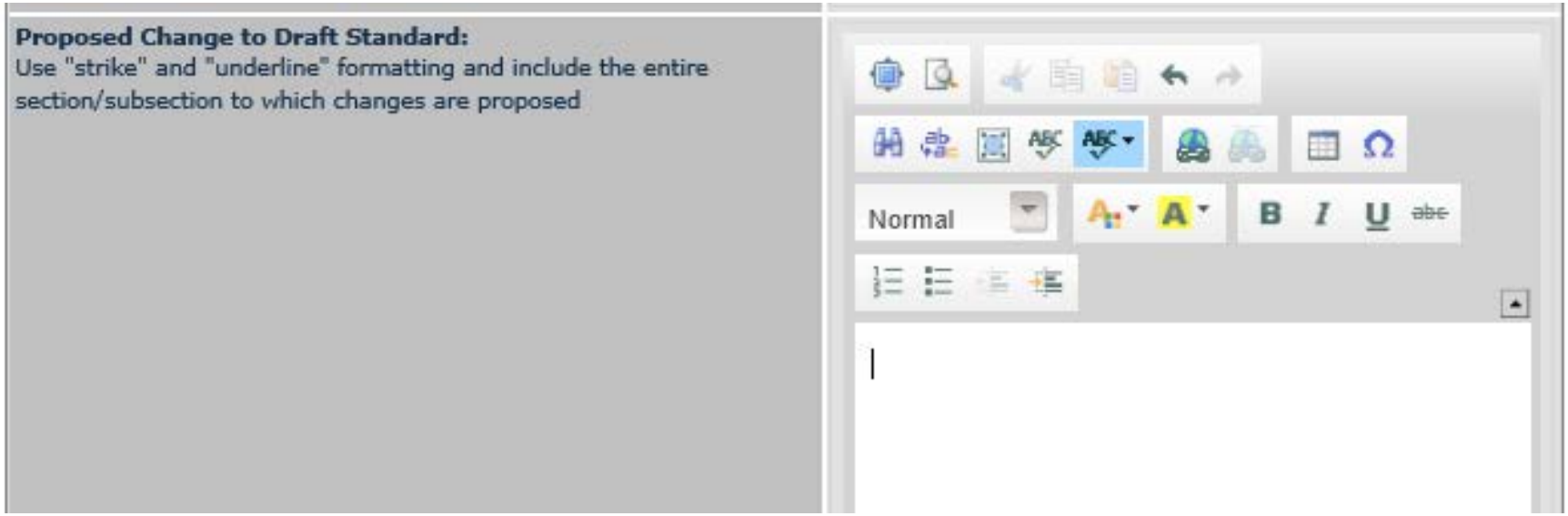
How the Public Comment process works

- Be clear by indicating the specific page, section, table and/or figure numbers that you are commenting on.
- Indicate whether your “intent” is an “objection” or not and whether your “comment type” is general/editorial/technical
- Include your justification for proposed change to the draft



How the Public Comment process works

- Propose a SPECIFIC change, using strike and underline formatting.
  - Copy the text from the draft and paste.
  - Then ~~strike~~ out what you don't like; <u>underline</u> what you add.



Public Comment Tips/Reminders

- Don't submit comments that relate to MINHERS or 380; they will be rejected/ignored
- Don't be vague or provide general feedback. While it can be taken under consideration, it's not 'actionable'.
- Don't submit comments on text that appears as black font.
  - To address issues on that text, submit an amendment here
- Do submit comments on text that appears as red ~~strikethrough~~ or underline.
- Don't have each Rater in your organization submit the same comment! One 'group' comment is enough!
- Reminder: volunteers on the committees respond to these comments (not paid RESNET staff)

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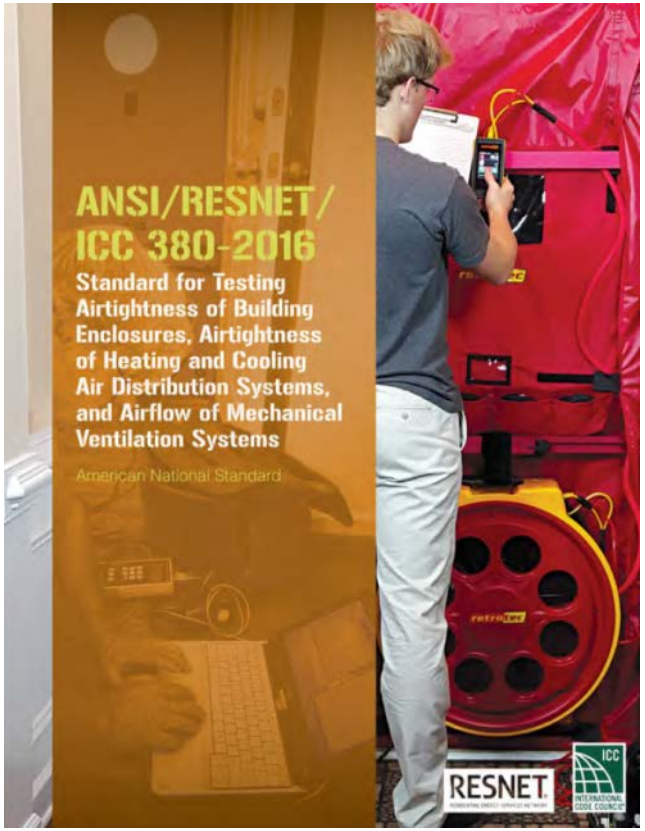
What other Public Comments and proposed Addendum are happening?

2019 update to ANSI 380-2016

- Like ANSI/RESNET/ICC 301-2014, ANSI/RESNET/ICC 380-2016 is due for its 3 yr update
- 1st public comment of PDS-01 BSR/RESNET 380-201x ended in January & is currently being revised.
- 2nd round of public comment is soon (mid to late April)!



What other Public Comments and proposed Addendum are happening?

Adding Appendix A & B to ANSI 301-2014

Addendum F; Appendix A Insulation Grading & Assessment

- **November – Dec 2016:** 1st round of public comment
- **April 2018:** 2nd round of public comment

Addendum N; Appendix B Inspection Procedures for Minimum Rated Features

- Like RESNET MINHERS Appendix A
- **April 2018:** 1st round of public comment

Q: What's the difference between an Addendum & an Appendix?

Part II – Differences between 301-2014 & 301-201x (2019)

- Stuff we won't talk much about
  - Approved interpretations & approved addenda
- Stuff we will talk about
  - Scope, Definitions, modeling changes that address "Multifamily"

Differences between 301-2014 & 301-2019

- We started with ANSI 301-2014…
- If it's up for public comment, it's shown in underline or ~~strikethrough~~ text (e.g., interpretations, multifamily stuff)
- These approved Addenda are integrated, using black text, but are NOT up for public comment
  - Addendum A, Domestic Hot Water
  - Addendum B, Innovative Design Requests
  - Addendum D, Adopt ANSI/RESNET/ICC 380-2016
  - Addendum E, House Size Index Adjustment Factors
  - Addendum G, Solid State (LED) Lighting
  - Addendum K, Roof Solar Absorptance Test
- Addenda F, L and N DO not appear in the draft of 301-201x

Multifamily stuff in draft Std 301-2019

- Today's topic:

  What you'll want to study in draft Std 301-2019

- This is **your MF homework** during the comment period.
  - After all, we want it to be workable!

- Note – this Standard also serves as a spec document for what rating software tools must be able to do.

New expanded Scope

Scope: Dwelling Units & Sleeping Units,

except hotels and motels. ***Not whole buildings with multiple units.****

- Townhomes
- Duplexes
- College dorms & Assisted Living
- Apt buildings
- Dwelling units in mixed commercial/residential

*** Composite ERI for residential portions of a building is described in section 5.1.5.**

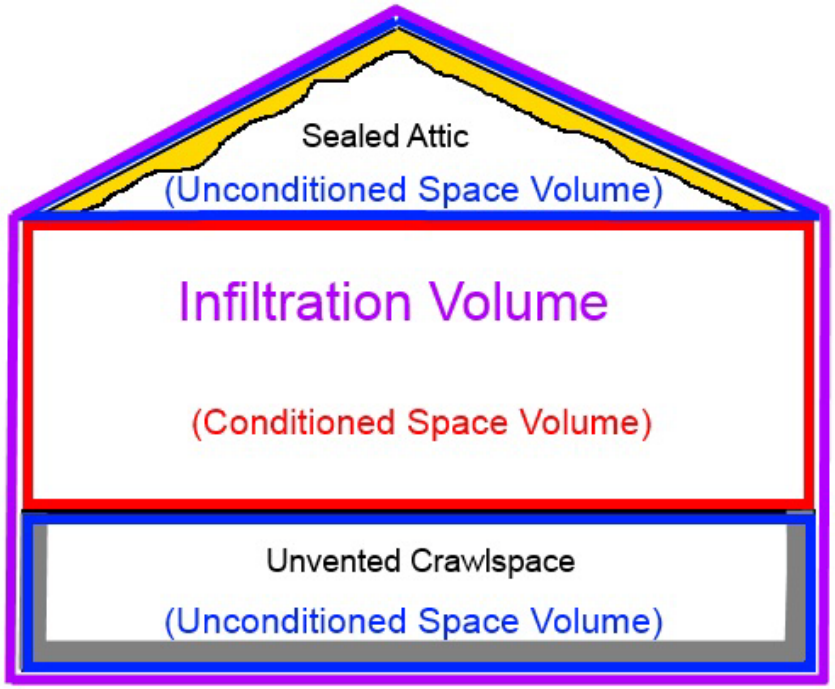
Get your terminology right!

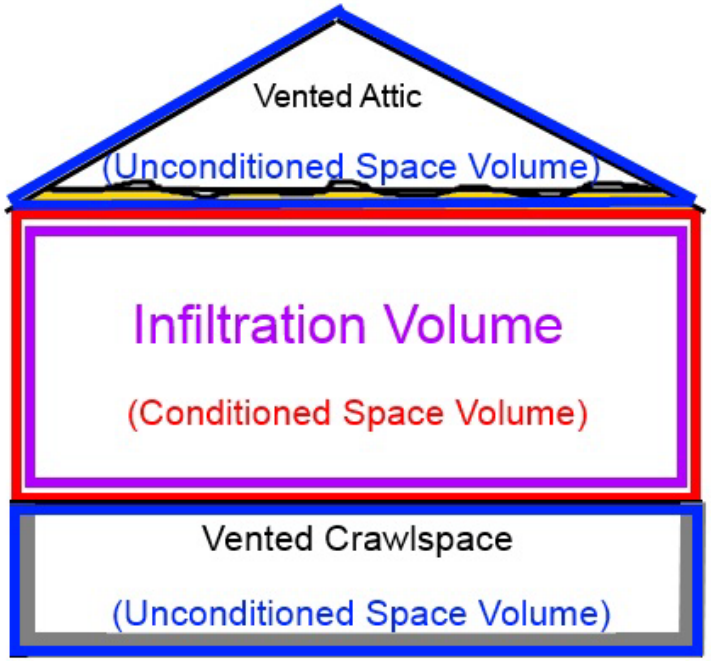
New definitions & refinements on old definitions

-- So review them!

- Bedroom refinements for MF
  - e.g., egress window not always realistic!
- Updated definitions on MF Qualifying Light Fixture Locations
  - (FYI – also new Tier definitions for efficient lighting)
- Dwelling-Unit Mechanical Ventilation
  - refined Supply and Balanced definitions to ensure fresh air comes directly from outdoors

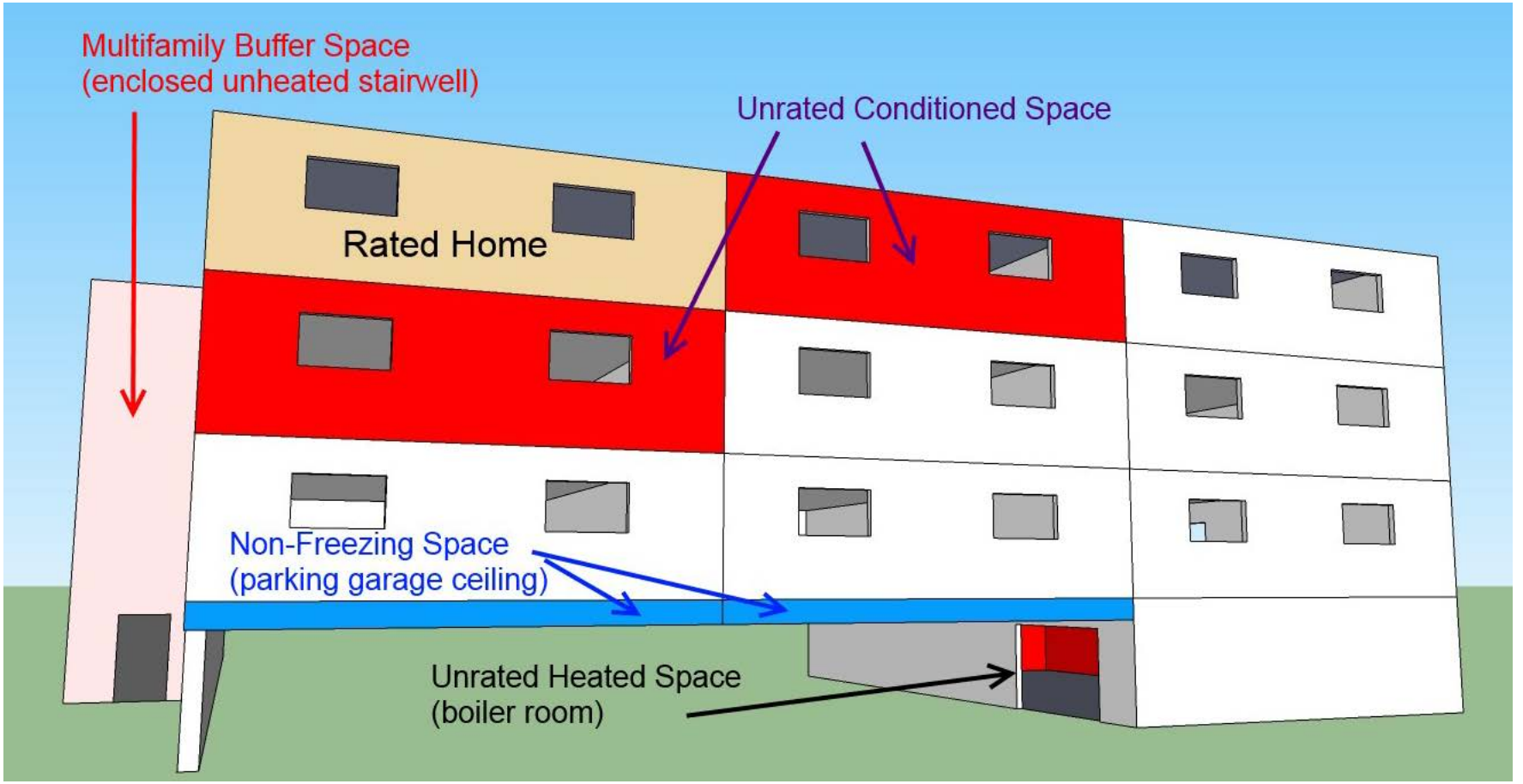
More new & revised definitions





Compartmentalization Boundary
is the outside surface of the
Infiltration Volume.

Definitions – on a roll!



The ONE Table…

4.2. Energy Rating Reference Home and Rated Home Configuration

4.2.1. General Requirements. Except as specified by this Section, the Energy Rating Reference Home and the Rated Home shall be configured and analyzed using identical methods and techniques.

4.2.2. Residence Specifications. The Energy Rating Reference Home and Rated Home shall be configured and analyzed as specified by Table 4.2.2(1).

Table 4.2.2(1) Specifications for the Energy Rating Reference and Rated Homes

Building Component	Energy Rating Reference Home	Rated Home
Above-grade walls:	Type: wood frame	Same as Rated Home
	Gross Area: same as Rated Home	Same as Rated Home
	U-Factor: from Table 4.2.2(2)	Same as Rated Home
	Solar Absorptance = 0.75	Same as Rated Home
	Emittance = 0.90	Same as Rated Home
Conditioned basement walls:	Type: same as Rated Home	Same as Rated Home
	Gross Area: same as Rated Home	Same as Rated Home
	U-Factor: from Table 4.2.2(2) with the insulation layer on the interior side of walls	Same as Rated Home
Floors over	Type: wood frame	Same as Rated Home

Deep dive: MF and Air Exchange

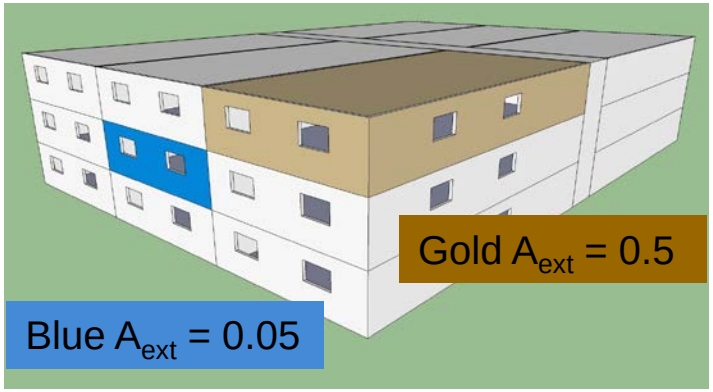
from **Table 4.2.2(1)** Specifications for the Energy Rating Reference and Rated Homes		
	Energy Rating Reference Home	Rated Home
Air Exchange Rate	Specific Leakage Area (SLA) [(d)] = 0.00036 assuming no energy recovery, supplemented as necessary to achieve the required Dwelling-Unit Mechanical Ventilation rate.[(f), (g)]	**In accordance with Standard ANSI/RESNET/ICC 380, obtain airtightness test results for:** • Building enclosure (for Detached Dwelling Units) • **Compartmentalization Boundary** (for Attached Dwelling Units). For Attached Dwelling Units with airtightness test results ≤ 0.125 cfm50 per ft^2 of …

Compartmentalization Boundary – The surface area that bounds the Infiltration Volume.

Deep dive: MF and Air Exchange

from **Table 4.2.2(1)**

	…	Rated Home
Air Exchange Rate (continued)	…	• Compartmentalization Boundary (for Attached Dwelling Units). **For Attached Dwelling Units with airtightness test results ≤ 0.125 cfm50 per ft^2 of Compartmentalization Boundary, the test results shall be modified by reduction factor A_{ext} $^{(r)}$.** For residences without …



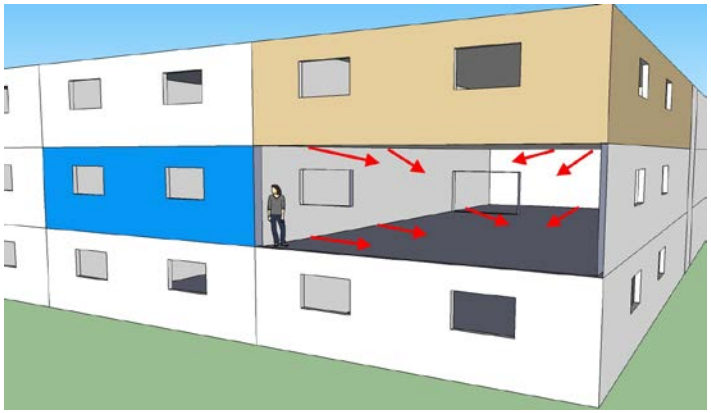
(r) Reduction factor A_{ext} (used only for Attached Dwelling Units) shall be the ratio of exterior envelope surface area to Compartmentalization Boundary.

(Informative Note) Does not include the area where attached to garages or other Dwelling Units.

Deeper dive: MF and Air Exchange

from **Table 4.2.2(1)**

	…	Rated Home
Air Exchange Rate (continued)	…	…factor A_{ext} [r]. For residences without Dwelling-Unit Mechanical Ventilation systems, or **without measured airflow, or which draw excessive ventilation air from adjacent Dwelling Units,[u]** the Infiltration rate [e] shall be as determined above, but not less than 0.30 air exchanges per hour (ach). For residences with …



(u) For Attached Dwelling Units, for the purpose of determining air exchange rate in the Rated Home, an **Exhaust System (unpaired with one or more Supply Systems)** shall be considered as drawing excessive ventilation air from adjacent Dwelling Units, if the value of reduction factor $A_{ext} < 0.5$.

Still diving: MF and Air Exchange

from **Table 4.2.2(1)**

	…	Rated Home
Air Exchange Rate (continued)	…	… than 0.30 air exchanges per hour (ach). For residences with Dwelling-Unit Mechanical Ventilation systems, the total air exchange rate shall be the **Infiltration rate**[(e)] in combination[(g)] with the time-averaged Dwelling-Unit **Mechanical Ventilation system rate**,[(f), (t)] which shall not be less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm

Insights from endnote (f) :

*Qfan = Qtot – **Φ** (Qinf × Aext)*

[infiltration credit]

Φ=1 for Balanced Ventilation Systems and *Qinf / Qtot* otherwise

[unbalanced ventilation is less effective !!]

Exception: A ventilation fan is not required when Q_{fan} is less than 10 cfm (5 L/s)

Deepest point: MF and Air Exchange

from **Table 4.2.2(1)**		
	…	Rated Home
Air Exchange Rate	…	… the time-averaged Dwelling-Unit Mechanical Ventilation system rate,[(f), (t)] which shall not be less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm

More insights from endnote (f) :

Where … the Rated Home mechanical ventilation rate *[…is adjusted into compliance…]*, and where the **ventilation air is pre-conditioned as part of a shared ventilation system** shared by multiple Dwelling Units, the software shall make **corresponding adjustments** to the shared preconditioning **equipment energy consumption** assigned to the Rated Home.

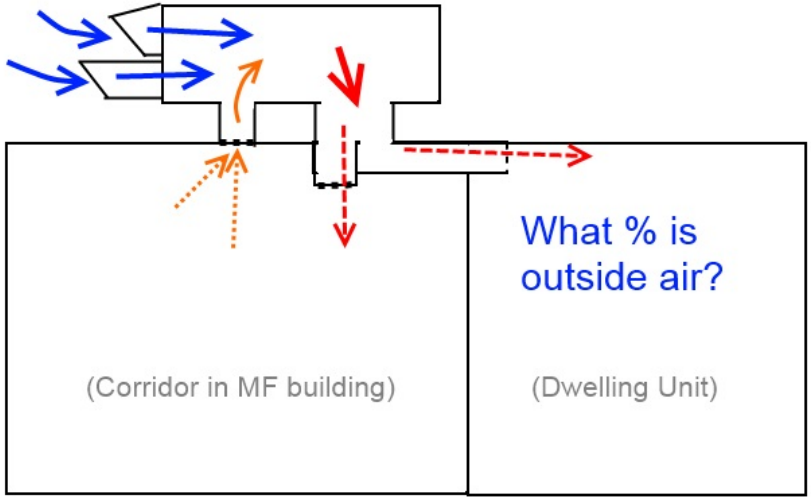
Ascending: MF and Air Exchange

from **Table 4.2.2(1)**		
	…	Rated Home
Air Exchange Rate	…	… the time-averaged Dwelling-Unit Mechanical Ventilation system rate,[(f), (t)] which shall not be less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm

*Now, from endnote **(t)** :*

[For…] a shared mechanical ventilation system […] the following shall be used to determine the ventilation airflows in the Rated Home.

1. Where **shared ventilation supply systems** provide a **mix of recirculated and outdoor air**, the **supply ventilation airflow shall be adjusted to reflect the percentage of air that is from outside**.



(Whew !): MF and Air Exchange

from **Table 4.2.2(1)**		
	…	Rated Home
Air Exchange Rate	…	… the time-averaged Dwelling-Unit Mechanical Ventilation system rate,[(f), (t)] which shall not be less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm

*…continued, from endnote **(t)**:*

[…] the following shall be used to determine the ventilation airflows in the Rated Home.

3. Where the […] Mechanical Ventilation system is a **Balanced System** or a **combination of systems**, **the system airflows shall be analyzed separately**, in accordance with the previous steps.

For software that does not explicitly model multiple, separate Supply and Exhaust Systems, the … system shall be modeled as a Balanced System, where the ventilation rate of the Rated Home is **the sum of either the exhaust airflows** measured in the Dwelling Unit or the **sum of the supply airflows** measured in the unit, whichever is greater.

Fan Energy for MechVent

from **Table 4.2.2(1)** Specifications for the Energy Rating Reference and Rated Homes		
	Energy Rating Reference Home	Rated Home
Dwelling-Unit Mechanical Ventilation **fan energy**:	None, except where a mechanical ventilation system is specified by the Rated Home and airflow is measured, in which case […] supply only or exhaust-only… 0.35*fanCFM*8.76 kWh/y … balanced without energy recovery or a combination of Supply and Exhaust Systems… 0.70*fanCFM*8.76 kWh/y … balanced with energy recovery… 1.00*fanCFM*8.76 kWh/y And where fanCFM is the minimum continuous Dwelling Unit Mechanical Ventilation system fan flow rate(f) of the Rated Home(y).	Same as Rated Home (x)

(x) Where the ventilation system … serve[s] the ventilation needs of more than one Dwelling Unit, the Rated Home kWh/y fan energy shall be calculated as a proportion of the entire system fan energy, using the system airflow, ventilation type, fan run time and the rated fan power[26] of the shared system… [*details*}

Htg/Clg interacts w MF MechVent …

from **Table 4.2.2(1)** Specifications for the Energy Rating Reference and Rated Homes		
	Energy Rating Reference Home	Rated Home
Heating [*& Cooling*] systems (i), (j)	[…] **Capacity**: sized in accordance with Section 4.4.3.1.	[…] Same as Rated Home **(s)**

(s) When the Rated Home is […*a MF unit…*], and where …Mechanical Ventilation supply air is pre-conditioned by a shared system before delivery to the Dwelling Unit, that shared pre-conditioning system shall be […*modeled…*] **as a separate HVAC system**, in addition to the primary space conditioning system serving the Dwelling Unit. The supply airflow delivered to the Rated Home is the only conditioning load that shall be assigned to that shared equipment, […].

(Normative Note) "Delivery" includes supply air ducted into the Dwelling Unit, or ducted into the Dwelling Unit's air distribution system, or indirectly through the door undercut or other intentional opening. Where the supply airflow cannot be measured, it shall be equal to the measured exhaust airflow or fanCFM, whichever is greater.

Ducts !! Should we test?

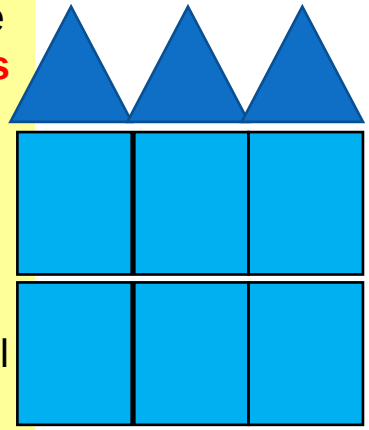
from **Table 4.2.2(1)**	Specifications for the Energy Rating Reference and Rated Homes	
	[…]	Rated Home
Thermal distribution systems	[…]	For forced air distribution systems: • Detached Dwelling Units shall test duct leakage to outside; • Attached Dwelling Units **requiring testing**(v) shall test total duct leakage; All duct leakage tests shall be in accordance with requirements of Standard ANSI/RESNET/ICC 380 (m) and the energy impacts […] calculated […] with the ducts located and insulated as in the Rated Home(w). […] For untested distribution systems in Attached Dwelling Units: • located entirely within **Conditioned Space Volume**: DSE=0.88 • located entirely within the **Infiltration Volume** of the Rated Home: DSE=0.92

Ducts – (shallow dive)

from **Table 4.2.2(1)**	Specifications for the Energy Rating Reference and Rated Homes
[…]	Rated Home
Thermal distribution […]	[…] Attached Dwelling Units **requiring testing**[(v)] shall test …

(v) Most duct systems in Attached Dwelling Units **do not require leakage testing**, but are permitted to use total duct leakage results in Rated Home inputs if collected for other purposes. **Total duct leakage testing is required** for any Dwelling Unit **that occupies more than one floor**. Total duct leakage testing is also required for any Dwelling Unit **where any portion of the ducts or air handler are located outside of Conditioned Space Volume**. Measurements of duct leakage to outside shall not be used for Ratings of Attached Dwelling Units.

(Informative Note) In most Attached Dwelling Units, space conditioning is a small part of the total energy consumption, and duct leakage in turn is a small part of the space conditioning load. This standard requires duct leakage testing only where it is likely to contribute significantly to the ERI.



Ducts (dive over)

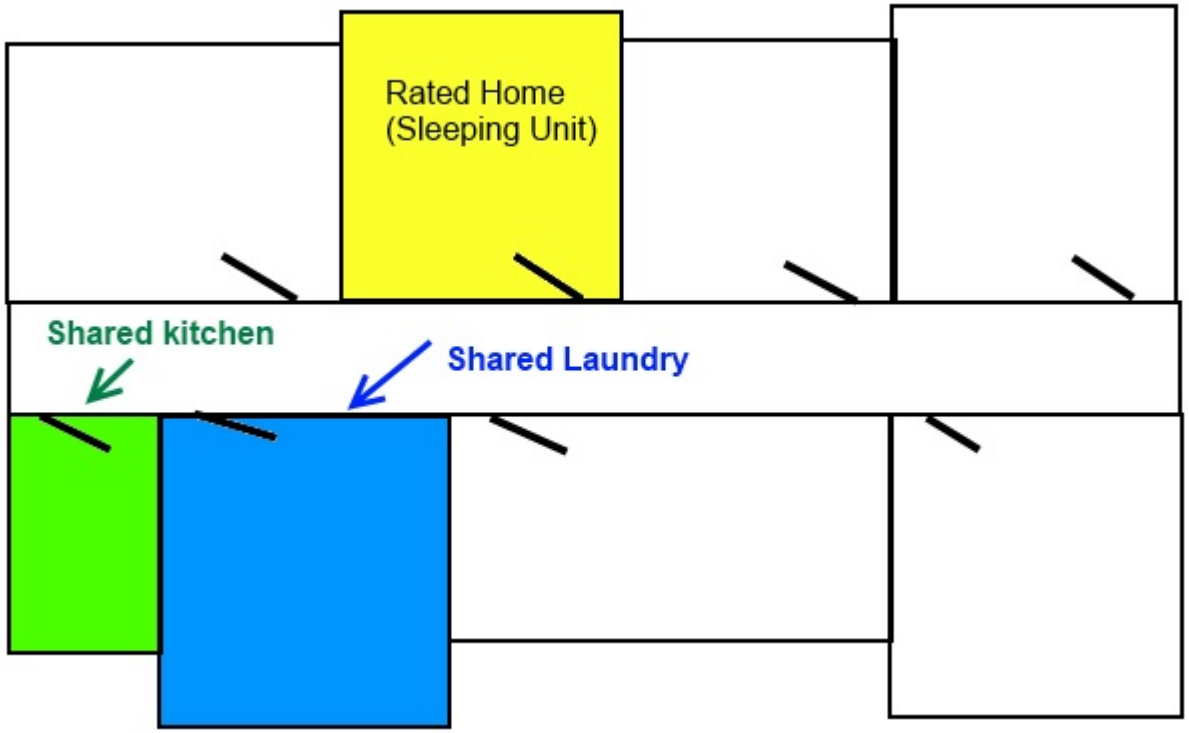
from **Table 4.2.2(1)**	Specifications for the Energy Rating Reference and Rated Homes	
	[…]	Rated Home
Thermal distribution systems	[…]	… shall test total duct leakage; […] Home**(w)**…

(w) For Attached Dwelling Units only: ...calculate the energy impact of total duct leakage results by counting leakage only from duct surface area that is not in […] Conditioned Space Volume,

plus a contribution from the associated air handler if located outside the Rated Home Conditioned Space Volume. When located outside the Rated Home Conditioned Space Volume, the air handler contribution shall be a minimum of 2% of the supply airflow for air handlers less than 5 years old and 5% of the supply airflow for all other air handlers; however, the sum shall not exceed the measured duct leakage from the entire duct system.

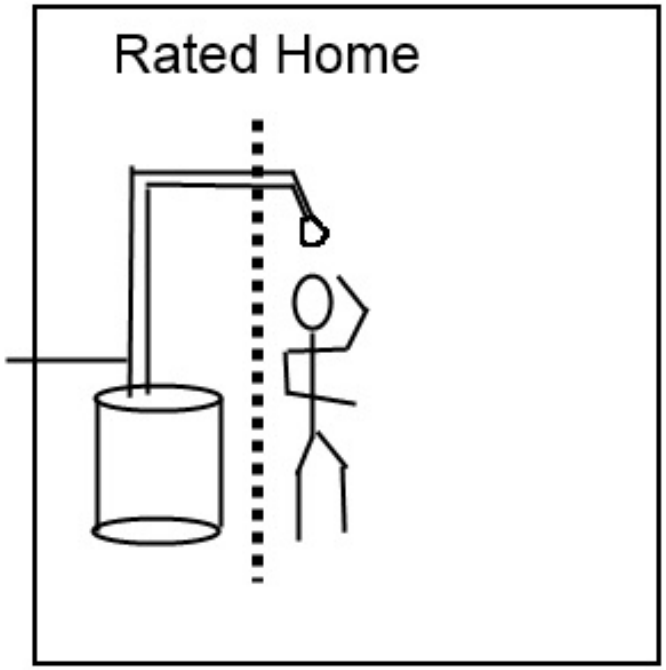
“There’s no _____ in this dwelling unit!”

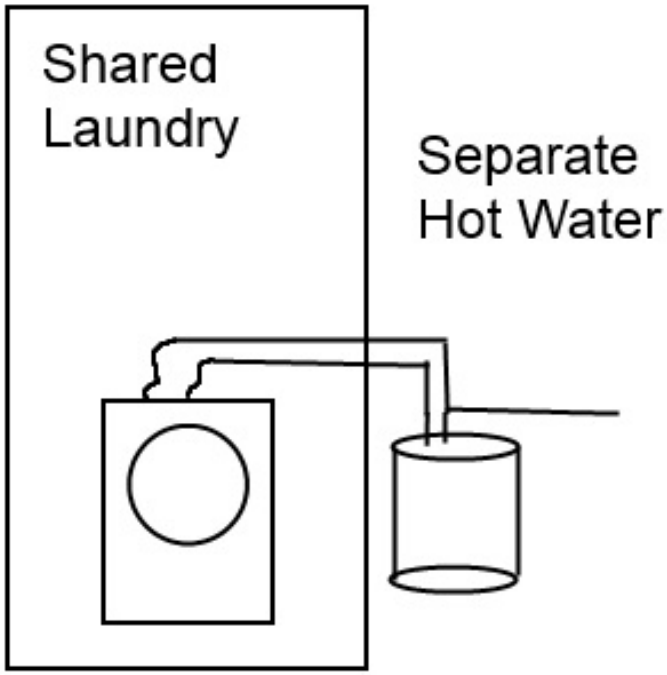
- “Internal Gains” (i.e. waste heat) from appliances located beyond the dwelling unit… are not counted in the Rated nor Reference homes.



Now we're in (MF) hot water…

- Do collect data from the water heater serving a shared laundry. It must be included separately in the rating. (Section 4.2.2.5.2.11)





MinRated Features must be modeled!

Laundry refinements for MF:

- If washer or dryer not in Dwelling Unit, assess the equipment in the nearest shared laundry on-site.
- Use the worst equip present (worst dryer CEF, worst washer LER)
- If ratio of Dwelling Units to shared dryers exceeds 8:1, Rated Home shall use the Reference Home dryer.
- Likewise for clothes washers.

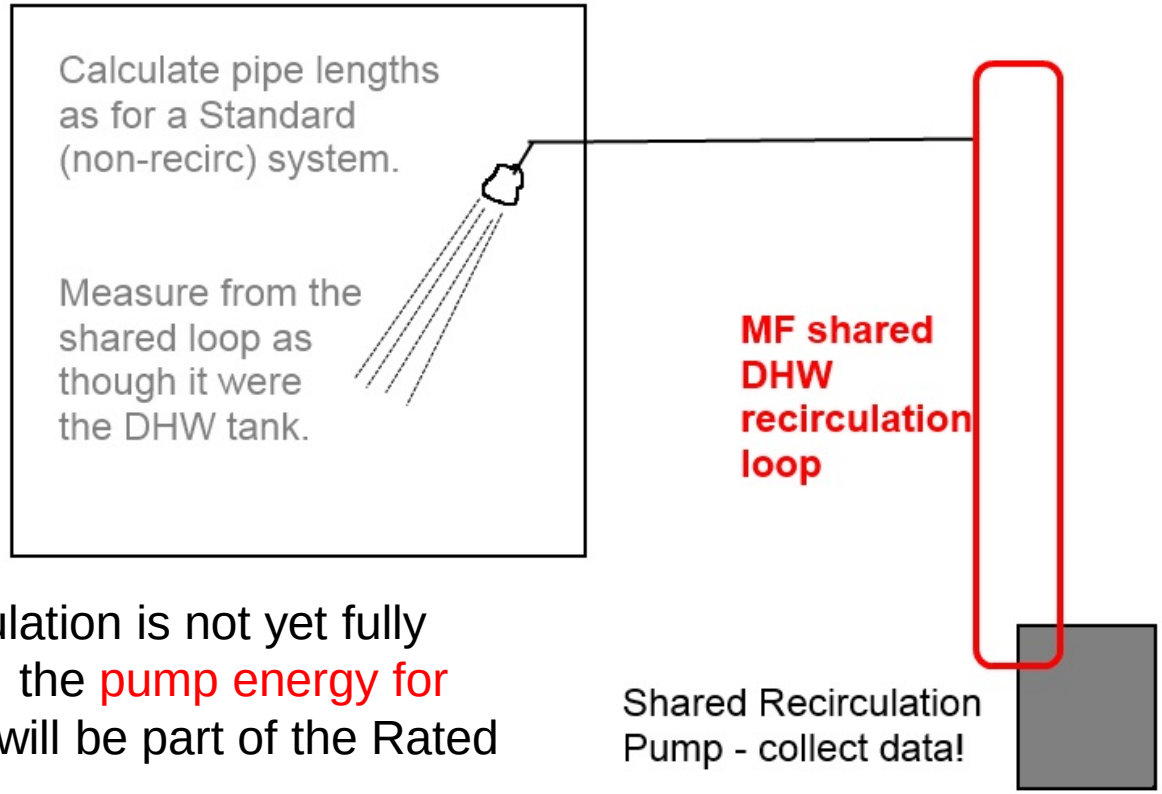
Yes, even dishwashers

Dishwasher refinements for MF:

- If the Dwelling Unit has no dishwasher,
  - assess the nearest shared kitchen in the building, if available for daily use by the Dwelling Unit occupants.

Are we loopy yet?

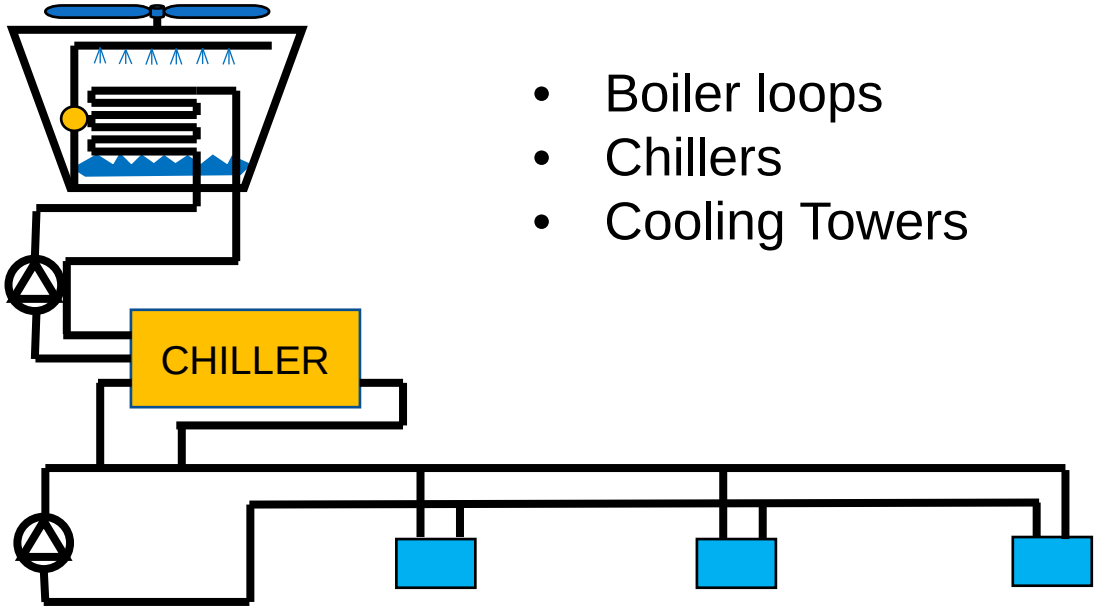
Service Hot Water Distribution - MF refinements



Shared central recirculation is not yet fully figured out. However, the pump energy for shared recirc system will be part of the Rated Home.

BIG, long loops.

What about the shared central space conditioning equip?



- Boiler loops
- Chillers
- Cooling Towers

… and water loop HPs, radiators, fan coils?

See sections 4.4.4 – 4.4.7

Comment period is near… Std 301-2019

- It is not perfect.
  - It will never be perfect. But is it good enough?
- Can you write something that will work better?
  - Please, do! Submit it in the comment period.
- This is **your MF homework** during the comment period.
  - Make sure you think this is workable!

Wrap-up

- Public comment period for PDS-01 301-201x started March 2 and ends Monday, April 16.
- If all goes well*, it could be available for use in HERS ratings/software by January 2020 and part of 2021* IECC
  - Scope covers dwelling/sleeping units in any height building
  - Central systems handled much better IN the software
  - Better addresses MF situations (shared laundry, solar, etc)
- It will include all approved addenda to date (DHW, IAF, LED lighting, Appendices on Insulation and Inspections)
- Public comment period for PDS-02 380-201x and the two Appendices above should start in April
- TBD: MF Rater Training, credentials, MF Provider, etc

Q&A