# RESNET QA Findings 2024: QA Field Observations & Online QA Reviews

Ryan Moore & Billy Giblin (& Jordi Kimbrough)

*RESNET QA Team*


# RESNET QA Team

## Scott Doyle

Managing Director of Quality Assurance

Scott leads the overall implementation of RESNET's Quality Assurance program and functions as a utility player assisting across all projects.

## Jordi Kimbrough

Quality Assurance Project Manager

Jordi leverages her project management skills to enhance consistency and standard implementation through annual reviews and provider support.

## Ryan Moore

QA Investigations Project Manager

Ryan conducts objective and comprehensive reviews of standards, ethics, and certification complaints, ensuring thorough and impartial investigation of each case.

## Billy Giblin

QA Field Specialist

Billy works with the RESNET Provider and Rater network to mentor and create greater consistency in the delivery of HERS Ratings.

# Agenda

- Quarterly QAD Webinars
- TDL in lieu of LTO
- Modeling Appliances – Uninstalled
- Ceiling Fan CFM/Watt
- Single Point Testing – 1.1
  - Double baselining
- QADs on Verification Team
- Sampling File QA
- Terminating Verifiers
- Two Field QA Requirements
- Registry Management

# Quarterly QAD Webinars

MINHERS Requirement to Attend ALL QAD Quarterly Webinars

*905.2.1 All Quality Assurance Designees annually shall:*

*905.2.1.1 Document attendance at the RESNET Conference or 12 hours of RESNET approved CEUs;*

*905.2.1.2 Attend a RESNET Roundtable; and*

905.2.1.3 Attend (either in-person or by reviewing the recording) all RESNET in-person or remote QAD update and training sessions.

* Please pay attention and digest the material

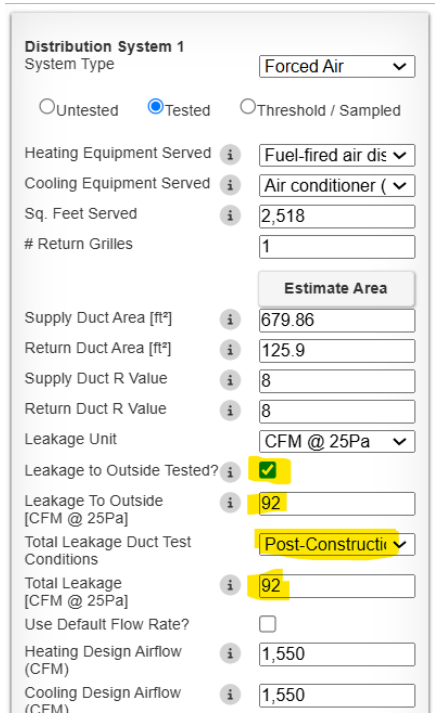
# Modeling TDL in lieu of LTO – Ekotrope

## How to model TDL in lieu of LTO

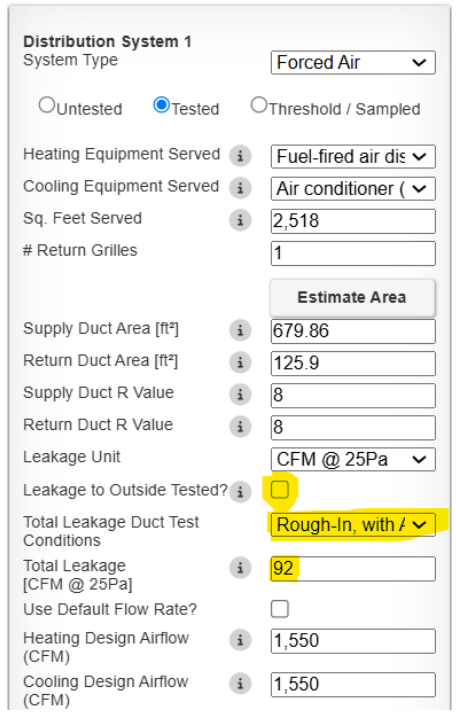
Ekotrope:

- Don’t “double input”!
- When did you test?

NO




YES:



# Modeling TDL in lieu of LTO – REM/Rate

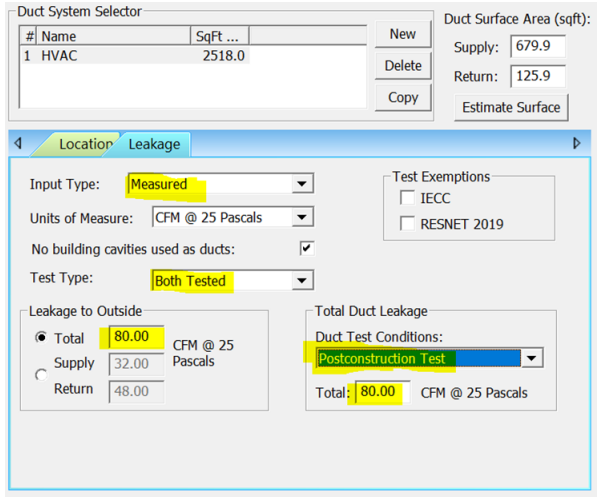
## How to model TDL in lieu of LTO

REM/Rate:

- Don't "double input"!
- When did you test?

- ***Both Tested -***
  This is the familiar view, with both the LtO and Total Duct Leakage inputs active.
- ***Leakage to Outside -***
  Only the LtO inputs are active.
- ***Total Duct Leakage -***
  Only the Total Duct Leakage inputs are active, and are used to auto-populate the grayed-out LtO inputs for simulation. Total Duct Leakage represents a worst-case value for LtO; real-world LtO cannot be larger than the Total Duct Leakage measurement.

NO

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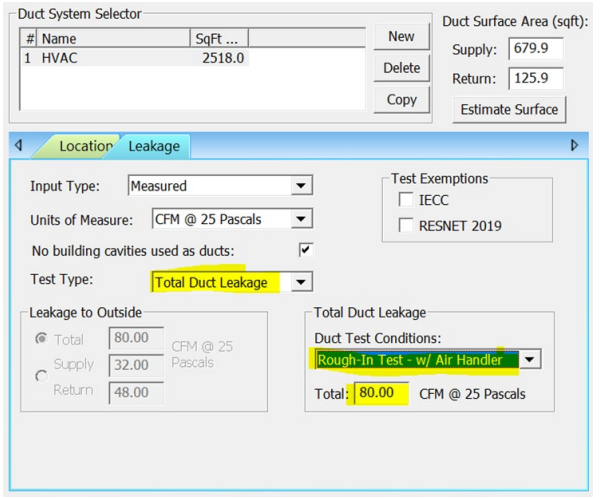



These selections are not restricted to IECC compliance checks; they are also evaluated for ENERGY STAR v3.x duct test scenarios and now for HERS-ERI allowable test results when only Total Duct Leakage is tested. The ESv3.x rough-in tests must include the full HVAC system with the sole exception of grilles and registers, and at Final the Rater must verify that all boots are sealed to the finished surfaces. For full details refer to the ESv3/3.1 Rater Field Checklist.

# Modeling TDL in lieu of LTO – Clarifications

***ENERGY STAR Rater Field Checklist footnotes:***
For a duct system with **three or more returns**, the total Rater-measured duct leakage is permitted to be the greater of **≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM25** at 'rough-in' or the greater of **≤ 12 CFM25 per 100 sq. ft. of CFA or ≤ 120 CFM25 at 'final'.** …

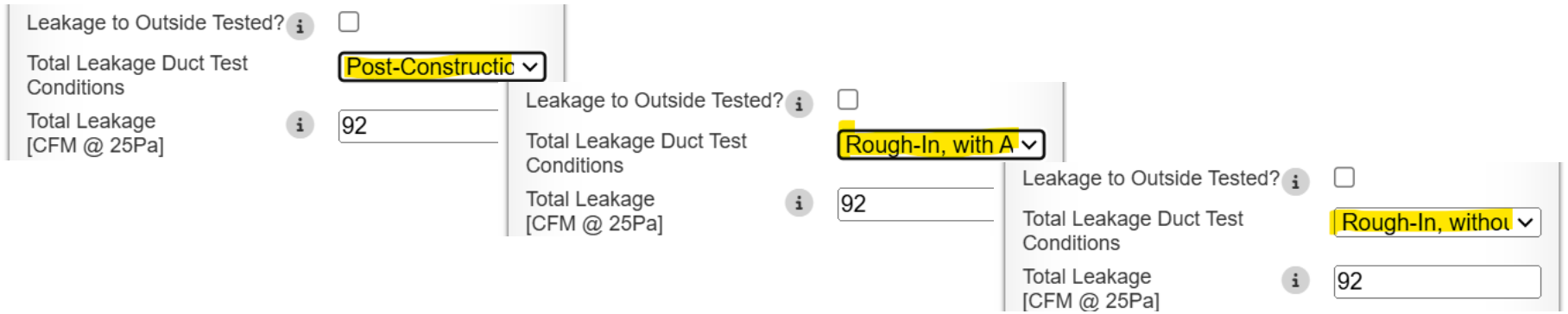
***ANSI/RESNET/ICC 301-2019 4.2.2 (1), footnote (w)***
***ANSI/RESNET ICC 301-2022 4.2.2 (1) footnote (y)***
"…**when all of the following conditions are met and documented**, **total duct leakage testing is permitted to be conducted in lieu of duct leakage to outside testing** and **half of the measured total leakage shall be assigned duct leakage to outside…"** :

- At pre-drywall and final stages of construction,
  - **100% of the ductwork and air handler shall be visible and**
  - **visually verified to be contained inside the Infiltration Volume.**
- **100% fully ducted**, with **no building cavities used as supply or return ducts.**
- The TDL shall be ≤ the greater of:
  - 4 CFM per 100 $ft^2$ of CFA served by the duct system being tested, or 40 CFM.
- For **duct systems with 3 or more returns,** the TDL shall be ≤ the greater of:
  - 6 CFM per 100 $ft^2$ of CFA served by the duct system being tested, or 60 CFM.
- Infiltration shall be ≤3ACH50.

# Modeling TDL in lieu of LTO – Clarifications

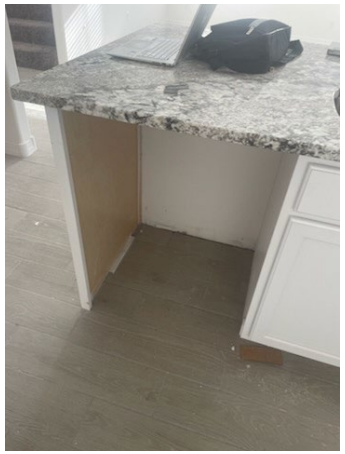
- Duct Leakage Test result values do not get altered based on *TDL Test Conditions* selected.
  - Q4 QAD Webinar
    - I stated incorrectly that this *Condition* affected the value

- Purpose of *Condition* dropdown:
  - So QAD knows when TDL was done
  - To clarify for AHJs that require duct testing in certain conditions



# Modeling Appliances – NOT YET INSTALLED

- **Refrigerators & Dishwashers - Ekotrope**



## NO

**Kitchen Appliances**

**Refrigerator**

Consumption [kWh/yr] 434

Outside Conditioned Space? ☐

**Dishwasher** ☑

#Manufacturer

#Model

Dishwasher Default: Custom

Efficiency Type: kWh/yr

Labeled Energy Rating [kWh]: 270

Dishwasher Size: Standard

## YES

**Kitchen Appliances**

**Refrigerator**

Consumption [kWh/yr] 691

Outside Conditioned Space? ☐

**Dishwasher** ☑

#Manufacturer

#Model

Dishwasher Default: HERS Reference

Outside Conditioned Space? ☐

**Refrigerator**

| | |
|---|---|
| Refrigerator Consumption | The total electric consumption per year, in kWh, of all refrigerators and freezers in the home or apartment. If there are multiple units in the home, this value is the sum, not the individual values. This information should be listed on the EnergyGuide label affixed to the refrigerator.<br><br>If this information is not available:<br>Either click the info icon to open a Help dialog with age-based defaults, or use the RESNET defaults.<br>RESNET defaults are based on number of bedrooms, as shown below:<br>1 BR: 655 kWh / yr<br>2 BR: 673 kWh / yr<br>3 BR: 691 kWh / yr<br>4 BR: 705 kWh / yr<br>5 BR: 727 kWh / yr<br>6 BR: 745 kWh / yr<br>Or, use the Standard equation kWh / yr = 637 + (# of bedrooms * 18) |

**Dishwasher Default Values**

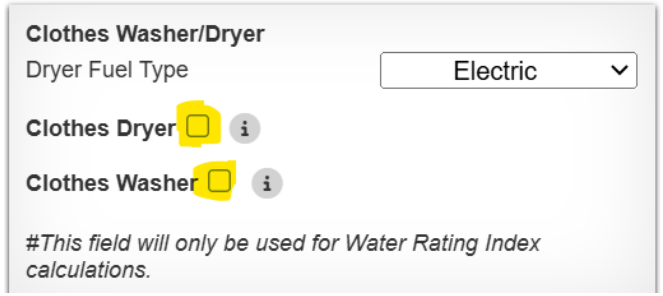
The following default values are taken from ANSI-RESNET 301-2019 Addendum A.

| | ENERGY STAR Defaults | | NAECA Minimum | HERS Reference |
|---|---|---|---|---|
| Dishwasher Size | Compact | Standard | Standard | Standard |
| Labeled Energy Rating [kWh] | 203 | 270 | 307 | 467 |
| Natural Gas Operating Cost [$] | 14.20 | 22.23 | 22.32 | 33.12 |
| Electric Rate [$/kWh] | 0.12 | 0.12 | 0.12 | 0.12 |
| Gas Rate [$/therm] | 1.09 | 1.09 | 1.09 | 1.09 |

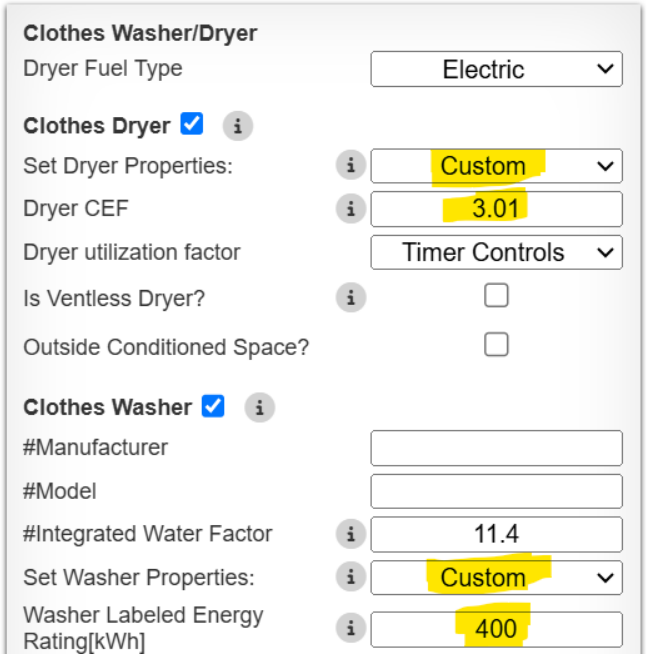
# Modeling Appliances – NOT YET INSTALLED

- Clothes Dryers & Clothes Washers – Ekotrope

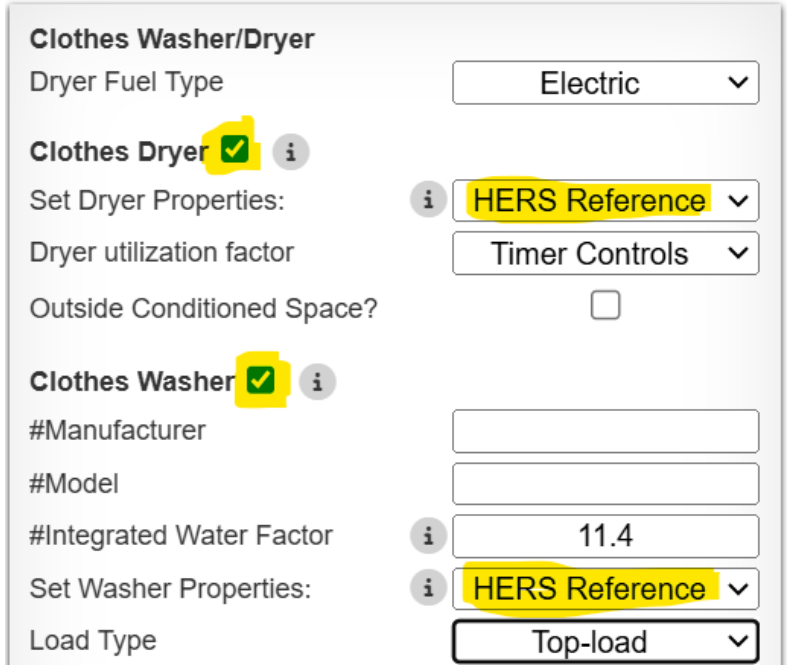
- NO

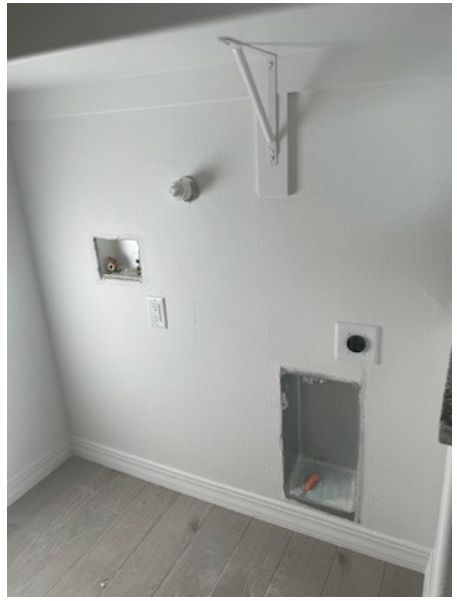



- NO




YES

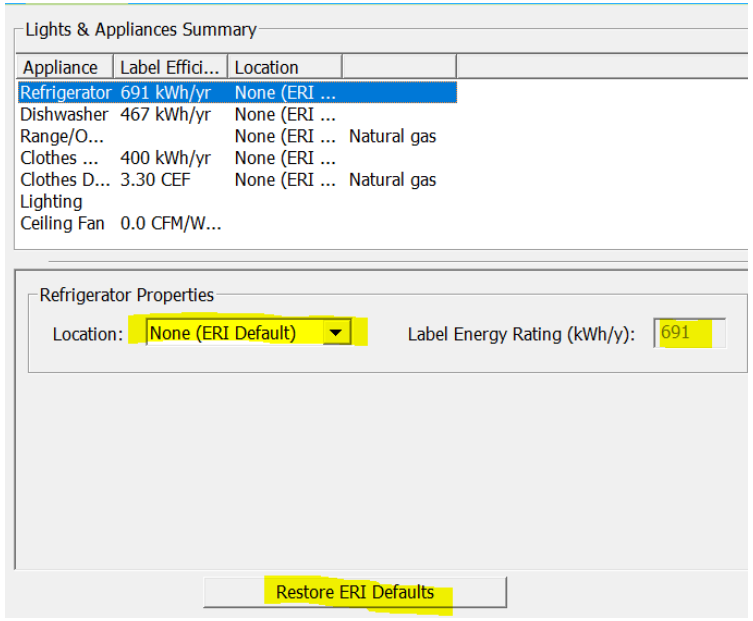


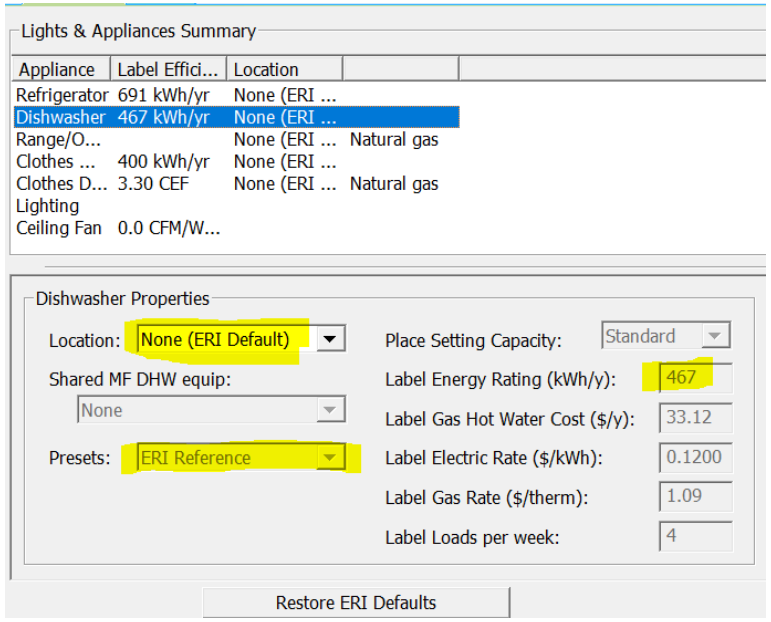



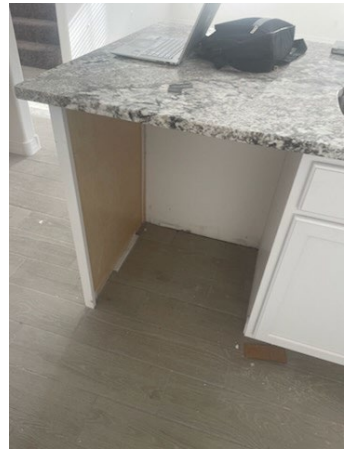
# Modeling Appliances – NOT YET INSTALLED

- **Refrigerators & Dishwashers – REM/Rate**

## YES

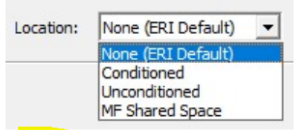


**General note about Location options:**

The location options provide options for attached MF situations as well as detached single family homes.

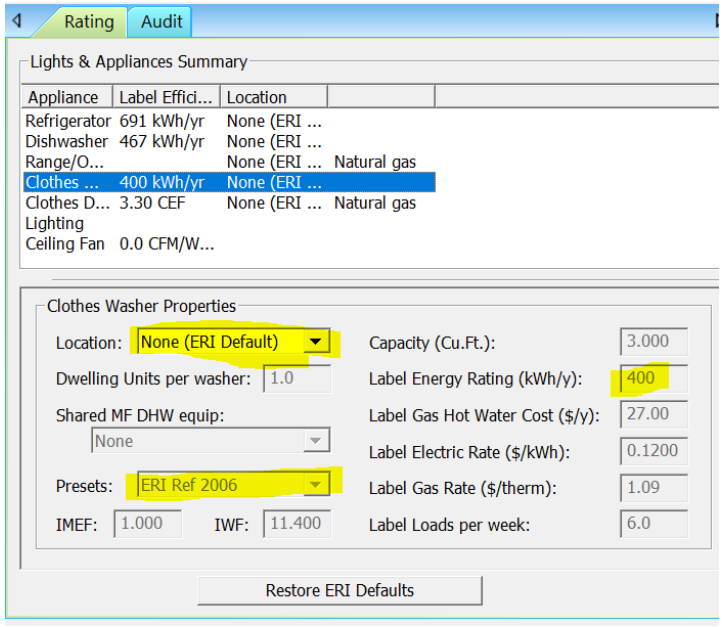


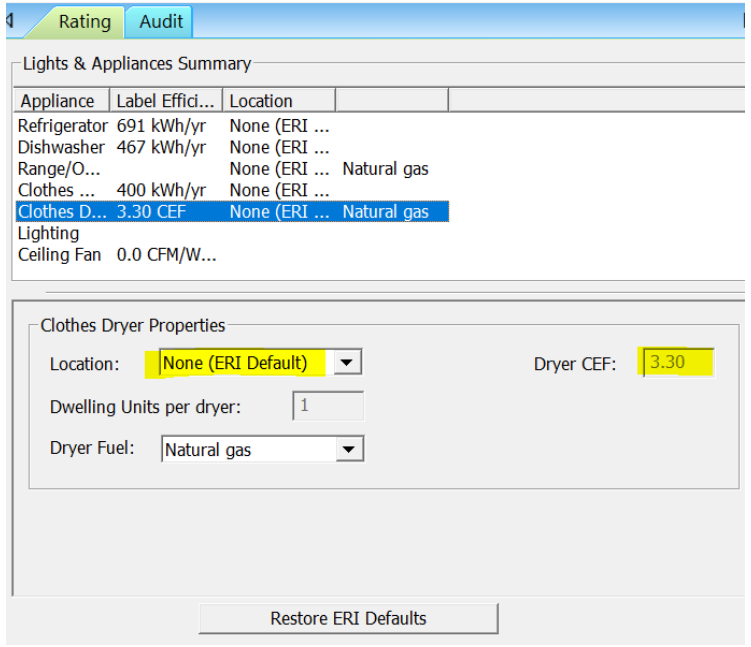

- **None (ERI Default) -** Choose this option if the appliance is not installed at the time of the rating. *This sets the behavior to the ERI default requirements* specified in ANSI/RESNET/ICC Std 301-2019.
- **Conditioned -**

# Modeling Appliances – NOT YET INSTALLED

- **Clothes Dryers & Clothes Washers – REM/Rate**

- **YES**

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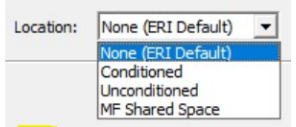


- **None (ERI Default) -**
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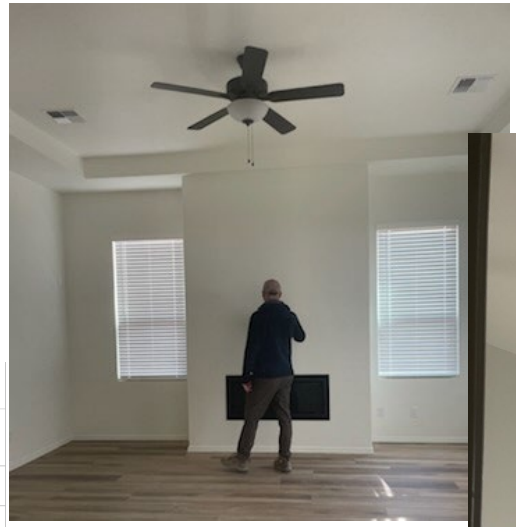
- **Conditioned -**

# Ceiling Fan CFM/Watt

- ANSI/RESNET/ICC 301-2019

**Normative Appendix B Inspection Procedures for Minimum Rated Features**

| Building Element: Ceiling Fans | | |
|---|---|---|
| **Rated Feature** | **Task** | **On-Site Inspection Protocol** |
| Total annual consumption of ceiling fan | Determine the total annual consumption of ceiling fan | Record whether ceiling fans are or are not installed at the time of the inspection.<br>When ceiling fans are installed at the time of the inspection:<br>• Record the number of ceiling fans in the Dwelling Unit. For ceiling fans to be modeled, there must be one fan per Bedroom plus one more elsewhere in the Dwelling Unit.<br>• Record the model number for all ceiling fans.<br>• Record the average efficiency for the fans installed (cfm/W) at medium speed. |



- For Ceiling Fans to be modeled, there must be one fan per Bedroom plus one more elsewhere in the Dwelling Unit.

# Single Point Testing - 1.1 Correction Factor

## Per ANSI/RESNET/ICC 380-2019 - 4.5.1

**4. Procedure for Measuring Airtightness of Building or Dwelling Unit Enclosure.**

**4.5. Procedure to Apply Results of Enclosure Air Leakage Test.**

**4.5.1.**

If the results of the building or Dwelling Unit enclosure air leakage test are to be used for conducting an energy rating or assessing compliance with a building or Dwelling Unit enclosure leakage limit, then the corrected airflow determined using a one-point test shall be adjusted using Equation 4.5-1a or 4.5-1b[25]

$$Adjusted\ CFM50 = 1.1 \times Corrected\ CFM50 \quad \text{(Equation 4.5-1a)}$$

$$Adjusted\ CMS50 = 1.1 \times Corrected\ CMS50 \quad \text{(Equation 4.5-1b)}$$

The ELA determined in Section 4.4.1.6 for a one-point air leakage test shall be adjusted using Equation 4.5-2.

$$Adjusted\ ELA = 1.1 \times ELA \quad \text{(Equation 4.5-2)}$$

Other applications of building or Dwelling Unit enclosure air leakage testing and the results of multi-point testing do not require the corrections in this section.

[25] (Informative Note) Example: defined by code or by an energy efficiency program.

# Single Point Testing - 1.1 Correction Factor

## Correction Calculator:

[Std380_TempAlt_correct_cfm50_rev11]

| Temperature & Altitude Correction For Envelope Leakage Test Results (v11) | |
|---|---|
| Input: | |
| Test method = | Depressurization |
| Test type = | Single Point |
| $T_{in}$ (F) = | 68 |
| $T_{out}$ (F) = | 32 |
| Elevation (ft) = | 100 |
| pressure exponent (n) = | 0.61 |
| Baseline P = | -0.2 |
| fan cfm50 ($Q_i$) = | 900 |
| Infil. Volume ($ft^3$) = | 18,000 |
| Output*: | |
| $C_o$ = | |
| corrected cfm50 = | 848 |
| corrected cfm50 +10% = | 933 |
| ELA ($in^2$) = | 46.6 |
| corrected ach50 = | 2.8 |
| corrected ach50 +10% = | 3.1 |

pressure exponent value (n) is not considered for Single Point tests

Double Baselining

* Corrected for The Energy Conservatory (TEC) and Retrotec Blower Door air flow calibrations at Normal Temperature and Pressure (NTP). Other air flow test equipment is not covered by these calculations.

# QADs on Verification Team

- QADs CANNOT do QA Reviews on Ratings on which they do any:
    - Takeoffs
    - Modeling Templates
    - Projected Ratings

    - Field Verification
    - Testing


- Any Role on the Verification Team

# Sampling File QA: Not your typical review!

## Worst-Case Template Reviews

**What's Different?**

Instead of reviewing a specific unit, ensure templates accurately reflect the worst-case scenario for each unique plan type.

*Are mid-construction changes reflected in the templates?*

**How Many Reviews Are Required?**

The greater of 1 or 10% of the worst-case templates PER community PER year must receive a file QA review.

Record your Worst-Case Template reviews using the software-specific tab of the QAD Checklist or use the QA App!

## Sample Set Reviews

**What's Different?**

Instead of reviewing a specific unit, verify the sampling protocol was applied correctly to specific sample sets. Review the whole sampling process from sampling controls to onsite data verification to accurate template registration.

**How Many Reviews Are Required?**

The greater of 1 or 1% of the total number of sample sets PER Rater of Record PER year require a file QA review.

Record your Sample Set reviews using the Sampling QA tab of the QAD Checklist!

# Terminating Verifiers

### Problematic Practice #1: Offloading QA Responsibilities

Updating registry notes to indicate QA deficiencies instead of completing the required QA, with the assumption that future providers will resolve the issue.

### Problematic Practice #2: Assigning Terminated Verifiers to Ratings

Failing to terminate verifiers in the registry with the purpose of assigning them to ratings they participated in.


**<u>What We've Learned</u>**

**Scaling these strategies amplifies negative and unforeseen consequences!**

# Impacts of Offloading QA

**For Builders**

Homes Excluded from QA

**For New Providers**

Additional or Unforeseen Requirements

**For Verifiers**

QA Non-Compliance

## HOMES EXCLUDED FROM QA PROCESS

When a provider skips required QA for a verifier, affected homes are excluded from the QA process. New providers can't access these homes, preventing builders and stakeholders from benefiting from the RESNET Gold Standard QA program.

## CHALLENGES FOR THE NEW PROVIDER

The new provider must resolve any disciplinary actions or QA deficiencies before a verifier becomes active. If the registry isn't updated promptly, the new provider may be caught off guard by unresolved QA issues.

## VERIFIER QA NON-COMPLIANCE

The Standards state that verifiers with deficient QA must be listed as Probation-Disciplinary. However, providers sometimes offload QA responsibilities without clearly explaining the implications or providing alternatives. This can catch verifiers off guard and make it more challenging for them to find a new provider.

# Guidance

- Set expectations that providers must have adequate notice when a rater leaves
- Expect corrective actions will be required for missed QA on a terminated rater
- Providers must update the registry with known changes within 5 business days

# Impacts of Assigning Terminated Verifiers to Ratings

**For Original Providers**

Deferred QA Requirements

**For Other Providers & RESNET**

Unclear Verifier Status

**For Verifiers**

Lack of Oversight of Associated Ratings

## DEFERRED QA REQUIREMENTS

Depending on the delay in updating the registry, these requirements may persist long after the verifier's involvement with the providership has ended.

## UNCLEAR VERIFIER STATUS

If the registry is inaccurate, RESNET and providers may be blindsided by unforeseen disciplinary issues, and RESNET may expect additional oversight from the provider.

## RATER OVERSIGHT OF ASSOCIATED RATINGS

Providers must not add a verifier to a registered rating without their knowledge; however, this is possible if the verifier is not promptly terminated from the registry.

# Guidance

- Be proactive in conducting field QA
- List the terminated rater in the notes section of the registered rating
- Providers must update the registry with known changes within 5 business days

# 2 Field QA Requirements to Check!

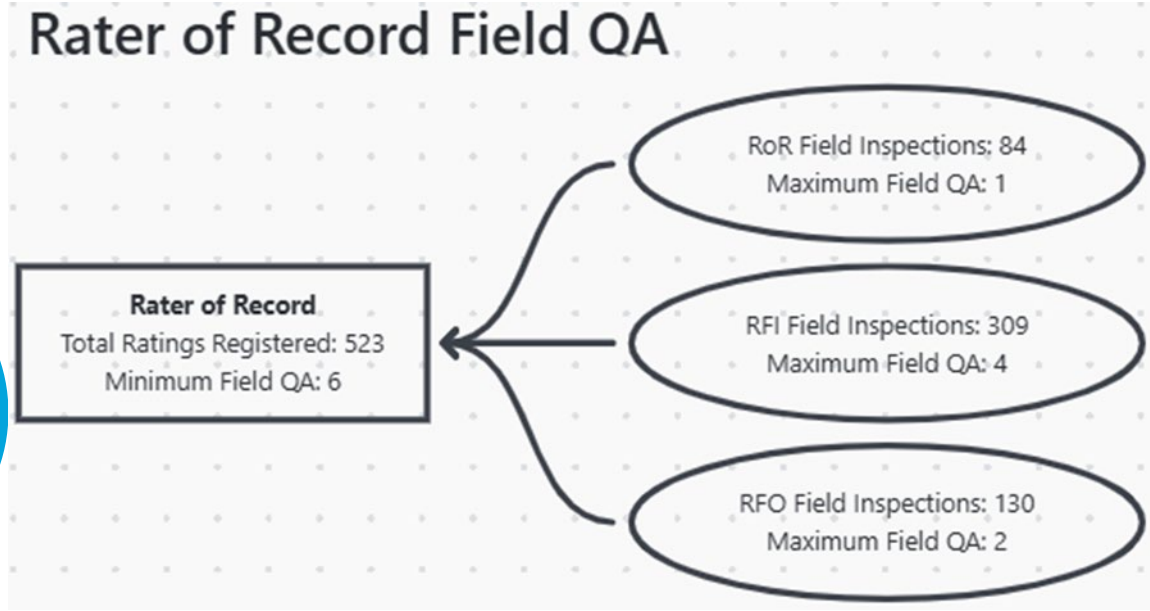
## 1 Field Verifier Field QA

Any Rater or RFI that conducts field inspections must receive the greater of 1 or 1% field QA reviews based on their annual total number of inspections (either final or pre-drywall).

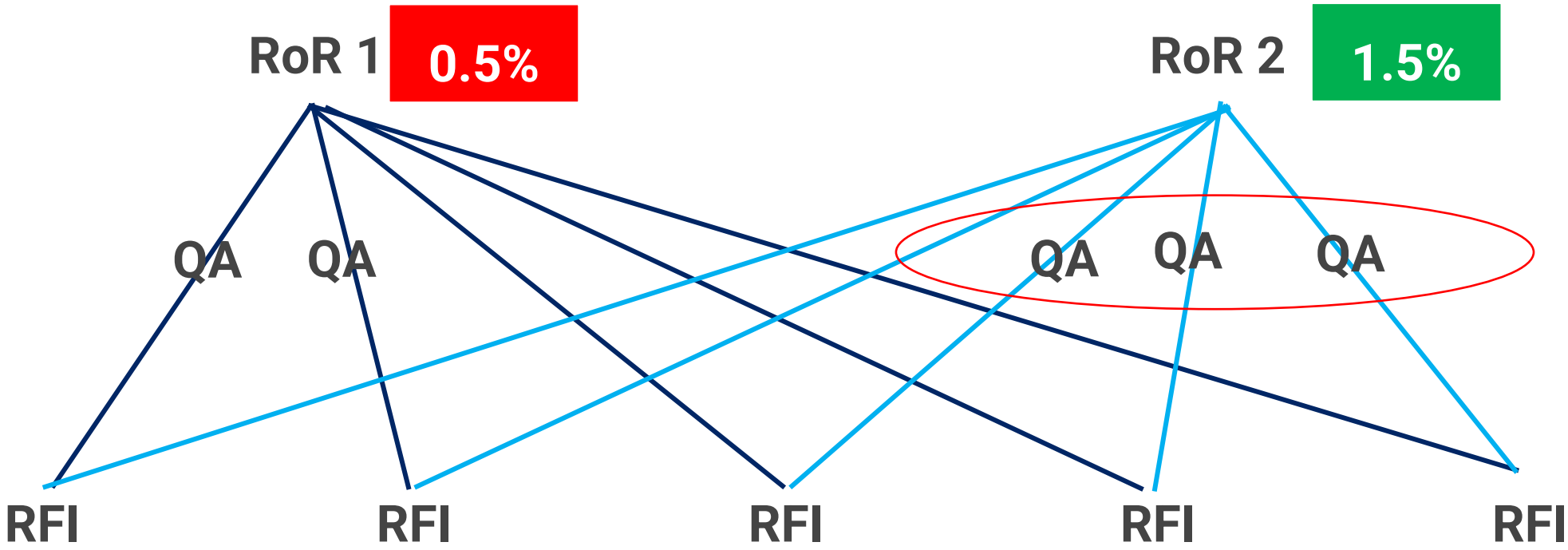
## 2 Rater of Record Field QA

All Raters must receive field QA reviews based on the greater of 1 or 1% of the total number of ratings registered where they are listed as the Rater of Record. Rater of Record field QA can be partially or completely satisfied by field verifier field QA reviews conducted on their Rater of Record ratings.

**Check out MINHERS sections 904.3.3.1.1 & 904.3.3.1.2 for details!**



# Example



# Guidance

- When reviewing quarterly QA, check Rater of Record QA specifically
- Occasionally, you will need to conduct an additional field QA to fulfill Rater of Record requirements

# Registry Management Reminders

## Ratings Registered within 90 Calendar Days

Based on the Rated Date, which can be either the date of final or last inspection OR the Energy Environmental Program certification date.

## Equipment Calibration Logs

RESNET is committed to verifying all gauges, duct blaster fans, & blower door fans, but other equipment logs are required.

## Missing or Expired Certification Dates

Registry now blocks registration of ratings where verifiers with missing or expired certification dates. Remember expired certifications should have a status of Suspended – Administrative!

## Verifier Status Changes & Notifications

Registry must be kept up-to-date & accurate at all times. Don't forget to notify verifiers in writing when their status changes.

# THANK YOU

RESNET Complaint Process if time permits

# RESNET Complaints

- RESNET Standards
- RESNET Code of Ethics
- ENERGY STAR / ZERH Certification Review

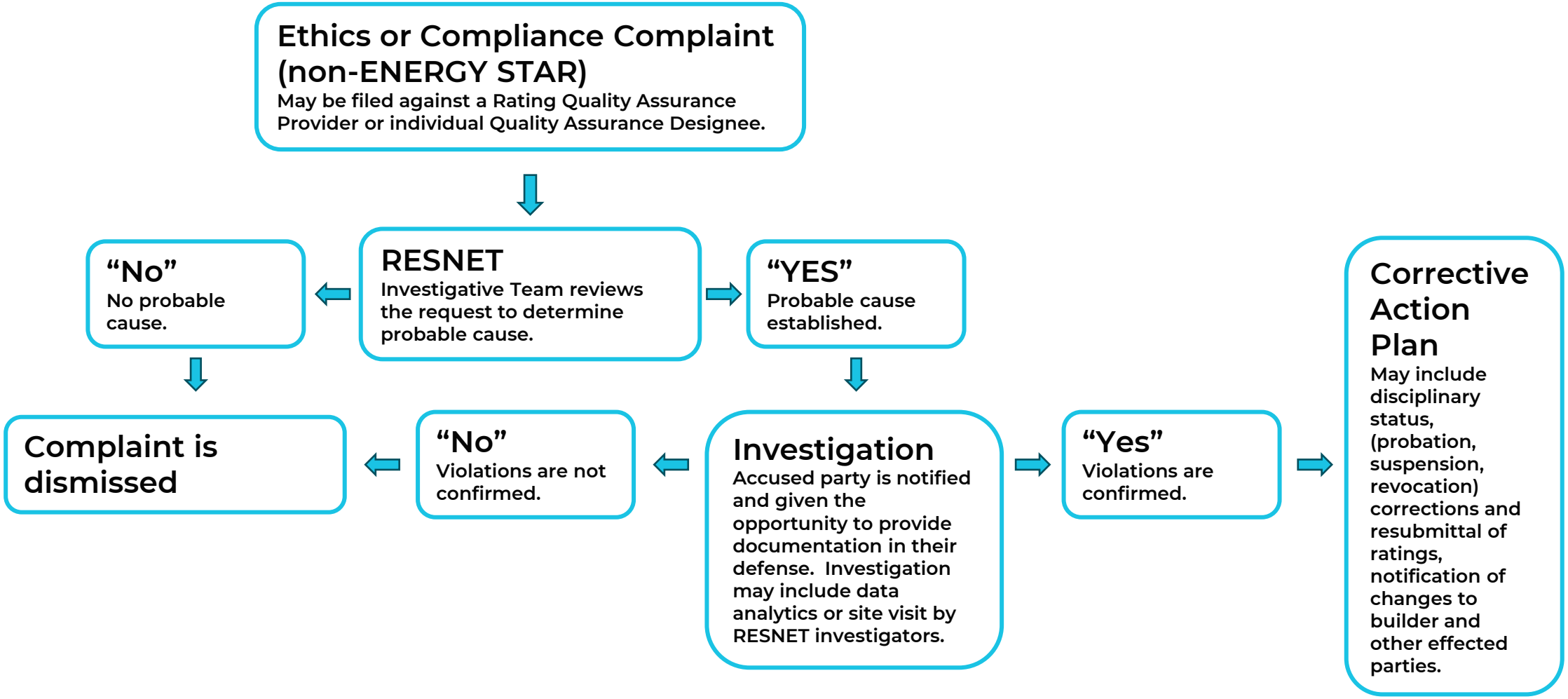
# Standards/Ethics Complaints

- **Complaints must start with the RESNET Accredited Provider.**

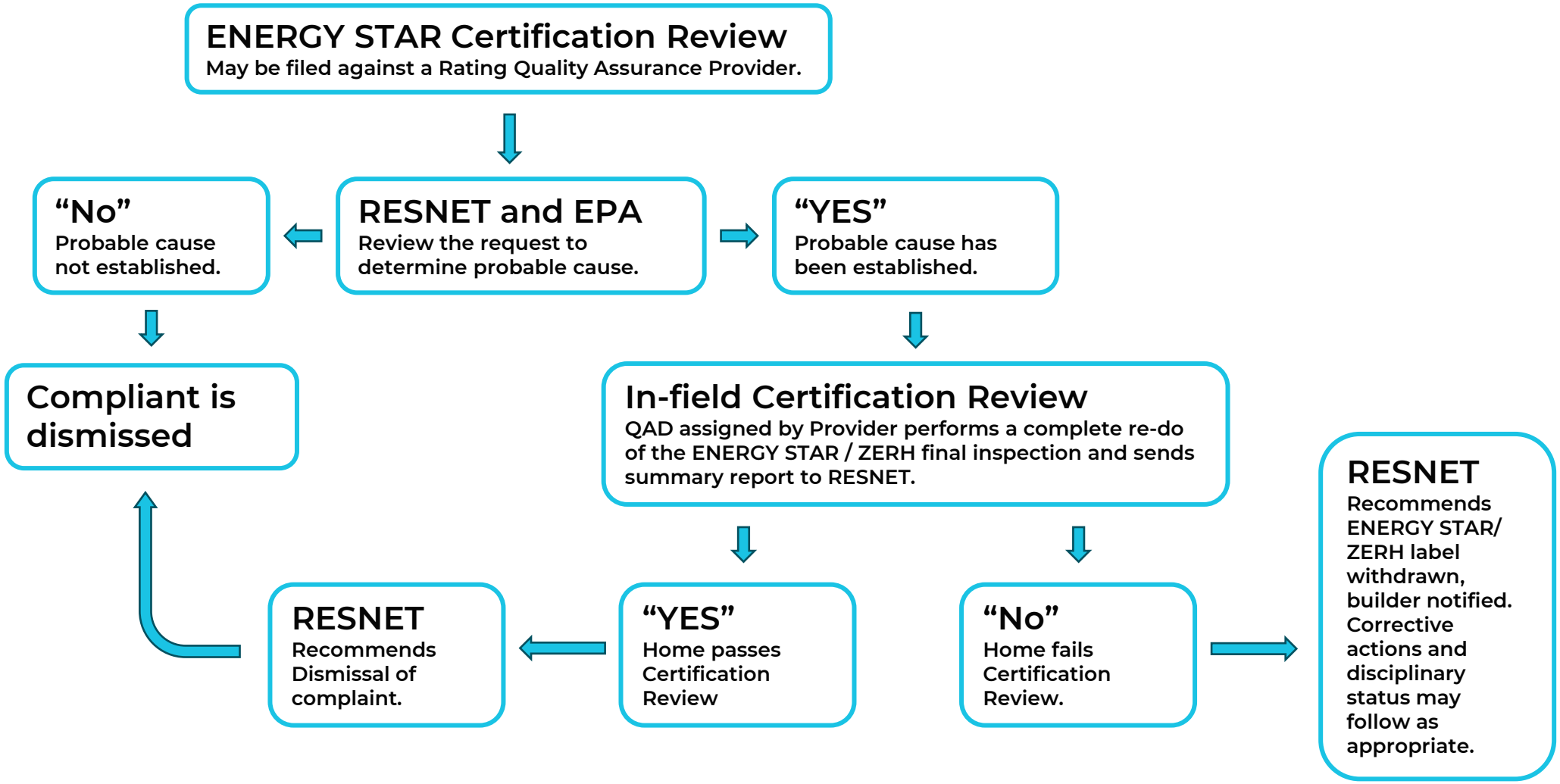
All providers are required to have a conflict resolution process in place.

## KEY POINT

# Standards/Ethics Complaints



# ENERGY STAR / ZERH Complaints



# Q&A / DISCUSSION

## THANK YOU (again)

ryanmoore@resnet.us
billy@resnet.us