Building Science Institute, Ltd. Co. Procedure B-2023 File Conformity Assessment

These procedures apply to Building Science Institute, Ltd. Co. True North Quality Management Services Quality Assessors and Verification Organization Quality Assessment Designees. The performance of these assessments is recorded in HouseRater.

Referenced Documents

BSI Policy 14 Referenced Standards, Codes, and Programs

Information Required for All File Conformity Assessments

Identifying Data & Weather Conditions

The Quality Assessor or Quality Assessment Designee must record the Verification Organization; name of Verifier or Software Analyst being assessed; the type of verification/software analysis work being performed, whether energy code compliance (Prescriptive, UA, Cost Performance, R406 ERI); or ERI; or ENERGY STAR®, Indoor airPLUS, Zero Energy Ready Home; street address of dwelling unit; name of the Quality Assessor or Quality Assessment Designee performing the assessment; the date of the assessment; type of assessment, whether remote observation or in-person site observation; outdoor temperature at dwelling unit at time of assessment, indoor temperature, windspeed, and elevation above sea level.

Assessment Criteria

The criteria the Verifier or Analyst are assessed against are the requirements of the Referenced Standards, Codes, or Program Certification Protocols, as applicable to the type of verification performed by the assessed Verifier or Software Analyst.

Observations

Observations are recorded as "Non-Conform" (NC) if the person observed does not conform with the requirements of the criteria they are assessed against.

Observations are recorded as "Conform" (C) if the person observed conforms with the requirements of the assessment criteria.

Observations are recorded as "Not Applicable" (NA) if the element is not present or the person being assessed cannot perform the verification.

The Quality Assessor or Quality Assessment Designee must record comments on non-conformance and not applicable items. Comments should be recorded on conforming items to ensure positive feedback or to collect additional information on the item.

File Conformity Assessment

Overview

- Do the Verifier names in the file match the Verifier names in the site data collected?
- Do the inspection dates in the file match the inspection dates in the site data collected?
- Does the orientation of the home in the file match the site data collected?
- Gas meter
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Electric meter
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Foundation type
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Home type
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Number of bedrooms

- - - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Number of floors above grade
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Conditioned floor area
    - Does the file data match the documentation?
  - Infiltration volume
    - Does the file data match the documentation?
  - Permit date
    - Is the permit date in the file data?
  - Framing contractor
    - Is the framing contractor in the file data?
  - Insulation contractor
    - Is the insulation contractor in the file data?
  - HVAC contractor
    - Is the HVAC contractor in the file data?

Building Envelope

- Elevations
  - Is there photo documentation for all elevation views?
- Foundation type(s)
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Exterior walls
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Thermal mass
  - Does the documentation support the field data entry?
  - Does the file data match the field data entry?
- Roof/ceiling structural type
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Rim/Band joist insulation R-value
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Doors
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Windows
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Skylight
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Insulation R-value & installation quality
  - Floors/foundation
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Foundation walls
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Walls
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Ceilings
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Vaulted ceilings
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?

Mechanicals

- HVAC equipment
  - Does the photo documentation support the field data entries?
  - Does the file data match the field data entry?
- HVAC system controls
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Water heaters
  - Does the photo documentation support the field data entry?
  - Does the file data match the field data entry?
- Water efficiency
  - Recirculation system type, control strategy, & branch length
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Flow rates of fixtures
    - Does the photo documentation of faucets & shower heads support the field data entry?
    - Does the file data match the field data entry?
  - DHW pipe distribution length
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - DHW pipe insulation R-value
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Solar DHW system pipe R-value
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Drain Water Heat Recovery model number, efficiency, & # of connected showers
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Number of shower heads
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Number of faucets
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Number of toilets
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Gallons per flush
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Duct system
  - Duct location
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Duct R-value
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Ventilation system
  - Mechanical ventilation system type
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Mechanical ventilation system manufacturer & model number
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Mechanical ventilation system fan wattage
    - Does the field collected data (fan manufacturer & model number) support the file data entry?
  - Mechanical ventilation run-time
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Gauge serial number
    - Does the photo documentation support the field data entry?

- - - - Does the file data match the field data entry?
  - ○ Gauge calibration
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Mechanical ventilation system test
    - ▪ Ventilation test method
      - • Does the photo documentation support the field data entry?
      - • Does the file data match the field data entry?
    - ▪ Test results
      - • Does the photo documentation support the field data entry?
      - • Does the file data match the field data entry?

Tests

- • Infiltration test
  - ○ Fan serial number
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Manometer serial number
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Manometer calibration
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ 10 second baseline with fan sealed
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Fan induced enclosure pressure difference of 50 Pa +/- 3 Pa, measured over 10 seconds (single point test) with results
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Fan induced enclosure pressure difference measured 5 equally spaced points between 10 Pa & 60 Pa, measured over 10 seconds at each point (multi-point test) with results
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Airflow corrected for altitude & temperature
    - ▪ Does the photo documentation support the field data entries?
    - ▪ Does the file data match correction factors, if needed?
  - ○ If single point test, add 10% of airflow to corrected result
    - ▪ Does the file data support the addition of 10% penalty for single point test?
- • Duct leakage test
  - ○ Fan serial number
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Manometer serial number
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Manometer calibration
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - ○ Total duct leakage test
    - ▪ Fan induced duct system pressure difference, w.r.t. outside, of 25 Pa +/- 3 Pa, measured over 10 seconds, with results
      - • Does the photo documentation support the field data entry?
      - • Does the file data match the field data entry?
    - ▪ Total duct leakage results grade
      - • Does the field data support the file data entry?
  - ○ Leakage to outside test
    - ▪ Duct system pressure difference w.r.t. dwelling unit re-checked & confirmed at 0.0 Pa +/- 0.5 Pa, with results
      - • Does the photo documentation support the field data entry?
      - • Does the file data match the field data entry?
- • Bedroom zonal pressure difference test
  - ○ Does the photo documentation support the field data entry?

- o Does the file data match the field data entry?
- Garage leakage test
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?

Lights & Appliances

- Fireplace
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Refrigerator manufacturer & model number
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Refrigerator location
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Dishwasher manufacturer & model number
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Range/oven fuel type
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Range type
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Oven type
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Clothes washer manufacturer & model number
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Clothes washer location
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Clothes dryer manufacturer & model number
  - o Does the photo documentation support the field data entry?
  - o Does the file data match the field data entry?
- Clothes dryer fuel type
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Clothes dryer location
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Ceiling fan quantity
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Ceiling fan manufacturer & model number
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Number of exhaust fans
  - o Does the documentation support the field data entry?
  - o Does the file data match the field data entry?
- Exhaust fan test results
  - o Kitchen range hood exhaust flow test
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
  - o Bath exhaust fan flow test
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
- Interior lights
  - o Percentage of Qualifying Light Fixtures
    - ▪ Does the photo documentation support the field data entry?
    - ▪ Does the file data match the field data entry?
- Exterior lights

- - - Percentage of Qualifying Light Fixtures
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
- Garage lights
    - Percentage of Qualifying Light Fixtures
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
- Radon mitigation systems
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?

Renewables

- Photovoltaic systems
    - PV system
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
    - PV system inverter
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
    - PV system orientation
        - Does the documentation support the field data entry?
        - Does the file data match the field data entry?
    - PV system tilt
        - Does the documentation support the field data entry?
        - Does the file data match the field data entry?
    - PV system area
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
- Solar DHW system type
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Solar DHW system collector area, orientation, & tilt
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Solar DHW system storage tank size & location
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Solar DHW system storage tank R-value
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?

ANSI/RESNET/ACCA Std 310 Air Handler Fan Flow

- Prerequisites for air handler unit airflow test met
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Forced-air HVAC System manufacturer & model number in design documents match installed equipment
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Test method selection
    - Does the documentation support the field data entry?
    - Does the file data match the field data?
- Pressure matching method
    - Manometer serial number
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
    - Manometer calibration
        - Does the photo documentation support the field data entry?
        - Does the file data match the field data entry?
- Measured airflow & plenum pressure recorded
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Flow grid test

- - Manometer serial number
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Manometer calibration
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Measured airflow & plenum pressure recorded
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Flow hood
  - Flow hood model number & serial number
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Airflow test results
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- OEM Static Pressure Table
  - Manometer serial number
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Manometer calibration
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
  - Average static pressure recorded for return & supply
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?

ANSI/RESNET/ACCA Std 310 Air Handler Fan Watt Draw

- Prerequisites for air handler unit watt draw test met
  - Does the documentation support the field data entry?
  - Does the file data match the field data entry?
- Plug-in Watt Meter
  - Average watt-draw
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Clamp-on Watt Meter
  - Average watt-draw
    - Does the photo documentation support the field data entry?
    - Does the file data match the field data entry?
- Analog Utility Meter
  - Kh factor on meter recorded
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Number of revolutions and number of seconds recorded
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Digital Utility Meter
  - Fan wattage
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?

ANSI/RESNET/ACCA Std 310 Refrigerant Charge

- Prerequisites for refrigerant charge evaluation met
  - Does the documentation support the field data entry?
  - Does the file data match the field data entry?
- Test method selection
  - Does the documentation support the field data entry?
  - Does the file data match the field data entry?
- Non-invasive (superheat) method
  - Average return air dry-bulb & wet-bulb temperatures
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Average outdoor air dry-bulb temperature

- - - Does the documentation support the field data entry?
      - Does the file data match the field data entry?
    - Average suction line temperature measured
      - Does the documentation support the field data entry?
      - Does the file data match the field data entry?
    - Average liquid line temperature measured
      - Does the documentation support the field data entry?
      - Does the file data match the field data entry?
    - All outdoor temperatures taken within 5 minute period
      - Does the documentation support the field data entries?
- Weigh-in Method
  - Documentation of original refrigerant charge data collected
    - Does the file contain the documentation of the original refrigerant charge?
  - Total length of liquid line measured and recorded
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Outside diameter of liquid line measured and recorded
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?

ANSI/ACCA Std 12 QH Combustion Appliance Zone

- Atmospherically Vented Appliances
  - Combustion gases measured at flue
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Direct Vented Appliances
  - Combustion gases measured at connection and around external perimeter of accessible vent pipe joints
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Unvented Heating Combustion Appliances
  - Measurement of combustion gases taken from area surrounding appliance
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Gas Fired Ovens
  - CO levels measured within vent
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Gas Leakage Test
  - Test results
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Combustion Appliance Zone (CAZ) Volume
  - Volume of space providing air to fossil fuel appliances measured
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
  - Net free area of opening which supply combustion air from adjoining room or outdoors measured
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- CAZ Depressurization Test
  - Systems pass/fail
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?
- Atmospherically Vented Combustion Appliance Venting
  - Draft test performed
    - Does the documentation support the field data entry?
    - Does the file data match the field data entry?

ERI mandatory requirements (R406)

IECC R406 Mandatory Requirements met

ENERGY STAR® Program Requirements

- ENERGY STAR Quality Assurance Checklist completed

Indoor airPLUS Program Requirements

- Indoor airPLUS Quality Assurance Checklist completed

Zero Energy Ready Home Program Requirements

- Zero Energy Ready Home Quality Assurance Checklist completed

Approved by the Building Science Institute, Ltd. Co. Quality Council on April 24, 2023
Approve: Amber Wood, Brian Christensen, Erik Straite, Kevin Burk
Reject: None
Not Voting: Brett Dillon, Chair; Wes Davis