KANSAS CITY MISSOURI

2021 International Energy Conservation Code (IECC) Implementation

As adopted by Ordinance 220364 on October 13, 2022.
Effective date July 1, 2023.
90-day grace period ends September 29,2023 at 4:00 PM.

August 17, 2023

Residential Energy Requirements

- Code Requirements
- Significant Process Changes
- Significant Construction Changes
- Local Amendments
- Structural/Fire Rating Changes
- Plan Requirements
- Inspection Requirements
- Questions

Residential Code Requirements

- 2021 IECC viewable online at https://codes.iccsafe.org/content/IECC2021P2
- For the 2021 IECC, Residential Code Sections shall include detached one and two-family dwellings, townhouses, and Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane.
- New residential structures shall comply with IECC Ch. 4 [RE]
- Existing residential structures shall comply with IECC Ch. 5 [RE]
- Local Amendments adopted per Kansas City Building and Rehabilitation Code (KCBRC), Chapter 18 of City Code.
- See KCMO City Planning and Development Information Bulletin 171- RE for submission and inspection guidelines. http://www.kcmo.gov/ib

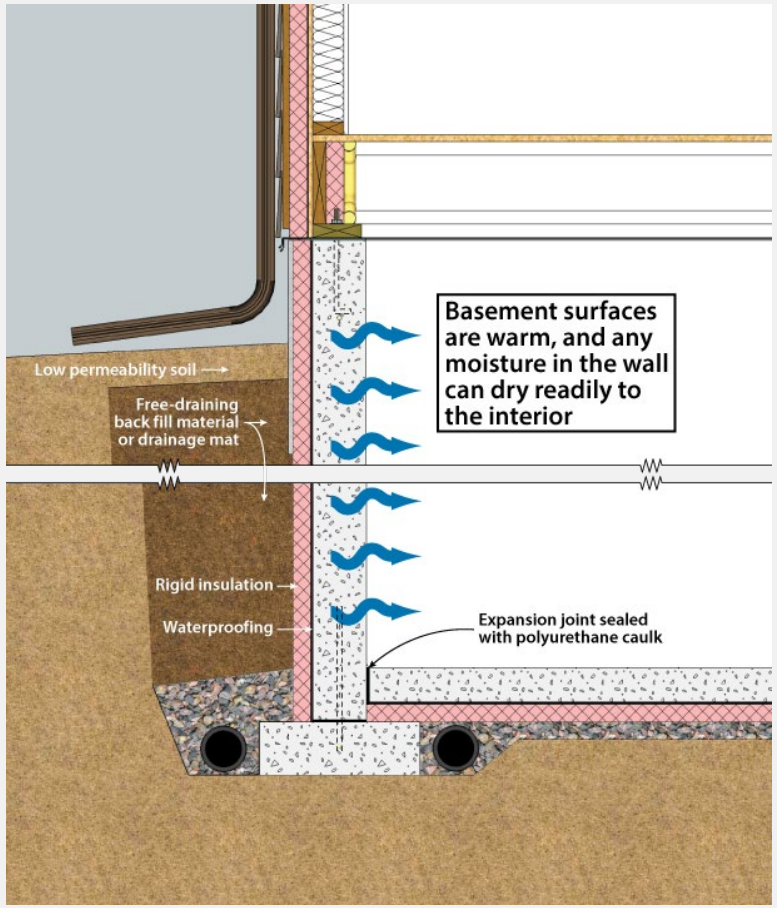
Significant Process Changes

- Previously Approved Master Plans will be void after 4:00 PM on September 29, 2023.
- Previously issued permits will continue to be inspected/approved under the code which they obtained approval.
- Once a plan under review is approved, a permit must be obtained of 6 months of the plan's date of approval.
- Plans under review with more than 6 months of inactivity will be voided.
- New plans and Master plans will be affixed with stamps stating 2018 IRC/ IBC and 2021 IECC
- Energy Code Analysis (ECA) sheets will be required in plan sets per requirements listed in IB 171 RE

Significant Construction Changes

RESIDENTIAL COMPARISON		
Eliminating the IRC Chapter 11 and Using Only The International Energy Conservation Code		
	2018 Adopted	2021
Energy Rating Index (ERI)	75	54(51.3) because of section 401.2.5 (3)
Attic Insulation	R-49	R-60
Wall Insulation	R-13	R-30 or R-20 + R5 Ci or R13 + R10 Ci or R20Ci
Whole house and duct leakage testing	Optional	Mandatory
Interior and exterior automatic lighting controls	Not Required	Mandatory
Energy Certificate	Required	Required with additional information
Footing Insulation	R10/2 ft	R-10/ 4 foot – see exception 402.2.2.9.1

Significant Construction Changes



KCBRC Amendments

- Walls - Table R402.4.1.1. Under 'Walls'. Amend first sentence to read: "Corners and headers shall be sealed and the junction of the foundation and sill plate shall be sealed."

- Ductwork - R403.3.7, Exception. In IRC projects building framing cavities may be used as ducts or plenums where sealed to prevent leakage through the thermal envelope.

- Electrical Readiness - R404.4 Electrical for future use on new buildings with electrical services
    1. Provide 2-inch conduit run up to attic for future photovoltaic systems.
    2. Provide 2-inch conduit run into garage areas for future electric vehicle charging stations.

Structural / Fire Rating Changes

Wall Bracing/wall issues

- 2 x 4 walls will not accommodate R-20 insulation
- 2 x 6 walls will accommodate R-30 foam with current bracing
- 2 x 6 walls can have R-20 compressible batts and R-5 foam on exterior, but would require let in bracing or Zip-R panels

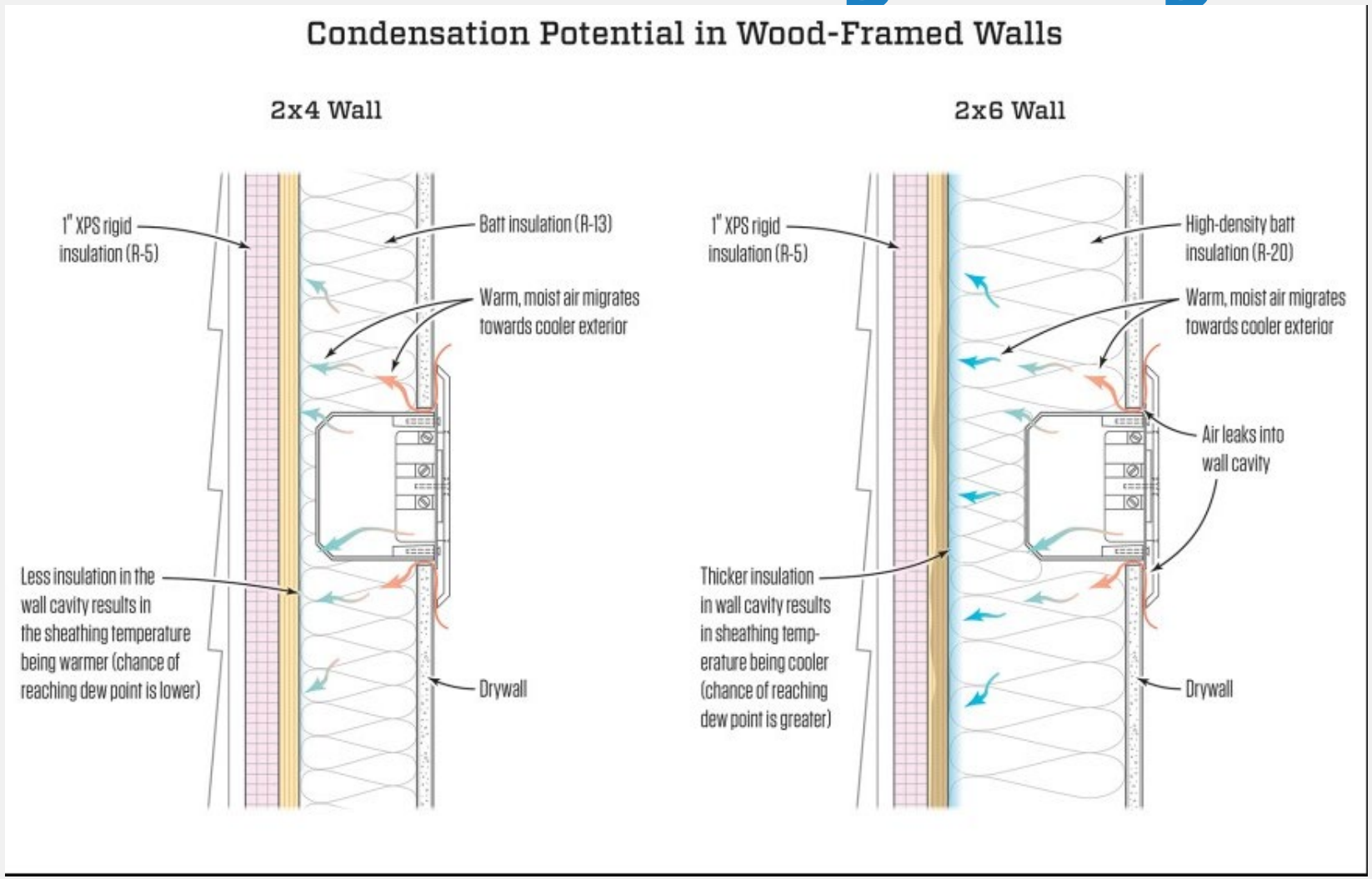
(fiberglass manufacturers have long produced 5 1/2-inch-thick high-density R-21 batts that fit a 2x6 wall without compression).

- Zip-R panels or similar products will require longer nails than standard Zip panels; training of sub contractors to use appropriate fasteners is essential
- Depending on insulation method used, wall bracing may require a structural engineering design or use of methods typically not used in the local industry

Fire Rating Issues

- Fire Rated walls/ floors cannot have foam insulation- prohibited by Fire Rated assemblies in most cases

Structural / Fire Rating Changes



Residential Plan Requirements

- **Required Documentation**:
- An Energy Code Analysis (ECA) must be provided for all new buildings or alterations and additions to existing buildings where compliance with the Energy Code in effect is required (see 2021 IECC Chapter RE 5).
- Where software is being used to calculate energy compliance, it shall be a nationally recognized software such as HERS/RESNET, or RES-check. The software calculations are required to be submitted, either as a separate document referenced on the plan or placed directly on the plan.
- All documentation to be submitted with plans as preliminary. HERS inspections must be done before 1st rough in. Final documentation must show compliance with chosen method.

Residential Plan Requirements

- Sheets labeled ECA as outlined in IB 171 RE
- Energy code method being used to comply with the 2021 IECC R401.2.
  a. Prescriptive Compliance- Design per table R402.1.3- requires to provide additional energy efficiency of table R401.2.5 and provide whole house and duct leakage testing.
  b. Total Building Performance – This would be something like RES-Check and require meeting the additional efficiency of 401.2.5 (2), along with providing whole house and duct leakage testing.
  c. Energy Rating Index Option (ERI)- This would be a HERS option with the ERI of 54 (51.3) along with whole house and duct leakage testing.
- A thermal envelope certificate shall be completed and provided on the plans to verify the final certificate values that must be met - R401.3.
- All framed walls that are required to be insulated shall be indicated on the plans and shall include notes where continuous exterior insulation is required.
- A cross section view showing foundation, wall, and roof thermal envelope boundary and insulation value to be installed.
- Plan and elevation views demarking the thermal envelope

Residential Inspection Requirements

- KCMO inspections will conduct separate inspections along with window flashing inspections as noted in the following.

Certified 3rd party inspectors (as verified by KCMO- contact Heath Perkins) will be allowed to do insulation inspections for non-prescriptive designs, their certificate from a nationally recognized agency will need to be provided with each report. Foundation insulation may be verified by the structural inspector with pictures.

These will generally be certified HERS or Rescheck inspectors

- **Prescriptive Path** (IRC and IBC Group R-2, R-3, and R-4 up to 3 stories)
- 1. Insulation inspections by the City, prior to concealment:
  a. Wall and floor insulation to be verified after framing is approved and before concealment, this includes attic baffles. Exterior insulation must be verified prior to concealment.
  b. Attic insulation will be verified prior to final but after sheet rock is installed.
- 2. Duct Leakage Testing to be completed and submitted by third party inspector prior to occupancy.
- 3. Whole House Leakage test to be completed and submitted by third party inspector prior to occupancy.
- 4. Energy Certificate to be installed per code and verified on final by City.

Residential Inspection Requirements

- **Total building Performance (all inspectors to be certified by a nationally recognized agency)**
- 1. Insulation inspections by Third Party Inspector per the design documents (since this method allows for code compliance that does not meet the letter of the code, third party is required). Res-check could be submitted, and inspections of insulation done by city
- 2. Duct Leakage Testing to be completed and submitted by third party inspector prior to occupancy.
- 3. Whole House Leakage test to be completed and submitted by third party inspector prior to occupancy.
- 4. Energy Certificate to be installed per code and verified on final.
- 5. Final report from Third Party Inspector verifying compliance with the design, prior to Temporary or full Certificate of Occupancy.

Residential Inspection Requirements

- **Energy Rating Index Option (ERI)-**

This requires certified rater. Preliminary rating documentation submitted with plan and 1st inspection must be conducted prior to 1st rough-in inspection by KCMO. For master plans after each rating must be submitted with the permit application as each is site specific. Failure of this will require choosing a different option. Insulation inspections done throughout building process by the rater as well as duct and whole house testing. Final HERS with all testing submitted to plan review for approval prior to a TCO or C of O being issued.

Questions

Thank You

City Planning and Development

Commercial Plan Requirements

- Code Scoping
- Significant Process Changes
- Significant Construction Changes
- Amendments
- Structural/Fire Rating Changes
- Required Documentation
- Plan Requirements
- Commissioning Methodology
- Commissioning Compliance Checklist
- Inspection Requirements
- Questions

Code Scoping

- Scope- For the 2021 IECC, Commercial shall include all buildings except detached one and two-family dwellings, townhouses, and Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane.
- New structures shall comply with chapter 4 [CE]
- Existing structures shall comply with chapter 5 [CE]
- Amendments per Kansas City Building and Rehabilitation Code (KCBRC)
- See Information Bulletin 171- CE for submission and inspection guidelines

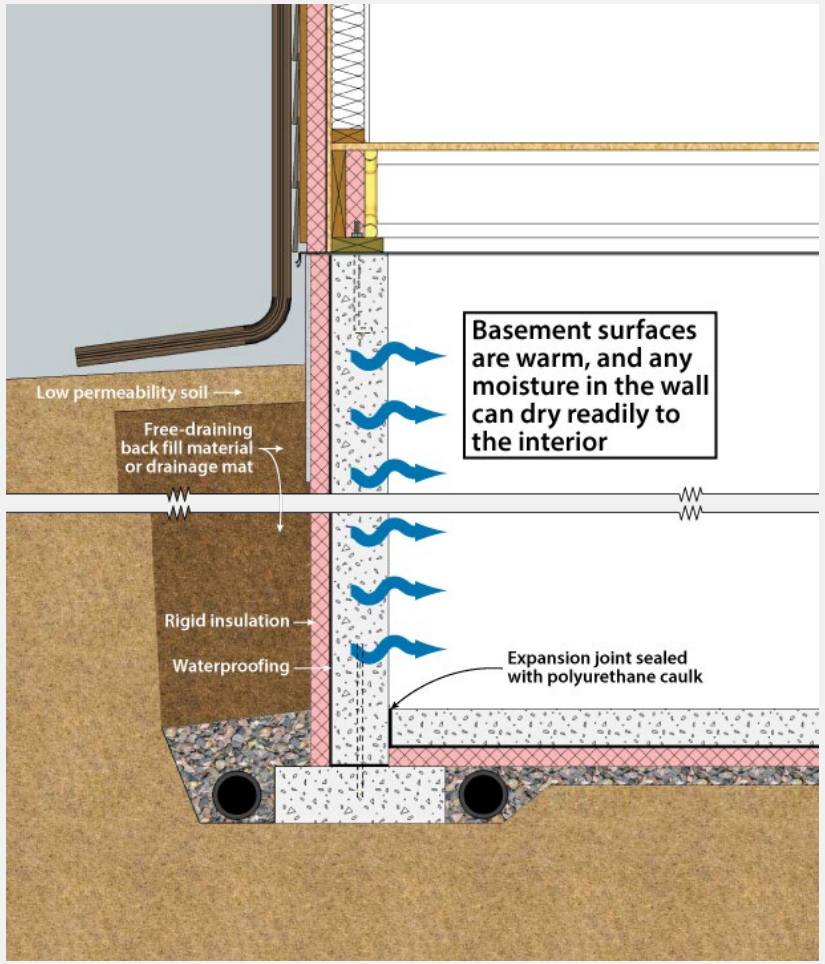
Significant Process Changes

- Previously issued permits will continue to be inspected/approved under the code which they obtained approval.
- Once a plan under review is approved, a permit must be obtained of 6 months of the plan's date of approval.
- Plans under review with more than 6 months of inactivity will be voided.
- New plans will be affixed with stamps stating 2018 IRC/ IBC and 2021 IECC
- Energy Code Analysis (ECA) sheets will be required in plan sets per requirements listed in IB 171 CE

Significant Construction Changes

COMMERCIAL		
	2012	2021
Wood Wall Insulation	R13	R13+3.8CI or R20
Metal Framed	R13+ 7.5 CI	No change
Attic Insulation	R-38 / R20 CI if above roof deck	R-49 / R30 CI if above roof deck
Whole Building and duct leakage testing	Optional	Mandatory
Interior and exterior automatic lighting controls	Optional	Mandatory and requires testing/commissioning report from Designer
Energy Certificate	Not Required	Required for all spaces/Buildings
Preliminary Commissioning report from designer of record	Optional	mandatory
Final Commissioning report from designer of record within 90 days of Certificate of Occupancy	Optional	Mandatory
Details on plans	Just statement of	Mandatory

Significant Construction Changes



KCBRC Amendments

- *C405.12 Electrical for future use on new buildings with electrical services.*

- Provide 2-inch conduit run up to attic for future photovoltaic systems.

- Provide 2-inch conduit run into parking areas for future electric vehicle charging stations.

Structural / Fire Rating Changes

Wall Bracing/Exterior Shear wall issues

- 2 x 4 walls will not accommodate R-20 insulation
- 2 x 6 walls can accommodate R-20 batts

(fiberglass manufacturers have long produced 5 1/2-inch-thick high-density R-21 batts that fit a 2x6 wall without compression).

- 2 x 4 walls can have and R-13 plus R3.8 continuous on the exterior, but would require something like Zip-R panels
- Zip-R panels or similar product will require longer nails than standard Zip panels; training of sub contractors to use appropriate fasteners is essential
- Depending on insulation method used, wall bracing/ shear walls may require a structural engineering design or use of methods typically not used in the local industry
- Icynene has recently reformulated its open-cell spray foam to increase its R-value from 3.6 to 3.7 per inch, in anticipation of the code change. Now a 5 1/2-inch wall insulated with Icynene can claim an R-value of 20.35.

Fire Rating Issues

- Fire Rated walls/ floors cannot have foam insulation- prohibited by Fire Rated assemblies in most cases

Required Documentation

- An Energy Code Analysis (ECA) must be provided for all new buildings or alterations and additions to existing buildings where compliance with the Energy Code in effect is required (see 2021 IECC Chapter CE 5).
- Where software is being used to calculate energy compliance, it shall be a nationally recognized software such as HERS/RESNET, or RES-check. The software calculations are required to be submitted, either as a separate document referenced on the plan or placed directly on the plan.
- All documentation to be submitted with plans as preliminary. HERS inspections must be done before 1st rough in. Final documentation must show compliance with chosen method.

Plan Requirements

- **Required Documentation**:
- Sheets labeled ECA as outlined in IB 171 CE
- Energy code method being used to comply with the 2021 IECC R401.2.
  a. Prescriptive Compliance- Design per table C402.1.3, sections C402 – C406, and C408 - requires to provide additional energy efficiency of section C406.
  b. Total Building Performance – This would be something like Com-Check and require meeting the requirements of C407
- A thermal envelope certificate shall be completed and provided on the plans to verify the final certificate values that must be met - C401.3.

Plan Requirements (continued)

- All framed walls that are required to be insulated shall be indicated on the plans and shall include notes where continuous exterior insulation is required.
- Building thermal envelope assemblies using Prescriptive Compliance path shall show compliance with the following on the construction documents, indicate on plans each of the following (C402):
- Opaque portions of thermal envelope shall comply with

  C402.2 and C402.1.3 or C402.1.4 or C402.1.5
- Roof Solar reflectance and thermal emittance C402.3
- Fenestration C402.4
- Air Leakage C402.5

Plan Requirements (continued)

- Table values from C402.1.3/C402.1.4 shall be shown on plans for each item of the thermal envelope. Plans must show a comparison of the code requirement and what is intended to be constructed/installed.
- Details shall be provided on construction documents to include but not limited to:

  a. Show how compliance of the thermal envelope will be maintained, including penetrations through the assemblies.

  b. Plan and elevation view demarking the thermal envelope.

  c. Section view showing foundation, wall, and roof thermal envelope boundary and insulation value to be installed.

  d. Details shall be provided on construction documents showing methods to meet the mechanical requirements of C403. This can be a tabular matrix or written narrative.

Plan Requirements (continued)

e. Details shall be provided on construction documents showing methods to meet the service water heating requirements of C404. This can be a tabular matrix or written narrative.

f. Details shall be provided on construction documents showing methods to meet the electrical requirements of C405. This can be a tabular matrix or written narrative.

g. Details shall be provided on construction documents showing methods to meet the Additional Efficiency Requirements of C406. This can be a tabular matrix or written narrative.

h. Detail shell be provided on construction documents showing methods to meet the Total Building Performance section of C407. This can be a tabular matrix or written narrative

Commissioning Methodology

Required Documentation:

COMMISIONING METHODOLOGY

- Details shall be provided on construction documents showing how compliance with C408 will be obtained and how Commissioning will be performed, this can be a tabular matrix or written narrative. At a minimum, the design professional shall detail the following and Commissioning shall be performed by an approved third party:
- a. How Mechanical Commissioning needs to be performed C408.2.1.
- b. How Electrical Commissioning needs to be performed C408.3.2.1 and C408.3.2.2.
- c. How Air Leakage commissioning shall be performed C402.5.1.5 Item 1.

IECC COMMISIONING COMPLIANCE CHECKLIST

Permit Number: _____

Date: _____ Project Name: _____

Project Address: _____

Commissioning Authority: _____

Commissioning Plan (Section C408.2.1)

- ☐ Commissioning Plan was used during construction and includes all items required by Section C408.2.1.
- ☐ Systems Adjusting and Balancing has been completed.
- ☐ HVAC Equipment Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____.
- ☐ HVAC Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____.
- ☐ Economizer Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____.
- ☐ Lighting Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____.
- ☐ Service Water Heater System Function Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____.
- ☐ Manual, record documents and training have been completed and scheduled.
- ☐ Preliminary Commissioning Report submitted to owner and report includes all items required by Section C408.2.4.

I hereby certify that the commissioning provider has provided me with evidence of mechanical, service water heating and lighting systems commissioning, where applicable, in accordance with the current adopted International Energy Conservation Code

X _____ _____

Signature of Building Owner or Owner's Representative Date

Commercial Inspection Requirements

GENERAL STANDARDS FOR COMMERCIAL INSPECTIONS (all third-party inspectors to be certified by nationally recognized agency)

Prescriptive Path

1. Insulation inspections by the city, prior to concealment

a. Wall and floor insulation to be verified after framing is approved and before concealment, this includes attic baffles. Exterior insulation must be verified prior to concealment.

b. Attic insulation will be verified prior to final but after sheetrock is installed

2. Duct Leakage Testing to be completed and submitted by third party inspector prior to occupancy per the approved commissioning plan.

3. Whole House leakage test to be completed and submitted by third party inspector prior to occupancy per the approved commissioning plan.

4. Energy Certificate to be installed per code and verified on final.

5. Final report from Third Party Inspector verifying compliance with the design for Mechanical Commissioning prior to Certificate of Occupancy.

6. Final report from Third Party Inspector verifying compliance with the design for Electrical Commissioning prior to Certificate of Occupancy.

Commercial Inspection Requirements

GENERAL STANDARDS FOR COMMERCIAL INSPECTIONS (all third-party inspectors to be certified by nationally recognized agency)

Total Building Performance

1. Insulation inspections by third party inspector per the design documents (since this method allows for code compliance that does not meet the letter of the code, third party inspection is required).
2. Duct Leakage Testing to be completed and submitted by third party inspector prior to occupancy per the approved commissioning plan.
3. Whole House Leakage test to be completed and submitted by third party inspector prior to occupancy per the approved commissioning plan.
4. Energy Certificate to be installed per code and verified on final.
5. Final report from Third Party Inspector verifying compliance with the design for Mechanical Commissioning prior to Certificate of Occupancy.
6. Final report from Third Party Inspector verifying compliance with the design for Electrical Commissioning prior to Certificate of Occupancy.

Thank You

City Planning and Development