Philadelphia Energy Code Enforcement

February 2025

Department of
Licenses and Inspections
CITY OF PHILADELPHIA

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Learning Description

(*Eligible for 1.5 hours or 0.15 ICC Continuing Education Credits*)

This session will include a review of the energy code application requirements, documents to be submitted with permit applications, commissioning expectations, inspection requirements, and energy documentation required for close-out of permits upon completion of construction.

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Disclaimer

This listing of codes, standards or any other regulations within this presentation is for informational purposes only. They do not constitute the full scope of provisions that may be applicable to your project and cannot be relied upon as evidence of compliance or enforcement.

Any code provision not mentioned in this presentation does not alleviate the person responsible for the design (owner, designer, etc.) from full compliance with necessary codes and standards nor does it diminish the importance of any specific feature or element.

Agenda

I. Introduction
   I. Fact Sheets
II. Residential Construction
   I. Compliance Paths
   II. Plan Review Requirements
   III. Inspection Requirements
   IV. FAQs
III. Commercial Construction
   I. Compliance Paths
   II. Plan Review Requirements
   III. Inspection Requirements
IV. Questions

Fact Sheets

Link to [Philadelphia Energy Compliance Materials]

Energy code compliance materials

The **Department of Licenses and Inspections** (L&I) ensures energy code compliance in Philadelphia. The materials on this page include information sheets, checklists, and forms related to energy code compliance.

Permit forms and materials

Search keywords

Title	Description	Date	Copy Link
Energy code compliance information sheet - Commercial	Guide to compliance with energy code for commercial (IBC) projects.	January 7, 2025	
Energy code compliance information sheet - Residential	Guide to energy code compliance for residential (IRC) projects.	January 7, 2025	
Energy code compliance - Path flowcharts	Review alternative paths to energy code compliance.	June 23, 2022	
Energy code compliance - Sam			
Energy code compliance - Wha			
HVAC equipment design form -			
HVAC equipment design form - family			

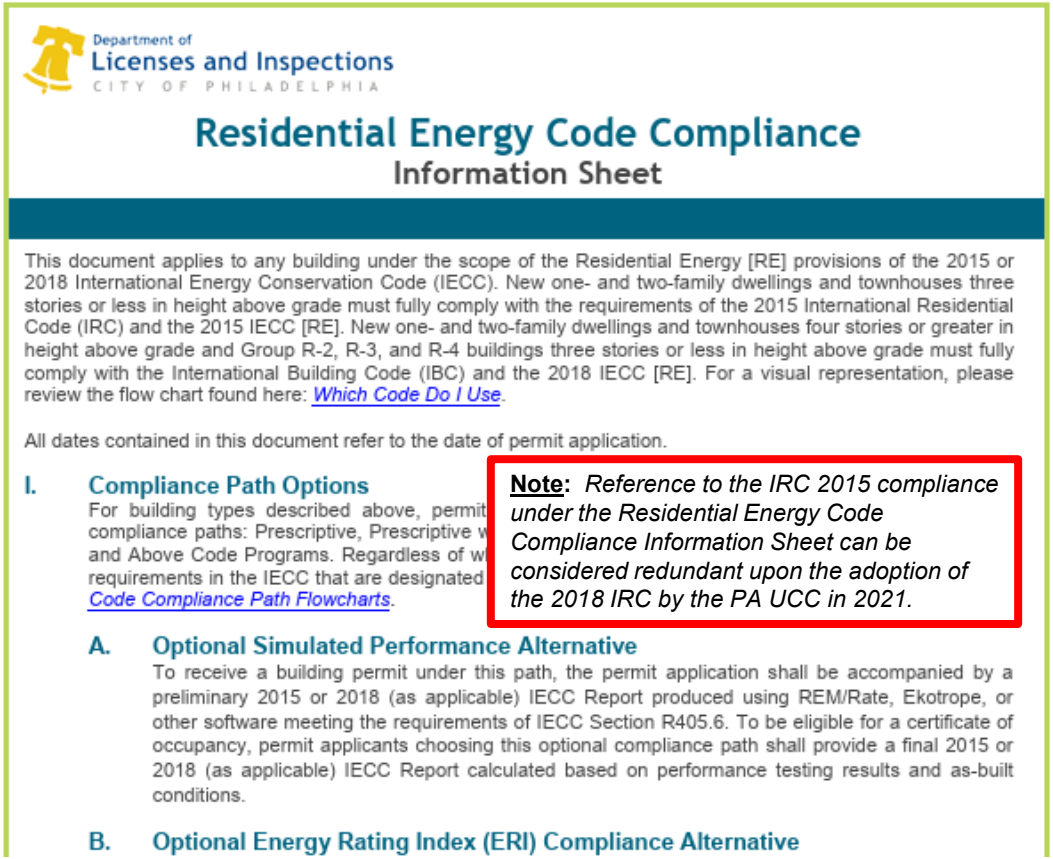
Inspection forms and materials

Search keywords

Title	Description	Date
Air barrier and insulation installation checklist - Residential	Use this checklist to certify that construction has been properly air protected and insulated.	June 15, 2022
Duct and envelope testing certificate (DET) - Residential	Use this certificate to ensure that construction's ducts and envelope have been installed properly.	June 15, 2022
HVAC equipment certification form - One or two family	Use this form to verify the building loads and equipment sizing for new, one-or-two family dwellings.	January 14, 2022
Mechanical systems commissioning compliance checklist - Commercial	Documenting process for achieving and validating performance of energy efficiency systems.	July 23, 2021

Fact Sheets

Link to Energy Code Compliance Information Sheet



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Residential Energy Code Compliance
Information Sheet

This document applies to any building under the scope of the Residential Energy [RE] provisions of the 2015 or 2018 International Energy Conservation Code (IECC). New one- and two-family dwellings and townhouses three stories or less in height above grade must fully comply with the requirements of the 2015 International Residential Code (IRC) and the 2015 IECC [RE]. New one- and two-family dwellings and townhouses four stories or greater in height above grade and Group R-2, R-3, and R-4 buildings three stories or less in height above grade must fully comply with the International Building Code (IBC) and the 2018 IECC [RE]. For a visual representation, please review the flow chart found here: *Which Code Do I Use*.

All dates contained in this document refer to the date of permit application.

I. Compliance Path Options

For building types described above, permit
compliance paths: Prescriptive, Prescriptive w
and Above Code Programs. Regardless of w
requirements in the IECC that are designated
Code Compliance Path Flowcharts.

Note: *Reference to the IRC 2015 compliance under the Residential Energy Code Compliance Information Sheet can be considered redundant upon the adoption of the 2018 IRC by the PA UCC in 2021.*

A. Optional Simulated Performance Alternative

To receive a building permit under this path, the permit application shall be accompanied by a preliminary 2015 or 2018 (as applicable) IECC Report produced using REM/Rate, Ekotrope, or other software meeting the requirements of IECC Section R405.6. To be eligible for a certificate of occupancy, permit applicants choosing this optional compliance path shall provide a final 2015 or 2018 (as applicable) IECC Report calculated based on performance testing results and as-built conditions.

B. Optional Energy Rating Index (ERI) Compliance Alternative

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WHAT CODE DO I USE?

Single Family

One- and two-family dwellings and townhouses

Three stories or less	→	2018 IRC (with PA amendments) +	2018 IECC [RE] (with PA amendments)
Four stories or more and two-family (duplex)	→	2018 IBC +	2018 IECC [RE] (with PA amendments)

Multifamily

Group R-2, R-3, R-4

Three stories or less	→	2018 IBC +	2018 IECC [RE] (with local amendment per Bill No.180593)
Four stories or more	→	2018 IBC +	2018 IECC [CE] or ASHRAE 90.1-2016

Code Links:

2021 PA Alternative Residential Energy Provisions: https://paenergycode.com/documents/documents/PAEP_2021.pdf
2018 IRC: https://codes.iccsafe.org/content/IRC2018P4
2018 IECC: https://codes.iccsafe.org/content/IECC2018P4
2018 IBC: https://codes.iccsafe.org/content/IBC2018P6
2018 IECC: https://codes.iccsafe.org/content/IECC2018P4
PA Amendments: https://www.dli.pa.gov/ucc/Documents/ICC-Code-Review-2018-Final-Report.pdf
ASHRAE 90.1 2016: https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards

Residential

Compliance Paths

Compliance Paths

METHOD	
Prescriptive	Meets values for each assembly for R values or U factors
Prescriptive UA Alternative (ResCheck)	May trade off values for a weighted average of the assemblies comprising building envelope
Simulated Performance	Demonstrates equivalent annual energy use
Energy Rating Index Performance	Demonstrates that the proposed building exceeds efficiency of the same building designed under the 2006 IECC.
Above Code Programs	Energy Star and PECO Home Rebates are currently accepted
PA Residential Alternative	Simplified provisions under the PA Uniform Construction Code for IRC buildings

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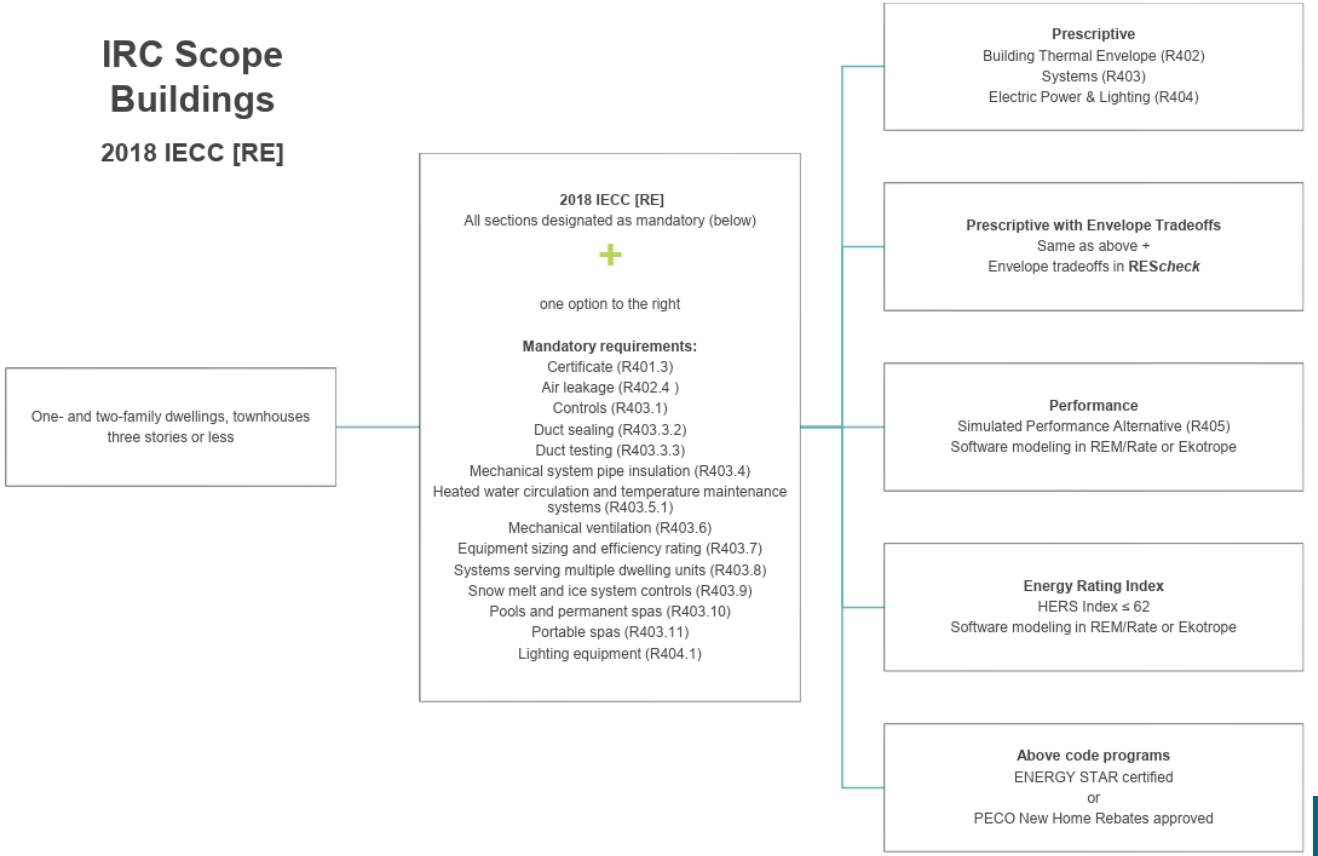
IRC Scope Buildings

2018 IECC [RE]



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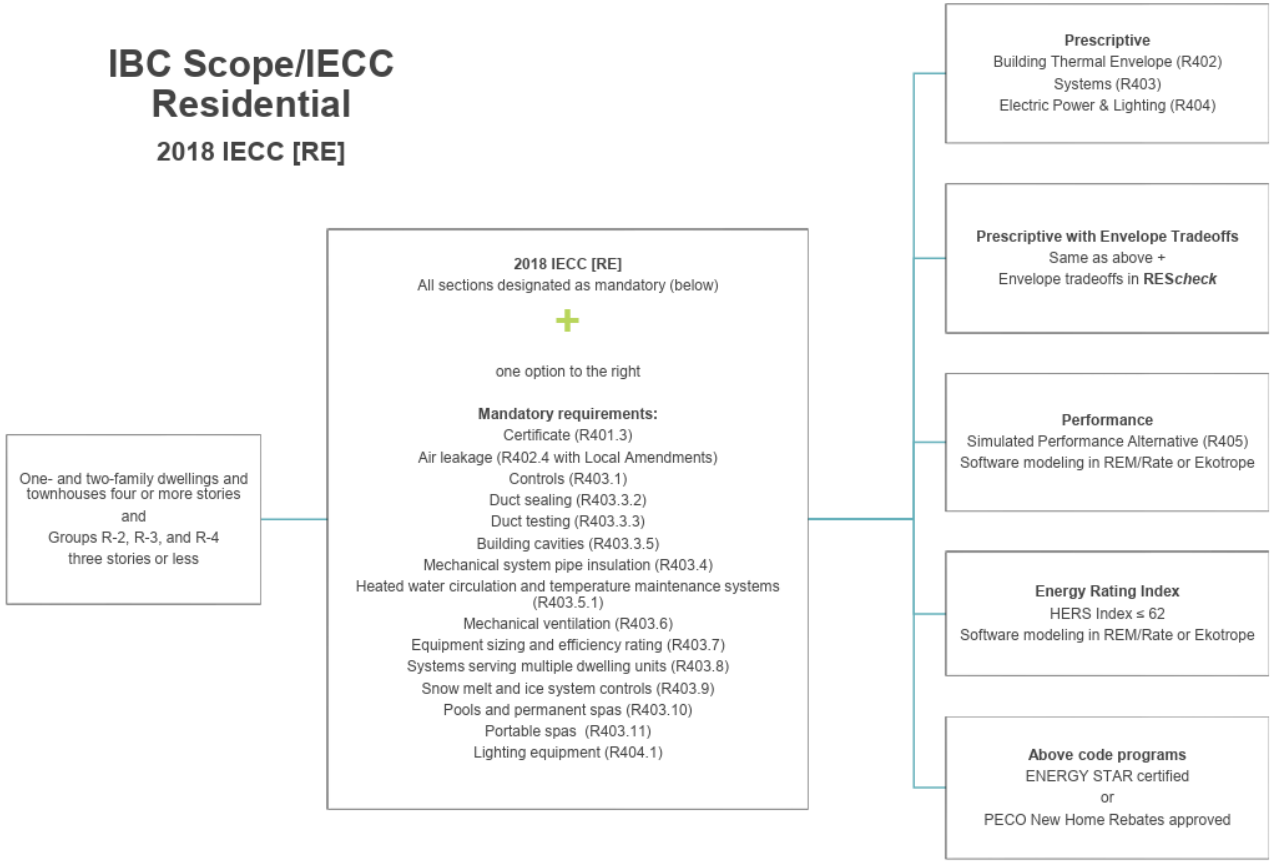
IBC Scope/IECC Residential

2018 IECC [RE]



Residential

Permit Requirements—New Construction

Permit Application Documentation

METHOD	Permit Detail		Qualifications
Prescriptive/ PA Alt	Compliance Summary	HVAC Design Worksheet for one and two family	Design Prof
Prescriptive UA Alternative	ResCheck 4.7.2.1 (or higher)	Same as above	Design Prof
Simulated Performance	Prelim Report	Same as above	Depends upon method
Energy Rating Index Performance	Prelim Report	Same as above	HERS Rater
Above Code Programs	Prelim Report	Same as above (NR for Energy Star)	Depends upon method

Building Permit Requirements

- Correct code path for building type;
- Continuous Thermal Envelope is represented on plan;
- Mandatory requirements are satisfied;
- Path-specific requirements are satisfied;
- The cavity can accommodate the insulation installation thickness;
- Ensure that all reports include a listing of assemblies, conditioned area corresponds to plan, R/ U Values correspond to plan. Inspection checklist is provided.

Plan Review Checklists

Supplemental permit checklists

energy

Title	Description	Date	Copy Link
Commercial energy (existing buildings) plan review checklist	Plan review checklist for additions, alterations, or window replacements in existing commercial buildings under the International Energy Conservation Code (IECC).	January 18, 2023	
Commercial energy (new construction) plan review checklist	Plan review checklist for new commercial construction permit applications under the International Energy Conservation Code (IECC).	January 18, 2023	
Commercial energy (mechanical) plan review checklist	Plan review checklist for commercial mechanical permit applications under the International Energy Conservation Code (IECC).	January 18, 2023	
Residential energy (existing buildings) plan review checklist	Plan review checklist for alterations and additions to existing residential buildings under International Energy Conservation Code (IECC).	January 18, 2023	
Residential energy (new construction) plan review checklist	Plan review checklist for new residential (IRC) construction permit applications under International Energy Conservation Code (IECC).	January 18, 2023	

Link to Permit Checklists page

RESIDENTIAL ENERGY - ARCHITECTURAL PLAN REVIEW CHECKLIST

Information on Construction Documents

- ☐ A continuous building thermal envelope is represented on the construction drawings
- ☐ Typical cross sections clearly indicate insulation R-value, type, and material for each unique assembly type
- ☐ Compliance path is clearly noted on the plans or accompanying documentation. Otherwise, assume prescriptive.
- ☐ Notes indicate the *Air Barrier and Insulation Installation Checklist* will be completed by an approved party
- ☐ Notes indicate the *Duct and Envelope Testing Certificate* will be completed by an approved party

Indicate the compliance path selected by the applicant and complete the appropriate section below

☐ Prescriptive | ☐ Total UA (REScheck) | ☐ Performance | ☐ Energy Rating Index | ☐ Above Code

Prescriptive Path (with no tradeoffs)

- ☐ R-values and U-factors on plans meet Table 402.1.2 for Climate Zone 4 for each assembly
- ☐ IRC R-Value computation method thermal envelope requirements (R-N1102.1.3/ EC-402.1.3)
- ☐ IRC U-factor assembly alternative thermal envelope requirements (R-N1102.1.4EC-402.1.4)
- ☐ IRC Total UA Alternative UA computation requirements (R-N1102.1.5/EC-402.1.5)
- ☐ IRC R-Value computation ceiling with attic spaces requirements (R-N1102.2.1/EC-402.2.1)
- ☐ IRC R-Value computation ceiling without attic spaces requirements (R-N1102.2.2/EC-402.2.2)
- ☐ Access hatches and doors (R-N1102.2.4/EC-402.2.3)
- ☐ Basement Wall insulation (R-N1102.2.9/EC-402.2.7)
- ☐ Slab-on-grade floors (R-N1102.2.10/EC-402.2.8)
- ☐ Crawl space wall insulation (R-N1102.2.11/EC-402.2.9)
- ☐ Thermally Isolated sunroom insulation and fenestration (R-N1102.2.13/EC-402.2.11)
- ☐ Fireplace doors (R-N1102.4.2/EC-402.4.3)
- ☐ Maximum fenestration U-factor (EC-402.5)
- ☐ Duct insulation (R-N1103.3.1/EC-403.2.1)
- ☐ Building framing cavities (R-N1103.3.5/EC-403.2.3)

Total UA Alternative: *REScheck* Reports

- ☐ Compliance field says "PASSES"
- ☐ Verify correct code edition
- ☐ Address matches the plans
- ☐ REScheck version 4.6.5 or higher
- ☐ Each unique assembly type is listed (including cantilevered floors, floors over garages, and bump-out ceilings)
- ☐ Listed R-values and U-factors match plans
- ☐ Cavity insulation R-values are not listed in the Continuous R-value column
- ☐ Signed by the person completing the report

Simulated Performance Alternative Reports

- ☐ For IRC-scope buildings, 2018 IECC Performance Report is present (R405.2)
- ☐ For IBC/IECC [RE] buildings, 2018 IECC Performance Report is present
- ☐ Annual Energy Cost of Design Home < or = IECC Home in the "SubTotal - Used to Determine Compliance" line (Note: Report may fail, provided the only non-compliant item is the Home Infiltration Check and the design infiltration value is < or = 5.0 ACH50)
- ☐ Energy Code Inspection Checklist is present

- ☐ Report contains the name of the individual completing the report
- ☐ Report contains the name and version of the software tool (REM/Rate or Ekotrope)
- ☐ Address matches the plans
- ☐ Each unique assembly type is listed (including cantilevered floors, floors over garages, and bump-out ceilings)
- ☐ Conditioned floor area matches plans
- ☐ Listed R-values and U-factors match plans
- ☐ IECC Simulated Performance alternative computation requirements (EC-405.3)

Energy Rating Index Reports

- ☐ For IRC-scope buildings, 2018 IECC Energy Rating Index Report is present
- ☐ For IBC-scope residential buildings, 2018 IECC Energy Rating Index Report is present
- ☐ infiltration value is < or = to 5.0 ACH50, and (2) the ERI score provided it is < or = 62)
- ☐ Energy Code Inspection Checklist is present
- ☐ Report contains the name of the individual completing the report
- ☐ Report contains the name and version of the software tool (REM/Rate or Ekotrope)
- ☐ Address matches the plans
- ☐ Each unique assembly type is listed (including cantilevered floors, floors over garages, and bump-out ceilings)
- ☐ Conditioned floor area matches plans
- ☐ Listed R-values and U-factors match plans

Above Code Program

- ☐ Preliminary HERS report and statement indicating project will receive ENERGY STAR certification or PECO New Home Rebates report andstatement indicating project will meet all program requirements

Residential Energy Plan Review Checklists

PLUMBING ENERGY CODE REQUIREMENTS	
R-3 pipe insulation is required if any of the following conditions exist (excludes Simulated Performance and ERI path):	
Piping ¾" or greater in nominal diameter (piping>" for IBC buildings)	
Piping serves more than one dwelling unit	
Piping is located outside the conditioned space	
There is piping from a water heater to a distribution manifold	
Piping is buried or located under a floor slab	
Circulation systems (where present):	
System is provided with a pump (no gravity or thermosyphon systems)	
Controls installed to start and stop the pump based on demand for hot water within the occupancy	

RESIDENTIAL ENERGY - ELECTRICAL PLAN REVIEW CHECKLIST	
☐	< or = 75% of lamps in permanently installed fixtures are high-efficacy (CFL, LED, or T-8 or lowe > or = 75% of permanently installed lighting fixtures contain only high-efficacy lamps
☐	Fuel gas lighting systems do not have continuously burning pilot lights

Residential Energy Plan Review Checklists

RESIDENTIAL ENERGY - MECHANICAL PLAN REVIEW CHECKLIST	
HVAC Equipment Design Form **HVAC System Sizing and Selection (Page 1)**	
☐	Address matches construction documents
☐	Design heating and cooling loads match the Manual J report
☐	Cooling system make and model match specs
☐	Cooling system output capacity is <or= 1.15X (1.25X for heat pumps) the design cooling load or next nom. size
☐	Heating system make and model match specs
☐	Heating system output capacity is < or = 1.40X the design heating load or next nominal size
☐	Air handler specs contain manufacturer's designation of < or = 2% air leakage (ASHRAE 193)
Whole-House Mechanical Ventilation Design Worksheet (Page 2)	
☐	Address matches construction documents
☐	Conditioned floor area and number of bedrooms match plans
☐	The correct ventilation rate has been circled based on the floor area and number of bedrooms
☐	Intermittent fans only - Required ventilation airflow has been multiplied by the appropriate factor
☐	Rated fan airflow meets or exceed required air flow
☐	HVI-rated fan efficacy is > or = 1.4 cfm/watt for fans with < 90 cfm maximum airflow
☐	HVI-rated fan efficacy is > or = 2.8 cfm/watt for fans with > or = 90 cfm maximum airflow
☐	Rated fan airflow and HVI-rated fan efficacy match specs
Additional Information on Construction Documents	
☐	Construction documents indicate whether any portion of the HVAC system will be outside the building thermal envelope. If yes, notes indicate that:
☐	Duct leakage testing will be performed and DET form will be submitted to the inspector
☐	Ducts > or = 3" diameter will be insulated to > or = R-8 in attics and > or = R-6 elsewhere
☐	Ducts< 3" diameter will be insulated to > or = R-6 in attics and > or = R-4.2 elsewhere
☐	Programmable thermostat is specified
☐	Building cavities are not used as ducts (IBC-scope buildings only)
☐	Notes indicate HVAC pipe insulation is specified, R-3 minimum (e.g. hydronic systems, refrigerant lines)

HVAC Equipment Design

One and Two Family Design Form:

- HVAC Equipment Sizing Worksheet identifies the design load analysis standard and confirms understanding of sizing requirements per ACCA Manual J & S.
- Ventilations worksheet demonstrates that whole house ventilation rate complies with the IRC or the IMC.
- Specification for heating/cooling equipment model & make to be deferred upon certification process

Multi-Family Design Form:

- Require plans demonstrating compliance with IECC and IMC and load calculations.
- Will require specification for heating/cooling equipment model & make.

HVAC Equipment Design:

(1) Mandatory Requirements & Equipment Sizing

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HVAC EQUIPMENT DESIGN FORM

Use this checklist for one- and two-family dwellings and townhouses of any height. Groups R-2, R-3, and R-4 three stories or less in height above grade plane use the Group R version.

Address:_____ Permit #:_____ Date: _____

Permit holder:_____ Phone: _____

Homes pursuing ENERGY STAR certification may attach a completed ENERGY STAR National HVAC Design Report in lieu of completing the remainder of this form. Otherwise, complete the following information.

Mandatory Items:

- ☐ **N1103.1.1** Thermostats shall be programmable
- ☐ **N1103.3.1**Ducts in unconditioned spaces ≥ 3" diameter shall be insulated to ≥ R-8 in attics and ≥ R-6 elsewhere
- ☐ **N1103.3.1**Ducts in unconditioned spaces < 3" diameter shall be insulated to ≥ R-6 in attics and ≥ R-4.2 elsewhere
- ☐ **N1103.3.2.1** Air handler shall have a manufacturer's designation of ≤ 2% air leakage when tested per ASHRAE 193
- ☐ **N1103.3.3** The *Duct and Envelope Testing* form shall be completed and submitted to the inspector
- ☐ **N1103.4** HVAC pipe insulation is R-3 minimum (e.g. hydronic systems, refrigerant lines) and outdoor insulation isprotected
- ☐ **N1103.7** Manual J report or other approved forms, including heating and cooling design loads, shall be submitted to the inspector
- ☐ **N1103.7** Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculatedin accordance with Manual J
- ☐ **Manual S.** Specified cooling equipment capacity shall be ≤ 1.15 times the design load or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.)
- ☐ **Manual S.** Specified heating equipment capacity shall be ≤ 1.40 times the design load or the next larger nominal size, whichever is greater
- ☐ **N1103.6** Whole-house mechanical ventilation worksheet has been completed (see reverse)

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HVAC EQUIPMENT DESIGN FORM - MULTIFAMILY

Use this checklist for **Groups R-2, R-3, and R-4 three stories or less** in height above grade plane.

House Address: _____ Permit #: _____ Date: _____

Permit holder: _____ Phone: _____

Homes pursuing ENERGY STAR certification may attach a completed ENERGY STAR National HVAC Design Report in lieu of completing the remainder of this form. Otherwise, complete the following information.

Mandatory Items:

- ☐ **R403.1.1** Thermostats are programmable
- ☐ **R403.3.1** Ducts in unconditioned spaces ≥ 3" diameter insulated to ≥ R-8 in attics and ≥ R-6 elsewhere
- ☐ **R403.3.1** Ducts in unconditioned spaces < 3" diameter insulated to ≥ R-6 in attics and ≥ R-4.2 elsewhere
- ☐ **R403.2.2.1** Air handler has manufacturer's designation of ≤ 2% air leakage when tested per ASHRAE 193
- ☐ **R403.3.3** The *Duct and Envelope Testing* form will be submitted to the inspector
- ☐ **R403.3.5** Building cavities are not used as ducts (IBC-scope buildings only)
- ☐ **R403.4** HVAC pipe insulation is R-3 minimum (e.g. hydronic systems, refrigerant lines) and outdoor insulation is protected
- ☐ **R403.7** Manual J report, including heating and cooling design loads, is attached
- ☐ **R403.7** Heating and cooling equipment have been selected in accordance with Manual S, based on loads calculated in accordance with Manual J:

Equipment Sizing and Selection:

Design loads:	**Equipment specifications:**
Design cooling load _____ (Btu/h)	Cooling system output capacity _____ (Btu/h)
	Cooling equipment make (optional): _____
	Cooling equipment model (optional): _____
Design heating load: _____ (Btu/h)	Heating system output capacity: _____ (Btu/h)
	Heating equipment make (optional): _____
	Heating equipment model (optional): _____

- ☐ **Manual S.** Specified cooling equipment capacity is ≤ 1.15 times the design load or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.)
- ☐ **Manual S.** Specified heating equipment capacity is ≤ 1.40 times the design load or the next larger nominal size, whichever is greater

☐ **IMC 403.3.2** Whole-house mechanical ventilation worksheet has been completed (see reverse)

EZ Permit Standard:

Ductwork & Warm-Air Appliances

- Manual J report, including heating and cooling design loads, shall be submitted to the inspector
- Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculated in accordance with Manual J
- **Manual S**. Specified cooling equipment capacity shall be ≤ 1.15 times the design load or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.)
- **Manual S**. Specified heating equipment capacity shall be ≤ 1.40 times the design load or the next larger nominal size, whichever is greater

CITY OF PHILADELPHIA
DEPARTMENT OF LICENSES & INSPECTIONS
Construction Services Division
Municipal Services Building - Concourse Level
1401 John F. Kennedy Boulevard
Philadelphia, Pennsylvania 19102

EZ PERMIT
DUCTWORK & WARM-AIR APPLIANCES
For the Installation of New Ductwork, Registers/Grilles/Diffusers, and Warm-Air Appliances
Revised 11/19

EZ Ductwork & Warm-Air Appliances Permit

Obtain permits for the installation of new ductwork, registers, grills and diffusers, and warm-air appliances without submitting plans by meeting the Conditions and Design Limitations below. Any deviations from this permit standard will result in permit revocation.

Special Flood Hazard Area: If subject property is located within a Special Flood Hazard Area (Floodplain), EZ Permit MAY ONLY be submitted at Permit Services at 1401 JFK Blvd, MSB, Concourse Level. Additional documentation required.

Conditions

- Ductwork and air-handling equipment must be self-contained within single tenant space.
- Any work requiring vertical/horizontal assembly penetrations shall not be applicable to the EZ permit process. Such penetration locations shall include:
  - Floor & Horizontal Assemblies
  - Exterior Walls
  - Stairway Enclosures
  - Fire-Resistance Rated Construction
- Ductwork and air-handling equipment shall not exceed a design capacity of 2,000 cfm. Contractors shall specify size of appliance tonnage.
- process shall not be applicable to kitchen exhaust systems.
- ole-house mechanical ventilation worksheet shall be completed and submitted with EZ Mechanical tion.

irements

- ucts to be constructed of Class 0 or 1 duct material in accordance with UL 181.
- ucts to be constructed as specified by SMACNA *HVAC Duct Construction Standards—Metal &*
- ss duct construction to conform to SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Duct Construction Standards.*
- shall resist, without structural failure, a 200-lb concentrated load, and shall not be installed in floors nd bathrooms required to have smooth, hard, nonabsorbent surfaces, with exceptions of dwelling units.

Residential Mechanical Energy Mandatory Requirements

- Thermostats shall be programmable
- Ducts in unconditioned spaces ≥ 3" diameter shall be insulated to ≥ R-8 in attics and ≥ R-6 elsewhere
- Ducts in unconditioned spaces < 3" diameter shall be insulated to ≥ R-6 in attics and ≥ R-4.2 elsewhere
- Air handler shall have a manufacturer's designation of ≤ 2% air leakage when tested per ASHRAE 193
- The *Duct and Envelope Testing* form shall be completed and submitted to the inspector
- HVAC pipe insulation is R-3 minimum (e.g. hydronic systems, refrigerant lines) and outdoor insulation is protected
- Manual J report, including heating and cooling design loads, shall be submitted to the inspector
- Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculated in accordance with Manual J
- **Manual S**. Specified cooling equipment capacity shall be ≤ 1.15 times the design load or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.)
- **Manual S**. Specified heating equipment capacity shall be ≤ 1.40 times the design load or the next larger nominal size, whichever is greater

HVAC Equipment Design:

(2) Whole-House Mechanical Design Worksheet

One- and Two-Family Dwellings & Townhouses

WHOLE-HOUSE MECHANICAL VENTILATION DESIGN WORKSHEET

1. **Fill in the conditioned floor area and number of bedrooms for the dwelling:**

   Conditioned Floor Area = _____ ft² Number of bedrooms = _____

2. **Circle the required airflow value on the table below or use Equation 15-1:**

   ➢ **Equation 15-1:**

   (0.01.1 x total sq.ft. area of house) + [7.5 x (number of bedrooms + 1)] = Ventilation rate (cu.ft./minute)

   (0.01 x _____ *sq.ft.*) + [7.5 x (_____ + 1)] = _____ *cu.ft./minute*

IRC Table M M1505.4.3(1)

Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements

Dwelling Unit Floor Area (square feet)	Number of Bedrooms				
	0-1	2-3	4-5	6-7	>7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

3. **Will the fan operate continuously or intermittently?** ☐ Continuous ☐ Intermittent

4. **If the fan will be operated intermittently,** multiply the airflow value from Table M 1505.4.3(1) (above) by the appropriate value in Table M)1505.4.3(2) (below). Note: the fan must operate *on a pre-set schedule.*

IRC Table M 1505.4.3(2)

Intermittent Whole-House Mechanical Ventilation Rate Factors

Run-time Percentage in Each 4-hour Segment	25%	33%	50%	66%	75%	100 %
Factor	4.0	3.0	2.0	1.5	1.3	1.0

5. **Enter the required airflow =** _____ CFM

☐ The fan's rated are flow rate shall meet or exceed the value in **Item 5**

☐ The fan's rated efficacy shall meet or exceed the appropriate value below:

- Bathroom/utility room fans 90 cfm or greater, in-line fans, and range hoods: **2.8 cfm/watt**
- Bathroom/utility room fans 10 cfm or greater and less than 90 cfm: **1.4 cfm/watt**
- HRV or ERV fans: **1.2 cfm/watt**

Design Professional / Mechanical Contractor Name: _____

Design Professional / Mechanical Contractor Signature: _____ Date: _____

Multi-Family Dwellings

WHOLE-HOUSE MECHANICAL VENTILATION DESIGN WORKSHEET

1. **Fill in the conditioned floor area and number of bedrooms for the dwelling:**

   Conditioned Floor Area = _____ ft² Number of bedrooms = _____

2. **Determine the required outdoor airflow rater per IMC 403.3.2.1 Equation 4-9:**

$$Q_{OA} = 0.01A_{floor} + 7.5(N_{br}+1)$$

Where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft²

N_{br} = number of bedrooms (but not less than one)

Show calculation below:

Q_{OA} = _____ **CFM**

3a. **Does the fan operate continuously or intermittently?** ☐ Continuous ☐ Intermittent

3b. **If the fan is to be operated intermittently *on a pre-set schedule*,** controls shall operate the fan for at least 1 hour of each 4-hour period and the airflow must be increased such that the average cfm over each 4-hour period is not less than the cfm prescribed by Equation 4-9. Describe control schedule below and fill in the design outdoor airflow rate:

Q_{OA} **intermittent** = _____ CFM

4. **R403.6.1. Fan efficacy. Enter the following information regarding the specified fan:**

Rated fan airflow = _____ CFM Fan make: _____

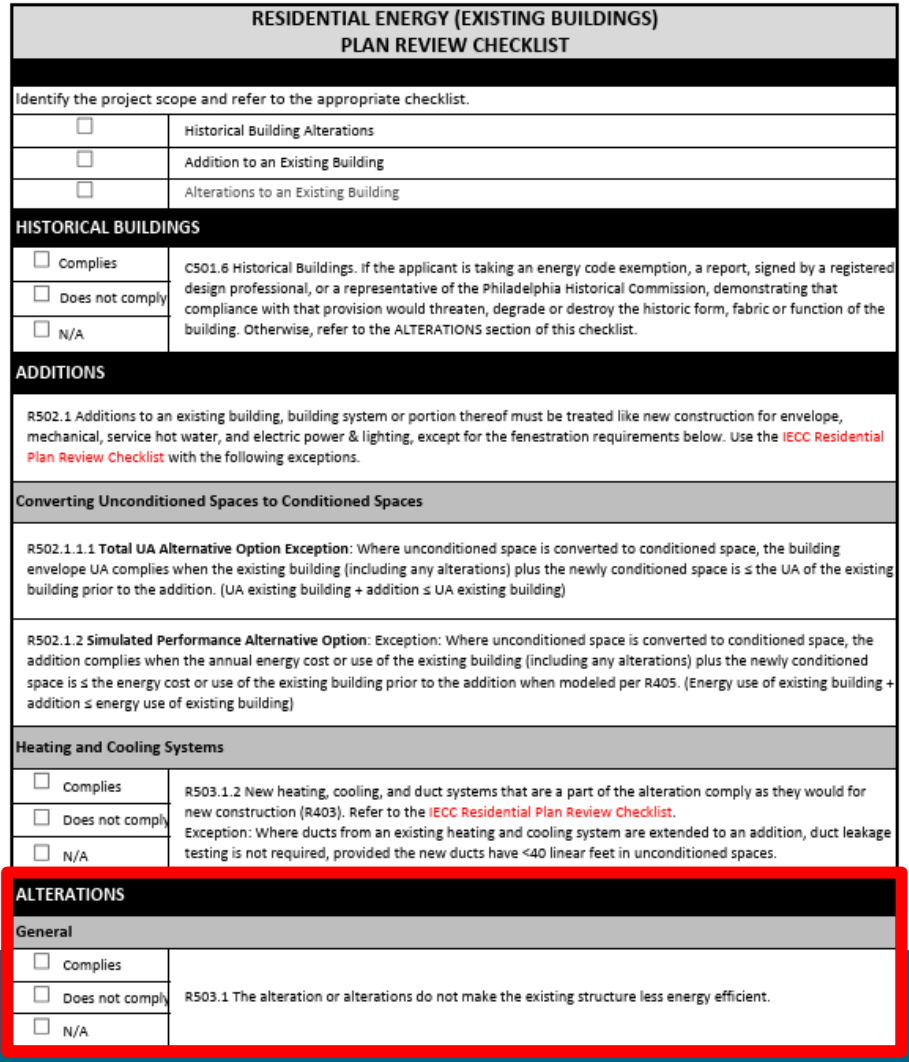
HVI-rated fan efficacy = _____ CFM/Watt Fan model: _____

Residential

Permit Requirements—Existing Buildings

Residential Energy Review Existing Buildings

- Where Existing Buildings are undergoing alterations or additions, ensure to review applicable provisions for minimum compliance requirements.
    - Historical Structures and Alteration workscopes may not require compliance to the minimum efficiency requirements under 2018 IECC based on existing conditions



RESIDENTIAL ENERGY (EXISTING BUILDINGS)
PLAN REVIEW CHECKLIST

Identify the project scope and refer to the appropriate checklist.

☐	Historical Building Alterations
☐	Addition to an Existing Building
☐	Alterations to an Existing Building

HISTORICAL BUILDINGS

☐ Complies ☐ Does not comply ☐ N/A	C501.6 Historical Buildings. If the applicant is taking an energy code exemption, a report, signed by a registered design professional, or a representative of the Philadelphia Historical Commission, demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the building. Otherwise, refer to the ALTERATIONS section of this checklist.

ADDITIONS

R502.1 Additions to an existing building, building system or portion thereof must be treated like new construction for envelope, mechanical, service hot water, and electric power & lighting, except for the fenestration requirements below. Use the IECC Residential Plan Review Checklist with the following exceptions.

Converting Unconditioned Spaces to Conditioned Spaces

R502.1.1.1 **Total UA Alternative Option Exception**: Where unconditioned space is converted to conditioned space, the building envelope UA complies when the existing building (including any alterations) plus the newly conditioned space is ≤ the UA of the existing building prior to the addition. (UA existing building + addition ≤ UA existing building)

R502.1.2 **Simulated Performance Alternative Option**: Exception: Where unconditioned space is converted to conditioned space, the addition complies when the annual energy cost or use of the existing building (including any alterations) plus the newly conditioned space is ≤ the energy cost or use of the existing building prior to the addition when modeled per R405. (Energy use of existing building + addition ≤ energy use of existing building)

Heating and Cooling Systems

☐ Complies ☐ Does not comply ☐ N/A	R503.1.2 New heating, cooling, and duct systems that are a part of the alteration comply as they would for new construction (R403). Refer to the IECC Residential Plan Review Checklist. Exception: Where ducts from an existing heating and cooling system are extended to an addition, duct leakage testing is not required, provided the new ducts have <40 linear feet in unconditioned spaces.

ALTERATIONS

General

☐ Complies ☐ Does not comply ☐ N/A	R503.1 The alteration or alterations do not make the existing structure less energy efficient.

Residential

Permit Requirements—Inspections

Inspection Responsibilities

Inspection	Prescriptive	Performance	ERI (R406.5)	Above-code
Foundation[1]	L&I	L&I	Third party[2]	Third party[2]
Pre-drywall	Third party[2]	Third party[2]	Third party[2]	Third party[2]
Plumbing	L&I	L&I	Third party[2]	Third party[2]
Mechanical	L&I	L&I	Third party[2]	Third party[2]
Duct/Envelope Testing	Third party[2]	Third party[2]	Third party[2]	Third party[2]
Final	L&I	Third party[2]	Third party[2]	Third party[2]

[1]Only when slab-on-grade or exterior basement wall insulation is specified
[2]Documentation collected by the inspector

Third Party Testing Certification Requirements

Blower door testing and duct-leakage testing, and air barrier inspections must be performed by a third party holding one of the following certifications:

- *RESNET-Certified HERS Rater
- *RESNET-Certified Rating Field Inspector (RFI)
- BPI Building Analyst
- BPI Infiltration & Duct Leakage
- BPI Energy Auditor
- BPI Envelope Professional

* Required for air barrier inspection

Inspection Documentation

Third Party Verification	When	Certification
Blower Door Test	Always	Air and Duct Leakage Form
Air Barrier (Visual Inspection)	Always	*Air Barrier Installation Checklist
HVAC Equipment Certification	Always	Residential HVAC Equipment Certification Form
Duct Leakage	Where duct is installed outside of conditioned space.	Air and Duct Leakage Form
Final Compliance Form	Performance Methods	**As Determined by Method

* Be Collected Prior To Close-In

** May Issue TCO pending submission of final certification

Air Barrier Installation Checklist

Department of
Licenses and Inspections
CITY OF PHILADELPHIA

AIR BARRIER & INSULATION INSTALLATION CHECKLIST

(Based on IECC 2018 and 2018 Table N1102.4.1.1)

House Address:_____ Permit #:_____ Date: _____

Permit holder:_____ Phone: _____

This checklist must be completed and provided to the inspector prior to the wallboard inspection.[1]

General	☐	A continuous air barrier is installed in the building envelope.
	☐	The exterior thermal envelope contains a continuous air barrier.
	☐	Breaks or joints in the air barrier are sealed.
	☐	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	☐	The air barrier in any dropped ceiling/soffit are aligned with the insulation and any gaps in the air barrier are sealed.
	☐	Recessed lighting fixtures installed in the building envelope are air tight & IC rated.
Walls	☐	Insulation is installed in all wall assemblies that separate conditioned space from unconditioned space or the outside.
	☐	Cavity insulation is R-20 or greater[2] or a combination of cavity and continuous insulation is installed with R-13 or greater cavity + R-5 or greater continuous.[3]
	☐	The junction of the foundation and sill plate are sealed.
	☐	The junction of the top plate and the top of exterior walls are sealed.
	☐	Knee walls have an air barrier on the attic side of the w
	☐	Walls are framed to allow the corner to be insulated o Corners are insulated with a material that is at least R-3
	☐	Headers of frame walls are insulated by completely fill at least R-3 per inch.
	☐	Exterior thermal envelope insulation for framed walls continuous alignment with the air barrier.

Inspecting company:_____ Phone: _____

Tester Name (print):_____ Signature:_____ Date: _____

BPI or HERS Rater certification number: BPI no: _____ HERS Rater no: _____

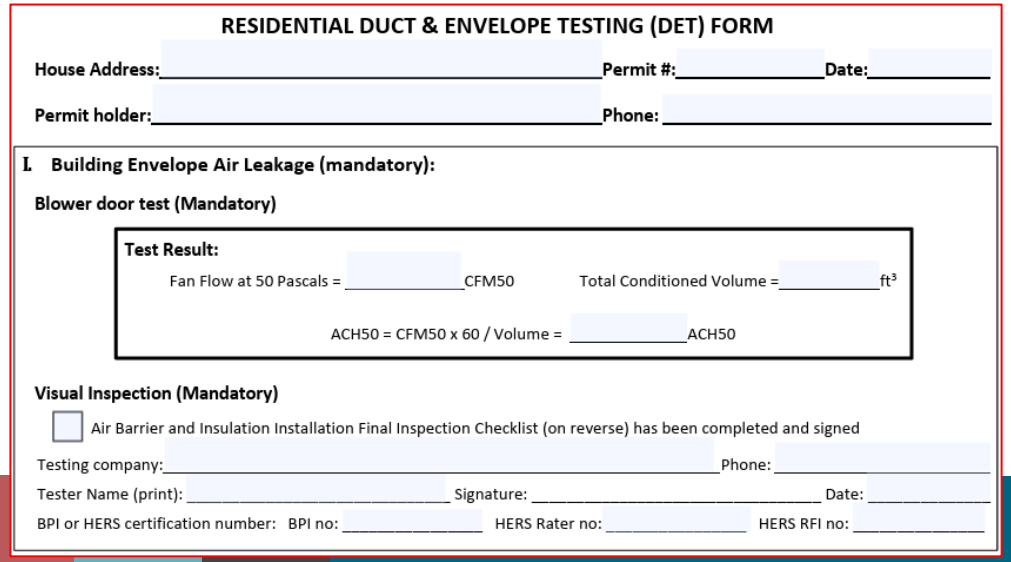
Find a qualified professional at:

https://peconewhomes.com/builders/find-participating-raters/ | http://www.bpi.org/locator-tool/find-a-contractor

Building Envelope Air Leakage

- Blower Door Testing per ASTM E 779 OR ASTM E 1827
  - Each Building or Structure
  - Air Leakage Rate < 5.0 air changes per hour @ 50 Pa (ACH 50)

**EC--R402.4.1.2: Reduction from 3.0 ACH to 5.0 ACH for IECC 2018.



RESIDENTIAL DUCT & ENVELOPE TESTING (DET) FORM

House Address:_____ Permit #:_____ Date:_____

Permit holder:_____ Phone: _____

I. Building Envelope Air Leakage (mandatory):

Blower door test (Mandatory)

Test Result:

Fan Flow at 50 Pascals = _____ CFM50 Total Conditioned Volume = _____ ft^3

ACH50 = CFM50 x 60 / Volume = _____ ACH50

Visual Inspection (Mandatory)

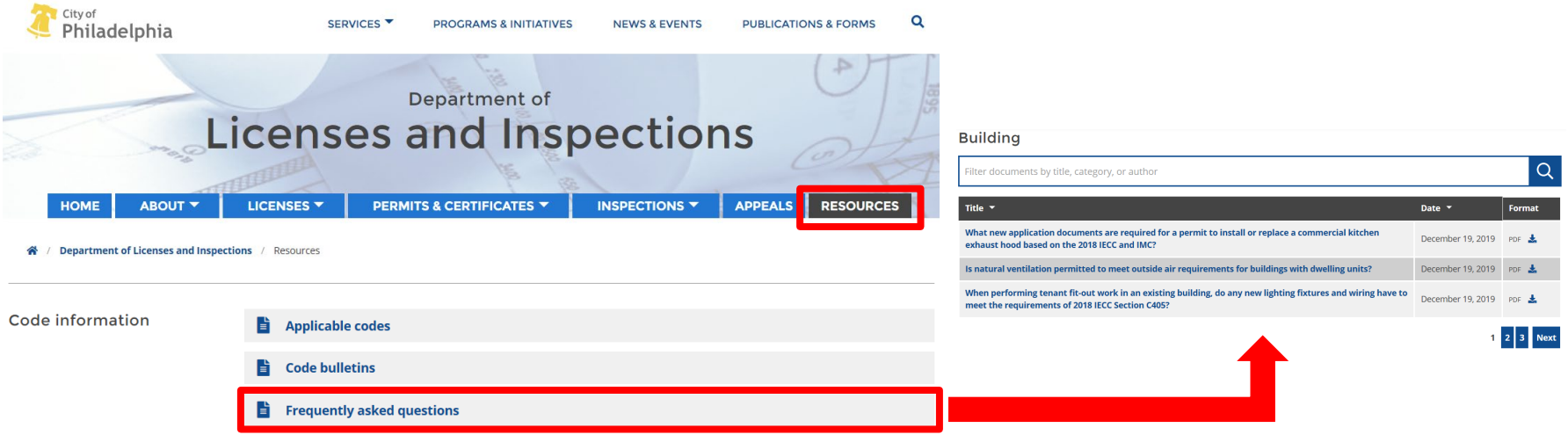
☐ Air Barrier and Insulation Installation Final Inspection Checklist (on reverse) has been completed and signed

Testing company:_____ Phone: _____

Tester Name (print): _____ Signature: _____ Date: _____

BPI or HERS certification number: BPI no: _____ HERS Rater no: _____ HERS RFI no: _____

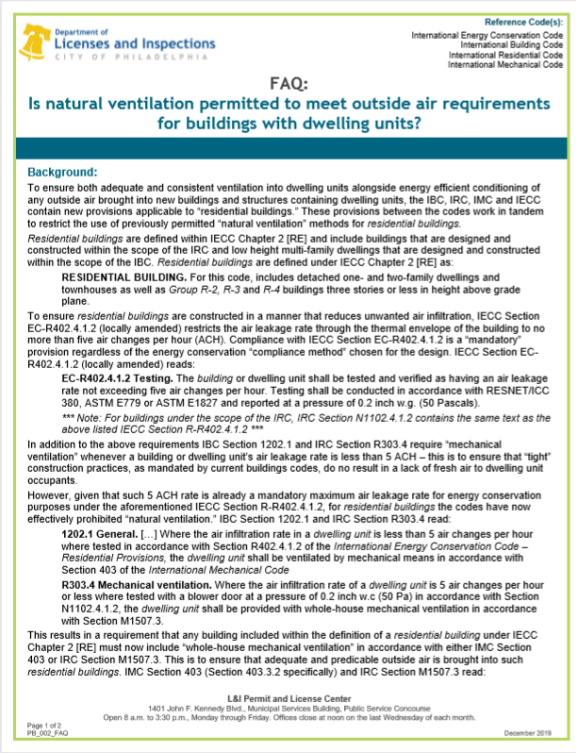
Energy FAQs



Available at Department's website: www.phila.gov/li - Select 'RESOURCES'

Residential Energy FAQs

- Dwelling Unit Natural Ventilation limits
  - *Clarifies the limits in the IBC, IECC, IMC and IRC for 'whole house ventilation'.*
  - *Air Changes per Hour (ACH) limited to 5 ACH per IECC R402.4 (per PA UCC)*
  - *This requires 'tight' building construction with minimal air leakage*
  - *Due to this, natural ventilation alone cannot create enough ACHs for adequate indoor air quality*
  - *Whole house ventilation now mandatory*



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Energy Conservation Code
International Building Code
International Residential Code
International Mechanical Code

FAQ:

Is natural ventilation permitted to meet outside air requirements for buildings with dwelling units?

Background:

To ensure both adequate and consistent ventilation into dwelling units alongside energy efficient conditioning of any outside air brought into new buildings and structures containing dwelling units, the IBC, IRC, IMC and IECC contain new provisions applicable to "residential buildings." These provisions between the codes work in tandem to restrict the use of previously permitted "natural ventilation" methods for *residential buildings*.

Residential buildings are defined within IECC Chapter 2 [RE] and include buildings that are designed and constructed within the scope of the IRC and low height multi-family dwellings that are designed and constructed within the scope of the IBC. *Residential buildings* are defined under IECC Chapter 2 [RE] as:

> **RESIDENTIAL BUILDING.** For this code, includes detached one- and two-family dwellings and townhouses as well as *Group R-2, R-3* and *R-4* buildings three stories or less in height above grade plane.

To ensure *residential buildings* are constructed in a manner that reduces unwanted air infiltration, IECC Section EC-R402.4.1.2 (locally amended) restricts the air leakage rate through the thermal envelope of the building to no more than five air changes per hour (ACH). Compliance with IECC Section EC-R402.4.1.2 is a "mandatory" provision regardless of the energy conservation "compliance method" chosen for the design. IECC Section EC-R402.4.1.2 (locally amended) reads:

> **EC-R402.4.1.2 Testing.** The *building* or dwelling unit shall be tested and verified as having an air leakage rate not exceeding five air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals).
>
> **** Note: For buildings under the scope of the IRC, IRC Section N1102.4.1.2 contains the same text as the above listed IECC Section R-R402.4.1.2 ****

In addition to the above requirements IBC Section 1202.1 and IRC Section R303.4 require "mechanical ventilation" whenever a building or dwelling unit's air leakage rate is less than 5 ACH – this is to ensure that "tight" construction practices, as mandated by current buildings codes, do no result in a lack of fresh air to dwelling unit occupants.

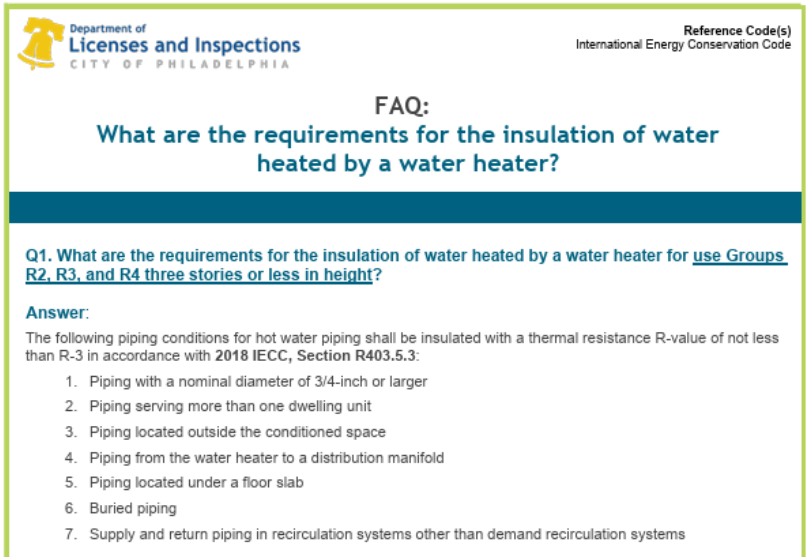
However, given that such 5 ACH rate is already a mandatory maximum air leakage rate for energy conservation purposes under the aforementioned IECC Section R-R402.4.1.2, for *residential buildings* the codes have now effectively prohibited "natural ventilation." IBC Section 1202.1 and IRC Section R303.4 read:

> **1202.1 General.** […] Where the air infiltration rate in a *dwelling unit* is less than 5 air changes per hour where tested in accordance with Section R402.4.1.2 of the *International Energy Conservation Code – Residential Provisions*, the *dwelling unit* shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code*
>
> **R303.4 Mechanical ventilation.** Where the air infiltration rate of a *dwelling unit* is 5 air changes per hour or less where tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section N1102.4.1.2, the *dwelling unit* shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

This results in a requirement that any building included within the definition of a *residential building* under IECC Chapter 2 [RE] must now include "whole-house mechanical ventilation" in accordance with either IMC Section 403 or IRC Section M1507.3. This is to ensure that adequate and predicable outside air is brought into such *residential buildings*. IMC Section 403 (Section 403.3.2 specifically) and IRC Section M1507.3 read:

L&I Permit and License Center
1401 John F. Kennedy Blvd., Municipal Services Building, Public Service Concourse
Open 8 a.m. to 3:30 p.m., Monday through Friday. Offices close at noon on the last Wednesday of each month.

Residential Energy FAQs



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s)
International Energy Conservation Code

FAQ:
What are the requirements for the insulation of water heated by a water heater?

Q1. What are the requirements for the insulation of water heated by a water heater for use Groups R2, R3, and R4 three stories or less in height?

Answer:

The following piping conditions for hot water piping shall be insulated with a thermal resistance R-value of not less than R-3 in accordance with **2018 IECC, Section R403.5.3**:

1. Piping with a nominal diameter of 3/4-inch or larger
2. Piping serving more than one dwelling unit
3. Piping located outside the conditioned space
4. Piping from the water heater to a distribution manifold
5. Piping located under a floor slab
6. Buried piping
7. Supply and return piping in recirculation systems other than demand recirculation systems

Heated Water Piping Insulation

- Clarifies requirements where insulation is required to be provided for heated water piping for residential projects per Section R403.5.3

Residential Energy Common Issues

- **Residential Building blower door testing**

  Required prior to Final Inspection. Testing must be by Accredited Inspector (RESNET-Certified HERS Rate, BPI Energy Auditor, etc.)

  Previous slides discussed details and Forms.

- **REScheck coordination with construction documents**

  'RESCheck' Report must match plans for consistent thermal envelope properties

  Ongoing issue due to some 'cookie cutter' details on plans not being updated to 2018 provisions

Commercial

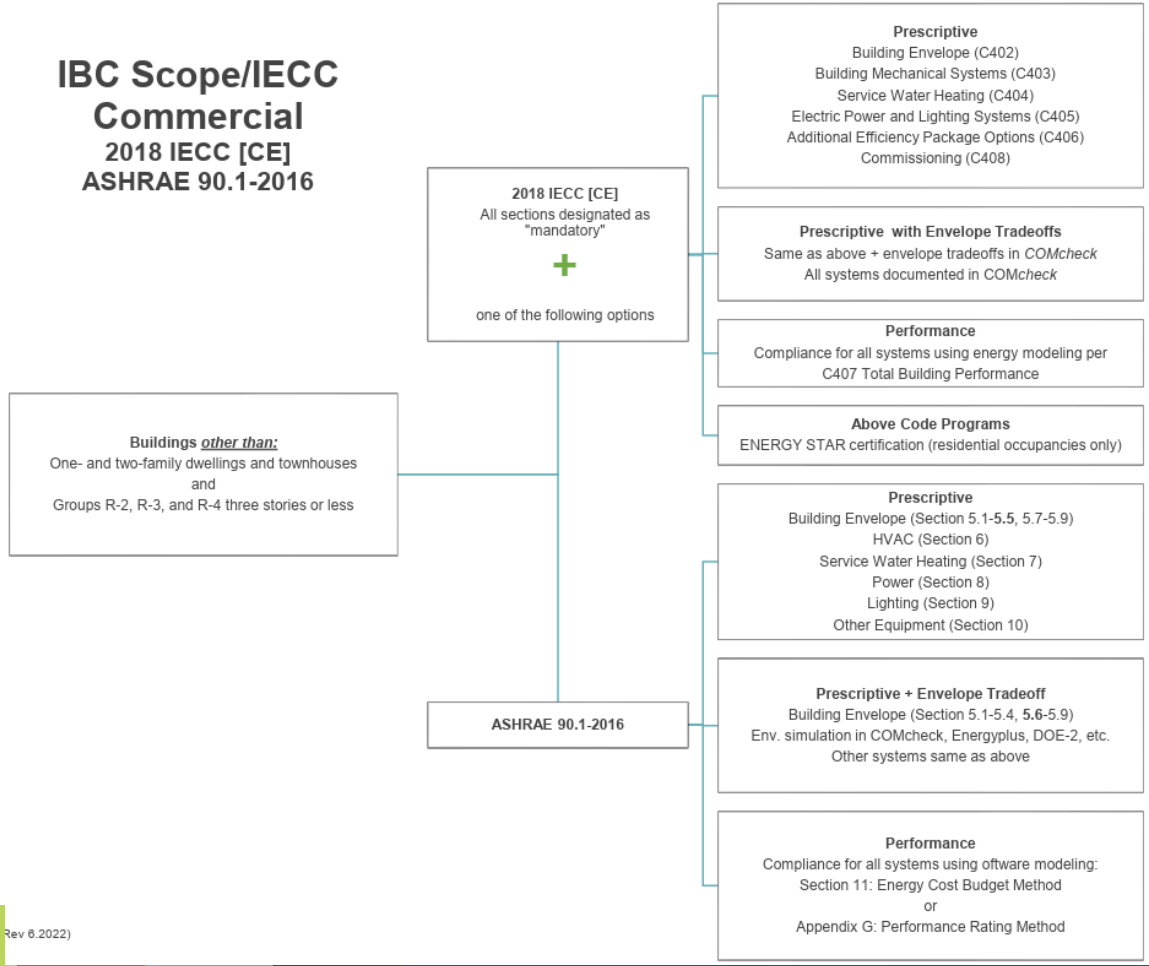
Compliance Paths

Compliance Paths

IECC (2018)	ASHRAE 90.1 (2016)
Prescriptive	
Envelope Trade-Off	
Simulated Performance	
Above Code Programs	

IBC Scope/IECC Commercial

2018 IECC [CE]
ASHRAE 90.1-2016



Commercial

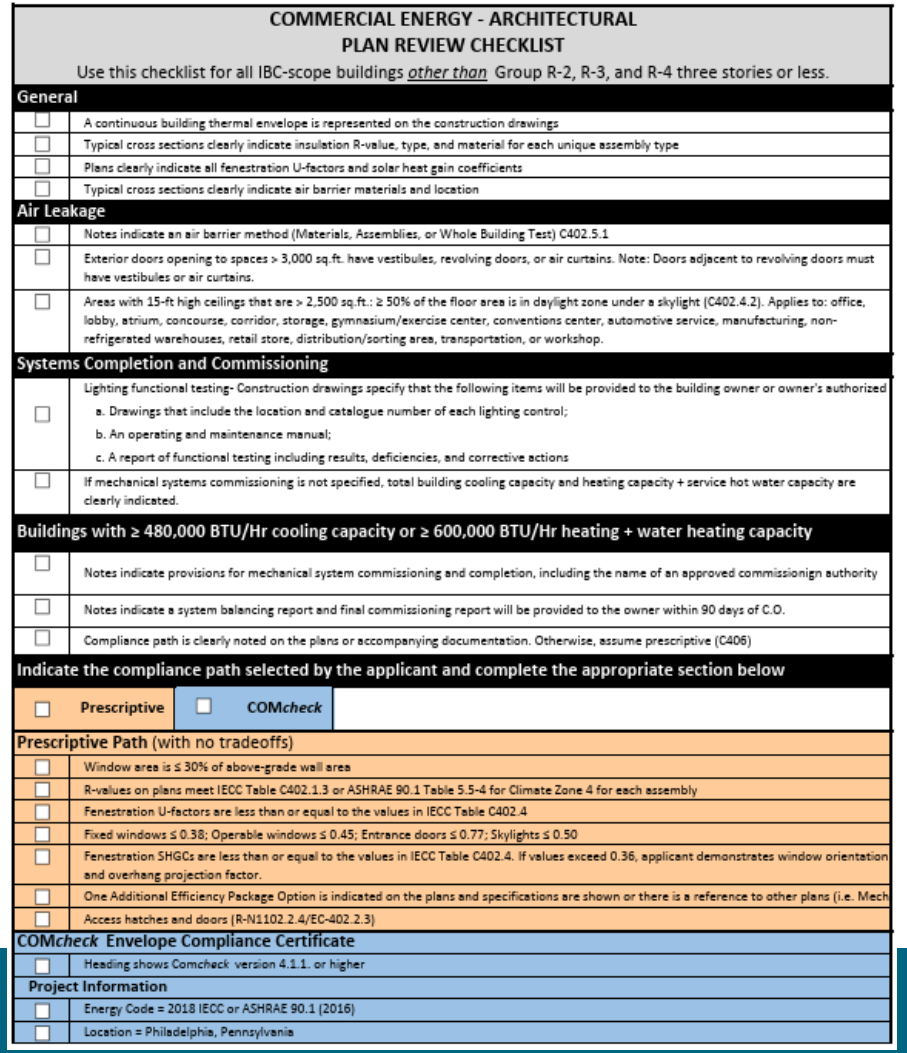
Permit Requirements - New Construction

Permit Application Documentation

METHOD	Permit Detail	Qualifications
Prescriptive	**Compliance Summary***	Design Prof
Prescriptive (Envelope Trade-Off)	**ComCheck** Ver 4.1.5.5 (or higher)	Design Prof
Simulated Performance	Prelim Report	Depends upon method
Above Code Programs	Prelim Report	Depends upon method

Commercial Energy Plan Review Checklist

- Plan Review Checklist provides requirements associated with Prescriptive & UA Trade-off Alternative Method (COMCheck)
- Where Simulated Performance method or Above Code Program compliance are utilized:
  - Separate supplemental energy compliance documentation will be required



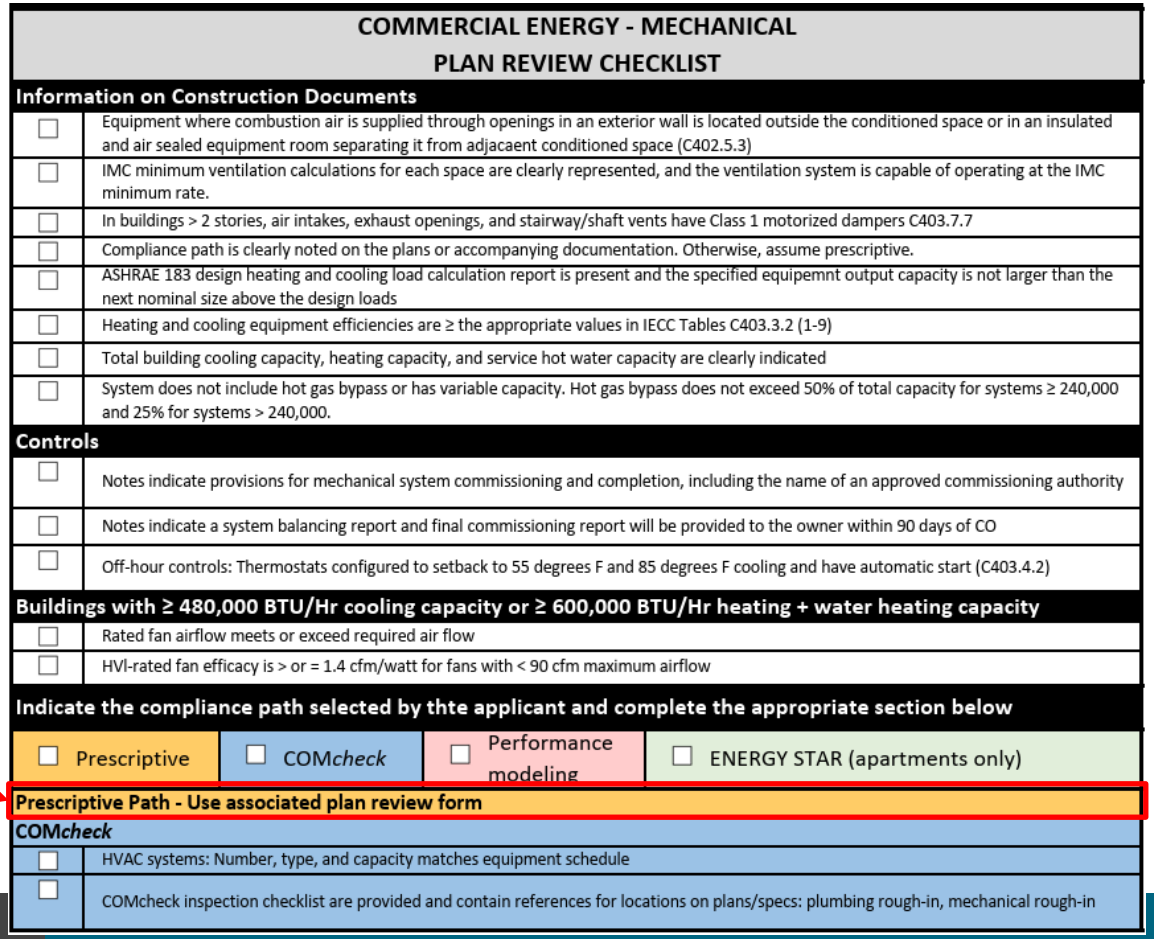
COMMERCIAL ENERGY - ARCHITECTURAL PLAN REVIEW CHECKLIST

Use this checklist for all IBC-scope buildings *other than* Group R-2, R-3, and R-4 three stories or less.

General	
☐	A continuous building thermal envelope is represented on the construction drawings
☐	Typical cross sections clearly indicate insulation R-value, type, and material for each unique assembly type
☐	Plans clearly indicate all fenestration U-factors and solar heat gain coefficients
☐	Typical cross sections clearly indicate air barrier materials and location
Air Leakage	
☐	Notes indicate an air barrier method (Materials, Assemblies, or Whole Building Test) C402.5.1
☐	Exterior doors opening to spaces > 3,000 sq.ft. have vestibules, revolving doors, or air curtains. Note: Doors adjacent to revolving doors must have vestibules or air curtains.
☐	Areas with 15-ft high ceilings that are > 2,500 sq.ft.: ≥ 50% of the floor area is in daylight zone under a skylight (C402.4.2). Applies to: office, lobby, atrium, concourse, corridor, storage, gymnasium/exercise center, conventions center, automotive service, manufacturing, non-refrigerated warehouses, retail store, distribution/sorting area, transportation, or workshop.
Systems Completion and Commissioning	
☐	Lighting functional testing- Construction drawings specify that the following items will be provided to the building owner or owner's authorized a. Drawings that include the location and catalogue number of each lighting control; b. An operating and maintenance manual; c. A report of functional testing including results, deficiencies, and corrective actions
☐	If mechanical systems commissioning is not specified, total building cooling capacity and heating capacity + service hot water capacity are clearly indicated.
Buildings with ≥ 480,000 BTU/Hr cooling capacity or ≥ 600,000 BTU/Hr heating + water heating capacity	
☐	Notes indicate provisions for mechanical system commissioning and completion, including the name of an approved commissionign authority
☐	Notes indicate a system balancing report and final commissioning report will be provided to the owner within 90 days of C.O.
☐	Compliance path is clearly noted on the plans or accompanying documentation. Otherwise, assume prescriptive (C406)
Indicate the compliance path selected by the applicant and complete the appropriate section below	
☐ Prescriptive	☐ COM*check*
Prescriptive Path (with no tradeoffs)	
☐	Window area is ≤ 30% of above-grade wall area
☐	R-values on plans meet IECC Table C402.1.3 or ASHRAE 90.1 Table 5.5-4 for Climate Zone 4 for each assembly
☐	Fenestration U-factors are less than or equal to the values in IECC Table C402.4
☐	Fixed windows ≤ 0.38; Operable windows ≤ 0.45; Entrance doors ≤ 0.77; Skylights ≤ 0.50
☐	Fenestration SHGCs are less than or equal to the values in IECC Table C402.4. If values exceed 0.36, applicant demonstrates window orientation and overhang projection factor.
☐	One Additional Efficiency Package Option is indicated on the plans and specifications are shown or there is a reference to other plans (i.e. Mech
☐	Access hatches and doors (R-N1102.2.4/EC-402.2.3)
COM*check* Envelope Compliance Certificate	
☐	Heading shows Com*check* version 4.1.1. or higher
Project Information	
☐	Energy Code = 2018 IECC or ASHRAE 90.1 (2016)
☐	Location = Philadelphia, Pennsylvania

Commercial Energy Mechanical Requirement Checklist

- Building Permit review checklist for mechanical requirements to be documented on construction drawing notes
- Where prescriptive compliance path is utilized, separate Commercial Mechanical Plan Review Checklist to be utilized

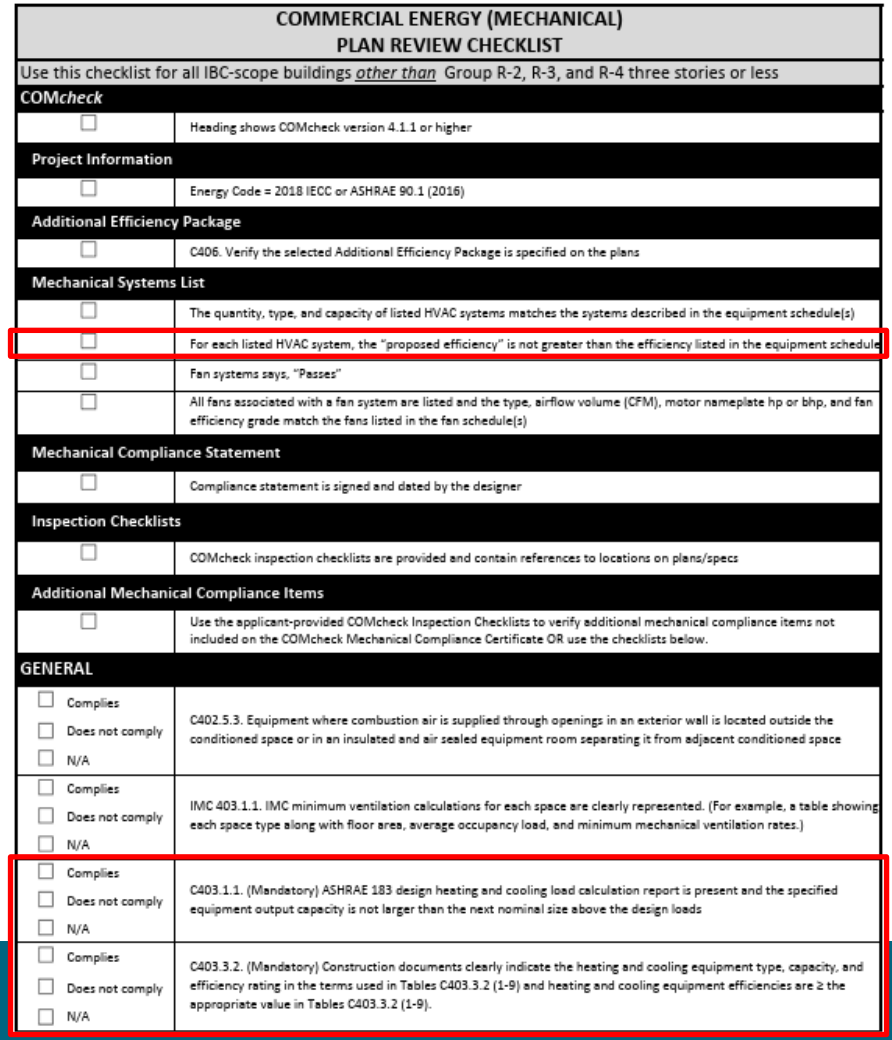


COMMERCIAL ENERGY - MECHANICAL
PLAN REVIEW CHECKLIST

Information on Construction Documents	
☐	Equipment where combustion air is supplied through openings in an exterior wall is located outside the conditioned space or in an insulated and air sealed equipment room separating it from adjacaent conditioned space (C402.5.3)
☐	IMC minimum ventilation calculations for each space are clearly represented, and the ventilation system is capable of operating at the IMC minimum rate.
☐	In buildings > 2 stories, air intakes, exhaust openings, and stairway/shaft vents have Class 1 motorized dampers C403.7.7
☐	Compliance path is clearly noted on the plans or accompanying documentation. Otherwise, assume prescriptive.
☐	ASHRAE 183 design heating and cooling load calculation report is present and the specified equipemnt output capacity is not larger than the next nominal size above the design loads
☐	Heating and cooling equipment efficiencies are ≥ the appropriate values in IECC Tables C403.3.2 (1-9)
☐	Total building cooling capacity, heating capacity, and service hot water capacity are clearly indicated
☐	System does not include hot gas bypass or has variable capacity. Hot gas bypass does not exceed 50% of total capacity for systems ≥ 240,000 and 25% for systems > 240,000.
Controls	
☐	Notes indicate provisions for mechanical system commissioning and completion, including the name of an approved commissioning authority
☐	Notes indicate a system balancing report and final commissioning report will be provided to the owner within 90 days of CO
☐	Off-hour controls: Thermostats configured to setback to 55 degrees F and 85 degrees F cooling and have automatic start (C403.4.2)
Buildings with ≥ 480,000 BTU/Hr cooling capacity or ≥ 600,000 BTU/Hr heating + water heating capacity	
☐	Rated fan airflow meets or exceed required air flow
☐	HVI-rated fan efficacy is > or = 1.4 cfm/watt for fans with < 90 cfm maximum airflow
Indicate the compliance path selected by thte applicant and complete the appropriate section below	
☐ Prescriptive	☐ COM*check* ☐ Performance modeling ☐ ENERGY STAR (apartments only)
Prescriptive Path - Use associated plan review form	
COM*check*	
☐	HVAC systems: Number, type, and capacity matches equipment schedule
☐	COMcheck inspection checklist are provided and contain references for locations on plans/specs: plumbing rough-in, mechanical rough-in

Commercial Mechanical Plan Review Checklist

- To be used where Commercial Energy prescriptive method compliance path is utilized
- Provisions to be complied include:
  - Additional efficiency package requirements to be identified
  - Equipment specifications to meet requirements based on design heating & cooling load calculations



COMMERCIAL ENERGY (MECHANICAL)
PLAN REVIEW CHECKLIST

Use this checklist for all IBC-scope buildings *other than* Group R-2, R-3, and R-4 three stories or less

COMcheck	
☐	Heading shows COMcheck version 4.1.1 or higher
Project Information	
☐	Energy Code = 2018 IECC or ASHRAE 90.1 (2016)
Additional Efficiency Package	
☐	C406. Verify the selected Additional Efficiency Package is specified on the plans
Mechanical Systems List	
☐	The quantity, type, and capacity of listed HVAC systems matches the systems described in the equipment schedule(s)
☐	For each listed HVAC system, the "proposed efficiency" is not greater than the efficiency listed in the equipment schedule
☐	Fan systems says, "Passes"
☐	All fans associated with a fan system are listed and the type, airflow volume (CFM), motor nameplate hp or bhp, and fan efficiency grade match the fans listed in the fan schedule(s)
Mechanical Compliance Statement	
☐	Compliance statement is signed and dated by the designer
Inspection Checklists	
☐	COMcheck inspection checklists are provided and contain references to locations on plans/specs
Additional Mechanical Compliance Items	
☐	Use the applicant-provided COMcheck Inspection Checklists to verify additional mechanical compliance items not included on the COMcheck Mechanical Compliance Certificate OR use the checklists below.
GENERAL	
☐ Complies ☐ Does not comply ☐ N/A	C402.5.3. Equipment where combustion air is supplied through openings in an exterior wall is located outside the conditioned space or in an insulated and air sealed equipment room separating it from adjacent conditioned space
☐ Complies ☐ Does not comply ☐ N/A	IMC 403.1.1. IMC minimum ventilation calculations for each space are clearly represented. (For example, a table showing each space type along with floor area, average occupancy load, and minimum mechanical ventilation rates.)
☐ Complies ☐ Does not comply ☐ N/A	C403.1.1. (Mandatory) ASHRAE 183 design heating and cooling load calculation report is present and the specified equipment output capacity is not larger than the next nominal size above the design loads
☐ Complies ☐ Does not comply ☐ N/A	C403.3.2. (Mandatory) Construction documents clearly indicate the heating and cooling equipment type, capacity, and efficiency rating in the terms used in Tables C403.3.2 (1-9) and heating and cooling equipment efficiencies are ≥ the appropriate value in Tables C403.3.2 (1-9).

Commercial Mechanical Plan Review Checklist

- Additional Review items include:
  - Minimum Ventilation Rates
  - Kitchen Exhaust System Requirements, including make-up air considerations
  - Systems Commissioning

SYSTEMS COMMISSIONING	
☐ Total building cooling capacity is ≤480,000 Btu/h (40 tons) and combined heating and service hot water capacity is ≤600,000 Btu/h.	
☐ Complies ☐ Does not comply ☐ N/A	Notes indicate provisions for mechanical system commissioning and completion, including the name of an approved commissioning authority.
☐ Complies ☐ Does not comply ☐ N/A	Notes indicate a system balancing report and final commissioning report will be provided to the owner within 90 days of CO.
ECONOMIZERS	
☐ Complies ☐ Does not comply ☐ N/A	C403.5. Economizer is present on each cooling system or exemption/exception is cited and verified
MECHANICAL SYSTEMS SERVING MULTIPLE ZONES	
☐ Project design does not include mechanical systems serving multiple zones. Skip to the next section.	
☐ Complies ☐ Does not comply ☐ N/A	C403.6.1. System is a variable air volume (VAV) system
VENTILATION SYSTEMS	
☐ Complies ☐ Does not comply ☐ N/A	C403.2.2. (Mandatory) Minimum ventilation calculations are correct, and where provided, the ventilation system is capable of operating at the IMC-minimum rate.
KITCHEN EXHAUST SYSTEMS	
☐ Project scope does not include kitchen exhaust systems. Skip to the next section.	
☐ Complies ☐ Does not comply ☐ N/A	C408.7.5. (Mandatory) Kitchen exhaust systems do not have >10% of replacement air introduced directly into the hood (no short-circuit systems)
☐ Complies ☐ Does not comply ☐ N/A	C408.7.5. (Mandatory) Spaces with kitchen exhaust systems do not have a conditioned air supply exceeding the greater of the following: 1. The ventilation rate required to meet the space heating or cooling load 2. Hood flow minus available transfer air flow
☐ Complies ☐ Does not comply ☐ N/A	C408.7.5. (Mandatory) Where the total exhaust hood airflow rate exceeds 5,000 cfm, each specified hood is a factory-built commercial exhaust hood and comply with UL 710, have a maximum exhaust rate not exceeding the values in Table C403.7.5, and either: 1. ≥50% of all replacement air is transfer air 2. Demand ventilation systems are installed for ≥75% of exhaust air and are configured to provide ≥50% reduction in exhaust and transfer air flow rates 3. Energy recovery devices with a recovery effectiveness of ≥40% are installed on ≥50% of total exhaust airflow

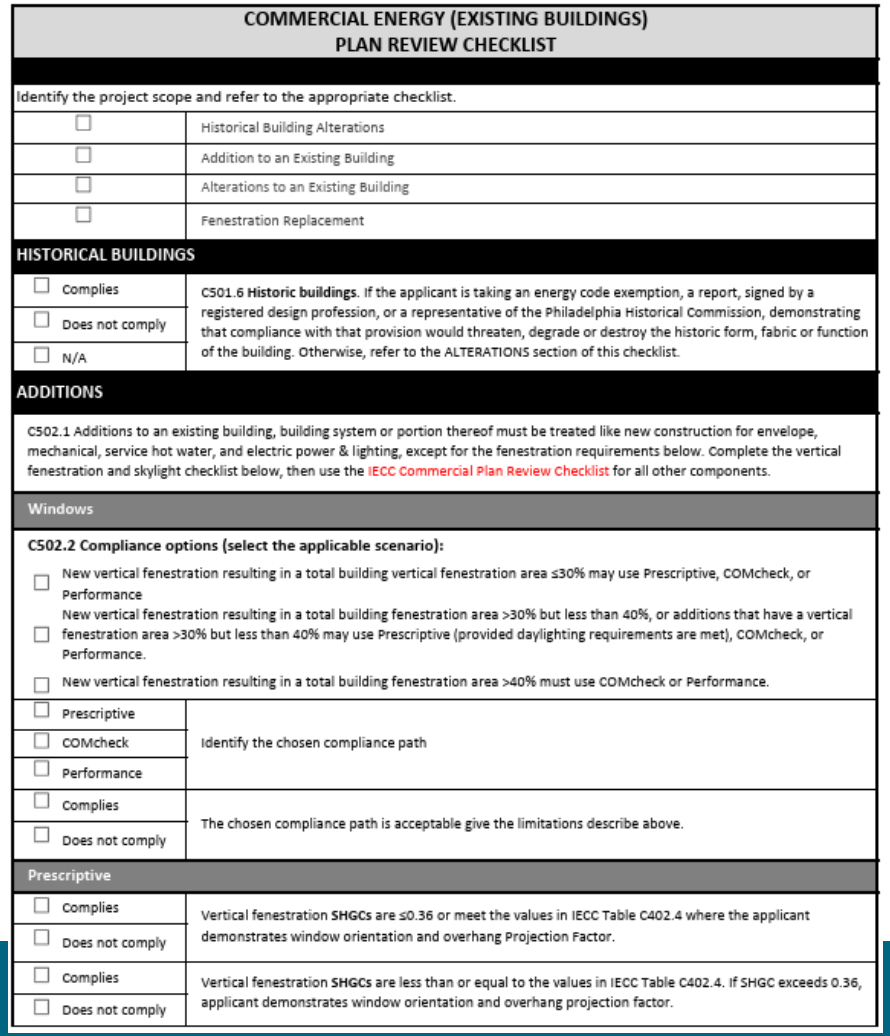
FANS AND FAN CONTROL	
☐ HVAC design does not include fans (e.g. hydronic systems) or all fans are integral to equipment covered by the minimum efficiency requirements in Tables C403.3.2 (1-10). Skip to the next section.	
☐ Complies ☐ Does not comply ☐ N/A	Equipment schedule contains fan motor nameplate horsepower (hp) and brake horsepower (bhp) for each fan in each HVAC system.
REFRIGERATION EQUIPMENT PERFORMANCE	
☐ Project scope does not include commercial refrigerators or freezers. Skip to the next section.	
☐ Complies ☐ Does not comply ☐ N/A	C403.10. Refrigeration equipment type, application, and volume per Tables C403.10.1(1) and C403.10.2(2) shall be clearly indicated in a refrigeration equipment schedule and AHRI 1200 energy use in kWh/day is ≤ the values in Tables C403.10.1(1) and C403.10.2(2).
DUCTS, PLENUMS, PIPING, AND OTHER HVAC ELEMENTS	
☐ Complies ☐ Does not comply ☐ N/A	C403.11.2.1. Duct pressure class is clearly indicated in the equipment schedule.

Commercial

Permit Requirements - Existing Buildings

Commercial Energy Review—Existing Buildings

- Where Existing Buildings are undergoing alterations or additions, ensure to review applicable provisions for minimum compliance requirements.
  - Analysis of any fenestration replacement compliance to be performed
  - Historical Structures and Alteration workscopes may not require compliance to the minimum efficiency requirements under 2018 IECC based on existing conditions



COMMERCIAL ENERGY (EXISTING BUILDINGS)
PLAN REVIEW CHECKLIST

Identify the project scope and refer to the appropriate checklist.

☐	Historical Building Alterations
☐	Addition to an Existing Building
☐	Alterations to an Existing Building
☐	Fenestration Replacement

HISTORICAL BUILDINGS

☐ Complies	C501.6 **Historic buildings**. If the applicant is taking an energy code exemption, a report, signed by a registered design profession, or a representative of the Philadelphia Historical Commission, demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the building. Otherwise, refer to the ALTERATIONS section of this checklist.
☐ Does not comply	
☐ N/A	

ADDITIONS

C502.1 Additions to an existing building, building system or portion thereof must be treated like new construction for envelope, mechanical, service hot water, and electric power & lighting, except for the fenestration requirements below. Complete the vertical fenestration and skylight checklist below, then use the IECC Commercial Plan Review Checklist for all other components.

Windows

C502.2 Compliance options (select the applicable scenario):

☐ New vertical fenestration resulting in a total building vertical fenestration area ≤30% may use Prescriptive, COMcheck, or Performance

☐ New vertical fenestration resulting in a total building fenestration area >30% but less than 40%, or additions that have a vertical fenestration area >30% but less than 40% may use Prescriptive (provided daylighting requirements are met), COMcheck, or Performance.

☐ New vertical fenestration resulting in a total building fenestration area >40% must use COMcheck or Performance.

☐ Prescriptive	Identify the chosen compliance path
☐ COMcheck	
☐ Performance	
☐ Complies	The chosen compliance path is acceptable give the limitations describe above.
☐ Does not comply	

Prescriptive

☐ Complies	Vertical fenestration **SHGCs** are ≤0.36 or meet the values in IECC Table C402.4 where the applicant demonstrates window orientation and overhang Projection Factor.
☐ Does not comply	
☐ Complies	Vertical fenestration **SHGCs** are less than or equal to the values in IECC Table C402.4. If SHGC exceeds 0.36, applicant demonstrates window orientation and overhang projection factor.
☐ Does not comply	

Commercial

Permit Requirements - Inspection

Inspections

- L&I scope of inspections has not changing.
- Additional certifications may be required based on compliance path.

Mechanical Systems Commissioning

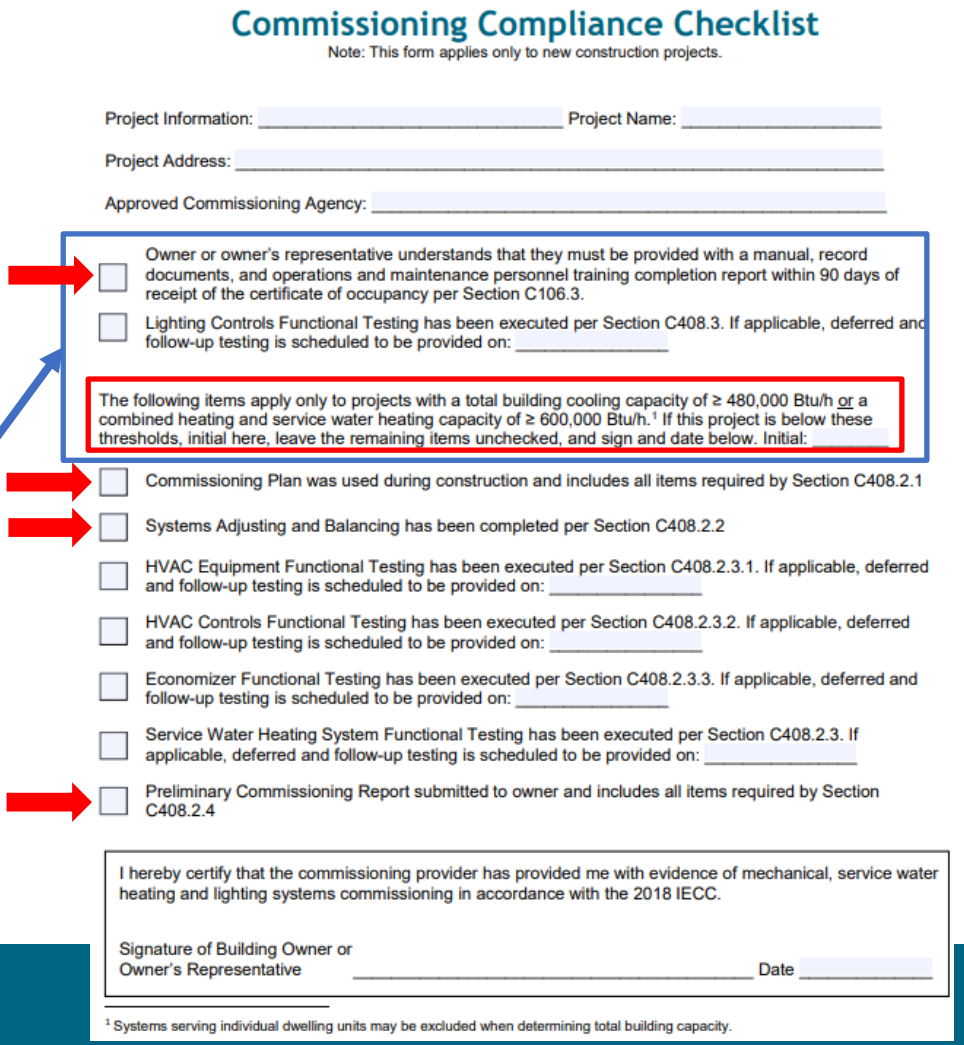
- Construction documentation must indicate total building cooling equipment capacity, as well as the combined mechanical systems and service water-heating equipment capacity.
  - Construction notes for System Commissioning Provisions required per IECC C408.2:

    - If Total building cooling equipment capacity is ≥480,000 or
    - If Combined mechanical systems and water heating equipment is ≥600,000 Btu/h

- The company name and contact information of an approved commissioning agent shall be included on the construction document notes.

Commissioning Compliance Checklist

- Where project mechanical equipment sizing do not meet Commissioning Compliance requirements:
  - Project applicants will only complete the first fields.
- Where deferral of final testing reports are proposed on the form, identify the follow-up testing date expected.
  - Preliminary Commissioning Report will still be required to be submitted prior to Temporary Certificate of Occupancy issuance.



Commissioning Compliance Checklist

Note: This form applies only to new construction projects.

Project Information: _____ Project Name: _____

Project Address: _____

Approved Commissioning Agency: _____

☐ Owner or owner's representative understands that they must be provided with a manual, record documents, and operations and maintenance personnel training completion report within 90 days of receipt of the certificate of occupancy per Section C106.3.

☐ Lighting Controls Functional Testing has been executed per Section C408.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

The following items apply only to projects with a total building cooling capacity of ≥ 480,000 Btu/h or a combined heating and service water heating capacity of ≥ 600,000 Btu/h.[1] If this project is below these thresholds, initial here, leave the remaining items unchecked, and sign and date below. Initial: _____

☐ Commissioning Plan was used during construction and includes all items required by Section C408.2.1

☐ Systems Adjusting and Balancing has been completed per Section C408.2.2

☐ HVAC Equipment Functional Testing has been executed per Section C408.2.3.1. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ HVAC Controls Functional Testing has been executed per Section C408.2.3.2. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Economizer Functional Testing has been executed per Section C408.2.3.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Service Water Heating System Functional Testing has been executed per Section C408.2.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Preliminary Commissioning Report submitted to owner and 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 in accordance with the 2018 IECC.

Signature of Building Owner or Owner's Representative _____ Date _____

[1] Systems serving individual dwelling units may be excluded when determining total building capacity.

Commissioning Reporting Requirements

Note that any deferral of commissioning report submissions to the property owner must be scheduled out no further than 90 days upon the receipt date of the Certificate of Occupancy.

II. Information on Construction Documents

A. Mechanical Systems Commissioning (Cx) (C408.2)

If mechanical systems and service water heating commissioning will not be performed, construction document notes shall clearly indicate total building cooling equipment capacity and combined mechanical systems and service water heating equipment capacity. If the total building cooling equipment capacity is ≥ 480,000 Btu/h, or the combined mechanical systems and service water heating equipment capacity is ≥ 600,000 Btu/h, construction document notes shall clearly indicate provisions for mechanical systems commissioning and completion requirements in accordance with IECC Section C408.2. Systems included in Section C403.5 that serve individual dwelling units are not required to be commissioned. Effective July 1, 2019, the company name and contact information of an *approved* commissioning agent shall be included on the construction document notes.

B. Reporting Specifications

A system balancing report and final commissioning report shall be provided to the owner within 90 days of the date of receipt of the certificate of occupancy. The final Cx report shall include:

a. Results of functional testing;
b. Disposition of deficiencies found during testing, including details of corrective measures used or proposed;
c. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance.

III. Lighting Functional Testing

Construction drawings shall specify that the following items will be provided to the building owner or owner's authorized agent within 90 days of receipt of the certificate of occupancy:

a. Drawings that include the location and catalogue number of each lighting control;
b. An operating and maintenance manual;
c. A report of functional testing including results, deficiencies, and corrective actions

Commissioning Agency Certifications

All New Construction permit applications are required identify the proposed Third Party Entity (independent of the construction of the project) to serve as the project Commissioning Agent.

- ACG Certified Commissioning Authority (CxA)
- AEE Certified Building Commissioning Professional (CBCP)
- ASHRAE Building Commissioning Professional (BCxP)
- BCA Certified Commissioning Professional (CCP)
- NEBB Commissioning Process Professionals (CxPP)

Testing And Balancing

Required Certifications:

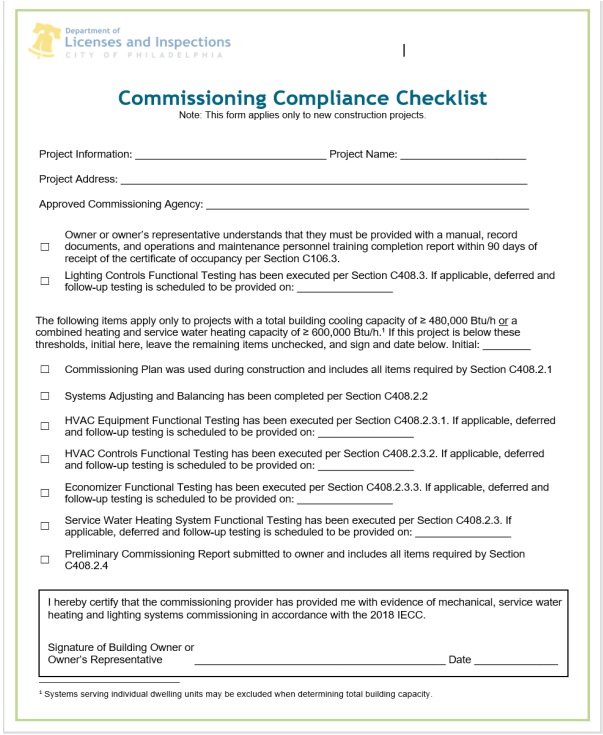
- TABB Certification
- NEBB Testing, Adjusting & Balancing (TAB) Certified Professional and Certified Technician
- AABC Test & Balance Engineer and Test & Balance Technician
- NBC Certified Balancing Technician and Certified Balancing Supervisor

Prerequisite for Scheduling Final Inspections

The Following Documents will be required prior to final inspection:

- Commissioning Compliance Checklist**
- Preliminary Commissioning Report (C408.2.4)
- Building Operations and Maintenance Documents

** To be completed by the Building Owner or Owner's Representative



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Commissioning Compliance Checklist

Note: This form applies only to new construction projects.

Project Information: _____ Project Name: _____

Project Address: _____

Approved Commissioning Agency: _____

☐ Owner or owner's representative understands that they must be provided with a manual, record documents, and operations and maintenance personnel training completion report within 90 days of receipt of the certificate of occupancy per Section C106.3.

☐ Lighting Controls Functional Testing has been executed per Section C408.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

The following items apply only to projects with a total building cooling capacity of ≥ 480,000 Btu/h or a combined heating and service water heating capacity of ≥ 600,000 Btu/h.[1] If this project is below these thresholds, initial here, leave the remaining items unchecked, and sign and date below. Initial: _____

☐ Commissioning Plan was used during construction and includes all items required by Section C408.2.1

☐ Systems Adjusting and Balancing has been completed per Section C408.2.2

☐ HVAC Equipment Functional Testing has been executed per Section C408.2.3.1. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ HVAC Controls Functional Testing has been executed per Section C408.2.3.2. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Economizer Functional Testing has been executed per Section C408.2.3.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Service Water Heating System Functional Testing has been executed per Section C408.2.3. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Preliminary Commissioning Report submitted to owner and 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 in accordance with the 2018 IECC.

Signature of Building Owner or Owner's Representative _____ Date _____

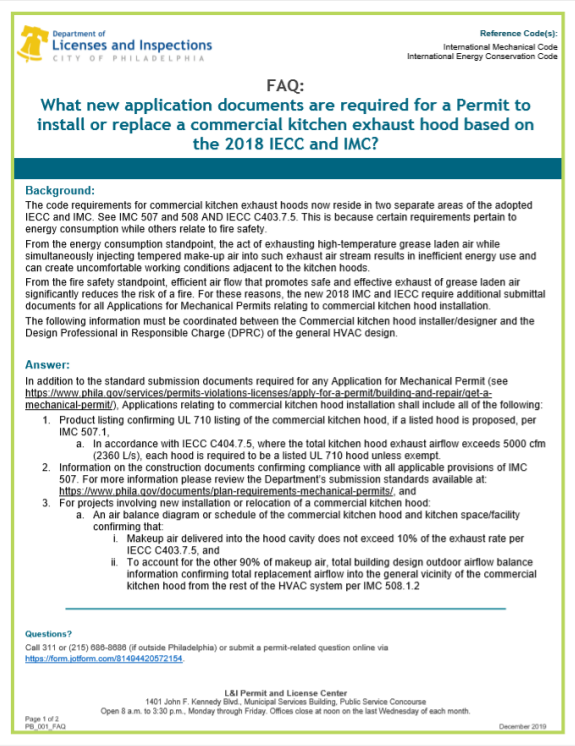
[1] Systems serving individual dwelling units may be excluded when determining total building capacity.

Commissioning Report Requirements

- Defined by Code under Section C408
- The Owner must be presented with a final report post-issuance.

Commercial Energy FAQs

- **Kitchen Hood Compliance**
  - *Lists new IMC and IECC provisions that provide regulations for hood installs*
  - *Limits hood cavity makeup air to 10% of exhaust. Other 90% is required from transfer air for kitchen area*
  - *Minimizes 'short circuit' supply and exhaust air*
  - *Promotes more predictable airflow because of reduced temperature differentials in air plume*



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Mechanical Code
International Energy Conservation Code

FAQ:

What new application documents are required for a Permit to install or replace a commercial kitchen exhaust hood based on the 2018 IECC and IMC?

Background:

The code requirements for commercial kitchen exhaust hoods now reside in two separate areas of the adopted IECC and IMC. See IMC 507 and 508 AND IECC C403.7.5. This is because certain requirements pertain to energy consumption while others relate to fire safety.

From the energy consumption standpoint, the act of exhausting high-temperature grease laden air while simultaneously injecting tempered make-up air into such exhaust air stream results in inefficient energy use and can create uncomfortable working conditions adjacent to the kitchen hoods.

From the fire safety standpoint, efficient air flow that promotes safe and effective exhaust of grease laden air significantly reduces the risk of a fire. For these reasons, the new 2018 IMC and IECC require additional submittal documents for all Applications for Mechanical Permits relating to commercial kitchen hood installation.

The following information must be coordinated between the Commercial kitchen hood installer/designer and the Design Professional in Responsible Charge (DPRC) of the general HVAC design.

Answer:

In addition to the standard submission documents required for any Application for Mechanical Permit (see https://www.phila.gov/services/permits-violations-licenses/apply-for-a-permit/building-and-repair/get-a-mechanical-permit/), Applications relating to commercial kitchen hood installation shall include all of the following:

1. Product listing confirming UL 710 listing of the commercial kitchen hood, if a listed hood is proposed, per IMC 507.1,
   a. In accordance with IECC C404.7.5, where the total kitchen hood exhaust airflow exceeds 5000 cfm (2360 L/s), each hood is required to be a listed UL 710 hood unless exempt.
2. Information on the construction documents confirming compliance with all applicable provisions of IMC 507. For more information please review the Department's submission standards available at: https://www.phila.gov/documents/plan-requirements-mechanical-permits/, and
3. For projects involving new installation or relocation of a commercial kitchen hood:
   a. An air balance diagram or schedule of the commercial kitchen hood and kitchen space/facility confirming that:
      i. Makeup air delivered into the hood cavity does not exceed 10% of the exhaust rate per IECC C403.7.5, and
      ii. To account for the other 90% of makeup air, total building design outdoor airflow balance information confirming total replacement airflow into the general vicinity of the commercial kitchen hood from the rest of the HVAC system per IMC 508.1.2

Questions?

Call 311 or (215) 686-8686 (if outside Philadelphia) or submit a permit-related question online via https://form.jotform.com/81494420572154

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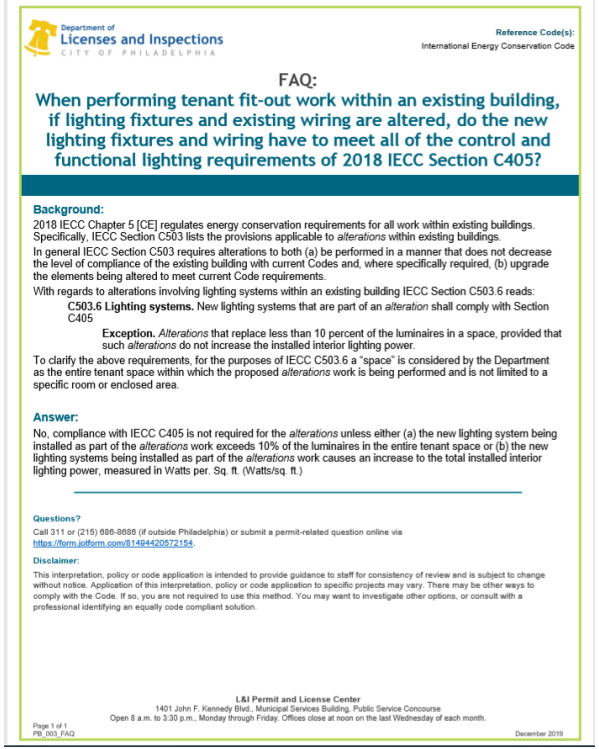
Commercial Energy FAQs (cont.)

- **IECC Lighting compliance for Existing Buildings**
  - *Clarifies an exception within the 'existing building' provisions of the Energy Code*
  - *Luminaire and wiring replacement for no more than 10% of the lighting fixtures within a tenant space are exempt from 2018 Energy Code lighting provisions (i.e. daylighting controls, etc.)*



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Energy Conservation Code

FAQ:

When performing tenant fit-out work within an existing building, if lighting fixtures and existing wiring are altered, do the new lighting fixtures and wiring have to meet all of the control and functional lighting requirements of 2018 IECC Section C405?

Background:

2018 IECC Chapter 5 [CE] regulates energy conservation requirements for all work within existing buildings. Specifically, IECC Section C503 lists the provisions applicable to *alterations* within existing buildings.

In general IECC Section C503 requires alterations to both (a) be performed in a manner that does not decrease the level of compliance of the existing building with current Codes and, where specifically required, (b) upgrade the elements being altered to meet current Code requirements.

With regards to alterations involving lighting systems within an existing building IECC Section C503.6 reads:

C503.6 Lighting systems. New lighting systems that are part of an *alteration* shall comply with Section C405

Exception. *Alterations* that replace less than 10 percent of the luminaires in a space, provided that such *alterations* do not increase the installed interior lighting power.

To clarify the above requirements, for the purposes of IECC C503.6 a "space" is considered by the Department as the entire tenant space within which the proposed *alterations* work is being performed and is not limited to a specific room or enclosed area.

Answer:

No, compliance with IECC C405 is not required for the *alterations* unless either (a) the new lighting system being installed as part of the *alterations* work exceeds 10% of the luminaires in the entire tenant space or (b) the new lighting systems being installed as part of the *alterations* work causes an increase to the total installed interior lighting power, measured in Watts per. Sq. ft. (Watts/sq. ft.)

Questions?

Call 311 or (215) 686-8686 (if outside Philadelphia) or submit a permit-related question online via https://form.jotform.com/81494420572154.

Disclaimer:

This interpretation, policy or code application is intended to provide guidance to staff for consistency of review and is subject to change without notice. Application of this interpretation, policy or code application to specific projects may vary. There may be other ways to comply with the Code. If so, you are not required to use this method. You may want to investigate other options, or consult with a professional identifying an equally code compliant solution.

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PB_003_FAQ

December 2019

Commercial Energy FAQs (cont.)

- **Roof Replacement with above deck insulation**
  - *Clarifies language to the extent of work required for above deck insulation removal for roof replacement work*
  - *Removal of all above deck insulation is still required to meet 2018 Energy Code requirements when new above deck insulation is installed*
  - *Roof replacement that can maintain existing insulation can continue to use the existing insulation when confirmed as suitable to accept new roof covering*

Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Building Code
International Energy Conservation Code

FAQ:

I am replacing the existing roof covering of a low-slope roof assembly that has existing rigid-insulation entirely above a cast-in-place concrete roof deck. Does the existing insulation now need to meet new 2018 IECC requirements for R- or U-value because the roof covering is being replaced?

Background:

Roofing work in the 2018 IBC and IECC is separated into multiple classes based on the extent of *alterations* work being proposed.

Changing the roof covering of an existing roof assembly which involves the removal of existing roof coverings is considered a *roof replacement*.

Roof replacement is defined under both IBC Section 202 and IECC Section 202 as follows (underline added for emphasis):

> **ROOF REPLACEMENT.** The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

When such work is proposed, IBC Section 1511.3 requires the complete removal of the existing roof coverings. Such removal includes all existing layers of roof coverings to such an extent that the roof "deck" is exposed. This will ensure any new roof covering installation occurs on a structurally sound and appropriate surface otherwise known as the roof "substrate". IBC Section 1511.3 reads:

> **1511.3 Roof replacement.** *Roof replacement* shall include the removal of all existing layers of roof coverings down to the roof deck

The intent of this section is to ensure that a new *roof covering* is not installed over existing *roof coverings* unless the subsections that follow IBC Section 1511.3, which specifically regulates *roof recovering* work, are met. As such, for the purposes of IBC Section 1511.3 the Department considers *roof replacement* work compliant with this Section where such work removes existing *roof coverings* down to either a suitable undamaged "substrate" upon which to install the new roof covering or the structural "deck" that supports the entire *roof assembly*.

The "substrate" identified above may or may not be existing above-deck insulating system. Where such "substrate" is damaged during the process of removal of the existing roof covering then, as the definition of *roof replacement* states, repairs must be made to ensure adequate support of any new *roof covering*

To ensure proper insulation is provided when a *roof replacement* occurs, IECC Section C503.1, which regulates *alterations* in general, and Section C503.3, which regulates *roof replacements* specifically, must be met. IECC Sections C503.1 and C503.3 read:

> **C503.1 General.** [. . .] *Alterations* shall be such that the existing *building* or structure is not less conforming to the provisions of this code than the existing *building* or structure was prior to the *alteration*. [. . .]
>
> **C503.3.1 Roof replacement.** *Roof replacements* shall comply with Section C402.1.3, C402.1.4, C402.1.5 or C407 where the existing roof assembly is part of the *building thermal envelope* and contains insulation entirely above the roof deck.

The definition of *roof replacement* and the Department's interpretation of IBC Section 1511.3, as described above, therefore do not require the removal of existing undamaged substrate. As such, IECC Section C503.3.1 would only apply to work where during the removal process of the existing roof covering the substrate, which

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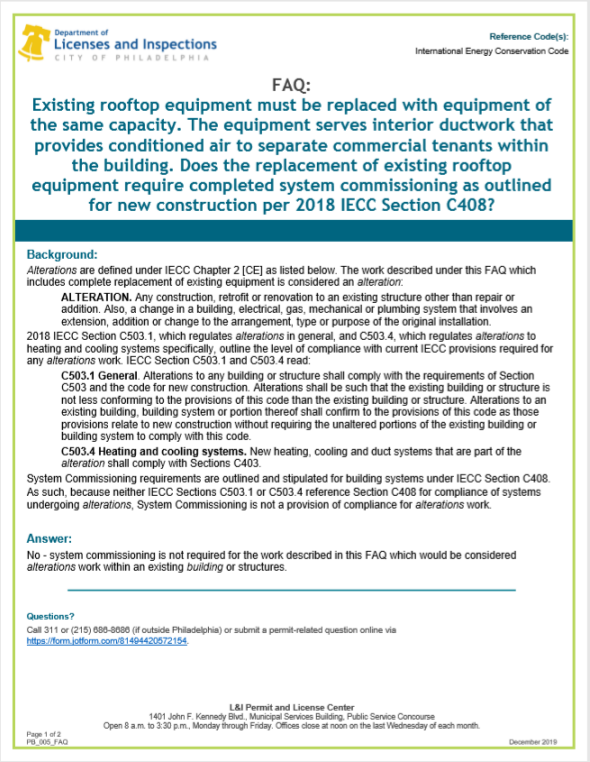
December 2019

Commercial Energy FAQs (cont.)

- **System Commissioning (Cx) for Existing Buildings**
  - *Clarifies to what extent Cx is required for existing buildings undergoing HVAC system alterations*
  - *Existing Building provisions of Energy Code only require compliance with efficiency and system specific provisions (i.e. economizer, etc.) provisions for HVAC alterations*



Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Energy Conservation Code

FAQ:

Existing rooftop equipment must be replaced with equipment of the same capacity. The equipment serves interior ductwork that provides conditioned air to separate commercial tenants within the building. Does the replacement of existing rooftop equipment require completed system commissioning as outlined for new construction per 2018 IECC Section C408?

Background:

Alterations are defined under IECC Chapter 2 [CE] as listed below. The work described under this FAQ which includes complete replacement of existing equipment is considered an *alteration*:

> **ALTERATION.** Any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

2018 IECC Section C503.1, which regulates *alterations* in general, and C503.4, which regulates *alterations* to heating and cooling systems specifically, outline the level of compliance with current IECC provisions required for any *alterations* work. IECC Section C503.1 and C503.4 read:

> **C503.1 General.** Alterations to any building or structure shall comply with the requirements of Section C503 and the code for new construction. Alterations shall be such that the existing building or structure is not less conforming to the provisions of this code than the existing building or structure. Alterations to an existing building, building system or portion thereof shall confirm to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code.
>
> **C503.4 Heating and cooling systems.** New heating, cooling and duct systems that are part of the *alteration* shall comply with Sections C403.

System Commissioning requirements are outlined and stipulated for building systems under IECC Section C408. As such, because neither IECC Sections C503.1 or C503.4 reference Section C408 for compliance of systems undergoing *alterations*, System Commissioning is not a provision of compliance for *alterations* work.

Answer:

No - system commissioning is not required for the work described in this FAQ which would be considered *alterations* work within an existing *building* or structures.

Questions?

Call 311 or (215) 686-8686 (if outside Philadelphia) or submit a permit-related question online via https://form.jotform.com/81494420572154.

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Commercial Energy FAQs (cont.)

- **Heated Water Piping Insulation**

  - *Clarifies the insulation requirements for heated water piping for uses other than Groups R2, R3, and R4 per Section C404.4*

  - *Clarifies location of insulation installation based on provisions of IECC 2018*

Q2. What are the requirements for the insulation of water heated by a water heater for other than use Groups R2, R3, and R4 three stories or less in height?

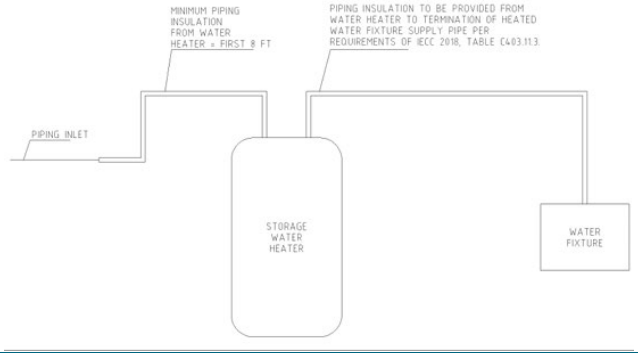
Answer:

All hot water piping shall be insulated in all of the following locations in accordance with **2018 IECC, Section C404.4**:

1. At the water heater to the terminal end of the plumbing fixture supply pipe
2. On the inlet and outlet of a storage water heater, insulation shall be provided to the piping to a heat trap or the first 8 feet of piping, whichever is less.
3. For any piping that is heat traced

See Exhibit A for details.

EXHIBIT A



Commercial Energy FAQs (cont.)

- **System Commissioning Agencies**

  - *Identifies the acceptable certifications required by an entity to perform System Commissioning*

  - *Clarifies the entity that can act as the System Commissioning Agency (can NOT be identified as the Contractor)*

Department of Licenses and Inspections
CITY OF PHILADELPHIA

Reference Code(s):
International Energy Conservation Code

FAQ:

What agency(ies) are approved to perform commissioning work required under 2018 IECC C408?

Background:

To validate that building systems, perform as intended, the International Energy Conservation Code (IECC) Section C408 requires all mechanical and service water heating systems, see IECC Section C408.2 for Exceptions, to undergo System Commissioning. This is to ensure that building systems perform in the most energy efficient manner possible by checking that the final installation of such systems meet the operating criteriaset forth in the design and construction documents.

System Commissioning is a multi-stage effort and may involve various parties including the Design Professionalin Responsible Charge of each respective building system, the Contractor(s) performing the work, testing and balancing (TAB) agency(ies), and approved Commissioning Agency(ies).

Due to the multiple parties involved, to make sure System Commissioning is performing in an objective manner, IECC Section C408.2 stipulates that only design professionals and approved agencies may perform System Commissioning – Contractors may NOT act as the System Commissioning agency on any project where they performed construction work. IECC Section C408.2 states:

> **C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements.** Prior to the final mechanical and plumbing inspections, the registered design professionalor approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Furthermore, as the Department has sole responsibility to approve any agency(ies) wishing to perform System Commissioning work, the Department's policy is to establish minimum qualification requirements for these as set forth below. This also applies to registered Design Professionals in Responsible Charge (DPRC) that wish to perform System Commissioning – when a DPRC is retained to perform System Commissioning work on systems that they designed, such DPRC MUST meet the minimum qualification requirements set forth below.

Answer:

System Commissioning can be performed by any Agency that maintains active and current Certifications in anyone of the following categories as administered by the associated Certifying body. Registered design professionals in responsible charge (DPRC) may also perform System Commissioning activities provided they also maintain active and current Certification as listed below.

Regardless of certifications held, Contractors may NOT act as the System Commissioning Agency on any project where they performed construction work.

Entities performing System Commissioning must hold one of the following Certifications.

- American Commissioning Group (ACG) Certified Commissioning Authority (CxA)
- Association of Energy Engineers (AEE) Certified Building Commissioning Professional (CBCP)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Building Commissioning Professional (BCxP)
- Building Commissioning Association (BCA) Certified Commissioning Professional (CCP)
- National Environmental Balancing Bureau (NEBB) Commissioning Process Professional (CxPP)

Commercial Energy Common Plan Issues

- **Kitchen Hood Compliance**

  Coordination between HVAC designer and Hood Installer for makeup air balance

- **Mandatory 'Additional Energy Package' Prescription Option**

  Construction documents must clearly state the 'additional' package selection per IECC Section C406

Questions

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Thank You

Stay tuned to future training webinar announcements through our L&I newsletter, to include Significant Changes with the upcoming 2021 Philadelphia Construction Codes adoption.

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