Code Updates
June 2019
Elizabeth Baldwin, P.E.
Chief Code Official
Changes and/or Challenges

- Two Different Code Cycles (2015 and 2018)
- IECC definition of ‘residential’ extends beyond the scope of IRC.
- PA UCC/ local modification to air change rate
- Leap to 2015/2018 Codes
  - Increased requirements, third party certifications
Implementation

- New Codes adopted on October 1, 2018. Mandatory for all applications filed on or after April 1, 2019

- Owner is responsible to comply with all provisions of the current code (2015 IRC and 2018 IECC).

- Third party inspection/ certification will be required on all applications filed on or after July 1, 2019.

- Will continue to work towards improved compliance and publish updates.
Information Sheet:
Residential Energy Code Compliance

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 applicants may choose between five main energy code compliance paths: Prescriptive, Prescriptive with Envelope Tradeoffs, Performance, Energy Rating Index, and Above Code Programs. Regardless of which compliance path is chosen, the applicant must meet all requirements in the IECC that are designated as "mandatory." For a visual representation, refer to Energy Code Compliance Path Flowcharts.

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, Enerware, 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
WHAT CODE DO I USE?

Single Family
One- and two-family dwellings and townhouses
- Three stories or less  
  2015 IRC + 2015 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 PA amendments)
- Four stories or more
  2018 IBC + 2018 IECC [CE] or ASHRAE 90.1-2016

Code Links:
2015 IRC: https://codes.iccsafe.org/content/IRC2015
2015 IECC: https://codes.iccsafe.org/content/IECC2015
2018 IBC: https://codes.iccsafe.org/content/IBC2018
2018 IECC: https://codes.iccsafe.org/content/IECC2018P2
ASHRAE 90.1 2016: https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards

Residential
## Compliance Alternatives

<table>
<thead>
<tr>
<th>METHOD</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td>Meets values for each assembly for R values or U factors</td>
</tr>
<tr>
<td>Prescriptive UA Alternative (ResCheck)</td>
<td>May trade off values for a weighted average of the assemblies comprising building envelope</td>
</tr>
<tr>
<td>Simulated Performance</td>
<td>Demonstrates equivalent annual energy use</td>
</tr>
<tr>
<td>ERI Performance</td>
<td>Demonstrates that the proposed building exceeds efficiency of the same building designed under the 2006 IECC.</td>
</tr>
<tr>
<td>Above Code Programs</td>
<td>Energy Star and PECO Home Rebates are currently accepted</td>
</tr>
</tbody>
</table>
**IRC Scope Buildings**

**2015 IECC [RE]**

**2015 IECC [RE]**
- All sections designated as mandatory (below)

  | Mandatory requirements: |
  | Certificate (R401.3) |
  | Air leakage (R402.4) |
  | Controls (R403.1) |
  | Duct sealing (R403.3.2) |
  | Duct testing (R403.3.3) |
  | Mechanical system pipe insulation (R403.4) |
  | Heated water circulation and temperature maintenance systems (R403.5.1) |
  | Mechanical ventilation (R403.6) |
  | Equipment sizing and efficiency rating (R403.7) |
  | Systems serving multiple dwelling units (R403.8) |
  | Snow melt and ice system controls (R403.9) |
  | Pools and permanent spas (R403.10) |
  | Portable spas (R403.11) |
  | Lighting equipment (R404.1) |

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**Prescriptive**
- Building Thermal Envelope (R402)
- Systems (R403)
- Electric Power & Lighting (R404)

**Prescriptive with Envelope Tradeoffs**
- Same as above +
- Envelope tradeoffs in RESCheck

**Performance**
- Simulated Performance Alternative (R405)
- Software modeling in REMRate or Ekotrope

**Energy Rating Index**
- HERS Index ≤ 63
- Software modeling in REMRate or Ekotrope

**Above code programs**
- ENERGY STAR certified
- PECO New Home Rebates approved

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IBC Scope/IECC Residential
2018 IECC [RE]

2018 IECC [RE]
All sections designated as mandatory (below)

Mandatory requirements:
Certificate (R401.3)
Air leakage (R402.4)
Controls (R403.2)
Duct sealing (R403.8.1)
Duct testing (R403.8.3)
Building cavities (R403.3.5)
Mechanical system pipe insulation (R403.4)
Heated water circulation and temperature maintenance systems (R403.5.1)
Mechanical ventilation (R403.6)
Equipment sizing and efficiency rating (R403.7.5)
Systems serving multiple dwelling units (R403.8)
Snow melt and ice system controls (R403.9)
Pools and permanent spas (R403.10)
Portable spas (R403.11)
Lighting equipment (R404.1)

Prescriptive
Building Thermal Envelope (R402)
Systems (R403)
Electric Power & Lighting (R404)

Prescriptive with Envelope Tradeoffs
Same as above + Envelope tradeoffs in REScheck

Performance
Simulated Performance Alternative (R405)
Software modelling in REM/Rate or Exiotrope

Energy Rating Index
HERS Index ≤ 62
Software modelling in REM/Rate or Exiotrope

Above code programs
ENERGY STAR certified
or
PECO New Home Rebates approved
Permit Requirements
New Construction Planned Approach
## Permit Application Documentation

<table>
<thead>
<tr>
<th>METHOD</th>
<th>Permit Detail</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td>Compliance Summary</td>
<td>Design Prof</td>
</tr>
<tr>
<td>Prescriptive UA Alternative</td>
<td>ResCheck 4.6.5 (or higher)</td>
<td>Design Prof</td>
</tr>
<tr>
<td>Simulated Performance</td>
<td>Prelim Report</td>
<td>Depends upon method</td>
</tr>
<tr>
<td>ERI Performance</td>
<td>Prelim Report</td>
<td>HERS Rater</td>
</tr>
<tr>
<td>Above Code Programs</td>
<td>Prelim Report</td>
<td>Depends upon method</td>
</tr>
</tbody>
</table>
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;
- Ensure that all reports include a listing of assemblies, conditioned area corresponds to plan, R/ U Values correspond to plan. Inspection checklist is provided.
HVAC Equipment Design

One and Two Family
• HVAC Equipment Sizing Worksheet identifies the design loads and the equipment capacity.
• Ventilations worksheet demonstrates that whole house ventilation rate complies with the IRC or the IMC.

All other residential:
Require plans demonstrating compliance with IECC and IMC and load calculations.
HVAC Equipment Design (One and Two Family: 1) Equipment Sizing

<table>
<thead>
<tr>
<th>Design loads:</th>
<th>Equipment specifications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design cooling load: ___________ (Btu/h)</td>
<td>Cooling system output capacity ___________ (Btu/h)</td>
</tr>
<tr>
<td></td>
<td>Cooling equipment make: ___________________</td>
</tr>
<tr>
<td></td>
<td>Cooling equipment model: ___________________</td>
</tr>
<tr>
<td>Design heating load: ___________ (Btu/h)</td>
<td>Heating system output capacity: ___________ (Btu/h)</td>
</tr>
<tr>
<td></td>
<td>Heating equipment make: ___________________</td>
</tr>
<tr>
<td></td>
<td>Heating equipment model: ___________________</td>
</tr>
</tbody>
</table>

- ☐ Manual J report is attached
- ☐ Manual S report is attached
- ☐ Specified cooling equipment does not exceed 1.15 times the design capacity or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design capacity by 1.25 times or the next nominal size.)
- ☐ Specified heating equipment does not exceed 1.40 times the design capacity or the next larger nominal size, whichever is greater
- ☐ Air handler has manufacturer's designation of ≤ 2% air leakage when tested in accordance with ASHRAE 193
- ☐ Whole-house mechanical ventilation worksheet has been completed (see reverse)
HVAC Equipment Design:
2) Whole-House Mechanical Design Worksheet

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:

   IRC Table M1507.3.3(1)
   Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements

<table>
<thead>
<tr>
<th>Dwelling Unit Floor Area (square feet)</th>
<th>0-1</th>
<th>2-3</th>
<th>4-5</th>
<th>6-7</th>
<th>&gt;7</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1,500</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>75</td>
<td>90</td>
</tr>
<tr>
<td>1,501 – 3,000</td>
<td>45</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
</tr>
<tr>
<td>3,001 – 4,500</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>4,501 – 6,000</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
</tr>
<tr>
<td>6,001 – 7,500</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
</tr>
<tr>
<td>&gt; 7,500</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
<td>165</td>
</tr>
</tbody>
</table>

   IRC Table M1507.3.3(2)
   Intermittent Whole-House Mechanical Ventilation Rate Factors

<table>
<thead>
<tr>
<th>Run-time Percentage in Each 4-hour Segment</th>
<th>25%</th>
<th>33%</th>
<th>50%</th>
<th>66%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.5</td>
<td>1.3</td>
</tr>
</tbody>
</table>

3. Does the fan operate continuously or intermittently? [ ] Continuous  [ ] Intermittent

4. If the fan is to be operated intermittently on a pre-set schedule, multiply the airflow value from Table M1507.3.3 (above) by the appropriate value in Table M1507.3.3(2) (below).

5. Enter the required airflow = ________ CFM

6. Enter the following information regarding the specified fan:

   Rated fan airflow = ________ CFM  
   Fan make: ________________

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

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## Inspection Responsibilities

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Prescriptive</th>
<th>Performance</th>
<th>ERI (R406.5)</th>
<th>Above-code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation¹</td>
<td>L&amp;I</td>
<td>L&amp;I</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
<tr>
<td>Pre-drywall</td>
<td>Third party²</td>
<td>Third party²</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
<tr>
<td>Plumbing</td>
<td>L&amp;I</td>
<td>L&amp;I</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
<tr>
<td>Mechanical</td>
<td>L&amp;I</td>
<td>L&amp;I</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
<tr>
<td>Duct/Envelope Testing</td>
<td>Third party²</td>
<td>Third party²</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
<tr>
<td>Final</td>
<td>L&amp;I</td>
<td>Third party²</td>
<td>Third party²</td>
<td>Third party²</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Third Party Verification</th>
<th>When</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blower Door Test</td>
<td>Always</td>
<td>Air and Duct Leakage Form</td>
</tr>
<tr>
<td>Air Barrier (Visual Inspection)</td>
<td>Always</td>
<td>*Air Barrier Installation Checklist</td>
</tr>
<tr>
<td>Duct Leakage</td>
<td>Where duct is installed outside of conditioned space.</td>
<td>Air and Duct Leakage Form</td>
</tr>
<tr>
<td>Final Compliance Form</td>
<td>Performance Methods</td>
<td>**As Determined by Method</td>
</tr>
</tbody>
</table>

* Be Collected Prior To Close-In
** May Issue TCO pending submission of final certification
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.

I. Building Envelope Air Leakage (mandatory):

**Blower door test (Mandatory)**

<table>
<thead>
<tr>
<th>Testing company:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester Name (print):</td>
<td>Signature:</td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

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

**Test Result:**

- Fan Flow at 50 Pascals = ___________CFM50
- Total Conditioned Volume = ___________ft³

\[
ACH50 = \frac{CFM50 \times 60}{Volume} = \text{___________ACH50}
\]

**Visual Inspection (Mandatory)**

- Air Barrier and Insulation Installation Checklist completed, signed and included with this certificate (see reverse for final).
# Air Barrier Installation Checklist

**AIR BARRIER & INSULATION INSTALLATION CHECKLIST**
(Based on IECC 2015 and 2018 Table R402.4.1.1)

House Address: 

Permit #: 

Date: 

Permit holder: 

Phone: 

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

<table>
<thead>
<tr>
<th>PRE-DRYWALL INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
</tr>
<tr>
<td>- A continuous air barrier is installed in the building envelope.</td>
</tr>
<tr>
<td>- The exterior thermal envelope contains a continuous air barrier.</td>
</tr>
<tr>
<td>- Breaks or joints in the air barrier are sealed.</td>
</tr>
<tr>
<td>- Air-permeable insulation shall not be used as a sealing material.</td>
</tr>
<tr>
<td><strong>Ceiling/attic</strong></td>
</tr>
<tr>
<td>- The air barrier in any dropped ceiling/soffit are aligned with the insulation and any gaps in the air barrier are sealed.</td>
</tr>
<tr>
<td>- Recessed lighting fixtures installed in the building envelope are air tight &amp; IC rated.</td>
</tr>
<tr>
<td>- Insulation is installed in all wall assemblies that separate conditioned space from unconditioned space or the outside.</td>
</tr>
<tr>
<td>- Cavity insulation is R-20 or greater or a combination of cavity and continuous insulation is installed with R-13 or greater cavity + R-5 or greater continuous.</td>
</tr>
<tr>
<td>- The junction of the foundation and sill plate are sealed.</td>
</tr>
<tr>
<td>- The junction of the top plate and the top of exterior walls are sealed.</td>
</tr>
</tbody>
</table>
Commercial Applications
## Compliance Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td></td>
</tr>
<tr>
<td>Envelope Trade-Off</td>
<td></td>
</tr>
<tr>
<td>Simulated Performance</td>
<td></td>
</tr>
<tr>
<td>Above Code Programs</td>
<td></td>
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</tbody>
</table>
## Permit Application Documentation

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<tr>
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<th>Permit Detail</th>
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<tbody>
<tr>
<td>Prescriptive</td>
<td>Compliance Summary*</td>
<td>Design Prof</td>
</tr>
<tr>
<td>Prescriptive (Envelope Trade-Off)</td>
<td>ComCheck</td>
<td>Design Prof</td>
</tr>
<tr>
<td>Simulated Performance</td>
<td>Prelim Report</td>
<td>Depends upon method</td>
</tr>
<tr>
<td>Above Code Programs</td>
<td>Prelim Report</td>
<td>Depends upon method</td>
</tr>
</tbody>
</table>

Developing Comprehensive Checklists
Inspections

- L&I scope of inspections is 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

- Effective July 1, 2019, the company name and contact information of an approved commissioning agent shall be included on the construction document notes.
Commissioning Agency Certifications

All New Construction permit applications filed after July 1, 2019 will be required to 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
The Following Documents will be required prior to final inspection:

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

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

- Improving checklists to increase compliance.

- Addressing how to manage new topics, such as daylighting controls and Kitchen hood make-up air.
PLUMBING CODE
Status

- Bill passed by Council and awaiting Mayor’s signature. Review ordinance at philagov.

- Adopts the 2018 IPC with local modifications.

- Optional adoption - Oct 1, 2019
  Mandatory adoption - April 1, 2020

- ICC will publish a consolidated Philadelphia Plumbing Code.
Highlights-Changes

- Expanded use of non-metallic pipe. The provisions allow for non-metallic pipe in residential buildings that do not exceed 150’ in height, with certain limitations.
- Number of required plumbing fixtures aligned with IPC.
- Separation of sanitary and stormwater drainage lines now required to the curb.
- Provisions promoting water conversation, such as non-potable water sources and waterless urinals, are adopted.
- Adopted provisions regulating private infrastructure.
Highlights - Retentions

- Philly single stack is retained as an engineered system.
- Curb traps on sanitary drains retained.
- Terminology of the Phila Plumbing Code retained.
Status

- Bill passed by Council and awaiting Mayor’s signature. Review ordinance at philad.gov.

- Adopts the 2018 IFC with local modifications.

- L&I will complete implementation by the end of the year.

- ICC will publish a consolidated Philadelphia Fire Code.
Highlights

● Eliminate conflicts with the IBC and IEBC.

● Adoption of IFC provisions:
  ● Fire Watch criteria as required by Ch 33 of the IBC
  ● Integrated system testing for new construction

● Streamlining operational permits.

● Clarification of requirements for outdoor events.
eCLIPSE
Current Status

- Final Design is coming to a close.
- Finalizing training and roll-out plans.
- Implementation target date: Oct 2019
- Public Information Sessions: Sept 2019
Benefits

- **Online Permitting**
  - Auto-Issue of certain permits
  - ePlan
- **Online Account Access**
- **More streamlined approval process across departments**
  - Streets, PWD, Planning/Historic, OPA
- **Appeals, amended permit and TCOs filed from within the permit job.**
- **Inspection Scheduling**
- **Combo Applications**
- **Project Umbrella**
Business Changes

- Residential New Construction must include MEP
  - Submit HVAC design and EIA at submittal.

- Design Professionals (in Responsible Charge) and Attorneys must register PA license and CAL if serving as applicant.

- Special Inspection Agency must be named at issuance.

- Contractor must affirm association if not the applicant.

- Certain permits require a property tax check.
  - May change to entity in the future.
Customer Service
Resources

- Resource Page
- Newsletter
  - Focus Groups
- Online help form
- Permit Tracker
Thank You

Elizabeth.Baldwin@phila.gov