



Code Updates

June 2019




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Chief Code Official



ENERGY CODE




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.
- 

Fact Sheets

Phila.gov/li: What's New



Department of
Licenses and Inspections
CITY OF PHILADELPHIA

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 buildings 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, ~~Ekotone~~, 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>

PA Amendments: <https://www.dli.pa.gov/ucc/Documents/Official-Record-of-2015-Code-Review-Amended%2007232018.pdf>

ASHRAE 90.1 2016: <https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards>

<https://www.phila.gov/li/Documents/What%20Code%20Do%20I%20Use.pdf>



Residential



Compliance Alternatives

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
ERI 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

IRC Scope Buildings

2015 IECC [RE]

One- and two-family dwellings, townhouses
three stories or less

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

+

one option to the right

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)

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

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

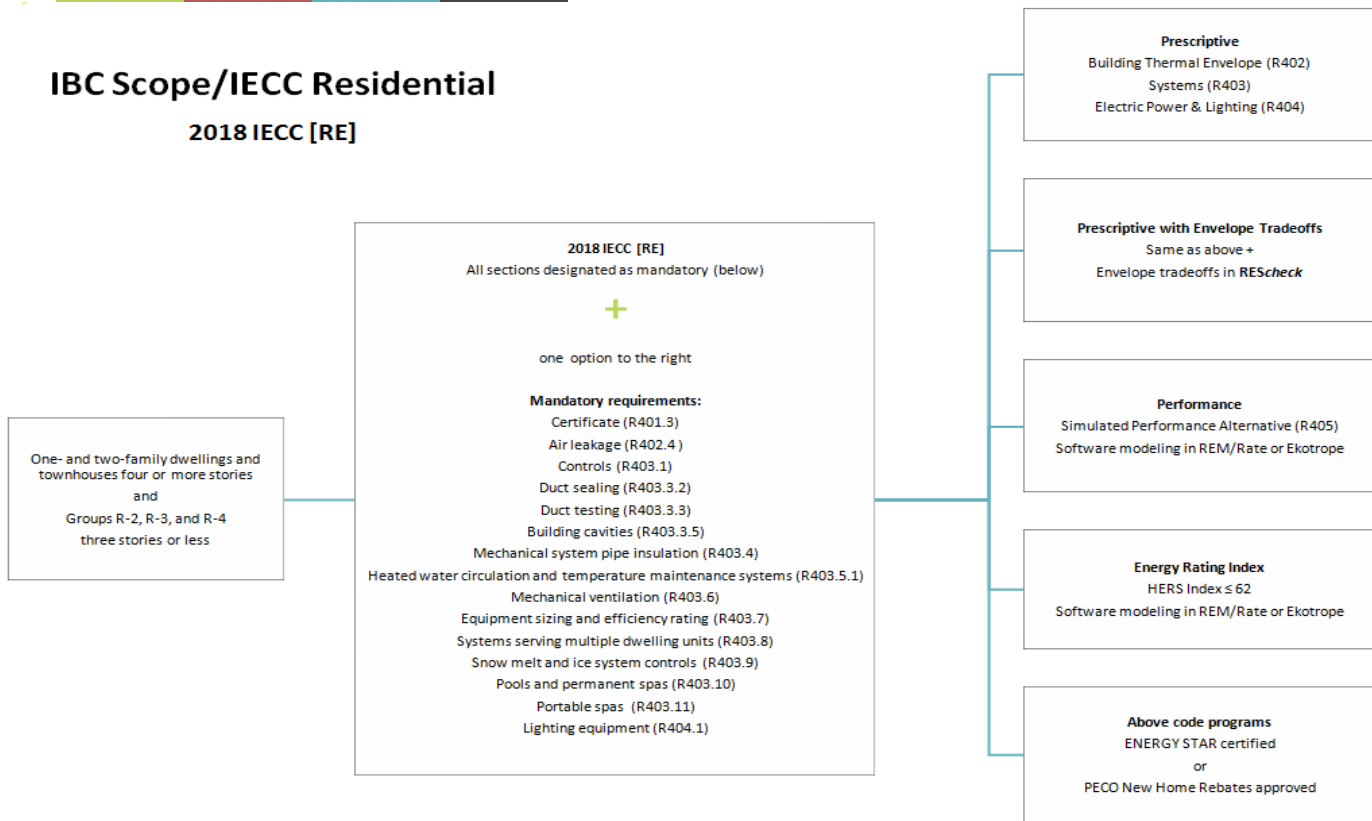
Performance
Simulated Performance Alternative (R405)
Software modeling in REM/Rate or Ekotrope

Energy Rating Index
HERS Index ≤ 62
Software modeling in REM/Rate or Ekotrope

Above code programs
ENERGY STAR certified
or
PECO New Home Rebates approved

IBC Scope/IECC Residential

2018 IECC [RE]



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Permit Requirements New Construction Planned Approach


A horizontal bar at the bottom of the slide consisting of five colored segments: teal, light green, red, teal, and dark grey, followed by a larger teal segment on the right.

Permit Application Documentation

METHOD	Permit Detail		Qualifications
Prescriptive	Compliance Summary	HVAC Design Worksheet for one and two family	Design Prof
Prescriptive UA Alternative	ResCheck 4.6.5 (or higher)	Same as above	Design Prof
Simulated Performance	Prelim Report	Same as above	Depends upon method
ERI 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;
 - ❑ 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

HVAC SYSTEM SIZING AND SELECTION

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, please fill in the following information.

Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculated in accordance with Manual J.

Design loads:

Design cooling load _____ (Btu/h)

Design heating load: _____ (Btu/h)

Equipment specifications:

Cooling system output capacity _____ (Btu/h)

Cooling equipment make: _____

Cooling equipment model: _____

Heating system output capacity: _____ (Btu/h)

Heating equipment make: _____

Heating equipment model: _____

- 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 $\leq 2\%$ 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

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. 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).

IRC Table M1507.3.3(2)

Intermittent Whole-House Mechanical Ventilation Rate Factors

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

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: _____

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

¹Only when slab-on-grade or exterior basement wall insulation is specified

²Documentation 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
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

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)

Testing company: _____ Phone: _____

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

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

Test Result:

Fan Flow at 50 Pascals = _____ CFM50 Total Conditioned Volume = _____ ft³

ACH50 = CFM50 x 60 / Volume = _____ 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.¹

PRE-DRYWALL INSPECTION	
General	<input type="checkbox"/> A continuous air barrier is installed in the building envelope.
	<input type="checkbox"/> The exterior thermal envelope contains a continuous air barrier.
	<input type="checkbox"/> Breaks or joints in the air barrier are sealed.
	<input type="checkbox"/> Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	<input type="checkbox"/> The air barrier in any dropped ceiling/soffit are aligned with the insulation and any gaps in the air barrier are sealed.
	<input type="checkbox"/> Recessed lighting fixtures installed in the building envelope are air tight & IC rated.
	<input type="checkbox"/> Insulation is installed in all wall assemblies that separate conditioned space from unconditioned space or the outside.
	<input type="checkbox"/> 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
	<input type="checkbox"/> The junction of the foundation and sill plate are sealed.
	<input type="checkbox"/> The junction of the top plate and the top of exterior walls are sealed.



Commercial Applications



Compliance Alternatives

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

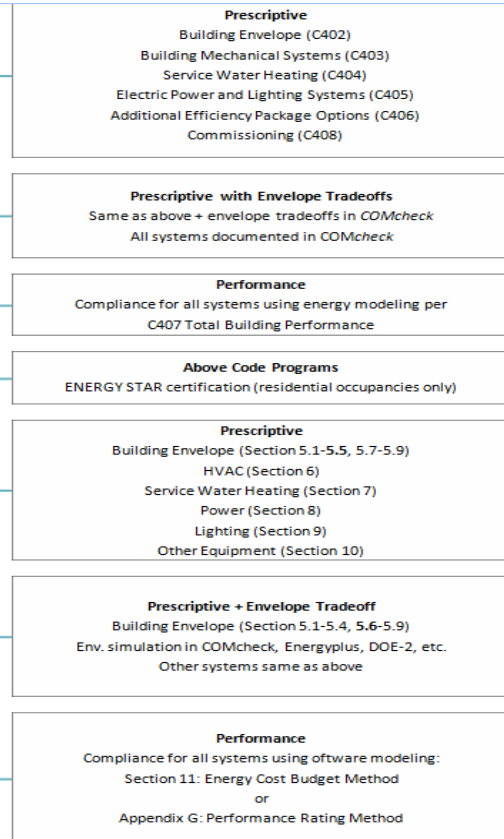
Buildings *other than*:
One- and two-family dwellings and townhouses
and
Groups R-2, R-3, and R-4 three stories or less

2018 IECC [CE]
All sections designated as "mandatory"

+

one of the following options

ASHRAE 90.1-2016



<https://www.phila.gov/li/Documents/Energy%20Code%20Compliance%20Path%20Flowcharts--Final.pdf>

Permit Application Documentation

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

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 $\geq 480,000$ or
 - If Combined mechanical systems and water heating equipment is $\geq 600,000$ 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 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

 Department of
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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 C108.3.

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 $\geq 480,000$ Btu/h or a combined heating and service water heating capacity of $\geq 600,000$ 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.
- 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 phila.gov.
 - 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 conservation, 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.
- 



FIRE CODE




Status

- Bill passed by Council and awaiting Mayor's signature. Review ordinance at phila.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

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