An aerial photograph of New York City, showing a dense urban landscape with numerous skyscrapers and buildings. The image is overlaid with a semi-transparent blue banner that contains the main title and subtitle. The background image is in grayscale, while the banner and text are in white and blue.

NYCECC ADMINISTRATIVE OVERVIEW: 2016 NYC Energy Conservation Code

Effective October 3, 2016

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NYC
Buildings

presented by
Bill de Blasio, Mayor
Melanie La Rocca, Commissioner

ACKNOWLEDGEMENTS

One City: Built to Last

We wish to acknowledge Mayor Bill de Blasio for his commitment to 80% reduction of Greenhouse Gas Emissions by 2050, over 2005 levels.

- A sweeping plan to retrofit public and private buildings to reduce the City's contributions to climate change.
- This makes New York the largest city to commit to the 80% reduction by 2050.
- It charts a long-term path for investment in renewable sources of energy and a total transition from fossil fuels.



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INTRODUCTION

Welcome to the New York City Department of Buildings Energy Code Training Modules!

This ADMINISTRATIVE OVERVIEW Module addresses:

- Current Laws, Rules, and Bulletins related to the [2016 NYCECC](#)
- Applicability of the [2016 NYCECC](#)
- Methods of Compliance
- NYC DOB Energy Code Submission Requirements
- NYC DOB Progress Inspection Requirements



INTRODUCTION

(continued)

This **ADMINISTRATIVE OVERVIEW** Module addresses:

This module addresses an overview of the use and applicability of the **2016 NYCECC**. Technical issues related to NYCECC compliance, plus additional examples of NYCECC documentation, are included within the **Envelope, HVAC (1&2), Lighting, and Residential Energy Code Training Modules** in this series.

Information about ASHRAE 90.1 2013 as modified by NYC (Appendix CA) is also included.



OVERVIEW: TRAINING MODULE ORGANIZATION

- The **ADMINISTRATIVE OVERVIEW** Module has been divided into a number of smaller sub-topics. These can be accessed either in-sequence or out-of-sequence through links in the main **Menu** slide.
- Each sub-topic begins with a brief overview of the issues to be reviewed, and many end with a set of summary questions.
- Many of the sub-topics are organized in a Q & A format. Code-related questions are posed at the top of a slide, with answers provided below, or in the following sequence of slides.



OVERVIEW: SLIDE NAVIGATION GUIDE

Look for the following icons:



The **NYC Buildings** logo takes you to the [2016 NYCECC Training Modules](#) home page.



The **Menu** icon takes you to the main menu page within each module.



The **Attention** icon brings up Callouts with key points and additional information.



The **Links** icon takes you to related DOB web pages or other resources.



OVERVIEW: SLIDE NAVIGATION GUIDE

Look for the following icons:



The **Documentation** icon addresses DOB documentation issues and requirements.



The **Inspection** icon addresses DOB Progress Inspection issues and requirements.



The **Code Reference** icon refers to relevant Code sections.

The slides are enhanced with special icons that will help to focus on key points, or serve as links to external resources. The Attention icon brings up Callouts (like this one) with key points and additional information.



ADMINISTRATIVE OVERVIEW: MODULE MENU

| | | |
|---|--|------------|
| 1. WHAT'S NEW IN 2016 NYCECC | Key Updates • Current Local Laws, Rules and Buildings Bulletins | 10 |
| 2. CODE APPLICABILITY | DOB Terminology • Exemptions and Exceptions • ECC Chapters/Building Types | 21 |
| 3. METHODS OF COMPLIANCE | General Criteria • Simple vs. Complex HVAC • Compliance Paths • ASHRAE 90.1 - 2013 | 31 |
| 4. SUBMISSIONS & INSPECTIONS | Cooling Concepts • Capacity and Efficiency Metrics • Load Calculations | 52 |
| 5. RESOURCES | Packaged and Split AC • Heat Pumps • Boilers and Furnaces | 102 |



1. WHAT'S NEW IN THE 2016 NYCECC: OVERVIEW

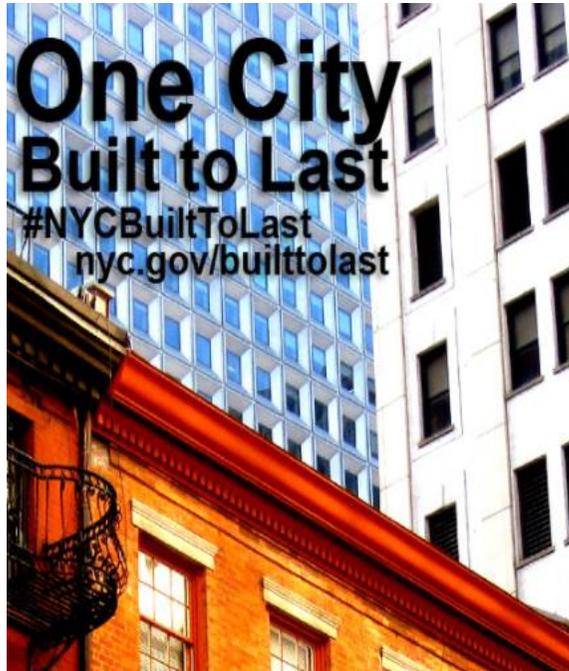
In this section you will learn about:

- What is driving the recent changes to the NYCECC
- Key changes and additions in the [2016](#) NYCECC
- Current NYC Local Laws affecting Energy Code compliance
- Current Rules and Bulletins affecting Energy Code compliance



1. WHAT'S NEW IN THE 2016 NYCECC

What's driving the recent changes to the Energy Code?



Citywide Focus on Energy and Greenhouse Gas (GHG) Reductions

■ One City Built to Last

- Targets 80% Reductions in GHG by 2050
- Local Laws were enacted, including:
 - [LL 84 of 2009](#) – Benchmarking Energy & Water Use
 - [LL 85 of 2009](#) – Established the 2009 NYCECC
 - [LL 88 of 2009](#) – Lighting Upgrades/Sub-meters
 - LL 87 of 2009 – Audits & Retro-Commissioning
 - [LL 91 of 2016](#) – Established the current 2016 NYCECC
 - [LL 125 of 2016](#) – Clean up bill

■ Federal Mandates: American Recovery & Reinvestment Act (ARRA) Funding Requirements

- States must enact Energy Codes equivalent to IECC 2009 and ANSI/ASHRAE/IESNA 90.1-2007
- States to achieve 90% Energy Code Compliance by 2017



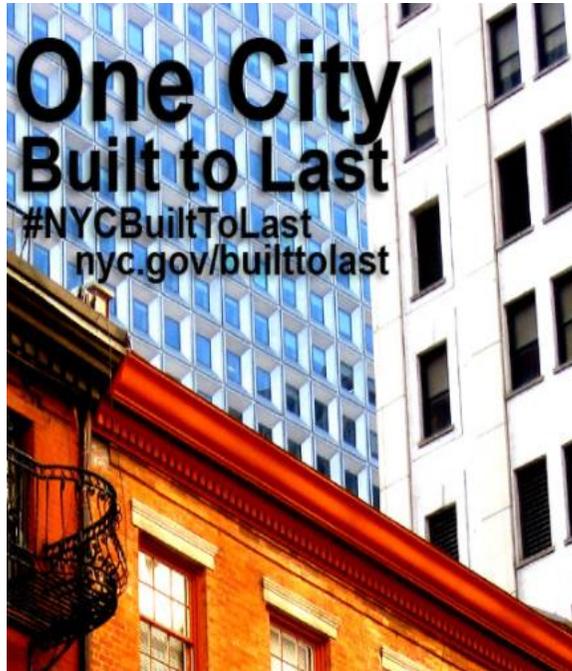
ARRA

American Recovery and
Reinvestment Act of 2009



1. WHAT'S NEW IN THE 2016 NYCECC

What's driving the recent changes to the Energy Code?



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 - [LL 91 of 2016](#) – Established the current 2016 NYCECC
 - [LL 125 of 2016](#) – Clean up bill

■ Federal Mandates: American Recovery & Reinvestment Act (ARRA) Funding Requirements

- States must comply with ASHRAE 90.1-2009 and ANSI/ASHRAE 90.1-2010
- States to achieve 90% Code compliance in new and renovated building space by 2017.



1. WHAT'S NEW IN THE 2016 NYCECC: KEY UPDATES

What are the major changes in the new Code?

- **Building Envelope – Increased residential insulation requirements**
- **Air Barrier Testing Mandatory for Residential and some Commercial buildings**
- **Solar-Ready: Appendix RB**
- **ERI for Residential**
- **Component performance alternative for Envelope compliance**
- **Mechanical equipment penetrations on Envelope**
- **Air Barrier Continuity Plan (ABC Plan) for buildings greater than 50,000 square feet**



1. WHAT'S NEW IN THE 2016 NYCECC: KEY UPDATES

What are the major changes in the new Code? *(continued)*

- Requirement to isolate open-air combustion fuel-burning appliances
- Reduced lighting LPD
- Mandatory daylighting controls for Commercial buildings
- Open plan office occupancy sensors
- Additional Energy Efficiency Options – Expanded
- New modeling protocol for ASHRAE 90.1, Appendix G

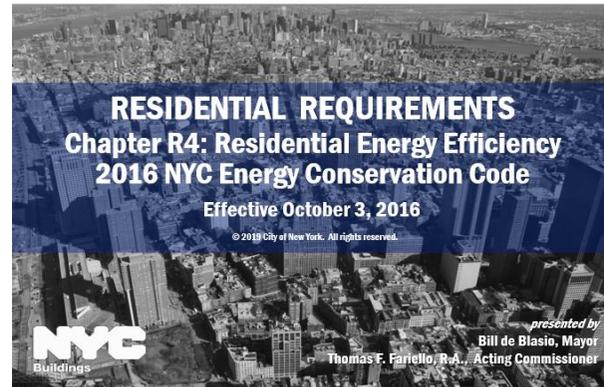
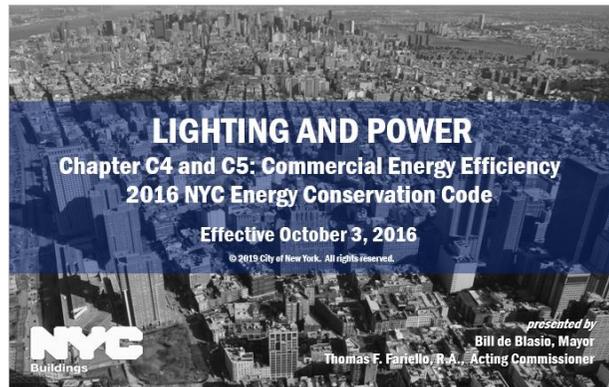
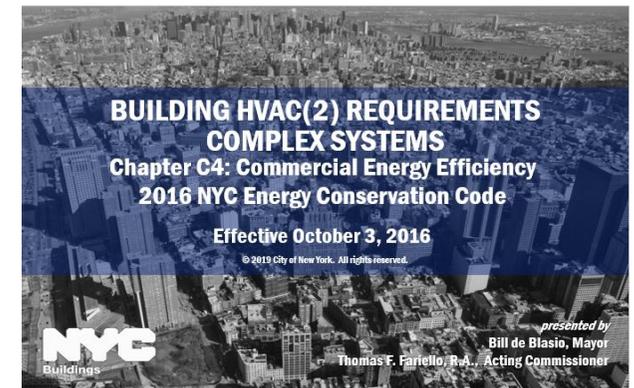
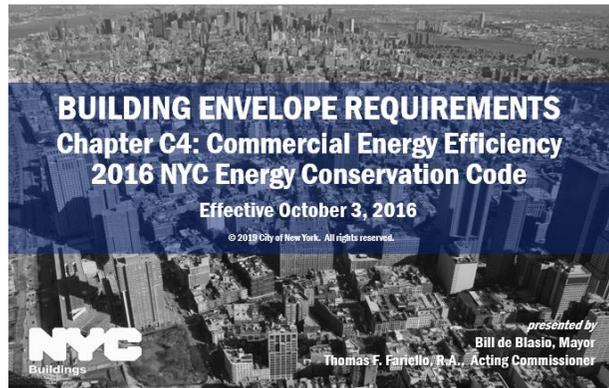


1. WHAT'S NEW IN THE 2016 NYCECC: KEY UPDATES

What are the major changes in the new Code?

Simplified, Streamlined & More Comprehensive

- Topic-specific updates addressed in additional DOB NYCECC training modules:



1. WHAT'S NEW IN THE 2016 NYCECC: LOCAL LAWS

What Local Laws are associated with the NYCECC?

Local Law 91 of 2016



- Establishes the 2016 NYCECC based on the 2015 IECC, ASHRAE 90.1-2013 and the 2016 Supplement to the NYSECCC (New York State Energy Conservation Construction Code)
- Went into effect October 3, 2016

Local Law 125 of 2016



- Made further amendments to conform the New York City Energy Conservation Code aligned with amendments to the 2016 New York State Energy Code



1. WHAT'S NEW IN THE 2016 NYCECC: RULES

What Rules of the City of New York are associated with the NYCECC?

1 RCNY §5000-01



- Defines Energy Code submission procedures
- Defines the requirements for project progress inspections in the construction drawings

1 RCNY §5000-02



- Corrects lighting controls in ASHRAE 90.1
- Clarifies energy modeling Appendix G requirements



1. WHAT'S NEW IN THE 2016 NYCECC: RULES

What Rules of the City of New York are associated with the NYCECC? *(continued)*

1 RCNY §101-07

- Requirement that the owner retains progress inspector(s)
- Defines general sampling rate of inspections
- **15%** of each relevant construction item in the scope of work, unless otherwise noted in **1 RCNY §5000-01**, or required by progress inspector
- Defines authority and responsibilities of the progress inspector; issues include: phased inspection for temporary Certificates of Occupancy, phased inspection controls, and lighting power densities.
- Addresses additional Energy Code verification issues



1. WHAT'S NEW IN THE 2016 NYCECC: BULLETINS

Which DOB Bulletins are associated with the NYCECC?

Buildings Bulletin 2017-004



- Outlines conditions under which an addition, alteration, renovation, or repair to a **lighting or electrical power system, or control equipment**, may *not* be required to comply with the Energy Code

Buildings Bulletin 2017-005



- Outlines conditions under which an addition, alteration, renovation, or repair to an **HVAC or service hot water system** may *not* be required to comply with the Energy Code

Buildings Bulletin 2017-006



- Outlines conditions under which an addition, alteration, renovation, or repair to a **building envelope** may *not* be required to comply with the Energy Code



2. CODE APPLICABILITY

Slides 21 to 30

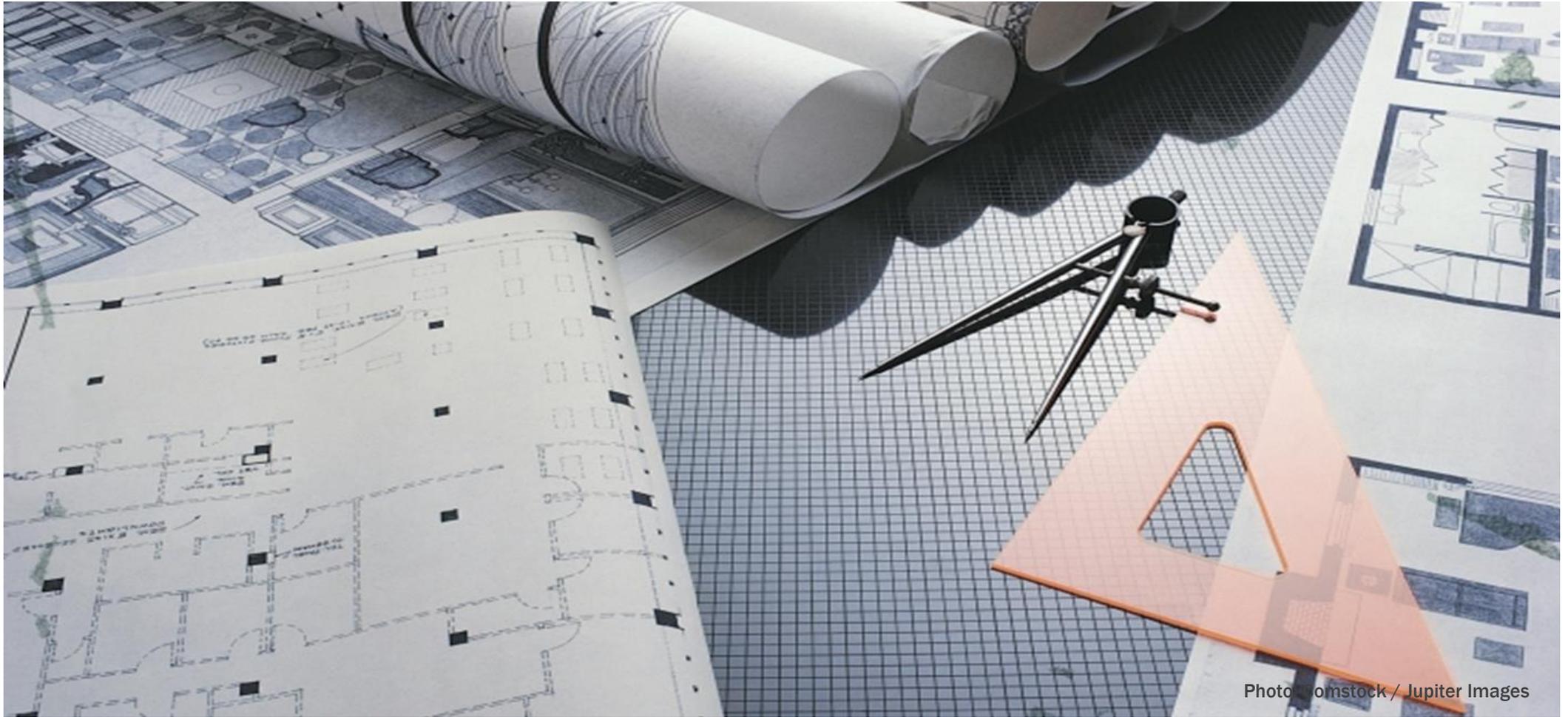


Photo: iStock / Jupiter Images

2. CODE APPLICABILITY: OVERVIEW

In this section you will learn about:

- **DOB terminology related to NYCECC applicability, including:**
 - Differences among Code, Rules, and Bulletins
 - Difference between Exemptions and Exceptions
 - Differences in applicability for New Construction, Additions, Alterations, Renovations, and Repairs
- **Applicable Chapters of the NYCECC for different building types**



2. CODE APPLICABILITY: GENERAL TERMINOLOGY-1

What's the Terminology used by DOB related to Code Applicability?

The Code

- The NYCECC is law.
- It applies to all buildings, new and existing, unless explicitly stated otherwise.

Rules

- Rules are prepared by DOB to implement the Code.
- Rules must go through a formal administrative public comment process.
- Rules are backed by the force of the law.

DOB's website is updated to reflect any changes to laws, rules and bulletins. Check the website frequently.

Bulletins

- Bulletins are issued by DOB to clarify interpretations of the Codes.
- May change more frequently than laws or rules.



2. CODE APPLICABILITY: GENERAL TERMINOLOGY-2

What's the Terminology used by DOB related to Code Applicability?

Exemptions

- Exemptions define specific building types, applications, or building elements that are not required to meet the Code, and are addressed in the PW1 form when they constitute the entire application (1 through 4 below, as listed on the PW1)

- The following are the **ONLY** allowed exemptions to the NYCECC:
 1. Historic buildings (per NYCECC [Section C501.6](#), [LL 91 of 2016](#), [LL 125 of 2016](#), [1 RCNY § 5000-01](#))
 - National or State designated historic buildings
 - Buildings certified as contributing buildings within a National or State historic district
 - Buildings certified as eligible for the designations above
 - City level certification **does not qualify** for exemptions



2. CODE APPLICABILITY: GENERAL TERMINOLOGY-2

What's the Terminology used by DOB related to Code Applicability?

Exemptions (continued)

2. The envelopes of unconditioned or low-energy buildings or spaces (low energy is <3.4 BTU/H or 1 Watt/SF peak design rate for space conditioning) and the scope of work is limited to the envelope.
3. Temporary structures under [BC § 3103](#) and [28-111.1](#)
 - The following work types, categorized as not affecting energy use:
 - Buildings certified as eligible for the designations above
 - City level FA (fire alarm), FP (fire suppression in a range hood), SD (standpipe), FS (fuel storage), EQ (construction equipment), CC (curb cut), OT/BPP (builder's pavement plan), OT/FPP (fire protection plan)
4. A post-approval amendment of an application that is exempt under a [prior edition](#) of the Energy Code

(*Numbers correspond to the exemptions listed on the [PW1, Section 10](#))



2. CODE APPLICABILITY: GENERAL TERMINOLOGY-3

What's the Terminology used by DOB related to Code Applicability?

Exceptions

- Exceptions are conditions under which specific provisions of the Code may not be required
 - Many exceptions are defined under Chapters [R5](#) and [C5](#) of the NYCECC. These types of exceptions typically define NYCECC **alternates**; i.e., a system requirement may not be required if other alternative measures are incorporated
- Exceptions specifically applicable to Alterations are defined in Sections [R503](#) and [C503](#) of the NYCECC
 - Apply only if they do not result in increased energy use of the building
- Clarifications of potential exceptions in additions, alterations/renovations, and repairs are provided in Building Bulletins [2017-004](#), [2017-005](#), [2017-006](#)



Exemptions, exceptions and other conditions relieved from compliance by the NYCECC § [R503](#) and [C503](#) must be identified in the submitted Energy Analysis, with citations to Code, [1 RCNY § 5000-01](#) and/or Bulletins provided.



2. CODE APPLICABILITY: DIFFERENT SCOPES OF WORK

New Buildings

- All must comply via Prescriptive or Performance-Based Approaches
- Only exemption is for envelope in low-energy/unconditioned buildings

Additions

- Must comply as a stand-alone addition or with the building as a single entity

Example, where an alteration, renovation or repair involves replacement of over 20% of the existing luminaires, the entire scope of work must meet the current NYCECC lighting provisions, as applicable.

Alterations/Renovations

- Only applies to scope of alteration work; unaltered portions are not required to comply
- Some exceptions may apply (per Bulletins)

Repairs

- Technically applies even if a permit is not required (e.g., window or roof placements or repairs)



2. CODE APPLICABILITY: BY BUILDING TYPE

Which chapters of the Code apply to different building types?

RESIDENTIAL

R-3 (detached one- and two-family dwellings, and multiple single-family dwellings)

AND

R-2 (Multifamily > 2-family) ≤ 3-stories
Factory-manufactured Homes and Mobile Homes



Residential
NYCECC [Chapter R4](#)

GROUP R BUILDINGS

R-1 (Hotels/motels) any height

AND

R-2 (Multifamily > 2-family) > 3 stories

AND

R-3 (One & Two Family) > 3 stories



ALL OTHER BUILDINGS

Building Type includes Group I, H



Commercial (Update)
NYCECC [Chapter C4](#) OR
[Appendix CA](#) as modified by NYC



2. CODE APPLICABILITY: MIXED OCCUPANCY

A mixed-occupancy building is one that contains both residential and commercial uses.

Each occupancy shall be separately considered

- Chapters R2, R3, R4, and R5 for residential
- Residential portions/occupancies are classified as Group R when determining the insulation requirements
- Chapters C2, C3, C4, and C5 or ASHRAE 90.1-2013 (Appendix CA) for commercial
 - Cannot mix and match codes for commercial portion – same code version must be followed and applied in its entirety
- Do not include the floors or walls that separate commercial from residential. Include only the exterior thermal envelope.



2. CODE APPLICABILITY: MIXED OCCUPANCY

Scenarios

- Buildings greater than 3 stories are categorized as commercial even if residential occupancies exist
- Use accessory area requirements (Major occupancy > 90% of floor area)*

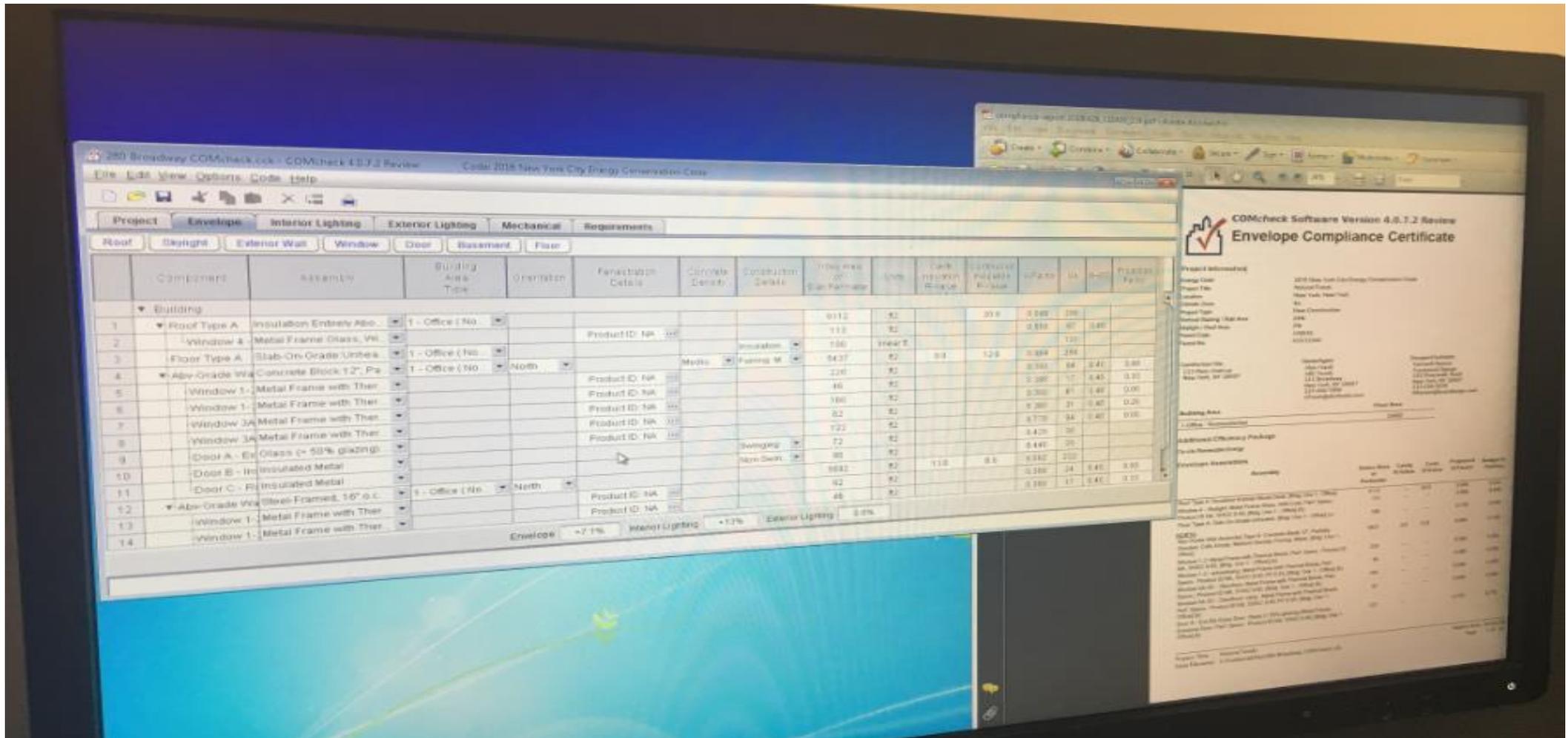
| 100% APARTMENTS | | 100% APARTMENTS | | 100% APARTMENTS | | 100% APARTMENTS | | 100% APARTMENTS | |
|-----------------|-------------|-----------------|-------------|-----------------|-------------|------------------------------|---|-----------------|------------|
| 100% APARTMENTS | | 100% APARTMENTS | | 100% APARTMENTS | | 60% RETAIL 40% APARTMENTS | | 100% APARTMENTS | |
| 100% RETAIL | | ≤ 10% RETAIL | | > 90% RETAIL | | | | 100% RETAIL | |
| FLOOR | PROVISION | FLOOR | PROVISION | FLOOR | PROVISION | FLOOR | PROVISION | FLOOR | PROVISION |
| 3 | Residential | 3 | Residential | 3 | Residential | 3 | Residential | 4 | Commercial |
| 2 | Residential | 2 | Residential | 2 | Residential | 2 | Residential | 3 | Commercial |
| 1 | Commercial | 1 | Residential | 1 | Commercial | 1 | 60% Commercial 40% Residential | 2 | Commercial |
| | | | | | | | | 1 | Commercial |

* Requires code official approval



3. METHODS OF COMPLIANCE

Slides 31 to 51



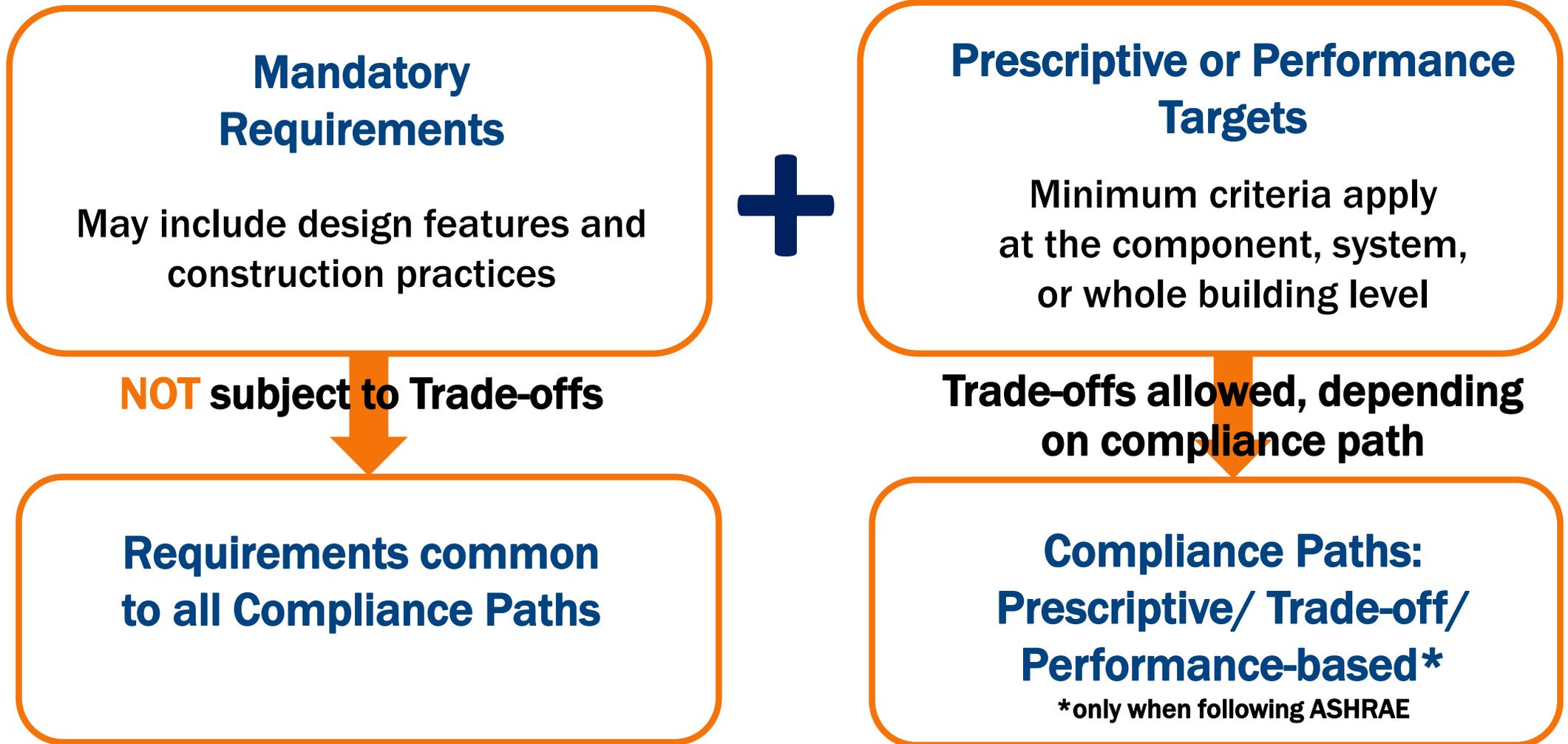
3. METHODS OF COMPLIANCE: OVERVIEW

In this section you will learn about:

- Mandatory provisions of the NYCECC
- Prescriptive vs. Performance-based compliance paths
- Using the ANSI/ASHRAE/IESNA Standard 90.1-2013 ([Appendix CA](#)) instead of NYCECC Chapters [C4](#) & [C5](#)



3. METHODS OF COMPLIANCE: CODE STRUCTURE



3. METHODS OF COMPLIANCE: CODE STRUCTURE

Mandatory Requirements

May include design features and construction practices



Prescriptive or Performance Targets

Minimum criteria apply at the component, system, or whole building level

NOT subject to Trade-off



Requirements apply to all Compliance Paths

It is important to understand the basic structure of the Energy Code. Mandatory requirements are defined throughout Chapters [R4](#) and [C4](#) of the NYCECC, and are not subject to any Trade-off. Additional NYCECC provisions can be satisfied through Prescriptive Compliance, Trade-offs, or a Performance-based approach.

The following slides describe each type of NYCECC provision in more detail.

and, depending on the Compliance Path

Compliance Paths: Prescriptive or Performance-based

based



3. METHODS OF COMPLIANCE

MANDATORY REQUIREMENTS - 1

What are examples of NYCECC Mandatory Requirements?

Residential (NYCECC Chapter [R4](#))

- Air leakage of envelope
 - Air tightness of the envelope shall be verified by:
 - Blower door testing
 - Maximum of 3 ACH allowed

- HVAC System Control:
 - Programmable thermostats per dwelling unit

- Lighting and Electrical:
 - At least 75% of lamps in permanently installed fixtures or at least 75% of permanently installed light fixtures shall be high-efficacy
 - Separately meter individual dwelling units



3. METHODS OF COMPLIANCE

MANDATORY REQUIREMENTS - 1

What are examples of NYCECC Mandatory Requirements?

Commercial (NYCECC Chapter [C4](#))

- Air leakage of envelope
 - Includes provisions for:
 - Maximum allowable leakage of window, storefront, curtainwall, and door assemblies
 - Continuous air barriers
 - Outdoor air intakes and exhaust openings
 - Loading dock weatherseals
 - Vestibules
 - Recessed lighting
 - Buildings of a certain size may require blower door testing or Air Barrier Continuity Plan (ABC Plan)



3. METHODS OF COMPLIANCE

MANDATORY REQUIREMENTS - 2

What are examples of NYCECC Mandatory Requirements?

HVAC (NYCECC Chapter [C403](#))

- Provisions for all systems include:
 - Minimum Heating & Air Conditioning equipment efficiencies
 - Thermostatic controls, including setback capabilities
 - Pipe insulation and duct insulation/sealing
 - When specific building conditions exist:
 - Demand control ventilation
 - Economizers
 - Energy recovery ventilation systems
 - Commissioning as per Section C408.2



3. METHODS OF COMPLIANCE

MANDATORY REQUIREMENTS - 2

What are examples of NYCECC Mandatory Requirements?

Electrical Power/Lighting (NYCECC Section [C405](#))

■ Lighting Controls

- Occupant sensors to automatically turn off lights within 20 minutes of being unoccupied
- Each area that does not have an occupancy sensor to have a time switch control
- Daylight dimming controls

■ Electrical Energy Consumption

- Residential buildings shall make provisions to separately meter individual dwellings



3. METHODS OF COMPLIANCE: COMPLIANCE PATHS

Options

- [2016 NYCECC](#) offers three compliance methods:
 1. Prescriptive – Through summary tables and other listed provisions
 2. Trade-off – For envelope assemblies through U-Factor approach or REScheck /COMcheck
 3. Performance-based – Residential only, Energy Modeling or ERI

Code also allows use of the ANSI/ASHRAE/IESNA 90.1-2013 ([Appendix CA](#)) standard (ASHRAE 90.1) as an alternative to NYCECC Chapter C4

- ASHRAE 90.1 also offers Prescriptive, Trade-off and Performance Paths



3. METHODS OF COMPLIANCE: PRESCRIPTIVE PATH 1

| Interior Lighting Power Allowances | |
|------------------------------------|----------------------|
| Lighting Power Density | |
| Building Area Type | (W/ft ²) |
| Convention Center | 1.01 |
| Dining: Cafeteria /Fast Food | 0.9 |
| Gymnasium | 0.94 |
| Office | 0.82 |
| Retail | 1.26 |
| Parking Garage | 0.21 |

Partial listing: prescriptive interior lighting power allowances [from NYCECC Table [C405.4.2\(1\)](#)]

PROS

- Typically the simplest approach to demonstrate compliance

CONS

- Lack of flexibility - Each space, assembly or piece of equipment must meet or exceed the prescribed criteria
- The level of stringency of some prescriptive criteria may create design challenges

Example: Prescribed Interior Lighting Power densities (based on Building Area Type) may be challenging for projects with a high percentage of conference rooms or other specialty spaces with higher lighting requirements



3. METHODS OF COMPLIANCE: TRADE-OFF PATH 2

PROS (Envelope Only)

- Level of Effort: Simple to Moderate
- Prerequisites:
 - Window to Wall area Ratio $\leq 30\%$
 - Skylight to Roof area Ratio $\leq 3\%$
- Compliance is demonstrated through a U-Factor-based **Total UA** approach or component performance alternative
 - Weighted average value per component type is allowed
 - Example: Non-compliance in one roof assembly can be compensated for by using more insulation in another roof assembly*
- If REScheck or COMcheck is used, Trade-offs can be performed among different envelope components (roofs, walls, fenestration)

CONS (Envelope Only)

- U-Factor calculations can become complex in some assembly types, such as metal buildings



3. METHODS OF COMPLIANCE: TRADE-OFF PATH 2

PROS (Envelope Only)

- Level of Effort: Simple to Model
- Prerequisites:
 - Window to Wall area Ratio $\leq 50\%$
 - Skylight to Roof area Ratio $\leq 3\%$
- Compliance is demonstrated through a U-Factor-based **Total UA** approach or component performance alternative
 - Weighted average value per component type is allowed
 - Example: Non-compliance in one roof assembly can be compensated for by using more insulation in another roof assembly*
- If REScheck or COMcheck is used, Trade-offs can be performed among different envelope components (roofs, walls, fenestration)

The UA approach involves multiplying the U-Factor of a building assembly (such as a wall or roof type) by the area of that assembly. When multiple assemblies are used in a project, a weighted average of the UA of each assembly type can be calculated to demonstrate overall compliance with the NYCECC.

CONS (Envelope Only)

- U-Factor calculations can become complex in some assembly types, such as metal buildings



3. METHODS OF COMPLIANCE: TRADE-OFF PATH 2

PROS (Envelope Only)

- Level of Effort: Simple to Moderate
- Prerequisites:
 - Window to Wall area Ratio $\leq 30\%$
 - Skylight to Roof area Ratio $\leq 3\%$
- Compliance is demonstrated through a U-Factor-based **Total UA** approach or component performance alternative
- **Trade-off allowed**
 - Allows trade-off of envelope components when fenestration greater than 30%
Example: Non-compliance in one roof assembly can be compensated for by using more insulation in another roof assembly
- If REScheck or COMcheck is used, Trade-offs can be performed among different envelope components (roofs, walls, fenestration)

CONS (Envelope Only)

- U-Factor calculations can become complex in some assembly types, such as metal buildings



3. METHODS OF COMPLIANCE: TRADE-OFF PATH 2

PROS (Envelope Only)

- Level of Effort: Simple to Moderate
- Prerequisites:
 - Window to Wall area Ratio $\leq 30\%$
 - Skylight to Roof area Ratio $\leq 3\%$
- Compliance is demonstrated through a U-Factor-based **Total UA** approach or component performance alternative
 - Weighted average value per component type is allowed
 - Example: Non-compliance in one roof assembly can be compensated for by using more insulation in another roof assembly*
- If REScheck or COMcheck is used, Trade-offs can be performed among different envelope components (roofs, walls, fenestration)

CONS (Envelope Only)

- U-Factor such as metal buildings

There are some limitations to the Trade-off approach. In residential construction, an applicant cannot exceed maximum allowed U-factors for vertical fenestration (0.32) or skylights (0.55) .



3. METHODS OF COMPLIANCE: TRADE-OFF PATH 2

Trade-Off Path Using COMcheck

280 Broadway.cck - COMcheck 4.0.7.2 Review Code: 2016 New York City Energy Conservation Code

File Edit View Options Code Help

Project Envelope Interior Lighting Exterior Lighting Mechanical Requirements

Roof Skylight Exterior Wall Window Door Basement Floor

| | Component | Assembly | Concrete Density | Orientation | Building Area Type | Fenestration Details | Construction Details | Gross Area or Slab Perimeter | Units | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | SHGC | Projection Factor |
|------------|-------------------|--|------------------|-------------|--------------------|----------------------|----------------------|------------------------------|------------|---------------------------|-------------------------------|----------|-----|------|-------------------|
| ▼ Building | | | | | | | | | | | | | | | |
| 1 | ▼ Roof 1 | Insulation Entirely Above Deck | | | 1 - Office (No... | | | 6112 | ft2 | | 13.0 | 0.073 | 438 | | |
| 2 | Skylight 1 | Metal Frame:Glass, With Curb | | | | Product ID: NA | | 112 | ft2 | | | 0.500 | 56 | 0.40 | |
| 3 | ▼ Exterior Wall 1 | Solid Concrete:8" Thickness | Medium Weight | North | 1 - Office (No... | | Furring: M... | 6000 | ft2 | 13.0 | 5.0 | 0.080 | 326 | | |
| 4 | Window 1 | Metal Frame with Thermal Break | | | | Product ID: NA | | 1500 | ft2 | | | 0.380 | 570 | 0.40 | 0.00 |
| 5 | Window 2 | Metal Frame with Thermal Break | | | | Product ID: NA | | 56 | ft2 | | | 0.380 | 21 | 0.40 | 0.00 |
| 6 | Door 1 | Glass (> 50% glazing):Metal Frame, Entrance Door | | | | Product ID: NA | | 42 | ft2 | | | 0.770 | 32 | 0.40 | 0.00 |
| 7 | Door 2 | Insulated Metal | | | | | Non-Swin... | 288 | ft2 | | | 0.500 | 144 | | |
| 8 | Door 3 | Insulated Metal | | | | | Swinging | 40 | ft2 | | | 0.420 | 17 | | |
| 9 | Exterior Wall 2 | Solid Concrete:8" Thickness | Medium Weight | East | 1 - Office (No... | | Furring: M... | 6000 | ft2 | 13.0 | 5.0 | 0.080 | 480 | | |
| 10 | Exterior Wall 3 | Solid Concrete:8" Thickness | Medium Weight | West | 1 - Office (No... | | Furring: M... | 6000 | ft2 | 13.0 | 5.0 | 0.080 | 480 | | |
| 11 | Exterior Wall 4 | Steel-Framed, 24" o.c. | | South | 1 - Office (No... | | | 1000 | ft2 | 13.0 | 5.0 | 0.070 | 70 | | |
| 12 | Floor 1 | Slab-On-Grade:Unheated | | | 1 - Office (No... | | Insulation... | 180 | linear ft. | | | | 131 | | |

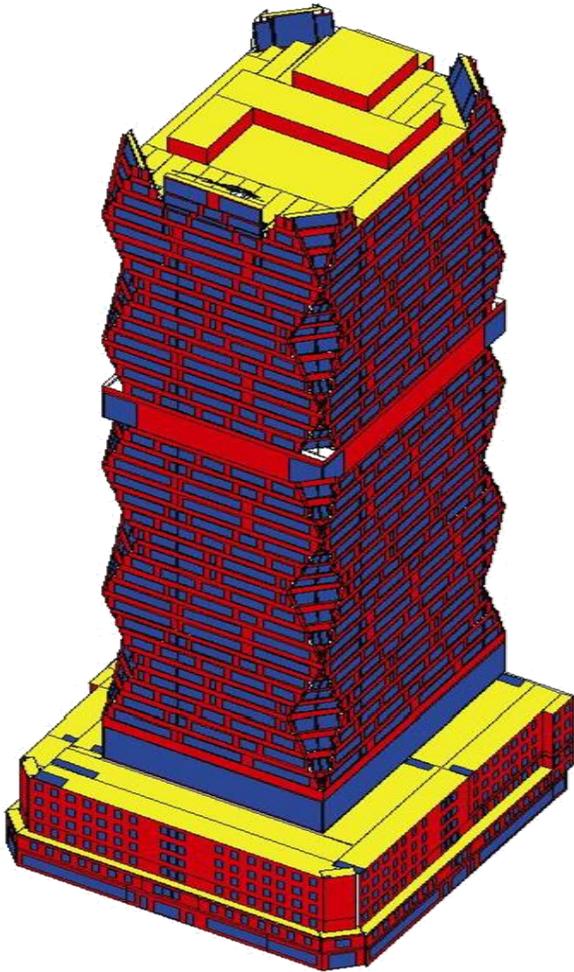


In this non-residential COMcheck example, the roof insulation R-value is below the prescriptive requirement of R-30ci; however overall envelope compliance has been achieved through improved performance of the exterior walls, windows, and doors.



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

TOTAL BUILDING PERFORMANCE



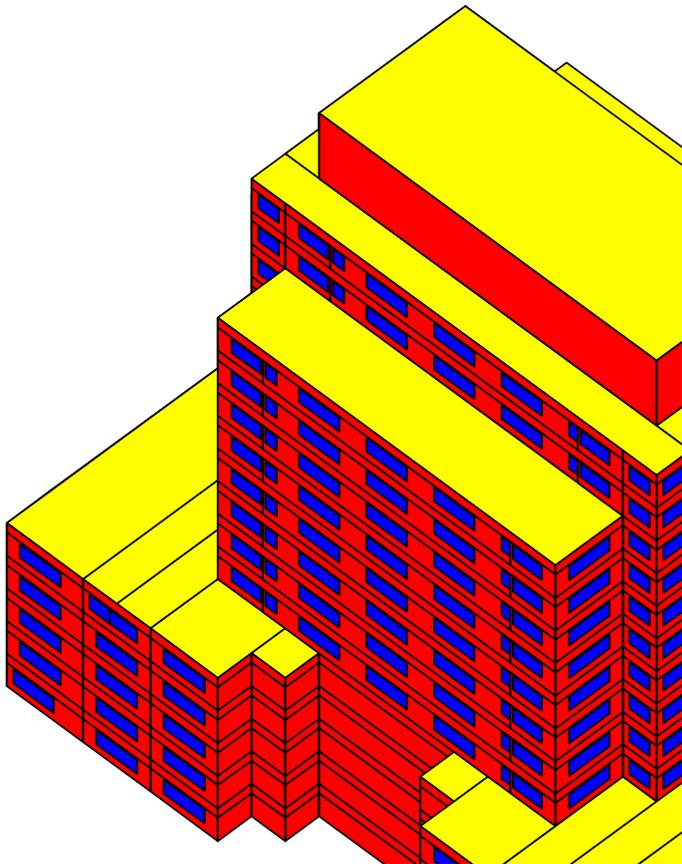
Approach

- For residential buildings, the Simulated Performance Alternative (Section NYCECC [R405](#)) or the Energy Rating Index (ERI) may be used for compliance
- For commercial buildings, the Energy Cost Budget Method (Section 11) or Appendix G, Performance Rating Method from ASHRAE 90.1-2013 as modified by New York City ([Appendix CA](#)) may be used for compliance
- Programs must also be approved by both the Secretary of State of New York State and the DOB Commissioner
 - DOE2-based software has such approval



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

TOTAL BUILDING PERFORMANCE



PROS

- The most flexible approach:
Aspects of the design which do not meet Prescriptive criteria (other than Mandatory provisions) can be Traded-off against measures that exceed Code criteria

CONS

- Level of effort is high, with associated costs
- The learning curve for energy modeling is steep
 - Modeling is often performed by consulting engineers or specialized consultants
- May generally require a longer review time by Plan Examiner



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

TOTAL BUILDING PERFORMANCE

What are examples of NYCECC Mandatory Requirements?

Sample Scenarios

- Fenestration area exceeds 40% of wall or 3% of roof
- Project is not meeting certain prescriptive requirements, such as economizers or energy recovery ventilation systems
- Project exceeds prescriptive interior Lighting Power Densities
- Project is making Trade-offs among disciplines (e.g., envelope, lighting, HVAC)
- Project is pursuing a LEED rating, and requires energy modeling
- Project is pursuing energy-efficiency rebates (e.g., NYSERDA, Con Edison), and requires energy modeling for those programs



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

ANSI/ASHRAE/IESNA 90.1 - 2013 (Appendix CA)

When would ASHRAE 90.1 be used to demonstrate compliance?

Applicability

- ASHRAE 90.1.2013 as modified by New York City ([Appendix CA](#)) is an approved alternative to Chapter [C4](#) of the 2016 NYCECC
- If used, ASHRAE 90.1 must be followed and applied in its entirety
 - Applicants cannot mix compliance of one discipline in the NYCECC with another discipline in ASHRAE-90.1
- Prescriptive, Trade-off, or Performance-based paths can be used
- This is the only path of compliance for the performance-based approach



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

ANSI/ASHRAE/IESNA 90.1 - 2013 (Appendix CA)

When would ASHRAE 90.1 be used to demonstrate compliance?

Potential Reasons to Use ASHRAE 90.1 ([Appendix CA](#))

- Window wall ratio exceeds 30%
- Skylight requirements are more lenient
 - Area can be up to 6% to stay in Prescriptive/Trade-off method instead of 3% in NYCECC (but up to 5% if daylight responsive controls installed in daylight zones under skylights)
- Shading devices in ASHRAE have more options – partial opaque materials and more multiple Projection Factors
- ASHRAE 90.1 is the only option for performance-based modeling
- Programs such as LEED, NYSERDA rebates, and federal tax credits are based on ASHRAE 90.1



3. METHODS OF COMPLIANCE: PERFORMANCE PATH

ANSI/ASHRAE/IESNA 90.1 - 2013 (Appendix CA)

What are the difficulties of using ASHRAE vs. the NYCECC?

More Extensive Mandatory Provisions

- Power, Section [8.4.1](#), has a combined maximum voltage drop requirement for main feeders and branch circuits (5%)
- Power, Section [8.4.2](#) has automatic receptacle control requirements
- Power, Section [8.4.3](#) indicates the electrical energy use of the following separately:
 - Total electrical energy
 - HVAC systems
 - Interior lighting
 - Exterior lighting
 - Receptacle circuits

ASHRAE 90.1 does include some provisions that are not included in the NYCECC. If an applicant uses ASHRAE 90.1 for compliance, they must meet all provisions of the standard, including mandatory provisions.

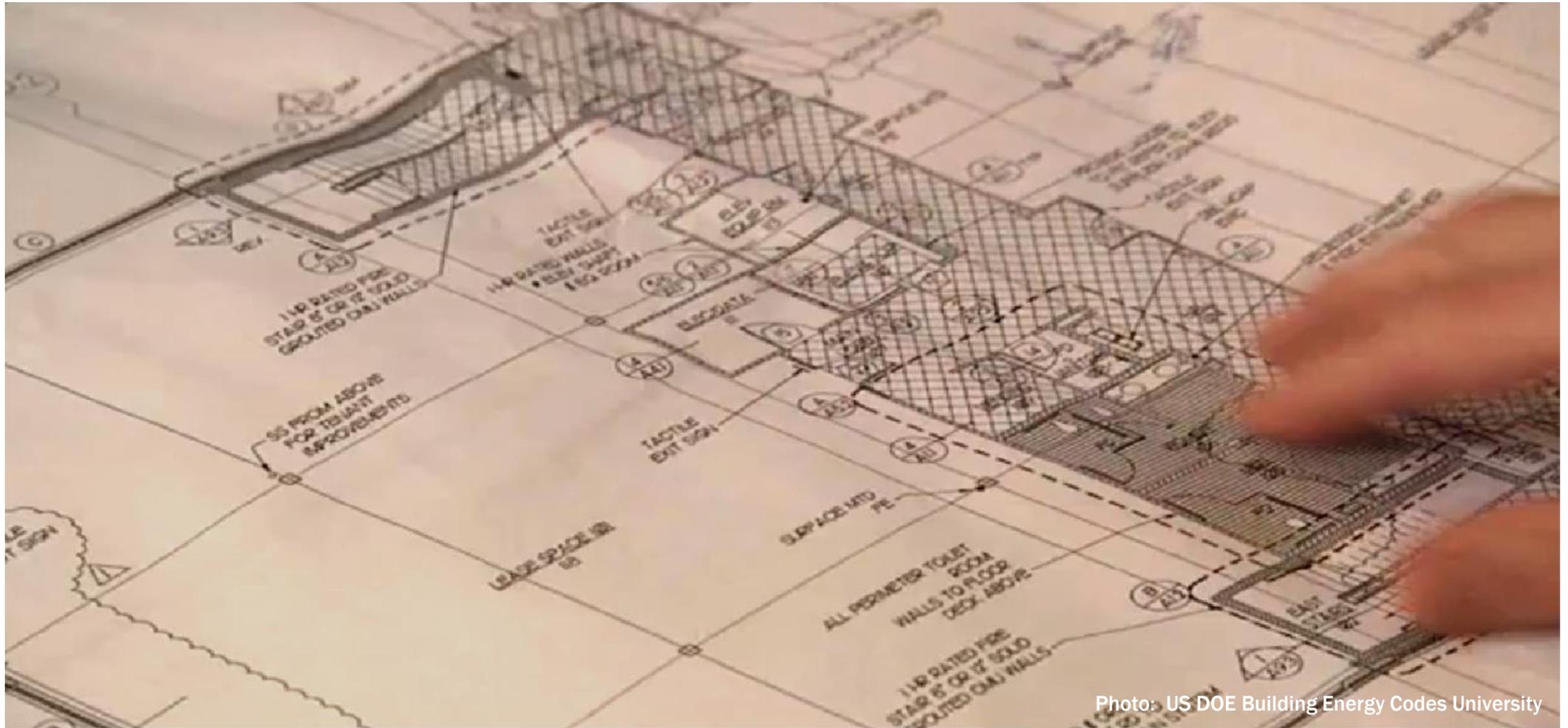
One key mandatory provision in 90.1 involves maximum voltage drops for main feeders and branch circuits. This requirement may result in heavier-gauge feeders, which could add significant costs to certain project types.

RECEPTACLE CIRCUITS EXCEPTION: Up to 10% of the load for each of the categories (b) through (e) shall be allowed to be from other electrical loads



4. SUBMISSIONS & INSPECTIONS

Slides 52 to 101



4. SUBMISSIONS & INSPECTIONS: OVERVIEW

In this section you will learn about:

- Requirements for NYCECC Submissions, including
 - Professional Statement and Owner Statement;
 - Energy Analysis; and
 - Supporting documentation.

- Requirements for NYCECC-related Progress Inspections



4. SUBMISSIONS & INSPECTIONS

NYCECC AND APPLICATIONS

What are the application requirements related to the NYCECC?

Per 1 RCNY § 5000-01

- Professional Statement
- Energy Analysis
- Supporting Documentation, including requirement for progress inspections in drawings



4. SUBMISSIONS & INSPECTIONS

PW1 – Professional Statement

What is Required for the Professional Statement?

- Completed under Section 10 of Form [PW1](#) and included in drawings
 - Must declare either compliance with, or exemption from, the NYCECC
 - Should include the version of the code being used



4. SUBMISSIONS & INSPECTIONS

PW1 – Professional Statement

NYC Buildings PW1: Plan / Work Application Orient and affix BIS job number label here

Must be typewritten.

1 Location Information *Required for all applications.*

| | | | | |
|------------------|--------------------|-----|-----|----------|
| House No(s) | Street Name | | | |
| Borough | Block | Lot | BIN | C.B. No. |
| Work on Floor(s) | Apt. / Condo No(s) | | | |

2 Applicant Information *Required for all applications. Fax, mobile telephone and e-mail address are optional information.*

10 NYCECC Compliance *New York City Energy Conservation Code*

- To the best of my knowledge, belief and professional judgment, all work under this application is in compliance with the NYCECC*
 Code Compliance Path (*choose one*): NYCECC ASHRAE
 Energy Analysis (*choose one*): Tabular Analysis REScheck COMcheck Energy Modeling (EN1)
- To the best of my knowledge, belief and professional judgment, all work under this application is exempt from the NYCECC* in accordance with one of the following (*choose one*):
- The work is an alteration of a State or National historic building.
 - The scope of the work is entirely in a "low-energy building" and is limited to the building envelope.
 - The entire scope of work involves a temporary structure and/or one or more of the following work types: FA, FP, SD, SP, FS, EQ, CC, OT/BPP, OT/FPP. Other work types are not exempt.
 - This is a post-approval amendment and exempt under a prior edition of the energy code. See statement of exemption on attached drawings.

3 Joint Project Types *Choose one and provide specified associated information.*

Alteration Type 1 or Alteration Type 1 required to meet New Building requirements (28-101.4.5) 14, 20, 22
 6A-E, 8B-C, 9-10, 12, 13C-F, 14, 18-20, 22 & PW1A, PD1
 Alteration Type 2 5A, 6A-D, 8A-B, 9-10, 13C-E, & 14, 20, 22
 Alteration Type 3 5A, 6B-F, 8C, 9-10, 13C-E, 20, 22
 New Building 6A-E, 8F-G, 9A, 9C-K, 10, 12 & 13A-E, 14, 18-20, PW1A, PD1
 Sign 5A, 6B-D, 9A, 9D, 22-23

Full Demolition 6B, 8D, 9A & 9C-D, 9K, 13D-E, 14, 21A, 22
 Subdivision 9A, 9D, 12A-B
 Condominium Improved 17
 SA Directive 14 acceptance requested?
 Yes No

6 Work Types *Select all that apply but no more than allowed by job and filing type. "OT" required on all NB and Alteration 1 initial applications.*

| | | | |
|---|---|---|---|
| 6A <input type="checkbox"/> BL - Boiler PW1C <input type="checkbox"/> FA - Fire Alarm <input type="checkbox"/> FB - Fuel Burning PW1C | <input type="checkbox"/> FS - Fuel Storage PW1C <input type="checkbox"/> FP - Fire Suppression <input type="checkbox"/> MH - Mechanical | <input type="checkbox"/> PL - Plumbing PW1B <input type="checkbox"/> SD - Standpipe PW1B <input type="checkbox"/> SP - Sprinkler PW1B | 6E <input type="checkbox"/> CC - Curb Cut 16 <input type="checkbox"/> OT/LAN - Landscape <input type="checkbox"/> OT/ANT - Antenna |
| 6B <input type="checkbox"/> EQ - Construction Equipment 15 | 6C <input type="checkbox"/> OT/GC - General Construction | 6D <input type="checkbox"/> OT - Other, describe: | 6F <input type="checkbox"/> OT/BPP - Builders Pavement Plan 8D <input type="checkbox"/> OT/FPP - Fire Protection Plan <input type="checkbox"/> OT/MAR - Marquee 8E, 26B |

12/14



4. SUBMISSIONS & INSPECTIONS

NYCECC and Applications

Related Applications

In section 11A of the [PW1](#) form, applicants must indicate all **Related DOB Job Numbers** associated to the NB or Alt.1 project or, if an application has not yet been filed, the name of the applicant or the applicant's firm and discipline for any anticipated, related applications, as well as indicate on the EN drawings



This is important for projects that file multiple applications, such as:

- ✓ A separate foundations package, earlier in the project.
- ✓ Later lighting and HVAC packages.

Separate applications can include the part Energy Analysis of just their respective system in their drawings, such as the insulation values associated with foundation work, but only if they are all filed under one application number.



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

What types of Energy Analyses are allowed?

[Per 1 RCNY §5000-01](#)

- Tabular Analysis
- REScheck or COMcheck software
- Energy Modeling
- Alternative Formats
 - Must be approved in advance by both the New York State Secretary of State and the New York City Commissioner



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

Option 1: Tabular Analysis

- The Tabular Analysis compares proposed values of each NYCECC-regulated item in the scope of work with the respective prescriptive values required by the Code
 - Applicable to New Buildings, Additions, and Alterations
 - Demonstrates Prescriptive Compliance
 - Can be used with either NYCECC or ASHRAE 90.1



4. SUBMISSIONS & INSPECTIONS

Sample: Tabular Analysis 1 for Commercial Building Alterations

| ITEM DESCRIPTION | PROPOSED DESIGN VALUE | CODE PRESCRIPTIVE VALUE AND CITATION | SUPPORTING DOCUMENTATION |
|--|--|---|--|
| BUILDING ENVELOPE | | | |
| Replace roof membrane and add insulation SRR = 2.2% | Roof Type 1: 6" XPS (R -30) continuous insulation above deck | Minimum R-30 continuous insulation NYCECC Table C402.1.3 | Roof Type 1: A-106 (Roof Plan) A-402 (Wall Sections) 6-8/A-603 (Roof Details) |
| Replace existing windows w/new aluminum framed windows, Floors 2 - 4 WWR = 29% PF = 0 | Window Type A: U = 0.43, SHGC = 0.29, Air leakage ≤ 0.10 cfm/SF Window Types B + C: U = 0.41, SHGC = 0.31, Air leakage ≤ 0.30 cfm/SF Window Type D: U = 0.41, SHGC = 0.23, Air leakage ≤ 0.30 cfm/SF | Window Types A-D: Maximum U-Factor = 0.45 Maximum SHGC = 0.40 NYCECC Table C402.4 Maximum Air Leakage = 0.3 cfm/SF NYCECC Table C402.5.2 , Footnote a | Window Types A-D: A-301-302 (Elevations) A-501 (Schedules) |
| Renovate interior side of exterior walls around new window openings - repair/replace gwb | N/A - No change proposed to existing 3 ½" metal stud furring walls which are completely filled with fiberglass batts (estimated R-3.1/inch). | NYCECC C503.1 Exception 3 – Existing ceilings, wall or floor cavities exposed during construction, provided that these cavities are filled with insulation. | A-102-104 (Floor Plans) 1-2/A-305 (Interior Elevations) |



4. SUBMISSIONS & INSPECTIONS

Sample: Tabular Analysis 1 for Commercial Building Alterations

| ITEM DESCRIPTION | PROPOSED DESIGN VALUE | CODE PRESCRIPTIVE VALUE AND CITATION | SUPPORTING DOCUMENTATION |
|--|--|---|--|
| BUILDING ENVELOPE | | | |
| Replace roof membrane and add insulation SRR = 2.2% | Roof Type 1: 6" XPS (R -30) continuous above deck | | Roof Type 1: (Roof Plan) Wall Sections 503 (Roof Details) |
| Replace existing windows w/new aluminum framed windows, Floors 2 - 4 WWR = 29% PF = 0 | Window Type A: U = 0.43, SHGC = 0.29, Air leakage ≤ 0.10 cfm/SF Window Types B + C: U = 0.41, SHGC = 0.31, Air leakage ≤ 0.30 cfm/SF Window Type D: U = 0.41, SHGC = 0.23, Air leakage ≤ 0.30 cfm/SF | Maximum U-Factor = 0.45 Maximum SHGC = 0.40 NYCECC Table C402.4 Maximum Air Leakage = 0.3 cfm/SF NYCECC Table C402.5.2 , Footnote a | Window Types A-D: A-301-302 (Elevations) A-501 (Schedules) |
| Renovate interior side of exterior walls around new window openings - repair/replace gwb | N/A - No change proposed to existing 3 ½" metal stud furring walls which are completely filled with fiberglass batts (estimated R-3.1/inch). | NYCECC C503.1 Exception 3 – Existing ceilings, wall or floor cavities exposed during construction, provided that these cavities are filled with insulation. | A-102-104 (Floor Plans) 1-2/A-305 (Interior Elevations) |

Applicants must include reference to the applicable Supporting Documentation for EACH item within the Tabular Analysis.



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

Option 2: REScheck or COMcheck submissions

- REScheck and COMcheck software, available for free from the US Department of Energy, can be used to prepare Energy Code compliance calculations (check US Department of Energy website regularly for updates)
 - Demonstrates Prescriptive Compliance
- OR**
- Allows Trade-Offs among different envelope assemblies (roofs, walls, glazing, etc.)
- Only 2016 NYCECC REScheck forms are permitted (not IECC)
 - Only 2016 NYCECC (not IECC) or ASHRAE 90.1-2013 COMcheck forms are permitted



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

Option 2: REScheck or COMcheck submissions *(continued)*

- COMcheck is applicable to New Buildings, Additions, or Alterations
 - Additions can be submitted as stand-alone projects, or within a whole-building assessment
 - Alterations can be submitted using one of two options:
 - As a stand-alone alteration, which applies only to the work being altered. The COMcheck assessment shall be based on the **alteration** option.
 - In a whole-building assessment, using as-built values for the project's unaltered portions.



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

Option 2: REScheck or COMcheck submissions *(continued)*

- REScheck is applicable to New Buildings, Additions, or Alterations
 - Additions can be submitted as stand-alone projects, or within a whole-building assessment
 - Alterations can be submitted as stand-alone projects in REScheck

Downloads: <https://www.energycodes.gov/>



4. SUBMISSIONS & INSPECTIONS

Sample COMcheck Input Report

280 Broadway.cck - COMcheck 4.0.7.2 Review Code: 2016 New York City Energy Conservation Code

File Edit View Options Code Help

Project Envelope Interior Lighting Exterior Lighting Mechanical Requirements

Roof Skylight Exterior Wall Window Door Basement Floor

| | Component | Assembly | Building Area Type | Orientation | Fenestration Details | Concrete Density | Construction Details | Gross Area | Units | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | UA | SHGC | Projection Factor |
|------------|-----------------------------------|--|--------------------|-------------|----------------------|------------------|----------------------|------------|------------|---------------------------|-------------------------------|----------|-----|------|-------------------|
| ▼ Building | | | | | | | | | | | | | | | |
| 1 | ▼ Roof Type A | Insulation Entirely Above Deck | 1 - Office (No... | | | | | 6112 | ft2 | | 20.0 | 0.048 | 288 | | |
| 2 | Window 4 - Skylight | Metal Frame:Glass, With Curb | | | Product ID: NA ... | | | 113 | ft2 | | | 0.500 | 57 | 0.40 | |
| 3 | ▼ Floor Type A | Slab-On-Grade:Unheated | 1 - Office (No... | | | | Insulation: None | 180 | linear ft. | | | | 131 | | |
| 4 | ▼ Abv-Grade Wall Assembly Type A | Concrete Block:12", Partially Grouted, Cells Empty | 1 - Office (No... | North | | Medium Weight | Furring: Metal | 5437 | ft2 | 0.0 | 12.0 | 0.064 | 298 | | |
| 5 | Window 1-2 | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 220 | ft2 | | | 0.380 | 84 | 0.40 | 0.00 |
| 6 | Window 1-2 - w/overhang | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 46 | ft2 | | | 0.380 | 17 | 0.40 | 0.33 |
| 7 | Window 3A-3D - Storefront | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 160 | ft2 | | | 0.380 | 61 | 0.40 | 0.00 |
| 8 | Window 3A-3D - Storefront, ovhng. | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 82 | ft2 | | | 0.380 | 31 | 0.40 | 0.28 |
| 9 | Door A - Ext Dbl Glass Door | Glass (> 50% glazing):Metal Frame, Entrance Door | | | Product ID: NA ... | | | 122 | ft2 | | | 0.770 | 94 | 0.40 | 0.00 |
| 10 | Door B - Insulated Hollow Metal | Insulated Metal | | | | | Swinging | 72 | ft2 | | | 0.420 | 30 | | |
| 11 | Door C - Roll-up Overhead | Insulated Metal | | | | | Non-Swinging | 80 | ft2 | | | 0.440 | 35 | | |
| 12 | ▼ Abv-Grade Wall Assembly Type B | Steel-Framed, 16" o.c. | 1 - Office (No... | North | | | | 5592 | ft2 | 13.0 | 8.0 | 0.062 | 222 | | |
| 13 | Window 1-2 | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 62 | ft2 | | | 0.380 | 24 | 0.40 | 0.00 |
| 14 | Window 1-2 - w/overhang | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 46 | ft2 | | | 0.380 | 17 | 0.40 | 0.33 |
| 15 | Window 3A-3D - Storefront | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 1267 | ft2 | | | 0.380 | 481 | 0.40 | 0.00 |
| 16 | Window 3A-3D - Storefront, ovhng. | Metal Frame with Thermal Break | | | Product ID: NA ... | | | 635 | ft2 | | | 0.380 | 241 | 0.40 | 0.33 |

Envelope +7.1% Interior Lighting +13% Exterior Lighting 0.0%

All Wall Types, Roof Types, Fenestration Types, and Door Types in the COMcheck analysis should use the same nomenclature as those shown in the Supporting Documentation (Drawings & Schedules).



4. SUBMISSIONS & INSPECTIONS

Sample COMcheck Report



COMcheck Software Version 4.0.7.2 Review
Envelope Compliance Certificate

Project Information

Energy Code: 2016 New York City Energy Conservation Code
 Project Title:
 Location: New York, New York
 Climate Zone: 4a
 Project Type: New Construction
 Vertical Glazing / Wall Area: 24%
 Skylight / Roof Area: 2%
 Permit Date: 1/30/18
 Permit No.:

Construction Site: New York, NY 10007
 Owner/Agent: New York, NY 10007
 Designer/Contractor: New York, NY 10007

Building Area

| Building Area | Floor Area |
|-----------------------------|------------|
| 1 - Office - Nonresidential | 32400 |

Additional Efficiency Package

On-site Renewable Energy

Envelope Assemblies

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | Proposed U-Factor | Budget U-Factor _{req} |
|--|-------------------------|----------------|---------------|-------------------|--------------------------------|
| Roof Type A: Insulation Entirely Above Deck, [Bldg. Use 1 - Office] | 6112 | --- | 20.0 | 0.048 | 0.032 |
| Window 4 - Skylight: Metal Frame: Glass, With Curb, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 113 | --- | --- | 0.500 | 0.500 |
| Floor Type A: Slab-On-Grade: Unheated, [Bldg. Use 1 - Office] (c) | 180 | --- | --- | 0.730 | 0.540 |
| NORTH | | | | | |
| Abv-Grade Wall Assembly Type A: Concrete Block: 12", Partially Grouted, Cells Empty, Medium Density, Furring: Metal, [Bldg. Use 1 - Office] | 5437 | 0.0 | 12.0 | 0.064 | 0.104 |
| Window 1-2: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 220 | --- | --- | 0.380 | 0.380 |
| Window 1-2 - w/overhang: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, PF 0.33, [Bldg. Use 1 - Office] (b) | 46 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 160 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront, ovhg.: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, PF 0.28, [Bldg. Use 1 - Office] (b) | 82 | --- | --- | 0.380 | 0.380 |
| Door A - Ext Dbl Glass Door: Glass (> 50% glazing): Metal Frame, Entrance Door, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 122 | --- | --- | 0.770 | 0.770 |

Project Title: U:\Sustainability\280 Broadway COMcheck.cck
 Data filename: U:\Sustainability\280 Broadway COMcheck.cck
 Report date: 03/15/18
 Page 1 of 31

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | Proposed U-Factor | Budget U-Factor _{req} |
|---|-------------------------|----------------|---------------|-------------------|--------------------------------|
| Door B - Insulated Hollow Metal: Insulated Metal, Swinging, [Bldg. Use 1 - Office] | 72 | --- | --- | 0.420 | 0.610 |
| Door C - Roll-up Overhead: Insulated Metal, Non-Swinging, [Bldg. Use 1 - Office] | 80 | --- | --- | 0.440 | 0.440 |
| Abv-Grade Wall Assembly Type B: Steel-Framed, 16" o.c., [Bldg. Use 1 - Office] | 5592 | 13.0 | 8.0 | 0.062 | 0.064 |
| Window 1-2: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 62 | --- | --- | 0.380 | 0.380 |
| Window 1-2 - w/overhang: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, PF 0.33, [Bldg. Use 1 - Office] (b) | 46 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 1267 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront, ovhg.: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, PF 0.33, [Bldg. Use 1 - Office] (b) | 635 | --- | --- | 0.380 | 0.380 |

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.
 (b) Fenestration product performance must be certified in accordance with NFRC and requires supporting documentation.
 (c) Slab-On-Grade proposed and budget U-factors shown in table are F-factors.

Envelope PASSES: Design 7% better than code

Envelope Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 2016 New York City Energy Conservation Code requirements in COMcheck Version 4.0.7.2 Review and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

Project Title: U:\Sustainability\280 Broadway COMcheck.cck
 Data filename: U:\Sustainability\280 Broadway COMcheck.cck
 Report date: 03/15/18
 Page 2 of 31



4. SUBMISSIONS & INSPECTIONS

Sample COMcheck Report

- A. Sign and seal the sheet with the Energy Analysis only at the Title Block when:
- A lead professional signs and seals for the entire project.
 - All applications related to the project share one application number, include the respective parts of the Energy Analysis in the discipline drawings, and the partial Energy Analysis represents the work of only that discipline.
 - All applications related to the project have different application numbers, present all parts of the Energy Analysis in the initial application as required, but each part is located on a separate drawing sheet with only the work of that discipline.
- B. Sign and seal each part of the Energy Analysis on the partial Energy Analysis, and **do not sign** at the Title Block, when:
- All applications related to the project have different application numbers, present all parts of the Energy Analysis in the initial application as required, and all parts on one sheet; and
 - No other work may be included on the sheet.

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | Proposed U-Factor | Budget U-Factor _{min} |
|--|-------------------------|----------------|---------------|-------------------|--------------------------------|
| Door B - Insulated Hollow Metal: Insulated Metal, Swinging, [Bldg. Use 1 - Office] | 72 | --- | --- | 0.420 | 0.610 |
| Door C - Roll-up Overhead: Insulated Metal, Non-Swinging, [Bldg. Use 1 - Office] | 80 | --- | --- | 0.440 | 0.440 |
| Abv-Grade Wall Assembly Type B: Steel-Framed, 16" o.c., [Bldg. Use 1 - Office] | 5592 | 13.0 | 8.0 | 0.062 | 0.064 |
| Window 1-2: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 62 | --- | --- | 0.380 | 0.380 |
| Window 1-2 - w/overhang: Metal Frame with Thermal Break, Perf. Specs.: Product ID NA, SHGC 0.40, PF 0.33, [Bldg. Use 1 - Office] (b) | 46 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront: Metal Frame with Thermal Break, Perf. Product ID NA, SHGC 0.40, [Bldg. Use 1 - Office] (b) | 1267 | --- | --- | 0.380 | 0.380 |
| Window 3A-3D - Storefront, ovhng.: Metal Frame with Thermal Break, Product ID NA, SHGC 0.40, PF 0.33, [Bldg. Use 1 - Office] (b) | 635 | --- | --- | 0.380 | 0.380 |

U-factors are used for software baseline calculations ONLY, and are not code requirements. Product performance must be certified in accordance with NFRC and requires supporting documentation. Proposed and budget U-factors shown in table are F-factors.

Design 7% better than code

Statement

The proposed envelope design represented in this document is consistent with the building plans, and the other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 2016 New York City Energy Conservation Code requirements in COMcheck Version 4.0.7.2 Review and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

Project Title: _____ Report date: 03/15/18
Data filename: U:\Sustainability\280 Broadway COMcheck.cck Page 2 of 31



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS

Option 3: Energy Modeling (EN1)

- The Energy Cost Budget Method or Performance Rating Method of ASHRAE 90.1-2013 ([Appendix CA](#)) can be used to demonstrate compliance.
 - Applicable to New Buildings, Additions, or Alterations
 - Requires computer energy modeling, using software programs approved by the Secretary of State of New York State and the NYC Commissioner of Buildings (e.g., DOE-2.1E, VisualDOE, Energy Plus, eQuest, Trane Trace 700, IESVE)
 - Compliance is demonstrated using the EN1 form and submitting modeling input/output files to the Department 
 - If changes occur during project execution, then energy model must be updated to as-built condition and the results must be submitted in EN2 form and certified by progress inspector 
 - The energy analysis must also include mandatory code provisions



4. SUBMISSIONS & INSPECTIONS

Sample EN1- Envelope Input

NYC Buildings EN1: Energy Cost Budget Worksheet

Enter information for sections 1, 2 and 3 - incorporate in the drawing set.

Must be typewritten

1 Location Information

| | |
|------------------|-------------|
| House No(s) | Street Name |
| Borough | Block |
| Lot | BIN |
| Work on Floor(s) | |

2 Applicant Information

| | |
|------------------|------------|
| Last Name | First Name |
| Business Name | |
| Business Address | |
| City | State |
| Zip | |
| Email | |

3 Energy Modeling Information

| |
|-----------------------------|
| Modeling Software & version |
| Weather File |
| Modeled Square Feet |
| Conditioned SQFT |
| Proposed Unmet Load Hours |
| Baseline Unmet Load Hours |
| Proposed Site EUI (kBtu/sf) |
| Baseline Site EUI (kBtu/sf) |

Falsification of any statement is a misdemeanor under the NYC Administrative Building Code and is punishable by a fine or imprisonment, or both. It is unlawful to give to a city employee, or for a city employee to accept, any benefit, monetary or otherwise, either as a gratuity for properly performing the job or in exchange for special consideration. Violation is punishable by imprisonment or fine or both.

Name (please print) _____

Signature _____ Date _____

P. E. / R. A. Seal (apply seal, then sign and date over seal)

| 6 Energy Inputs and Supporting Documentation Index | | | | | | | | | | |
|---|---|---------------------------------------|-----------------------|-----------|---|-----------------------|--------------------|--------------------------|--------------------------|---------------------|
| a Above-Grade Wall & Fenestration Areas | | | | | | | | | | |
| | Orientation | Baseline Case | | | Proposed Case | | | Supporting Doc. Location | Model Output Report | |
| | | Window + Wall Area (ft ²) | Vertical Glazing Area | | Window + Wall Area (ft ²) | Vertical Glazing Area | | | | |
| | | (ft ²) | (ft ²) | (%) | (ft ²) | (ft ²) | (%) | | | |
| Above-Grade Wall & Vertical Glazing Area by Orientation | North | 105252 | 41172 | 39.1 | 105252 | 48592 | 46.2 | EN-006 | LV-D | |
| | East | 19720 | 8281 | 42 | 19720 | 9774 | 47.4 | EN-006 | LV-D | |
| | South | 105708 | 41424 | 39.2 | 105708 | 48889 | 46.5 | EN-006 | LV-D | |
| | West | 20388 | 9547 | 46.8 | 20388 | 11268 | 54.7 | EN-006 | LV-D | |
| | Total | 251072 | 100425 | 40 | 251072 | 118524 | 47.2 | EN-006 | LV-D | |
| Roof & Skylight Area | Roof + Skylight Area (ft ²) | | Skylight Area | | Roof + Skylight Area (ft ²) | | Skylight Area | | Supporting Doc. Location | Model Output Report |
| | | | (ft ²) | (%) | | | (ft ²) | (%) | | |
| | Total | 51607 | 0 | 0 | 51607 | 0 | 0 | EN-006 | LV-D | |

 Applicants are required to submit the Energy Modeling reports to verify the inputs listed on the EN1 form.



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS: Key Considerations

Responsibility by Discipline

- Different registered design professionals may sign and seal their respective parts of the Energy Analysis report
 - Applies only if Prescriptive compliance (or Trade-off within Envelope) is used
 - If all systems are filed under the same application number, each registered design professional can include his or her part of the Energy Analysis in their respective CDs
 - If multiple application numbers are filed, all parts of the Energy Analysis must be filed in the initial application for the project, except:
 - Foundation and earthwork permits – a Tabular Analysis can be submitted just for this work



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS: Key Considerations

Mixed Occupancy: 3-stories or Less

- For a building with both commercial and residential occupancies
 - Each occupancy shall be considered separately
 - For example, COMcheck will be required for the commercial portion of the building and REScheck will be required for the residential portion of the building
 - The commercial portion shall meet the applicable provisions of Chapters [C2](#), [C3](#), [C4](#) and [C5](#) or ASHRAE 90.1-2013 ([Appendix CA](#))
- Cannot mix and match Codes for commercial portion – same Code version must be followed and applied in its entirety
 - The residential portion shall meet the applicable provisions of Chapters [R2](#), [R3](#), [R4](#), and [R5](#)



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS: Key Considerations

Mixed Occupancy: Greater than 3-stories

- For a building with both commercial and residential occupancies
 - Each occupancy shall be considered separately
 - For example, a single COMcheck shall be used to address both commercial and residential occupancies
 - Residential portions/occupancies are classified as Group R when determining the insulation requirements
 - The building/application shall meet the applicable provisions of Chapters [C2](#), [C3](#), [C4](#) and [C5](#) or ASHRAE 90.1-2013 ([Appendix CA](#))
 - Cannot mix and match Codes for commercial portion – same Code version must be followed and applied in its entirety



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS: Key Considerations

Lead Professional

- Where whole-building analysis is used, a Lead Professional must be identified.
 - Applies only if Prescriptive compliance (or Trade-off within Envelope) is used
 - Applies to all situations where Trade-offs between disciplines (envelope, mechanical/service water heating, lighting/power) are used
 - Lead Professional must sign and stamp the entire Energy Analysis
 - Can be a registered design professional other than the architect/engineer of record



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS UPDATES

When are Energy Analysis Updates required?

Updates to a previously approved analysis are required when:

- Design changes are made to one or more NYCECC-regulated elements
 - Applies even if the project still complies overall
 - Energy Analysis & Supporting Documentation resubmitted prior to construction via PAA (*see following slide*)
 - If design changes result in one or more disciplines failing Prescriptive criteria
 - Requires whole building Energy Analysis from a Lead Professional
 - Construction may be stopped pending a PAA submission with revised Energy Analysis



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS UPDATES (*conditions*)

When are Energy Analysis Updates required?

Updates to a previously approved analysis are required when:

- Construction-phase changes made to one or more NYCECC-regulated elements
 - Applies even if the project still complies overall
 - A signed and sealed as-built Energy Analysis and Supporting Documentation are required prior to sign off (*see following slide*)
 - Can be stamped by separate design professionals, if Prescriptive compliance was achieved



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS UPDATES

When are Energy Analysis Updates required?

EN2 must reflect as-built conditions

- P.E./R.A. Progress Inspectors check the appropriate box in **Section 3**.
 - As-built conditions conform to **originally approved Energy Analysis**, or
 - As-built conditions conform to **attached, revised, professionally certified Energy Analysis** (same professional of the previously approved EA), or
 - As-built conditions conform to **the last revised Energy Analysis previously approved as a PAA**



4. SUBMISSIONS & INSPECTIONS

ENERGY ANALYSIS UPDATES (*conditions*)

When are Energy Analysis Updates required?

EN2 must reflect as-built conditions

- If there are multiple inspectors, each inspector needs to submit a separate EN2 form for the portions of the building corresponding to their TR8 inspections

| | |
|---|---|
| 3 As Built Information <i>P.E./R.A. responsible for progress inspections, choose one below and sign/seal.</i> | |
| <input type="checkbox"/> The as-built conditions of the completed building conform to the originally approved energy analysis and do not require a revised energy analysis. | <input type="checkbox"/> The energy analysis has been revised according to <u>one</u> of the statements below: <input type="checkbox"/> Attached is a revised energy analysis, prepared, signed and sealed by the registered design professional who prepared the previously submitted and approved energy analysis. The as-built conditions of the completed building conform to this revised energy analysis. <hr/> <input type="checkbox"/> The last revised energy analysis was submitted and approved as a post approval amendment on _____ (date). The as-built conditions of the completed building conform to this revised energy analysis. |



4. SUBMISSIONS & INSPECTIONS

SUPPORTING DOCUMENTATION

What type of Supporting Documentation should be provided?

■ Per [1 RCNY §5000-01](#)

Supporting Documentation is defined for:

- Envelope
- Mechanical/Service Water Heating
- Electrical (including Lighting)
- Mandatory Requirements (including Commissioning)
- Permanent certificate in residential buildings
- Deferred submittals
- Progress Inspections



4. SUBMISSIONS & INSPECTIONS

SUPPORTING DOCUMENTATION

What type of Supporting Documentation should be provided?

Supporting Documentation is required and should:

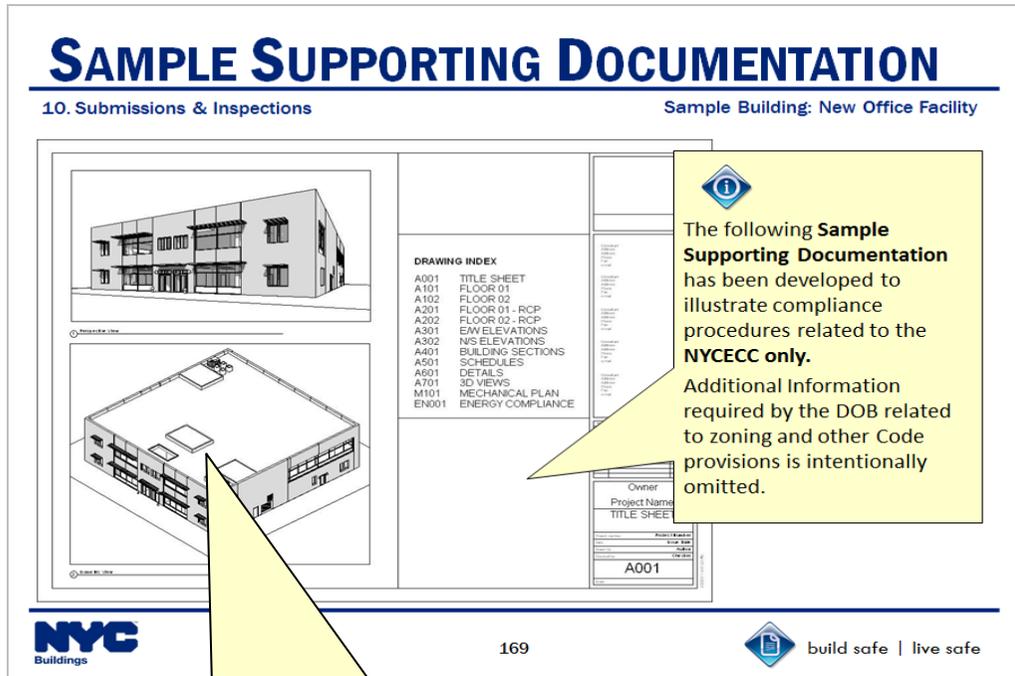
- Be in the format of a [Supporting Documentation Index](#) that:
 - Verifies the values submitted in the Energy Analysis
 - Verifies that mandatory requirements of the NYCECC are met
- Provide a listing and description of the applicable progress inspections required based on the scope of work of the project, per table I and/or II of 1 RCNY § 5000-01

| <u>SUPPORTING DOCUMENTATION INDEX</u> | | |
|---|---|---|
| <u>Code chapter and/or standard used for design</u> <u>Climate Zone 4A</u> | | |
| <u>Code Section</u> | <u>Item Description</u> | <u>Supporting Documentation Location</u> |
| <u>(List specific code section)</u> | <u>(List all elements of the scope of work in the detail that they are addressed by the energy code.)</u> | <u>(List the drawing page number and/or section title.)</u> |



4. SUBMISSIONS & INSPECTIONS

SAMPLE SUPPORTING DOCUMENTATION



This sample drawing is provided at full size in the NYC DOB ECC Building Envelope module.

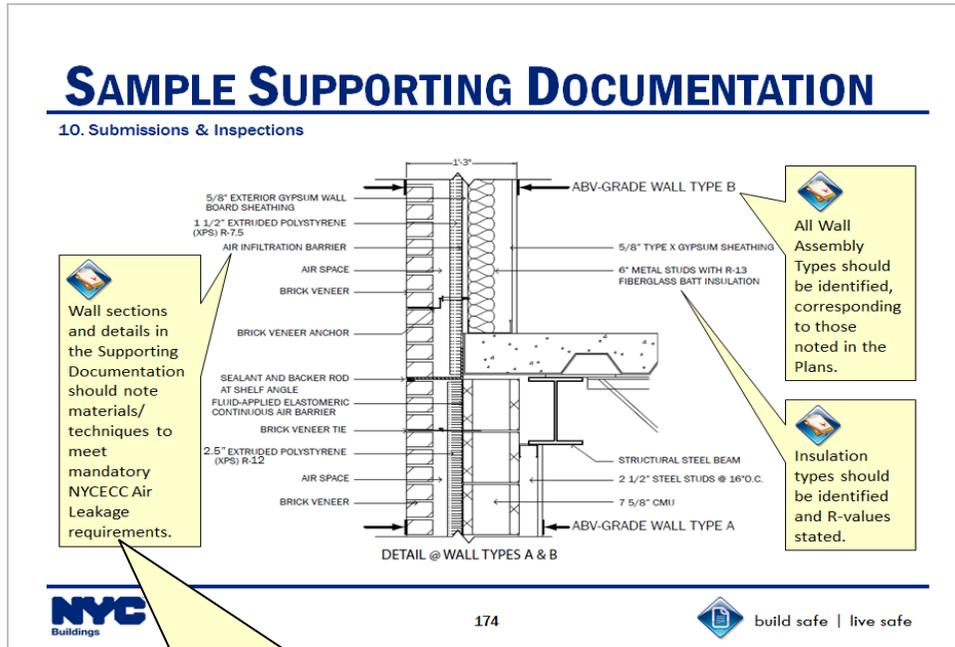
Example Provided by Discipline

- Sample Supporting Documentation is provided in each of the DOB NYCECC Training Modules:
 - Residential
 - Envelope
 - Lighting
 - HVAC 1 & 2



4. SUBMISSIONS & INSPECTIONS

SAMPLE SUPPORTING DOCUMENTATION



This sample drawing is provided at full size in the NYC DOB ECC Building Envelope module.

- Sample Supporting Documentation demonstrates the type of information that should be provided via:
 - Plans, Elevations, Sections, Details
 - Schedules
 - Drawing Notes and Narratives
- Emphasis is placed on comprehensiveness, coordination, and clarity



4. SUBMISSIONS & INSPECTIONS

Progress Inspections 1: *How are Progress Inspections determined and verified?*

Per [1 RCNY §5000-01](#)

- Progress Inspections are defined for both Residential & Commercial structures in the following categories:
 - Envelope Inspections
 - Mechanical and Plumbing Inspections (Residential)
 - Mechanical and Service Water Heating Inspections (Commercial)
 - Electric Power and Lighting Systems
 - Other (Maintenance information, Permanent Certificate, and Solar-Ready Requirements for Residential)



4. SUBMISSIONS & INSPECTIONS

Progress Inspections 1: *How are Progress Inspections determined and verified? (continued)*

Progress Inspections are required to

- Verify the measures submitted in the Energy Analysis & Supporting Documentation are incorporated into the construction

Verification

- Through DOB's [TR8](#) form 
- Through DOB's [EN2](#) form 



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: *How are Progress Inspections performed?*

Types

- Visual inspections in most instances
 - Timing and frequency of inspections must be coordinated with contractors
- Testing of some systems required
 - Residential Examples:
 - Blower door testing is now mandatory (see *Residential Module*)
 - Outdoor air intake & exhaust dampers
 - Programmable thermostats
 - Duct leakage (where air handling equipment or ductwork is in unconditioned space)
 - Commercial Examples:
 - HVAC and service hot water system controls
 - Lighting controls



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: *How are Progress Inspections performed?*

Extent

- Per [1 RCNY §101-07](#), at least 15% of each relevant construction item
 - Per [1 1 RCNY §5000-01](#), items such as ductwork leakage (residential) or HVAC controls (commercial) require a higher inspection rate (no less than 20% of each type)
 - Per [1 RCNY §101-07](#), not less than one of each relevant construction item



Image: Courtesy of pnnl.gov



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: *How are Progress Inspections performed?*

Qualifications

- Defined in [1 RCNY §101-07](#)

Primary Inspector or Inspection Supervisor

- Residential & Commercial
 - Registered Design Professional of Record for the work
- Residential
 - Registered design professional with minimum 5 years experience in Energy Code systems for buildings
- Commercial
 - Registered design professional with minimum 5 years experience in Energy Code systems for buildings and minimum 3 years experience for the system type to be inspected



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: *How are Progress Inspections performed?*

Qualifications

- Defined in [1 RCNY §101-07](#)

Primary Inspector or Inspection Supervisor

- Residential & Commercial
 - Registered Design Professional
- Residential
 - Registered design professional with minimum Energy Code systems for buildings
- Commercial
 - Registered design professional with minimum Energy Code systems for buildings and minimum the system type to be inspected

The progress inspector has an obligation to avoid conflict of interest. A progress inspector and/or a progress inspection agency shall not engage in any activities that may conflict with their objection judgment and integrity, including, but not limited to, having a financial and/or other interest in the construction, installation, manufacture or maintenance of structures or components that they inspect, as defined in [1RCNY § 101-07](#)).



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: *How are Progress Inspections performed?*

Qualifications

- Defined in [1 RCNY §101-07](#)

Supplemental Inspector

The supplemental inspector must work under the direct supervision of the Primary Inspector or inspector supervisor, as defined in [1RCNY § 101-07](#)).

- Residential & Commercial
 - Under direct supervision of the Inspection Supervisor
- Residential & Commercial
 - Minimum 3 years experience in inspection/construction observation of buildings for Energy Code-regulated systems (commercial inspectors must have experience with commercial buildings)



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Supporting Documentation

| | Inspection/Test | Periodic (minimum) | Reference Standard (See ECC Chapter C6) or Other Criteria | ECC or Other Citation |
|------|--|--|--|---|
| IIA | Envelope Inspections | | | |
| IIA1 | Protection of exposed foundation insulation: Insulation shall be visually inspected to verify proper protection where applied to the exterior of basement or cellar walls, crawl-space walls and/or the perimeter of slab-on-grade floors. | As required during foundation work and prior to backfill | Approved construction documents | C303.2.1 ; ASHRAE 90.1- 5.8.1.7 |
| IIA2 | Insulation placement and R-values: Installed insulation for each component of the conditioned space envelope and at junctions between components shall be visually inspected to ensure that the R-values are marked, that such R-values conform to the R-values identified in the construction documents and that the insulation is properly installed. Certifications for unmarked insulation shall be similarly visually inspected. | As required to verify continuous enclosure while walls, ceilings and floors are open | Approved construction documents | C303.1 , C303.1.1 , C303.1.2 , C402.1 , C402.2 ; ASHRAE 90.1 – 5.5 , 5.6 , 5.8.1 , 11 or Appendix G |
| IIA3 | Fenestration U-factor and product ratings: U-factors , SHGC and VT values of installed fenestration shall be visually inspected for conformance with the U-factors , SHGC and VT values identified in the construction drawings by verifying the manufacturer’s NFRC labels or, where not labeled, using the ratings in ECC Tables C303.1.3(1) , (2) and (3) . | As required during installation | Approved construction documents; NFRC 100, NFRC 200 | C303.1 , C303.1.3 , C402.4 ; ASHRAE 90.1 – 5.5 ; 5.6 , 5.8.2 , 11 or Appendix G |
| IIA4 | Fenestration air leakage: Windows and sliding or swinging door assemblies, except site- built windows and/or doors, shall be visually inspected to verify that installed assemblies are listed and labeled by the manufacturer to the referenced standard. For curtain wall, storefront glazing, commercial entrance doors and revolving doors, the testing reports shall be reviewed to verify that the installed assembly complies with the standard cited in the approved plans. | As required during installation; prior to final construction inspection | NFRC 400, AAMA/WDMA/CSA101/ I.S.2/A440 ASTM E283; ANSI/DASMA 105 | C402.5.2 ; ASHRAE 90.1 – 5.4.3.2 , 5.8.2.2 |
| IIA5 | Fenestration areas: Dimensions of windows, doors and skylights shall be verified by visual inspection. | Prior to final construction inspection | Approved construction documents | C402.4 ; ASHRAE 90.1 – 5.5.4.2 , 11 or Appendix G |
| IIA6 | Air sealing and insulation - visual: Openings and penetrations in the building envelope, including site-built fenestration and doors, shall be visually inspected to verify that a continuous air barrier around the envelope forms an air-tight enclosure. The progress inspector shall visually inspect to verify that materials and/or assemblies have been tested and meet the requirements of the respective standards, or must observe the testing of the building and/or assemblies meet the requirements of the standard, in accordance with the standard(s) cited in the approved plans. | As required during construction | Approved construction documents; ASTM E2178, ASTM E2357, ASTM E1677, ASTM E779, ASTM E283. | C402.5 ; ASHRAE 90.1 – 5.4.3 . |
| IIA7 | Air sealing and insulation - testing: Testing must be performed in accordance with section ECC C402.5.1.3 or ASHRAE 90.1 section 5.4.3.5 , and shall be accepted if the building and/or its air-barrier assemblies meet the requirements detailed in such section. Testing must be performed by a third-party independent of the contractor and acceptable to the department. | As required during construction, or prior to final construction inspection | Approved construction documents, ASTM E 779 | C402.5.1.3; ASHRAE 90.1 – 5.4.3.5 |



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Supporting Documentation

| | Inspection/Test | Periodic (minimum) | Reference Standard (See ECC Chapter C6) or Other Criteria | ECC or Other Citation |
|------------|---|--|--|---|
| IIA | Envelope Inspections | | | |
| IIA1 | Protection of exposed foundation insulation: Insulation shall be visually inspected to verify proper protection where applied to the exterior of basement or cellar walls, crawl-space walls and/or the perimeter of slab-on-grade floors. | As required during foundation work and prior to backfill | Approved construction documents | C303.2.1 ; ASHRAE 90.1- 5.8.1.7 |
| IIA2 | Insulation placement and R-values: Installed insulation for each component of the conditioned space envelope and at junctions between components shall be visually inspected to ensure that the R-values are marked, that such R-values conform to the R-values identified in the construction documents and that the insulation is properly installed. Certifications for unmarked insulation shall be similarly visually inspected. | As required to verify continuous enclosure while walls, ceilings and floors are open | Approved construction documents | C303.1 , C303.1.1 , C303.1.2 , C402.1 , C402.2 ; ASHRAE 90.1 - 5.5 , 5.6 , 5.8.1 , 11 or Appendix G |
| IIA3 | Fenestration U-factor and product ratings: U-factors , SHGC and VT values of installed fenestration shall be visually inspected for conformance with the U-factors , SHGC and VT values identified in the construction drawings by verifying the manufacturer's NFRC labels or, where not labeled, using the ratings in ECC Tables C303.1.3(1) , (2) and (3) . | As required during installation | Approved construction documents; NFRC 100, NFRC 200 | C303.1 , C303.1.3 , C402.4 ; ASHRAE 90.1 - 5.5 ; 5.6 , 5.8.2 , 11 or Appendix G |
| IIA4 | Fenestration air leakage: Windows and sliding or swinging door assemblies, except site- built windows and/or doors, shall be visually inspected to verify that installed assemblies are listed and labeled by the manufacturer to the referenced standard. For curtain wall, storefront glazing, commercial entrance swinging doors, the testing reports shall be reviewed to verify that the installed assembly complies with approved plans. | As required during installation; prior to final construction inspection | NFRC 400, AAMA/WDMA/CSA101/ I.S.2/A440 ASTM E283; ANSI/DASMA 105 | C402.5.2 ; ASHRAE 90.1 - 5.4.3.2 , 5.8.2.2 |
| IIA5 | Fenestration areas: Dimensional | | | .1 |
| IIA6 | Air sealing and insulation doors, shall be visually inspected. The progress inspector shall verify the requirements of the referenced standards. | | | .1 |
| IIA7 | Air sealing and insulation section 5.4.3.5, and shall be visually inspected. Testing must be performed by a third-party independent of the contractor and acceptable to the department. | construction inspection | documents, ASTM E 779 | E |

A Progress Inspections Table must be included in the Supporting Documentation drawings, noting all applicable inspections to be performed based on the scope of work, plus Reference Standards and NYCECC Citations.

The design applicant must also include contract language requiring the contractor to identify time in the construction schedule for the progress inspections.

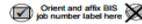


4. SUBMISSIONS & INSPECTIONS

Progress Inspections: TR8 Report



TR8: Technical Report
Statement of Responsibility for
Energy Code Progress Inspections
This form must be typewritten



| 3 Energy Code Progress Inspection <i>Required for applications where Energy Code Compliance Progress Inspection is marked Yes on TR1</i> | | | | | |
|--|--------------------------|---|--|--|------------------------------|
| 3A ← Identification of Requirement | | | 3B Identification of Responsibilities | 3C Certificate of Complete Inspections / Tests | 3D Withdraw Responsibilities |
| Y | N | Progress Inspections | Table Reference in 1RCNY §5000-01(h) (1) and (2) | Initial & Date | Initial & Date |
| <input type="checkbox"/> | <input type="checkbox"/> | Protection of exposed foundation insulation | (IA1), (IIA1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Insulation placement and R values | (IA2), (IIA2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration u-factor and product rating | (IA3), (IIA3) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration air leakage | (IA4), (IIA4) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration areas | (IA5), (IIA5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Air sealing and insulation — visual | (IA6), (IIA6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Air sealing and insulation — testing | (IA7), (IIA7) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Loading deck weather seals | (IIA8) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Vestibules | (IIA9) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fireplaces | (IB1), (IIB1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Shutoff dampers | (IB2), (IIB2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | HVAC insulation and sealing | (IB5), (IIB5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Duct leakage testing | (IB6), (IIB6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Electrical energy consumption | (IC1), (IIC1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Lighting in dwelling units | (IC2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Interior lighting power | (IC2), (IIC3) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Exterior lighting power | (IC4) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Lighting controls | (IC5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Electrical motors | (IC6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Maintenance information | (ID1), (IID1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Permanent certificate | (ID2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Solar Ready Requirements | (ID3) | | |

* For column 3C, indicate date when the actual final inspection was performed.

September 2016



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: TR8 Report



TR8: Technical Report
Statement of Responsibility
Energy Code Progress Inspection

The applicant (R.A. or P.E.) defines the required progress inspections by checking “Y” or “N” in the left-hand column under section 3 of the TR8 form.

3 Energy Code Progress Inspections

| 3A Identification of Requirement | | Table Reference in 1RCNY §5000-01(h) (1) and (2) | 3B Identification of Responsibilities | 3C Certificate of Complete Inspections / Tests | 3D Withdrawal Responsibilities |
|----------------------------------|--------------------------|---|--|---|-----------------------------------|
| Y | N | | Initial & Date | Initial & Date | Initial & Date |
| <input type="checkbox"/> | <input type="checkbox"/> | Protection of exposed foundation insulation | (IA1), (IIA1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Insulation placement and R values | (IA2), (IIA2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration u-factor and product rating | (IA3), (IIA3) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration air leakage | (IA4), (IIA4) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenestration areas | (IA5), (IIA5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Air sealing and insulation — visual | (IA6), (IIA6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Air sealing and insulation — testing | (IA7), (IIA7) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Loading deck weather seals | (IIA8) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Vestibules | (IIA9) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fireplaces | (IB1), (IIB1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Shutoff dampers | (IB2), (IIB2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | HVAC and service water heating equipment | (IB3), (IIB3) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | HVAC and service water heating system controls | (IB4), (IIB4) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | HVAC insulation and sealing | (IB5), (IIB5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Duct leakage testing | (IB6), (IIB6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Electrical energy consumption | (IC1), (IIC1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Lighting in dwelling units | (IC2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Interior lighting power | (IC2), (IIC3) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Exterior lighting power | (IC4) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Lighting controls | (IC5) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Electrical motors | (IC6) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Maintenance information | (ID1), (IID1) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Permanent certificate | (ID2) | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Solar Ready Requirements | (ID3) | | |

* For column 3C, indicate date when the actual final inspection was performed.

September 2016

Prior to Permit, the designated Progress Inspector must initial and date each inspection they will be responsible for, and sign/seal under section 5 of the TR8 form. If multiple Progress Inspectors are involved in a project, each one must submit a signed/sealed TR8 for their scope of inspection services.



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: TR8 Report

NYC
Buildings

TR8: Technical Report
Statement of Responsibility for
Energy Code Progress Inspections
This form must be typewritten

Orient and affix BIS
job number label here

1 | Location Information *Required for all applications.*

6 | Inspection Applicant's Certification of Completion

I have completed the items specified herein and certify the following (check one only):

- All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations.
- All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Withdrawal of Applicant: I am withdrawing responsibility for the items of progress inspections and/or tests indicated herein and herewith submit the results or status of the work performed to date.

Name (please print)

Signature _____ Date _____

P.E. / R.A. Seal *(apply seal, then sign and date over seal)*

September 2016

* For column 3C, indicate date when the actual final inspection was performed.

September 2016



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: TR8 Report

NYC
Buildings

TR8: Technical Report
Statement of Responsibility for
Energy Code Progress Inspections
This form must be handwritten.

Orient and affix BIS
job number label here

6 Inspection Applicant's Certification of Completion

I have completed the items specified herein and certify the following (check one only):

- All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations.
- All work performed substantially conforms to approved construction documents and has been performed in accordance with applicable provisions of the New York City Energy Conservation Code and other designated rules and regulations, except as indicated in the attached report.

I am aware of the additional sanctions imposed on false filings by §28-211.1.2 of the Administrative Code.

Withdrawal of Applicant: I am withdrawing responsibility for the items of progress inspections and the results or status of the work performed to date.

Name (please print)

Signature _____ Date _____

P.E. / R.A. Seal (apply seal, then sign and date over seal)

Upon completion of the applicable inspections, the Progress Inspector initials and dates each inspection performed (column 3C). Any inspections assigned to the Progress Inspector that are not performed are addressed through column 3D (withdraw responsibilities). Final signatures and seals are provided in section 6 of the TR8 form.

| | | | | |
|---|--|--|--|--|
| <input type="checkbox"/> exterior lighting power (IC4) | | | | |
| <input type="checkbox"/> lighting controls (IC5) | | | | |
| <input type="checkbox"/> Electrical motors (IC6) | | | | |
| <input type="checkbox"/> Maintenance information (ID1), (ID1) | | | | |
| <input type="checkbox"/> Permanent certificate (ID2) | | | | |
| <input type="checkbox"/> Solar Ready Requirements (ID3) | | | | |

* For column 3C, indicate date when the actual final inspection was performed.

September 2016



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: TR8 Report

- EN2 Coordination
- Commissioning
- Column 3C: Date is the date the final inspection is performed
- Rule 101-07: What is required in the inspection (photo documentation)
Documentation. An approved agency shall maintain records of inspections and tests for at least 6 years or for such shorter period as the commissioner shall determine and shall make such records available to the department upon request. Such records shall include field logs, test results, laboratory reports, notes, photographs and such other information as may be necessary or appropriate to establish the sufficiency of the inspection. The principal of the approved agency shall furnish to the department upon request such records of any inspection or test, in the manner required by the department.



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Commissioning

System Commissioning (Section C408) is required for the following:

- Building Mechanical Systems (Section C403)
- Service Water Heating Systems (Section C404)
- Electrical Power and Lighting Systems (Section C405)



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Commissioning (*continued*)

System Commissioning (Section C408) is required for the following:

Mechanical systems, renewable energy, and service water heating systems shall include but are not limited to, at a minimum, the following heating, ventilating, air conditioning, service water heating, indoor air quality and refrigeration systems (mechanical and/or passive) and associated controls:

1. Heating, cooling, air handling and distribution, ventilation and exhaust systems
2. Energy recovery systems
3. Manual or automatic controls
4. Plumbing systems
5. Service water heating systems
6. Refrigeration systems
7. Renewable energy and energy storage systems
8. Other systems/equipment/components supporting HVAC and affecting energy use



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Commissioning

When System Commissioning is required:

- Drawings must specify that a Final Commissioning Report is to be provided to the building owner, and
- The Commissioning Report Certification must be submitted to the Department:
 - Within 30 months of the issuance of the C/O or letter of completion for *new buildings* $\geq 500,000$ sf in conditioned space area, excluding R-2 occupancies
 - Within 18 months of the issuance of the C/O or letter of completion for *all other buildings*

System Commissioning is not required for:

- Mechanical Systems of Total installed Heating capacity $< 600,000$ Btu/h and Total installed Cooling capacity $< 480,000$ Btu/h
- Renewable Energy Systems of Total generating capacity < 25 kW



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Back-up

Per NYC Administrative Code §28-116.2.3

A record of all inspections shall be kept by the person performing the inspection

- The Commissioner can require inspection reports to be filed with the Department.
- Records of inspections shall be maintained for a period of six years after sign-off, or for such other period of time as the Commissioner may require
- Records of inspections shall be made available to DOB upon request

EN2 Form

- This DOB form is signed by the **Progress Inspector**, certifying that the values in either the last approved Energy Analysis or the as-built Energy Analysis represent values in the constructed building



While a specific format is not stated, inspection records can include:

- Logs, reports, meeting minutes
- Photographs
- Annotated Drawings



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Sample EN2 FORM

NYC
Buildings

EN2: As Built Energy Analysis
This form must be typewritten and submitted in person to the Certificate of Occupancy Division's Borough Office where energy analysis was reviewed.

 Orient and affix BIS job number label here 

1 Progress Inspector Information *Required for all applications.*

| | | |
|------------------|--------------------|----------------|
| Last Name | First Name | Middle Initial |
| Business Name | Business Telephone | |
| Business Address | Business Fax | |

3 As Built Information *P.E./R.A. responsible for progress inspections, choose one below and sign/seal.*

- The as-built conditions of the completed building conform to the originally approved energy analysis and do not require a revised energy analysis.
- The energy analysis has been revised according to one of the statements below:
- Attached is a revised energy analysis, prepared, signed and sealed by the registered design professional who prepared the previously submitted and approved energy analysis. The as-built conditions of the completed building conform to this revised energy analysis.
 - The last revised energy analysis was submitted and approved as a post approval amendment on _____ (date). The as-built conditions of the completed building conform to this revised energy analysis.

I, _____, a registered design professional who performed or supervised the progress inspections for _____ (envelope, or HVAC/service water heating, or electrical/lighting work), certify that, to the best of my knowledge and professional judgment, the above checked statement(s) are true with respect to the progress inspections I completed as indicated on my signed, sealed and submitted TRB.

Name (please print) _____

Signature _____ Date _____

P.E. / R.A. Seal (apply seal, then sign and date over seal)

01/11



4. SUBMISSIONS & INSPECTIONS

Progress Inspections: Sample EN2 FORM

NYC
Buildings

EN2: As Built Energy Analysis
This form must be typewritten and submitted in person to the Certificate of Occupancy Division's Borough Office where energy analysis was reviewed.

Orient and affix BIS job number label here

1 Progress Inspector Information *Required for all applications.*

| | | |
|------------------|--------------------|------------------|
| Last Name | First Name | Middle Initial |
| Business Name | Business Telephone | |
| Business Address | Business Fax | |
| City | State | Zip |
| | | Mobile Telephone |

3 As Built Information *P.E./R.A. responsible for progress inspections, choose one below and sign/seal.*

The as-built conditions of the completed building conform to the originally approved energy analysis and do not require a revised energy analysis.

The energy analysis has been revised according to one of the statements below:

- Attached is a revised energy analysis, prepared, signed and sealed by the registered design professional who prepared the previously submitted approved energy analysis. The as-built conditions of the completed building conform to this revised energy analysis.
- The last approved energy analysis was submitted and approved as a post approval amendment on _____ (date). The as-built conditions of the completed building conform to this revised energy analysis.

I, _____, a registered design professional who performed or supervised the progress inspections for _____ (envelope, or HVAC/service water heating, or electrical/lighting work), certify that, to the best of my knowledge and professional judgment, the above checked statement(s) are true with respect to the progress inspections I completed as indicated on my signed, sealed and submitted TRS.

Name (please print) _____

Signature _____ Date _____

P.E./R.A. Seal (apply seal, then sign and date over seal)

01/11

The Progress Inspectors and design applicants will need to coordinate to ensure that the as-built conditions and approved Energy Analysis are consistent. An as-built Energy Analysis update may be required.



5. RESOURCES

Slides 102 to 107



5. RESOURCES: OVERVIEW

In this section you will learn about:

- Resources and links
- DOB assistance
- Images/Photo Credits & Copyrights



5. RESOURCES: LINKS

The following resources have been referenced in this module:

| Resource | Link |
|---|---|
| 2016 NYCECC | http://www1.nyc.gov/site/buildings/codes/2016-energy-conservation-code.page |
| Local Law 91 of 2016 | http://www1.nyc.gov/assets/buildings/local_laws/ll91of2016.pdf |
| Local Law 125 of 2016 | http://www1.nyc.gov/assets/buildings/local_laws/ll125of2016.pdf |
| Code Notes | http://www1.nyc.gov/site/buildings/codes/list-code-notes.page |
| NYCECC FAQ | http://www1.nyc.gov/site/buildings/codes/nycecc-faq.page |
| UPDATED - Energy Code: Supporting Documents How to Guides | http://www1.nyc.gov/assets/buildings/pdf/h2g_all.pdf |
| 1 RCNY § 5000-01 | http://www1.nyc.gov/assets/buildings/rules/1_RCNY_5000-01.pdf |



5. RESOURCES: LINKS

(continued)

| Resource | Link |
|----------------------------------|---|
| 1 RCNY § 101-07 | http://www1.nyc.gov/assets/buildings/rules/1_RCNY_101-07.pdf |
| Buildings Bulletins | http://www1.nyc.gov/site/buildings/codes/building-bulletins/page |
| EN1, EN2, and TR8 Forms | http://www1.nyc.gov/site/buildings/codes/energy-code-forms.page |
| REScheck/COMcheck | https://www.energycodes.gov/ |
| Blower Door Testing | https://www.energy.gov/energysaver/blower-door-tests |
| One City: Built to Last | http://www.nyc.gov/html/builttolast/pages/home/home.shtml |
| New York City Construction Codes | http://www2.iccsafe.org/states/newyorkcity/ |



5. RESOURCES: DOB ASSISTANCE

Questions on the NYCECC
can be submitted to DOB at:



EnergyCode@buildings.nyc.gov



5. RESOURCES

IMAGES/PHOTO CREDITS & COPYRIGHTS

| Company or Individual | Slide Numbers |
|---|------------------------------------|
| NYC Department of Buildings | 31, 65, 66, 67, 69, 80, 81, 102 |
| US DOE Building Energy Codes University | 52 |
| Basc.pnnl.gov | 85, 99 |





NYCTM
Buildings

build safe | live safe