Cracking the Code:

What You Need to Know about the Commercial Energy Code

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BuildUp MN

Introductions

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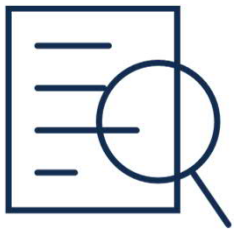
About BuildUp MN

- Statewide program delivering tools, training, and support to simplify energy code compliance
- Part of the Minnesota Advanced Energy Codes Partnership, led by the Efficient Technology Accelerator
- We are here to be a resource for you!

Focus Areas



Resource Hub

Plain-language guides and tools to make energy code compliance clear and simple

Training

Job-specific training for code officials, designers, and contractors

Third Party Plan Review

Support communities with expert plan reviews on complex projects

https://www.buildupmn.org/

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Today's Topics

- Energy Code Basics
- Compliance Pathways
- Key Provisions and Documentation Examples
- Questions & Answers

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Energy Code Basics

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verification
commissioning
durability
decarbonization
optimization
measurement
adaptation
integration
mitigation
preservation
responsibility
control
sustainability
accountability
performance
operation
validation
reduction
savings
benchmarking
regulation
reliability
innovation
resilience
impact
modernization
standards
efficiency
compliance
implementation
progress
enforcement
monitoring
conservation
management
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What is your role?

Compliance is a Requirement:

- The 2024 Minnesota Commercial Energy Code is mandatory — and a key part of the design process.
- Architects play a central role in translating code requirements into effective, buildable design solutions.
- Applying the energy code with intent ensures buildings perform as designed and deliver real-world performance and long-term value for clients.

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Designing for Long-Term Value and Performance

- Requirements in the energy code provide an optimum balance between initial construction cost and long-term energy costs for building owners and tenants.
- Reducing energy directly translates to long-term savings, benefitting business, property owners, and tenants.

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Occupant Comfort, Safety & Health

- Tight building envelopes are important where outdoor air quality is a concern.
- Energy-efficient buildings are often more comfortable and provide better indoor air quality, benefitting employees, customers, and tenants.

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Recent Code Update

Cover image © International Code Council

Projects that began design prior to 1/5/2024

2020 Minnesota Energy Code

2018 IECC with ASHRAE 90.1-2016 and MN Amendments

2024 Minnesota Commercial Energy Code

ASHRAE 90.1-2019 and MN Amendments

Today (Effective 1/5/2024)

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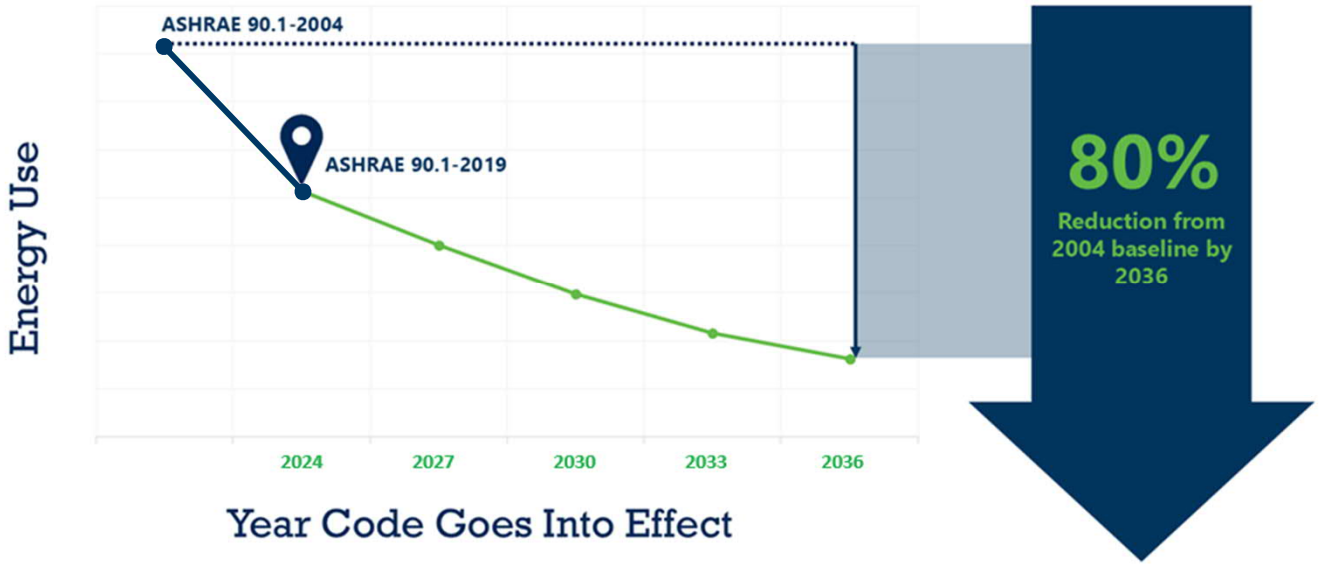
MN Commercial Energy Code Trajectory



Beginning in 2024, Minnesota must adopt a new energy code each time a new model code is released at the national level – approximately every three years.

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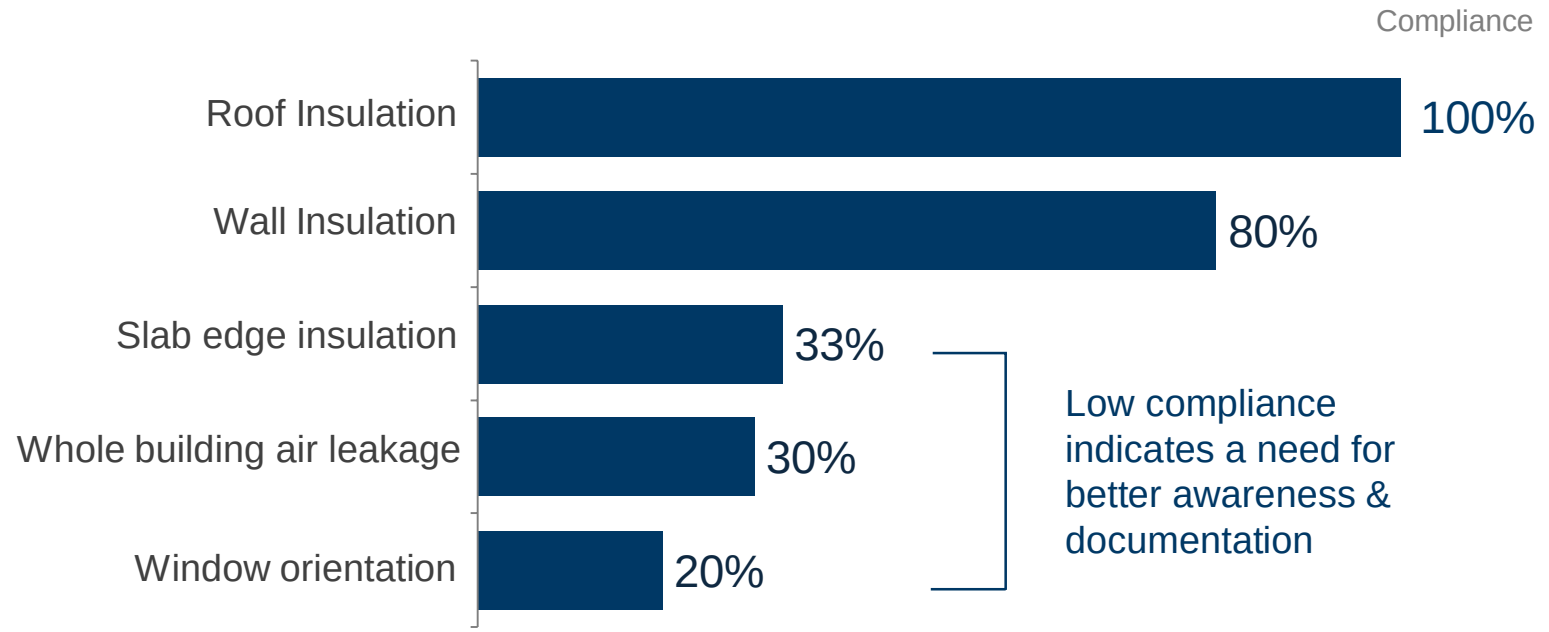
Architectural measures compliance rates



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Reading the Code

1 Purpose

2 Scope

3 Definitions, Abbreviations, and Acronyms

4 Administration and Enforcement

5 Building Envelope

6 Heating, Ventilation and Air Conditioning

7 Service Water Heating

8 Power

9 Lighting

10 Other Equipment

11 Energy Cost Budget Method

12 Normative Reference

Informative Reference G (PRM)

Informative Reference H

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Purpose

Minimum code of standards for the construction, reconstruction, alteration, and repair of buildings governing matters including design and construction standards regarding heat loss control, illumination, and climate control.

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Project types that must comply:

- New buildings and their systems
- New portions of buildings and their systems
- New systems and equipment in existing buildings
- All historical buildings
- Alterations to existing buildings
- Existing buildings undergoing a change of occupancy

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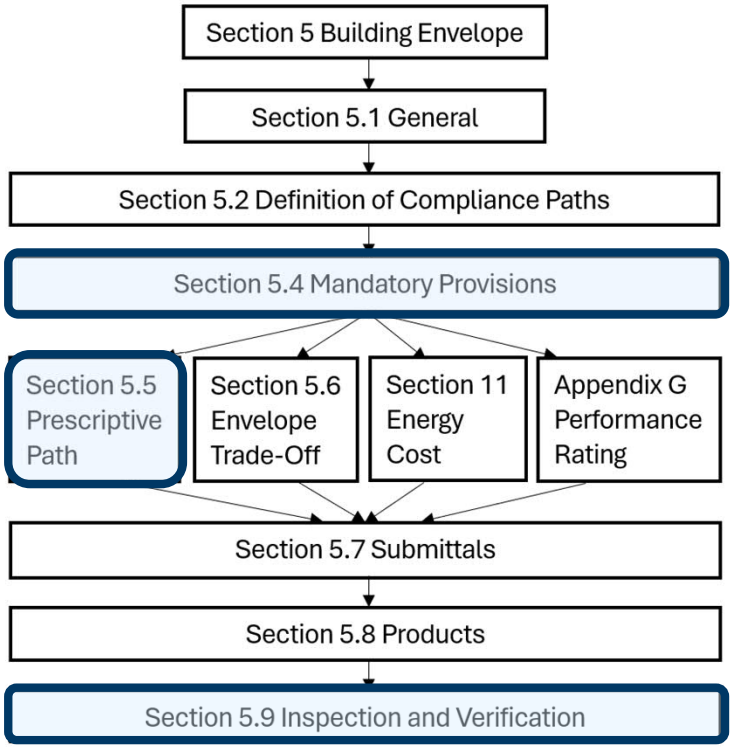
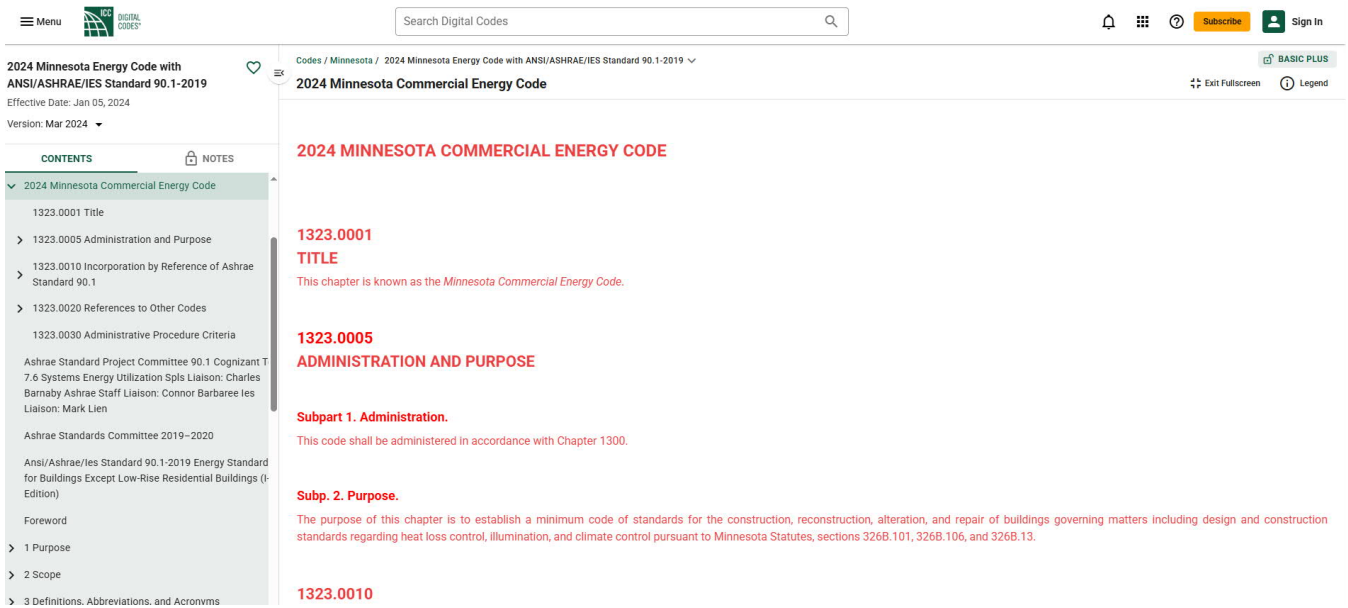
When Compliance is NOT Required

- Small Residential Buildings
  - Single family dwellings
  - Two-family dwellings
  - Townhomes
  - Manufactured and modular homes
- Residential multi-family structures of three stories or fewer above grade
- Buildings that use neither electricity nor fossil fuel

Navigating the Sections



Accessing the Code



https://codes.iccsafe.org/content/MNEC2024P1/2024-minnesota-commercial-energy-code

image © International Code Council

Architect's Role In Energy Code

- Starting in 2024, Minnesota began adopting a new commercial energy code every time a new national model code is released—about every three years.
- Your role as an architect is key in applying these requirements to real-world projects, balancing compliance and design intent.
- Understanding how the code is organized makes it easier to find what you need and apply it effectively in practice.

Compliance Pathways

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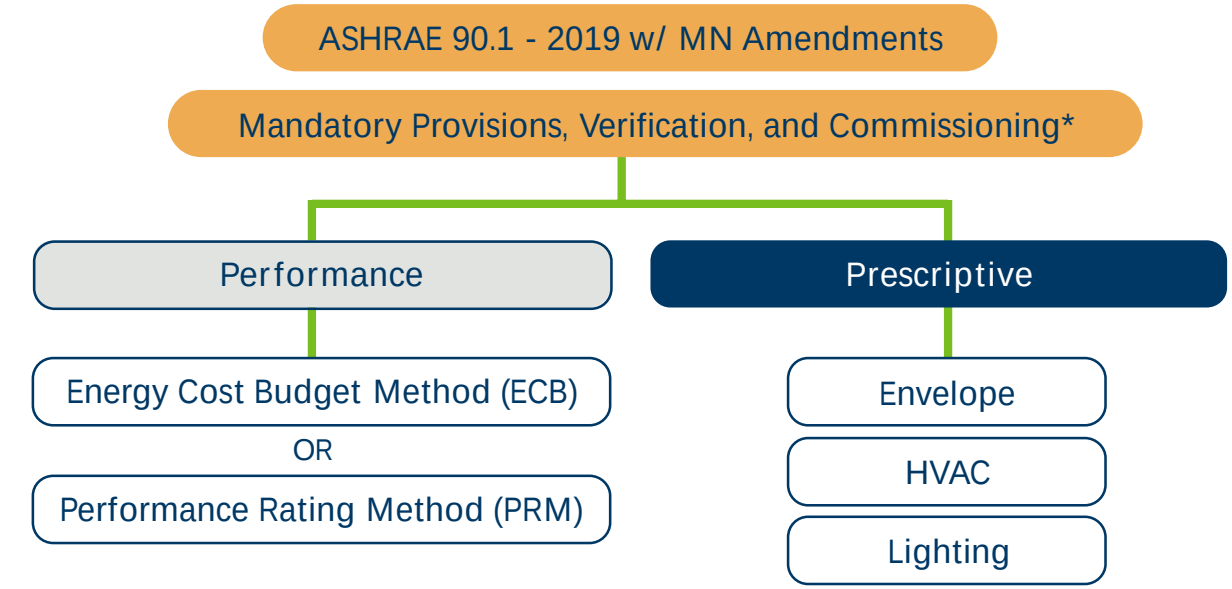
2024 Minnesota Commercial Energy Code



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Requirements for All Paths

- Mandatory Provisions (Subsections X.4)
  - Required for all projects (except some simplified methods)
  - Cannot be traded off using energy modeling
- Verification, Testing, and Commissioning (Subsections X.9)
  - Verification and testing required for all projects
  - Commissioning required for most projects

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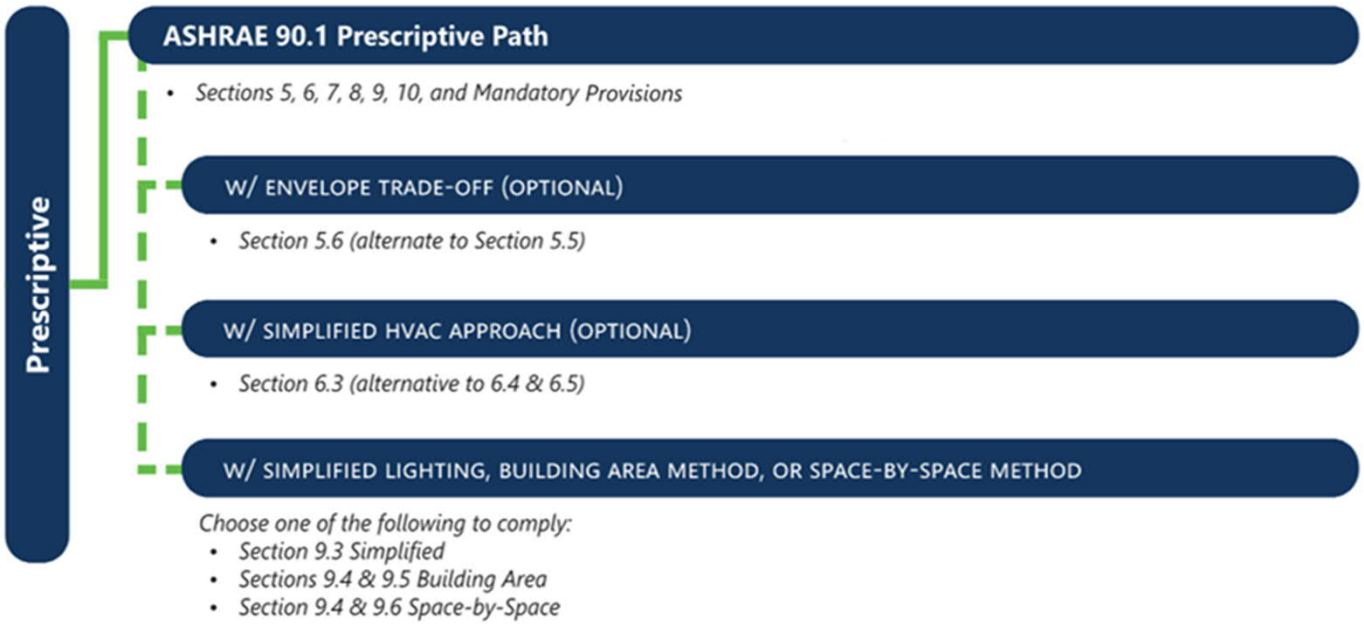
Prescriptive Path – Compliance Pathways



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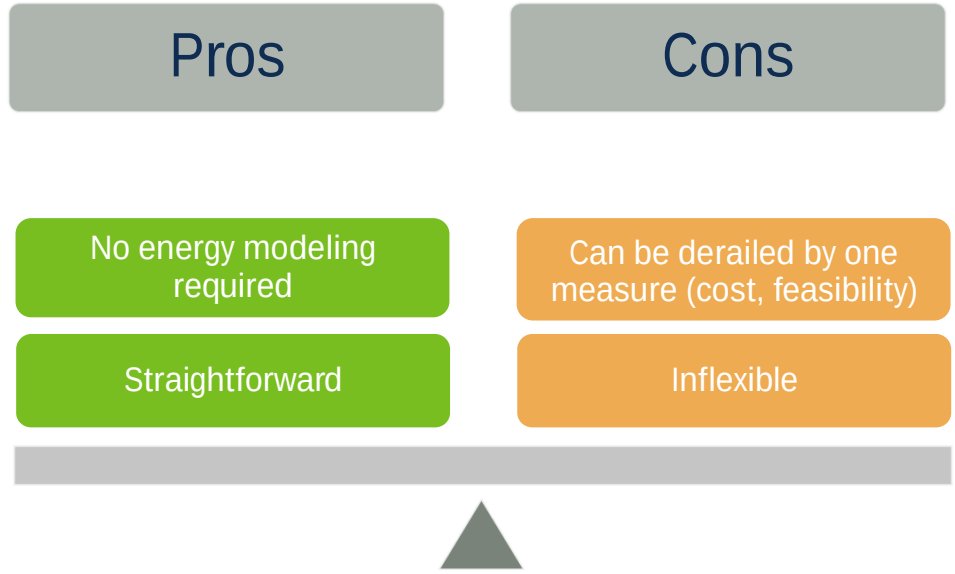
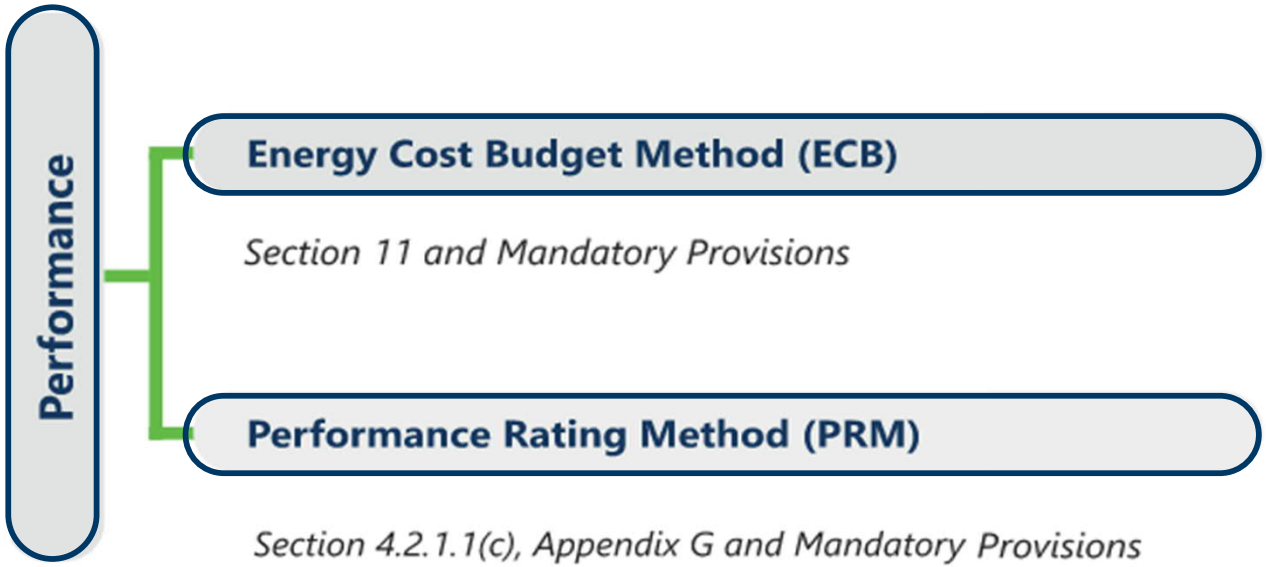
Prescriptive Path Pros & Cons



Performance Path



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Additional Performance Path Considerations

- Mandatory requirements are still mandatory
- Required to either meet all prescriptive envelope measures or achieve envelope performance via envelope trade-off
- On-site renewables are considered separately
- App. G and Section 11 have different modeling and documentation requirements
- Meeting sustainable building guidelines (B3, LEED, Energy Star) is not a substitute for code compliance

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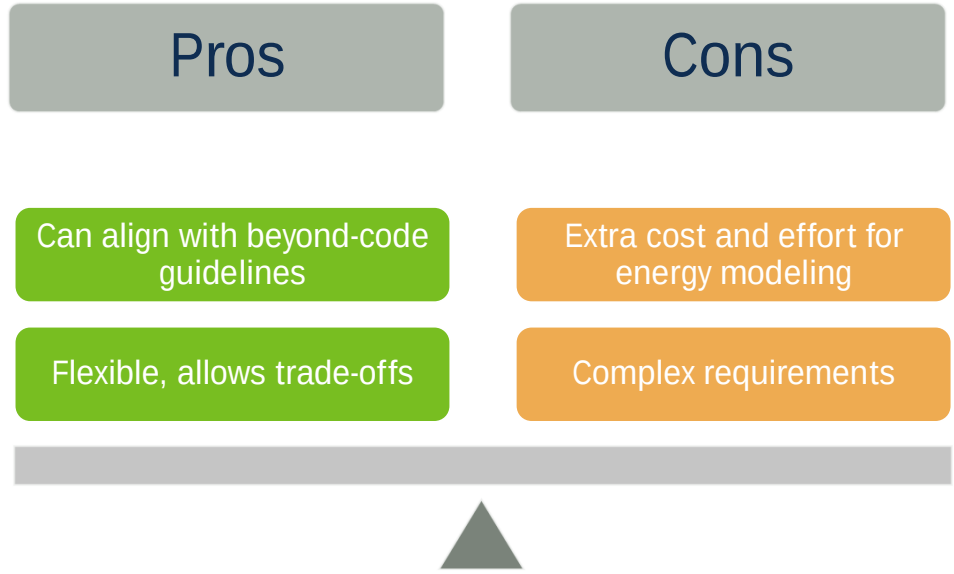
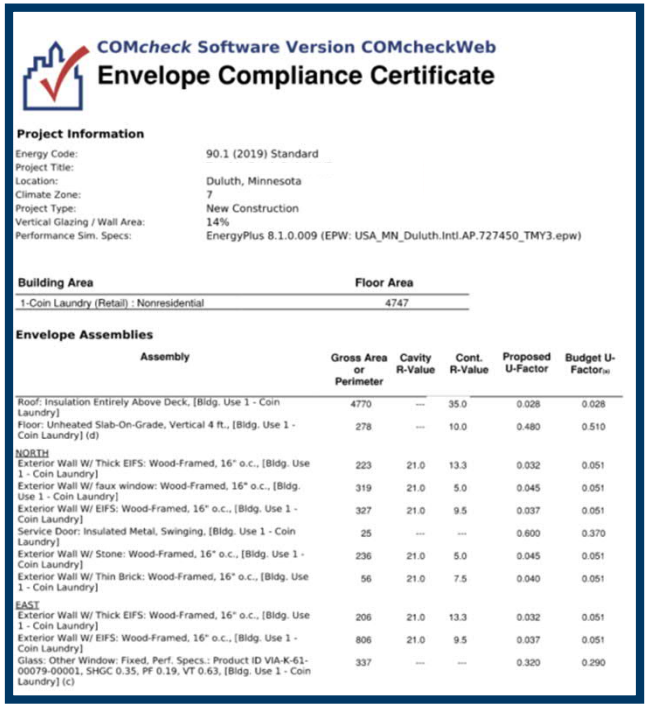
Performance Path Pros & Cons



Envelope Trade-Off

- Allows for tradeoffs between envelope components to show energy code compliance
  - o e.g., making up for below-code wall insulation with triple-pane windows
- Uses software (usually COMcheck) to demonstrate a summary comparison of envelope performance values to prescriptive path requirements



COMcheck Software Version COMcheckWeb

Envelope Compliance Certificate

Project Information

Energy Code:	90.1 (2019) Standard
Project Title:	
Location:	Duluth, Minnesota
Climate Zone:	7
Project Type:	New Construction
Vertical Glazing / Wall Area:	14%
Performance Sim. Specs:	EnergyPlus 8.1.0.009 (EPW: USA_MN_Duluth.Intl.AP.727450_TMY3.epw)

Building Area	Floor Area
1-Coin Laundry (Retail) : Nonresidential	4747

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof: Insulation Entirely Above Deck, [Bldg. Use 1 - Coin Laundry]	4770	---	35.0	0.028	0.028
Floor: Unheated Slab-On-Grade, Vertical 4 ft., [Bldg. Use 1 - Coin Laundry] (d)	278	---	10.0	0.480	0.510
NORTH					
Exterior Wall W/ Thick EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	223	21.0	13.3	0.032	0.051
Exterior Wall W/ faux window: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	319	21.0	5.0	0.045	0.051
Exterior Wall W/ EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	327	21.0	9.5	0.037	0.051
Service Door: Insulated Metal, Swinging, [Bldg. Use 1 - Coin Laundry]	25	---	---	0.600	0.370
Exterior Wall W/ Stone: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	236	21.0	5.0	0.045	0.051
Exterior Wall W/ Thin Brick: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	56	21.0	7.5	0.040	0.051
EAST					
Exterior Wall W/ Thick EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	206	21.0	13.3	0.032	0.051
Exterior Wall W/ EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	806	21.0	9.5	0.037	0.051
Glass: Other Window: Fixed, Perf. Specs.: Product ID VIA-K-61-00079-00001, SHGC 0.35, PF 0.19, VT 0.63, [Bldg. Use 1 - Coin Laundry] (c)	337	---	---	0.320	0.290

Envelope Trade-Off Requirements

- For prescriptive path, envelope performance must meet or exceed prescriptive baseline
- For performance path, envelope performance must not be worse than 7% below prescriptive baseline (15% for residential buildings)
- COMcheck report is a representation of design, not a substitute for CDs

Envelope Assemblies

Assembly	Cavity R-Value	Cont. R-Value	Proposed U-Factor
EAST			
Exterior Wall W/ Thick EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	21.0	13.3	0.032
Exterior Wall W/ EIFS: Wood-Framed, 16" o.c., [Bldg. Use 1 - Coin Laundry]	21.0	9.5	0.037
Glass: Other Window: Fixed, Perf. Specs.: Product ID VIA-K-61-00079-00001, SHGC 0.35, PF 0.19, VT 0.63, [Bldg. Use 1 - Coin Laundry] (c)	---	---	0.320

Envelope PASSES: Design 1% better than code

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Documentation Requirements for All Projects (Section 4.2.5)

General

- Energy code compliance path identified
- Functional testing and verification processes and system performance requirements

Mechanical

- Mechanical system design criteria
- Mechanical system types, sizes and efficiencies
- Economizer description
- Fan motor bhp, hp and controls
- Duct sealing, sizing, insulation and location
- Pipe insulation and location
- Terminal air or water design flow rates

Envelope

- Insulation materials and R-values
- Fenestration U-factors and SHGCs
- Area-weighted U-factor and SHGC calculations
- Air sealing details, including air barrier location
- COMcheck or similar report *(if using envelope trade-off)*

Electrical

- Electrical distribution diagram
- Lighting fixture schedule with wattages
- Lighting control narrative
- Locations of daylight zones on plans

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Energy Code Schedule Examples

2024 MN ENERGY CODE REQUIREMENTS

CLIMATE ZONE: 6A

ENERGY CODE COMPLIANCE PATHWAY: ENERGY MODEL / APPENDIX G

MEP DESIGN BUILD, DESIGN ASSIST OR FULL DESIGN: FULL MEP DESIGN SERVICES

CERTIFICATIONS AND/OR PROGRAMS:
ENTERPRISE GREEN COMMUNITIES CRITERIA COMPLIANT

VERIFICATION AND TESTING PROVIDERS:
COMMISSIONING AGENT: [redacted]

ENVELOPE PERFORMANCE VALUES CLIMATE ZONE 6A (SEE TABLE 5.5-6)

NEW EXTERIOR WALL CONSTRUCTION MATERIAL:
- NEW WALL ABOVE GRADE R VALUE: MINIMUM WOOD STUDS: R19.6+5CI OR 13+7.5CI
- NEW WALL BELOW GRADE R VALUE: MINIMUM: R15CI FOR RESIDENTIAL

FLOOR
- NEW FLOOR CONSTRUCTION MATERIAL: WOOD FRAME
- NEW FLOOR R VALUE MINIMUM: R30.3
- NEW SLAB ON GRADE R VALUE MINIMUM: R20 FOR 48"

ROOF
- NEW ROOF CONSTRUCTION MATERIAL: WOOD FRAME
- NEW ROOF R VALUE MINIMUM: R30CI

WINDOWS AND DOORS (AREA-WEIGHTED U-VALUES AND SHGC AS PER ENERGY STAR)
ZONE 6A MAXIMUMS FOR ASSEMBLY (SEE SPECIFICATIONS)
- UNIT WINDOWS: U-VALUES (0.31), SHGC (0.38):
- COMMON FIXED WINDOWS: U-VALUES (0.31), SHGC (0.38):
- DOORS: U-VALUES (0.XX), SHGC (0.XX):
- STOREFRONT: U-VALUES (0.31), SHGC (0.38):

VALUES UPDATED TO BE CONSISTENT WITH PROJECT MANUAL AND ENERGY MODEL

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Energy Code Schedule Examples

MN ENERGY CODE REQUIREMENTS

PER MN BUILDING CODE, PROJECT COMPLIES WITH ASHRAE 90.1-2019. SEE TABLE BELOW FOR REQUIREMENTS - WHERE VALUES DIFFER ASSUME THE MOST RESTRICTIVE (HIGHLIGHTED IN GREY).

ENVELOPE, WINDOWS, & DOORS (CLIMATE ZONE 6)	MNEC 2024 (ASHRAE 90.1-2019 TABLE 5.5-6)		PROVIDED
	R-VALUE (MINIMUM REQUIRED)		
	NONRESIDENTIAL	RESIDENTIAL	
ROOF - INSULATION ABOVE DECK	R-30 C.I.	R-30 C.I.	R-30 C.I.
WOOD WALL INSULATION	0.051 (ASSEMBLY)	0.051 (ASSEMBLY)	0.051 (ASSEMBLY)
MASS WALL INSULATION (CIP CONCRETE) - ABOVE GRADE	R-13.3 C.I	N/A	R-18 C.I
MASS WALL INSULATION (CIP CONCRETE) - BELOW GRADE	R-10 C.I.	N/A	R-10 C.I
FLOOR INSULATION	R-16.7	R-16.7	R-30
WINDOWS & DOORS (CLIMATE ZONE 6)			
RESIDENTIAL WINDOWS (NON METAL FRAMING)	U 0.30	U 0.30	U-FACTOR: 0.27 FIXED/ 0.25 AWNING
STOREFRONT FIXED WINDOWS (METAL FRAMING)*	U 0.36	N/A	U 0.34/ SHGC 0.40
STOREFRONT DOOR (METAL FRAMING)	U 0.68	N/A	U 0.68
DOORS - SWINGING, OPAQUE	U 0.37	N/A	U 0.68
DOORS - NONSWINGING, OPAQUE	U 0.31	U 0.31	R-4.75 (U 0.21)

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Energy Code Schedule Examples

ENERGY CODE SUMMARY

CLIMATE ZONE 6 - GROUP R	REQUIRED	PROVIDED
TABLE C402.1.3 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MIN. REQUIREMENTS		
Roof - Insulation entirely above roof deck	R-30ci	R-54ci (R-42ci at 4th floor deck)
Walls, above grade - Wood framed	R-20 + R-3.8ci	R-20 + R-14ci
Floors - Joist/framing	R-30	R-64.8 + 23.5ci
Slab-on-grade floors - Unheated	R-15 for 24" below	R-17 or R-26.4 full foundation wall + R9.4 full slab
TABLE C402.3 MIN. ROOF REFLECTANCE AND EMITTANCE OPTIONS		
Three-year-aged solar reflectance index	64	65 or greater
TABLE C402.4 BUILDING ENVELOPE FENESTRATION MAX. U-FACTOR ADN SHGC REQUIREMENTS		
U-factor - Fixed fenestration	0.36	0.16
U-factor - Operable fenestration	0.43	0.19
U-factor - Entrance doors	0.77	0.25
SHGC - N Orientation - PF<0.2	0.53	0.27
SHGC - SEW Orientation - PF<0.2	0.40	0.27
TABLE C402.5 AIR LEAKAGE - THERMAL ENVELOPE		
Tested air leakage rate of building envelope	<0.4 CFM/ft2 @ 75 Pa	<0.06 CFM/ft2 @ 50 Pa

Architect's Role in Compliance

- Discuss intended compliance path early in design to identify critical design decisions that may affect compliance
- Integrate energy modeling into early design stages
- Know the alignments and differences between code requirements and requirements of other guidelines
- Ensure value engineering does not affect energy code compliance
- Validate that all project documentation is present and compliant for permit submission

Key Provisions and Documentation Examples

Envelope Trade-Off with COMcheck

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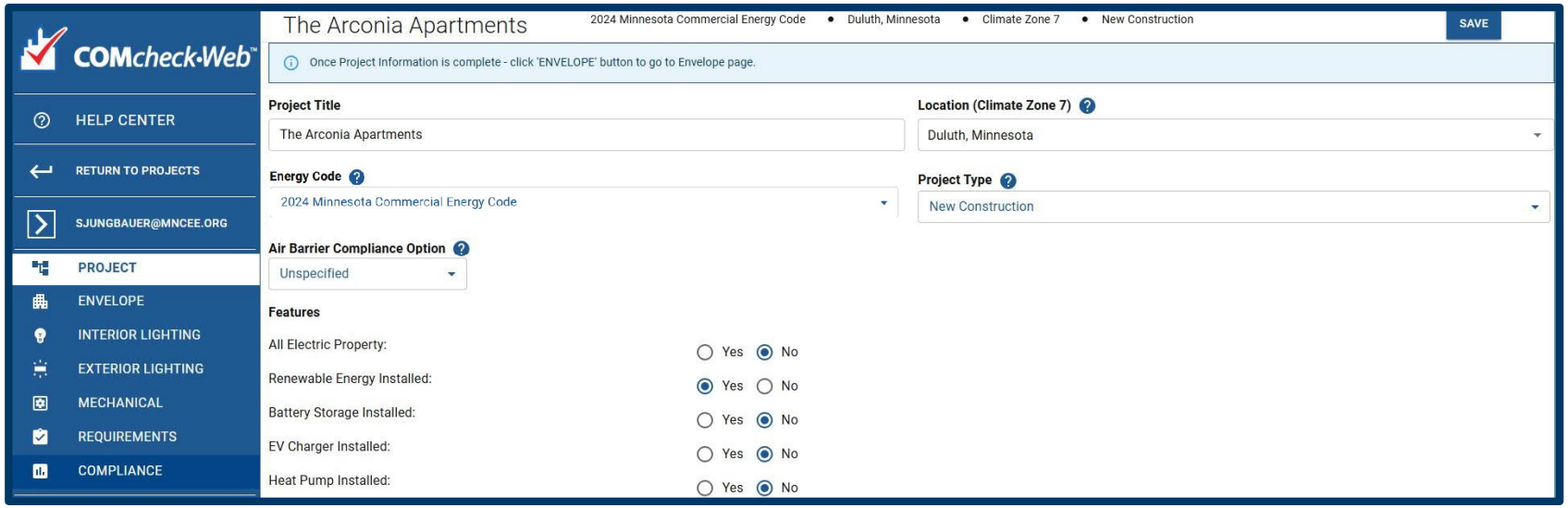
COMcheck Report



https://comcheck.energycode.pnnl.gov/

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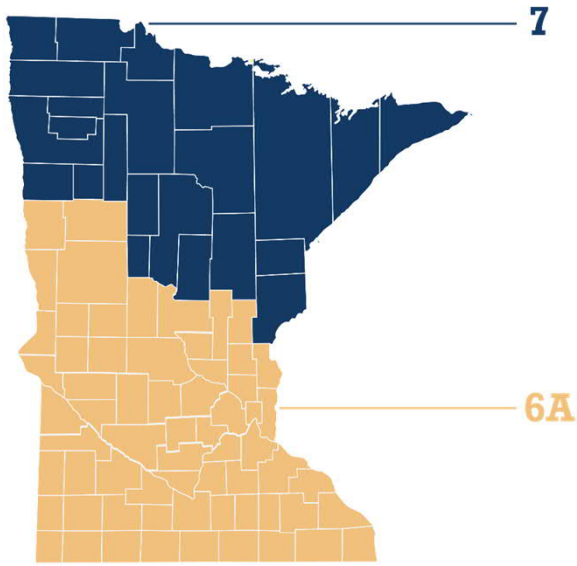
COMcheck Tips – Project Information

COM*check* Software Version COMcheckWeb

Envelope Compliance Certificate

Project Information

Energy Code:	2024 Minnesota Commercial Energy Code
Project Title:	[redacted]
Location:	Minneapolis, Minnesota
Climate Zone:	6a
Project Type:	New Construction
Vertical Glazing / Wall Area:	31%
Permit Date:	[redacted]
Performance Sim. Specs:	
All Electric:	false
Is Renewable:	false
Has Battery:	false
Has Charger:	true
Has Heat Pump:	false



COMcheck Tips – Building Definition

- Define all major occupancy types in the project
- Parking garage guidance (special for MN):
  - If garage is not heated, select Parking Garage - Nonresidential
  - If garage is heated/semiheated, select Warehouse - Nonresidential
- Take floor area measurements directly from construction documents, preferably from a summary table rather than measurements

Building Area	Floor Area
1-Multifamily (Multifamily) : Residential	99250
2-Parking Garage (Parking Garage) : Nonresidential	23960
3-Health Care-Clinic (Health Care-Clinic) : Nonresidential	43420

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COMcheck Tips – Assemblies

- Select correct assembly type for each assembly (roof type, wall stud type, window frame material and operability)
- Calculate and enter gross areas of assemblies
  - Include window openings for walls and frames for windows
  - Parapets and wall sections extended beyond enclosure do not count

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Insulation Entirely Above Deck, [Bldg. Use 1 - Multifamily]	23680	---	35.0	0.028	0.032
Exterior Wall 1: Wood-Framed, 16" o.c., [Bldg. Use 1 - Multifamily]	46859	20.0	6.0	0.044	0.051
Window 1: Vinyl/Fiberglass Frame:Operable, Perf. Specs.: Product ID na, SHGC 0.32, [Bldg. Use 1 - Multifamily] (b)	9339	---	---	0.270	0.430

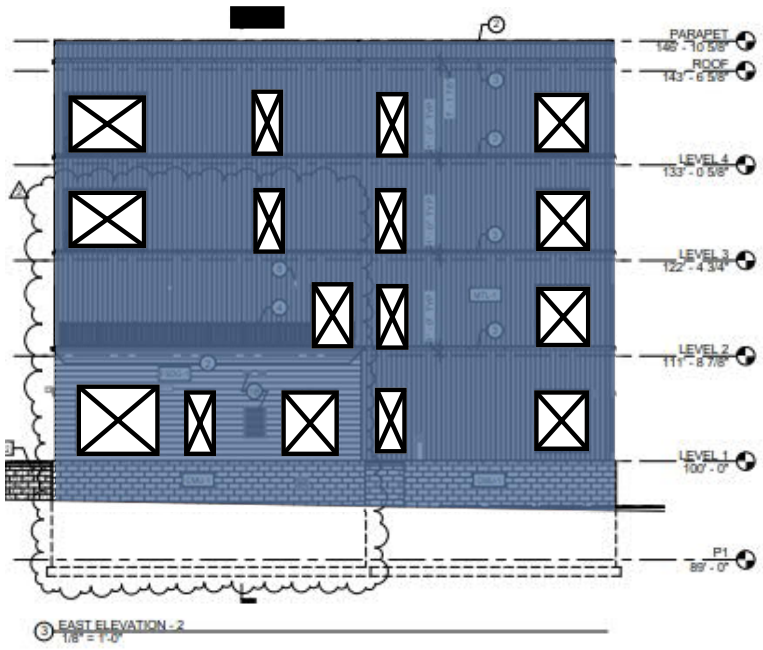
COMcheck Tips – Assemblies (cont.)

- Enter R-values for walls and roofs and U-factor for windows
  - Note that SHGC is defined in the window assembly type
- Check calculated U-factor using 90.1 Appendix A
- Check to see if budget (code) U-factor column matches expectations – if not, check assembly and building definitions

Envelope Assemblies

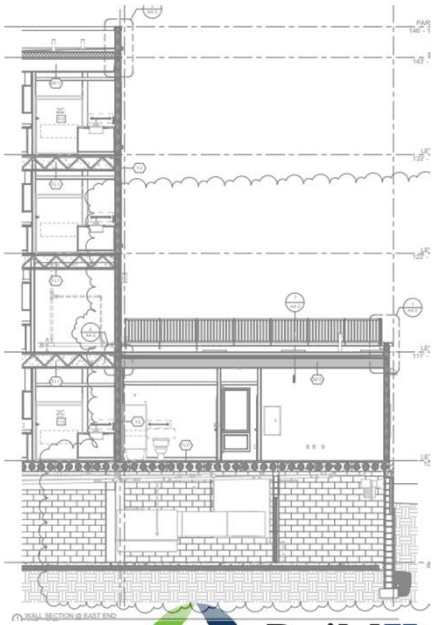
Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Insulation Entirely Above Deck, [Bldg. Use 1 - Multifamily]	23680	---	35.0	0.028	0.032
Exterior Wall 1: Wood-Framed, 16" o.c., [Bldg. Use 1 - Multifamily]	46859	20.0	6.0	0.044	0.051
Window 1: Vinyl/Fiberglass Frame:Operable, Perf. Specs.: Product ID na, SHGC 0.32, [Bldg. Use 1 - Multifamily] (b)	9339	---	---	0.270	0.430

COMcheck Tips - Examples



Incorrect

Use gross area: windows included



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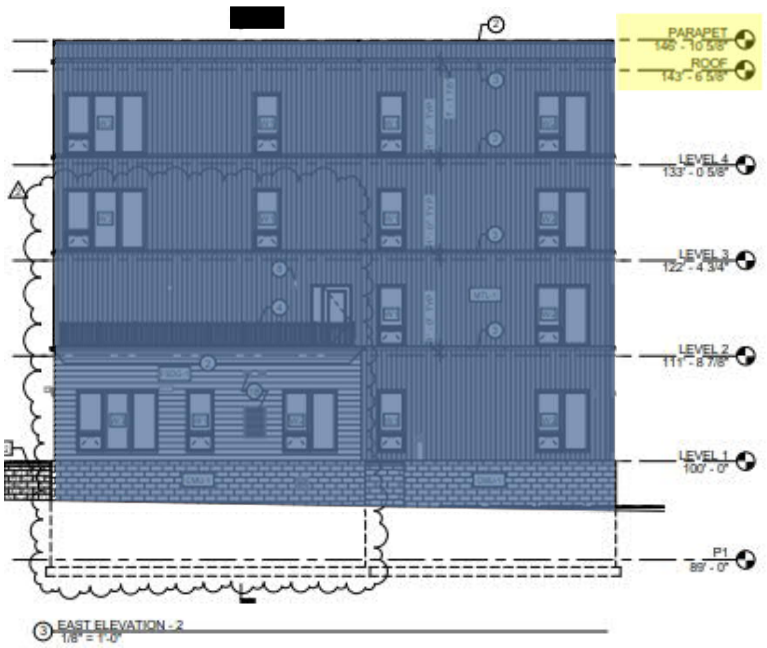
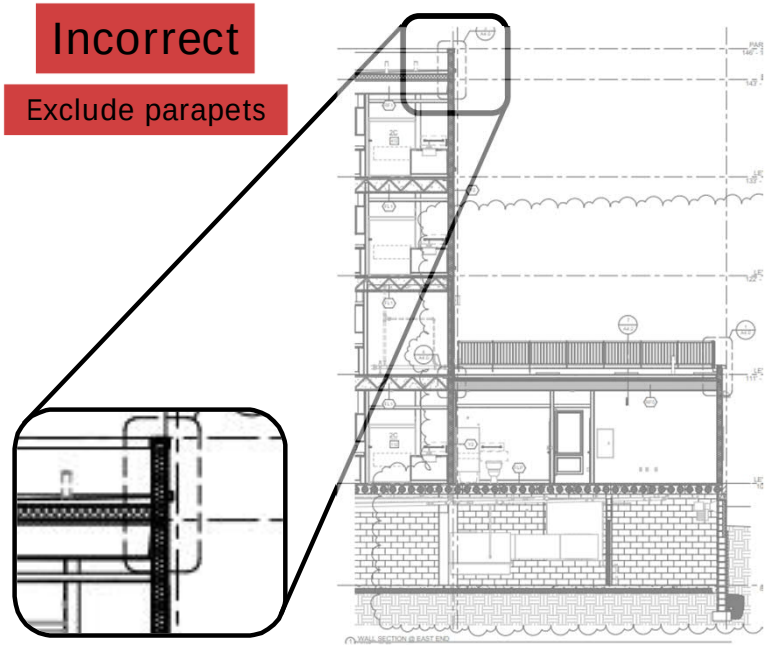
COMcheck Tips - Examples



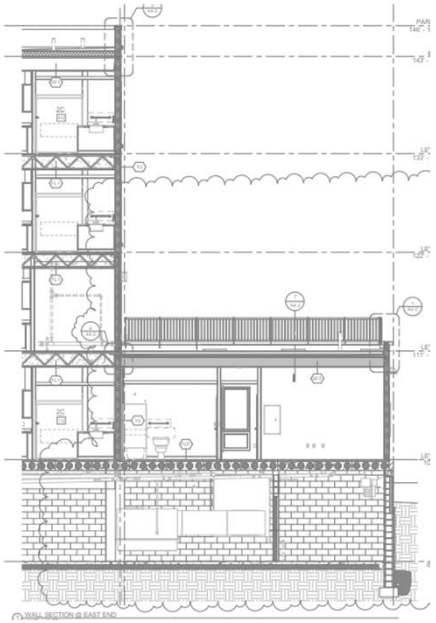
Incorrect

Exclude parapets



COMcheck Tips - Examples

Correct



COMcheck Tips - Examples

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
North Windows: , Perf. Specs.: Product ID Andersen E-Series w/ Heatlock, SHGC 0.33, VT 0.55, Exterior Envelope, [Bldg. Use 2 - Multifamily] (b)	1642	---	---	0.270	0.420

Incorrect

2.05 PERFORMANCE REQUIREMENTS

A. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements for the specific window type in accordance with the following:
   1. Performance Class (PC): R.

B. Overall Thermal Transmittance (U-value): .27, maximum, including glazing, measured on window sizes required for this project.

DWELLING UNITS - WINDOWS
U-FACTOR = .27 OR LOWER
SHGC = .38 OR LOWER

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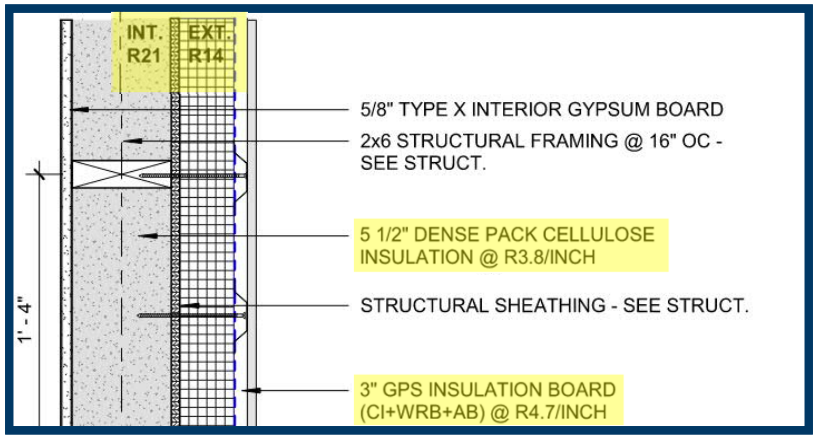
COMcheck Tips - Examples



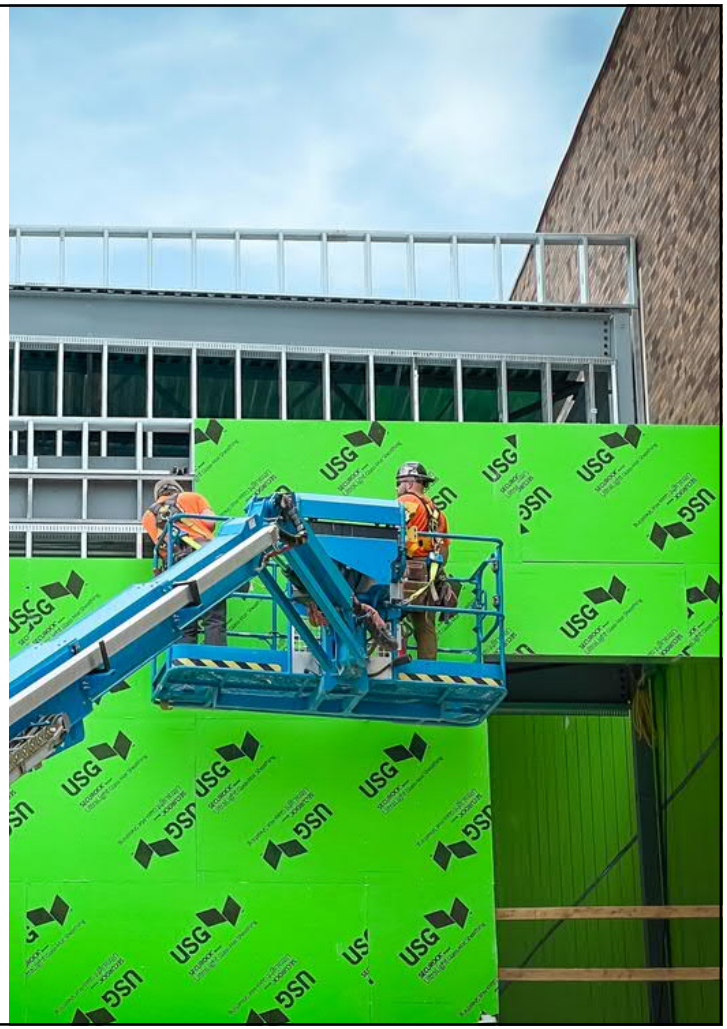
	Cavity	Continuous
Listed	R-21	R-14

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Exterior Wall NE: Exterior Wall NE, Exterior Envelope, [Bldg. Use 1 - Multifamily]	3013	20.0	14.0	0.032	0.051

Air Leakage

Air Leakage Requirements

- Buildings should have airtight envelope designs to reduce cooling and heating loads
- Exterior building envelopes must have a continuous air barrier that meets the energy code air leakage requirements
- Can be accomplished two ways:
  - Whole-building pressurization testing
  - Continuous air barrier verification



Pressurization Testing Requirements

- Third party must conduct a blower door test
  - Non-residential - requirement for whole building
  - Residential buildings - test individual units, requirement for weighted average of units
- Alternatives and exceptions:
  - Large buildings can test a representative sample
  - Can run a diagnostic and fix leaks
  - Continuous air barrier verification program

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Continuous Air Barrier Verification

- Alternative to blower door testing
- Also requires an independent third party
- Before construction, provider conducts design review on continuous air barrier
- During construction, provider conducts periodic field inspections to ensure continuous air barrier is installed correctly
- Complete records and results of design review and inspections must be submitted to the building owner

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Air Leakage Documentation

3. Include blower and water test for building as required. Commercial standard conventional testing. Following are sample inserts from the MN Energy Codes:

   Whole-Building Air Leakage

   Whole-building pressurization testing shall be conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air leakage rate of the building envelope shall not exceed 0.40 cfm/ft^2 under a pressure differential of 0.3 in. of water, with this air leakage rate normalized by the sum of the above -grade and below-grade building envelope areas of the conditioned space and semi-heated space.

   a. Buildings of Group R or I Occupancies: Air Leakage shall not exceed 0.30 cfm/ft^2 under 0.2 inches of water.
   b. NOTE: Special inspections require 3rd party testing during construction.
      1. Include complete building envelope testing.
      2. All exterior doors and windows to have a water penetration test.
   c. NOTE: Follow all requirements of Testing of Commercial Buildings.

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Air Leakage Documentation

1.03 BUILDING ENVELOPE CONSULTATION

A. Building Envelope Consultation services are to comply with the 2024 Minnesota Energy Code requirements for ASHRAE 90.1-2019, exception 3 of Section 5.4.3.1.1, 5.9.1.2 Verification of the Design and Installation of the Continuous Air Barrier.

B. DESIGN REVIEW
   1. Perform one review of the CD documents. Review will focus on the exterior envelope, materials and assemblies, transitions between building enclosure assemblies, and fenestration and doors allowable air leakage.
   2. In addition to meeting the requirements of ASHRAE 90.1-2019, design review services include reviewing for thermal transfer, constructability, and material compatibility.
   3. Provide a report and attend an online meeting following the review. Our report will consist of electronic redline markings in Bluebeam Revu on the drawings as necessary to clarify specific details.

C. QUALITY ASSURANCE OBSERVATIONS
   1. Perform periodic observations during installation of building enclosure systems, including waterproofing, below-grade systems, exterior walls, air/weather barriers, fenestrations and doors, roofing, and critical connections, junctions, and envelope transitions.
   2. Provide a Daily Observation Report to document observations made at the time of each site visit. If discrepancies are observed, they will be discussed with the Contractor prior to departing the site.
   3. As discrepancies are observed and documented, it is the responsibility of others to make necessary correction(s). At subsequent visits, we will document corrections if not covered or hidden from view. If hidden from view, we will note as such.
   4. Include eight site visits for observations. Actual installation phasing and sequencing may modify the number of visits.

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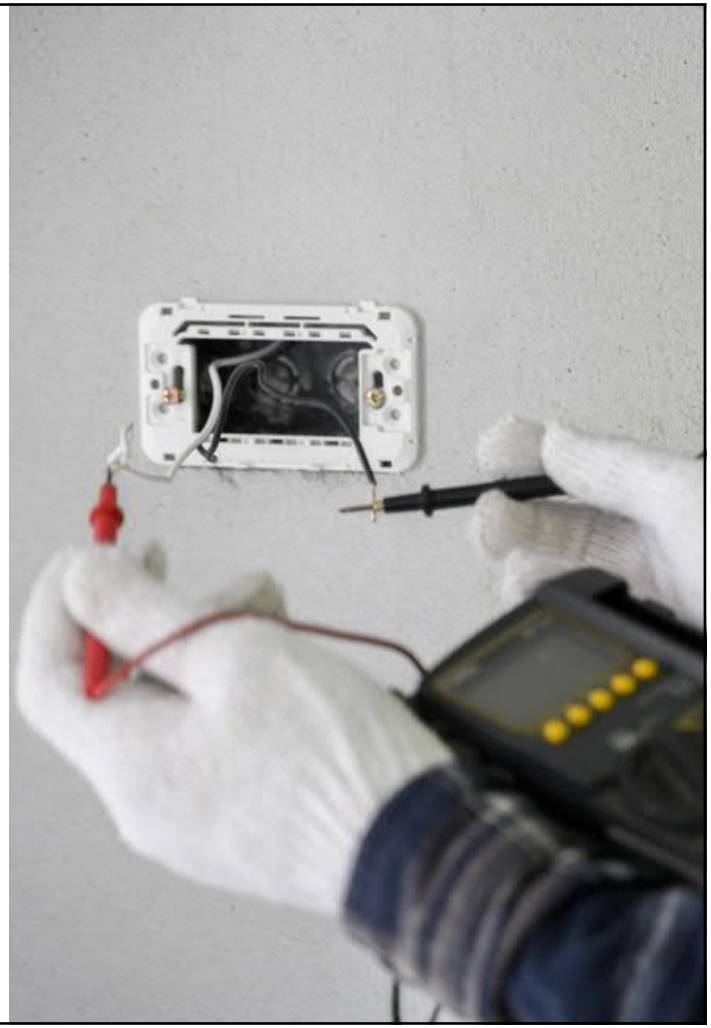
Verification, Testing, and Commissioning

Verification and Functional Testing

- Required for all projects
- Scopes for each discipline listed in respective code sections
- Providers can’t be individuals who performed design or installation of the system/assemblies being verified/tested
- Results must be documented and provided to the building owner



Commissioning (Cx)

- New for 2024 MN Energy Code
- Scope includes and exceeds typical verification and testing
- Commissioning provider reviews design before permitting and reports testing and training results to owner
- Does not have to be a third party – can be an employee of the owner, design firm, or contractor
  - Must not be directly associated with design or installation

Commissioning Scope

- Commissioning is required for buildings that have either:
  - ≥10,000 ft^2 of conditioned space
  - Combined heating, cooling, and SWH capacities of ≥960,000 BTU/h
- Notable exceptions include dwelling units and non-refrigerated warehouses
  - If building contains both exempt and non-exempt spaces, commissioning is only required on non-exempt spaces if their combined floor area meets the required floor area or load capacity

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Commissioning Deliverables

- Commissioning plan
  - Details commissioning activities and how they are integrated into design team and contractor actions
- Design review report
  - Evaluates compliance with OPR, BOD, and energy code
- Preliminary commissioning report
  - Compiles results of commissioning and testing to assure the owner that building is operating properly
  - Includes unresolved issues and post-occupancy testing plans
- Final commissioning report
  - Provides details of additional testing and corrective activities done after occupancy

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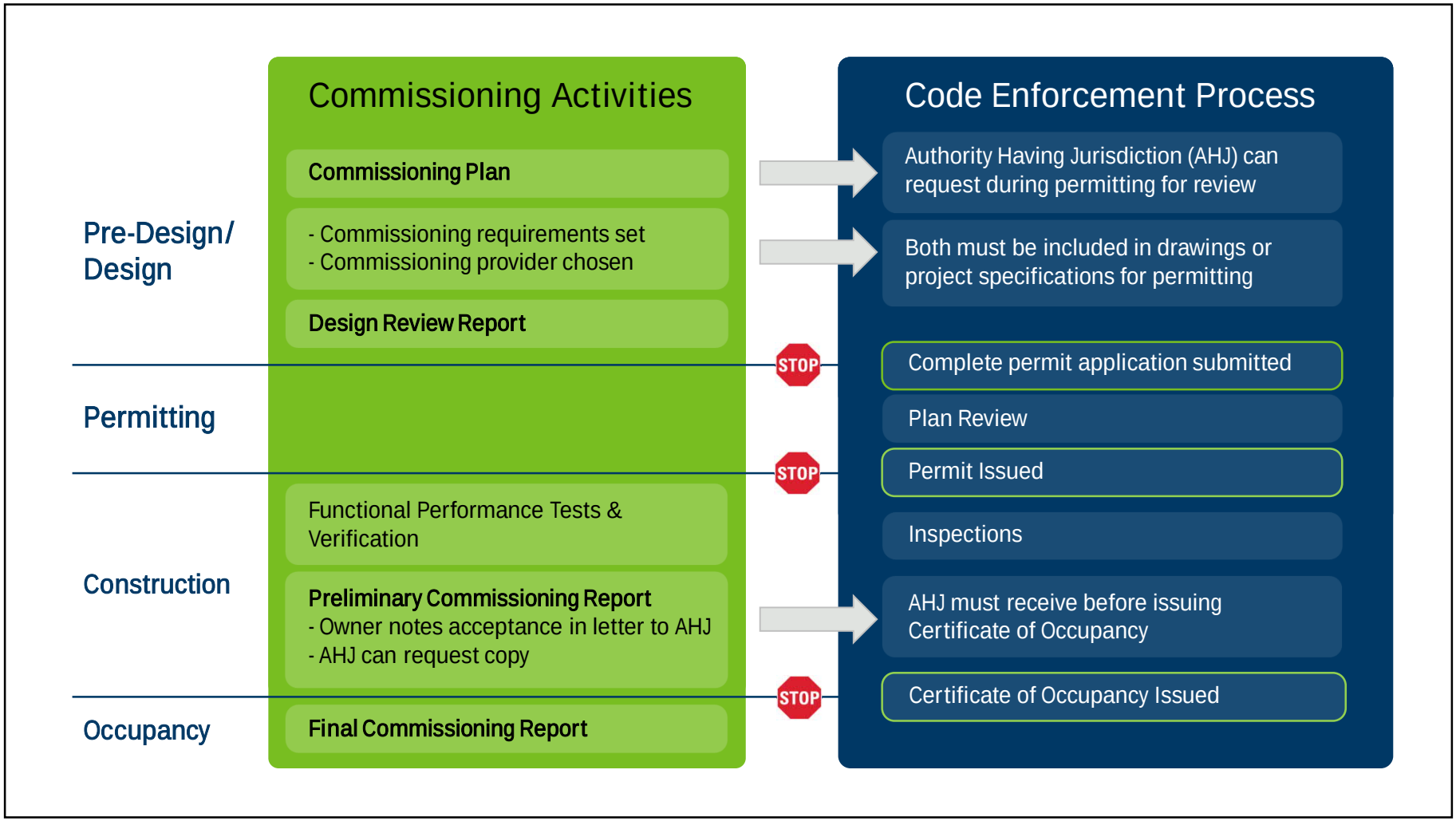
Commissioning Activities
Code Enforcement Process
Pre-Design/ Design
Commissioning Plan
- Commissioning requirements set
- Commissioning provider chosen
Design Review Report
Authority Having Jurisdiction (AHJ) can request during permitting for review
Both must be included in drawings or project specifications for permitting
STOP
Permitting
Complete permit application submitted
Plan Review
STOP
Permit Issued
Construction
Functional Performance Tests & Verification
Inspections
Preliminary Commissioning Report
- Owner notes acceptance in letter to AHJ
- AHJ can request copy
AHJ must receive before issuing Certificate of Occupancy
STOP
Occupancy
Final Commissioning Report
Certificate of Occupancy Issued

Documentation Examples

2. THERMOSTATIC CONTROLS:
   - A. ENSURE ALL CONTROLS (THERMOSTATS OR CONTROL SYSTEMS) SERVING COMFORT HEATING AND COOLING EQUIPMENT ARE CAPABLE AND/OR PROGRAMMED AS FOLLOWS:
     - a. FOR ASHRAE 90.1-2019 ENERGY CODE:
       - BE PROGRAMMABLE AND COMPLY WITH SECTION 6.4.3
       - COMPLY WITH SECTION 6.4.3.3.2 SETBACK CONTROLS.
         1. BE PROGRAMMED FOR 10 DEG F SETBACK BELOW HEATING AND AT LEAST 5 DEG F ABOVE COOLING SETPOINT DURING UNOCCUPIED TIMES.
         2. BE PROGRAMMED WITH DEADBAND OF 5°F.

3. COMMISSIONING:
   - A. THE FOLLOWING EQUIPMENT SHALL BE COMMISSIONED BY [MECHANICAL CONTRACTOR]
     - a. ROOF TOP UNIT RTU-1
     - b. FAN COIL UNITS
     - c. CONDENSING UNITS
     - d. SUPPLY AND EXHAUST FANS
     - e. GAS FIRED UNIT HEATERS
     - f. ELECTRIC UNIT HEATERS
     - g. BOILERS
     - h. PUMPS
     - i. DOMESTIC WATER HEATERS

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Documentation Examples

SECTION 23 08 00

HVAC SYSTEMS COMMISSIONING

PART 1 GENERAL

1.01 DESCRIPTION

A. Purpose
1. The Engineer will perform the Commissioning to verify operation and functional performance of HVAC systems for compliance with the specifications.
2. Document HVAC tests inspections.
3. Verify application of operation and maintenance manuals, as-built (record) documents, spare parts listing, special tools listing, and other items as may be specified herein for support of HVAC systems and equipment.
4. Coordinate and direct training to personnel for operation and maintenance of HVAC equipment and systems.

B. General
1. Furnish labor and material to accomplish complete HVAC commissioning as specified herein. Complete interim commissioning of HVAC systems during initial season operation and follow-up commissioning of HVAC systems during additional season operation.

1.02 QUALITY ASSURANCE

A. Reference: ASHRAE Guideline 0-2005, Guideline for Commissioning of HVAC Systems.

B. Commissioning Agent shall be a Certified Commissioning Authority by either ASHRAE or the Building Commissioning Association.

C. Commissioning procedures shall comply with the requirements of ASHRAE 90.1 for compliance with the State of Minnesota Energy Code.

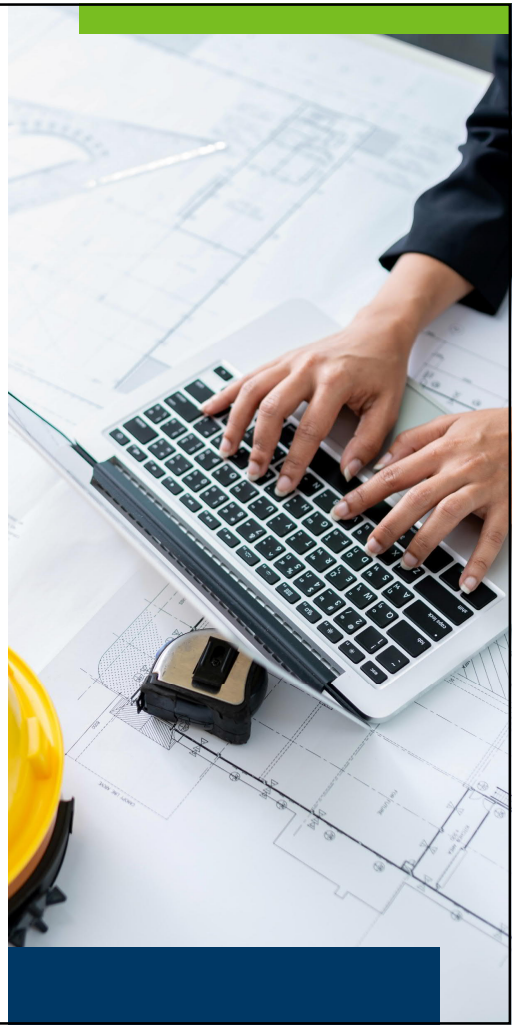
3.05 COMMISSIONING REPORT

A. Submit three copies of a typewritten commissioning report completely describing the commissioning procedures utilized. As a minimum, the following checklists shall be utilized.
1. Functional performance tests shall be completed by the Commissioning Authority in the presence of the following entities:
   a. Mechanical Contractor
   b. Controls Contractor
   c. Electrical Contractor
   d. City's Representative.
2. Commissioning report shall completely describe the results of the functional performance tests. If equipment does not perform as specified, the Commissioning Authority shall document remedial action required and reschedule functional performance testing.

C. DX Cooling and Gas Heat.
1. Prior to functional performance test.
   a. Verify piping connections are as shown on the plans. Verify that cooling coils are equipped with trapped drain piping.
   b. Physically inspect the installation to verify that air is not bypassing the coils.
   c. Verify that controls are connected to the control valves.
2. Functional Performance.
   a. Initiate a need for cooling and from the controls.
   b. Physically observe modulation of the control valves.
   c. Document the following entering and leaving conditions during heating and cooling modes.
      1) Entering and Leaving Air temperatures
      2) Entering and Leaving Air pressures
   d. Verify that moisture carryover is not occurring.
   e. Verify that drain pan drains rapidly.

Architect's Role in Documentation

- Ensure COMcheck report aligns with information on CDs
- Restate code requirements in your own words rather than copying code language verbatim – less likely to be missed
- Consider air leakage, testing, and commissioning requirements and engage providers early in design
- Identify providers and describe commissioning and testing activities in your permit set
- Encourage team to meet your level of detail across the board
- The clearer your drawings are, the better your building will be



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Quick Reference Guide

MEASURE	INTENT	TECHNICAL REQUIREMENTS & CODE SECTION REFERENCES
HVAC Commissioning*^	Requires that mechanical systems are reviewed regularly to ensure correct design and construction, saving energy by ensuring all systems are operating properly and compliant with the energy code.	Commissioning must be performed on the building's mechanical systems by either a third party entity, the owner's qualified employees, or an individual not directly associated with the design or installation of the systems being tested. Commissioning includes the functional testing required in Section 6.9.1 as well as additional activites during design and construction of the building. Details on specific commissioning requirements can be found in Appendix H. **Prior to Building Permit Issuance:** 1) Commissioning provider must be designated and identified on construction documents 2) Commissioning plan (4.2.5.2.2(a)) and design review report (4.2.5.2.2(b)) must be submitted to owner 3) Commissioning requirements must be included in construction documents **Prior to Building Occupancy:** 1) Preliminary commissioning report (4.2.5.2.2(c)) must be provided to owner 2) Owner must provide building official a letter confirming receipt of preliminary commissioning report *Reference:* ***Section 6.9.2***

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Quick Reference Guide

APPLICABILITY	NOTABLE EXCEPTIONS
Applies to all exterior windows and skylights. Each product can comply individually or a weighted average of all products in a category can comply. Dynamic glazing must meet requirements at minimum SHGC and cannot be used in a weighted average.	South, east, and west walls can apply a multiplier to their SHGC based on the projection factor (PF) of structures providing permanent shading. Requirements are waived for street-side, street-level windows where the street-level story is ≤20 feet, the window has a continuous overhang with weighted-average PF >0.5, and the window area is <75% of the gross wall area. If this exemption is used, this area cannot be used for any weighted average calculations. Requirements are waived for skylights that meet the criteria for the increased U-factor allowance detailed in the Window U-Factor section.

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Plan Review Checklist

For envelope trade-off and performance path projects, do the opaque assembly construction types (walls, roofs, floors) shown in the construction documents match what is documented in the COMcheck and/or proposed design simulation reports?	Section 5.6.1.1 Table 11.5.1 (No.5) Table G3.1(No.5)
Do the construction documents (most likely the project manual) identify the method for meeting the requirements for whole-building air leakage (either pressurization testing or a continuous air barrier verification program), and are the requirements of the selected method clearly specified?	Section 5.4.3.1.1 Section 5.9.1.2

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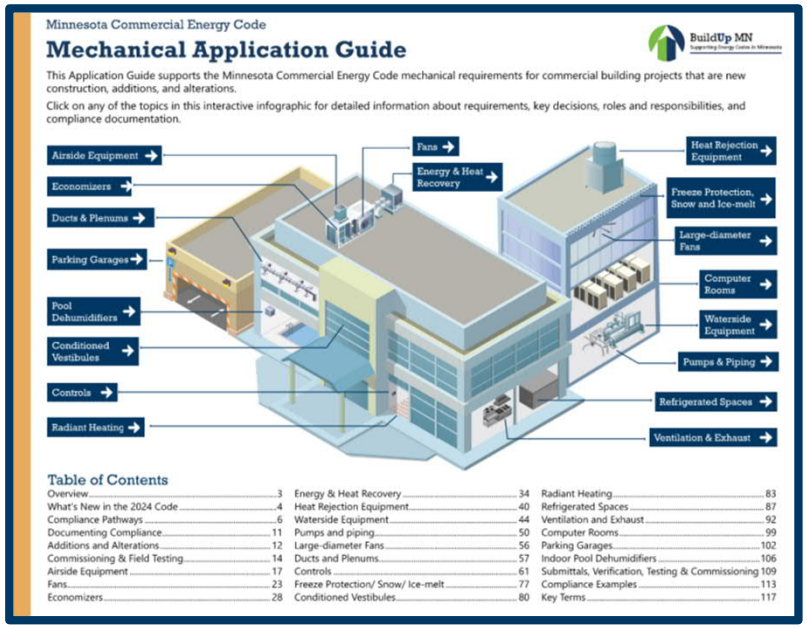
Additional BuildUp Resources



Minnesota Commercial Energy Code

Mechanical Application Guide

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This Application Guide supports the Minnesota Commercial Energy Code mechanical requirements for commercial building projects that are new construction, additions, and alterations.

Click on any of the topics in this interactive infographic for detailed information about requirements, key decisions, roles and responsibilities, and compliance documentation.

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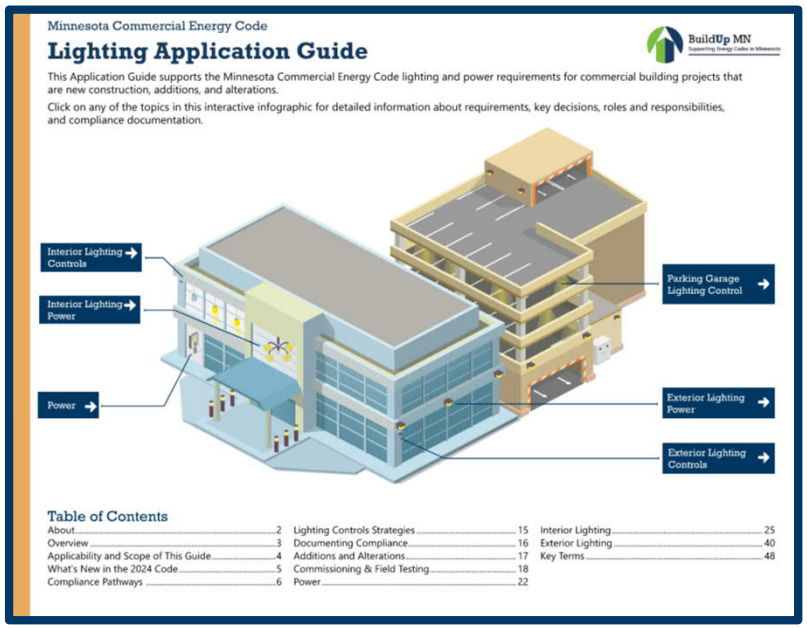

Minnesota Commercial Energy Code

Lighting Application Guide

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This Application Guide supports the Minnesota Commercial Energy Code lighting and power requirements for commercial building projects that are new construction, additions, and alterations.

Click on any of the topics in this interactive infographic for detailed information about requirements, key decisions, roles and responsibilities, and compliance documentation.

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• Application Guides (Lighting, Mechanical)
• What's Changed in 2024
• Plan Review Checklist
• Commercial Energy Code Compliance Pathways Graphic
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