



# Plan Review- COMcheck™ for a Simple Commercial Building 2015 IECC and 9<sup>th</sup> Edition: Commercial

Massachusetts Codes and Standards  
Compliance Support Program



## What Is Mass Save®?



- Mass Save® is an initiative sponsored by Massachusetts' gas and electric utilities and energy efficiency service providers, including
  - The Berkshire Gas Company
  - Cape Light Compact
  - Columbia Gas of Massachusetts
  - Eversource Energy
  - Liberty Utilities
  - National Grid
  - Unitil
- The Sponsors of Mass Save work closely with the Massachusetts Department of Energy Resources to provide a wide range of services, incentives, trainings, and information promoting energy efficiency that help residents and businesses manage energy use and related costs.



## Today...



Objectives for today . . .

- Documentation required to conduct a plan review on a simple commercial building
- Steps to complete an energy code plan review
- Utilizing *COMcheck*™ as a plan review tool
- Relate plan review documentation to the field inspection
- Identify and ask for further documentation for incomplete areas



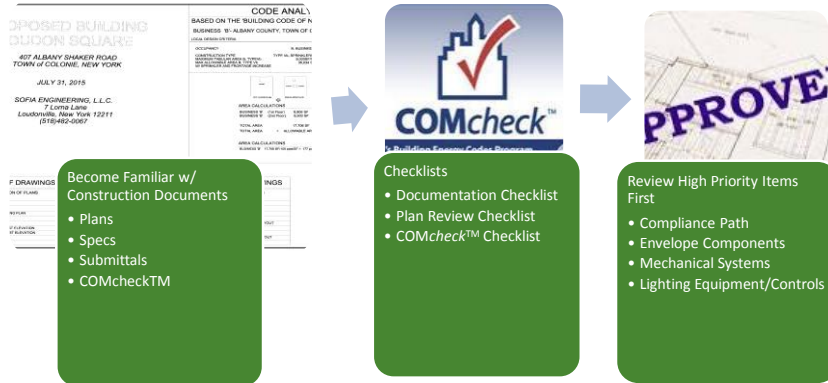
## The Plan Review Process



- A Quality Plan Review requires:
  - Organization
  - Proper Use of Tools
  - Consistent Methodology



## The Plan Review Process



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## Document Review

C103 Construction Documents & Other Supporting Documents:

1. Construction Document prepared by registered design professional
2. COMcheck™ Certificates and Reports
3. Commissioning Plan for HVAC
4. Commissioning Plan for Lighting Controls
5. HVAC Sizing Documentation



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# Our Tools



## Proposed Application/Documentation Checklist

**COMMERCIAL NEW CONSTRUCTION**  
 Massachusetts Energy Code 9th Edition  
 Plan Review Checklist for IECC Compliance Paths (DMAT - FOR REVIEW ONLY)  
 (To be completed before building permit is issued)

Applicant Name: \_\_\_\_\_ Applicant Phone: \_\_\_\_\_

Project Address: \_\_\_\_\_

**Type of Construction:**  
 New Construction  Addition  Alteration  Change of Occupancy

**Select Compliance Path (C401.3):**  
 ASHRAE Standard 90.1 (select one)  
 Prescriptive Path  Chapter 11  Appendix G  
 IECC Prescriptive Path  
 IECC Performance Path (select one):  
 Modeled Performance  RESNET  PHUS  Energy Star Homes  
 789 CMR 51.00 Massachusetts Residential Code (Residential Buildings up to 5 stories only)

**Compliance Path # 1: ASHRAE Standard 90.1**  
 For Prescriptive Path and Chapter 11:  
 Main COMcheck Report  C401.3 (Mass States Territory)  
 Two Options (Mass States Territory)  
 C405.2 Mass Efficient HVAC  C405.3  C405.4 Enhanced Lighting Controls  
 C405.5 Renewable Energy  C405.6 DDAS  C405.7 High Efficiency Drive

**For Chapter 11 and Appendix G:**  
 1. A submittal with proposed design complies with Chapter 11 or Appendix G  
 2. A submittal with analysis report  
 3. The name of individual performing the analysis and generating the report  
 4. The version number of the compliance software tool

**Compliance Path #2: IECC Prescriptive**  
 Main COMcheck Report  Meet C402.3 Rooftop Solar Prerequisites  Indicate C405 (Option) Below  
 Section 605  
 Two Options (Mass States Territory)  
 C405.2 Mass Efficient HVAC  C405.3 (Mass States Territory)  One Option (non-Mass States Territory)  
 C405.4 Mass Efficient HVAC  C405.5 (Mass States Territory)  C405.6 (Mass States Territory)  C405.7 (Mass States Territory)  C405.8 (Mass States Territory)  C405.9 (Mass States Territory)  C405.10 (Mass States Territory)  C405.11 (Mass States Territory)  C405.12 (Mass States Territory)  C405.13 (Mass States Territory)  C405.14 (Mass States Territory)  C405.15 (Mass States Territory)  C405.16 (Mass States Territory)  C405.17 (Mass States Territory)  C405.18 (Mass States Territory)  C405.19 (Mass States Territory)  C405.20 (Mass States Territory)  C405.21 (Mass States Territory)  C405.22 (Mass States Territory)  C405.23 (Mass States Territory)  C405.24 (Mass States Territory)  C405.25 (Mass States Territory)  C405.26 (Mass States Territory)  C405.27 (Mass States Territory)  C405.28 (Mass States Territory)  C405.29 (Mass States Territory)  C405.30 (Mass States Territory)  C405.31 (Mass States Territory)  C405.32 (Mass States Territory)  C405.33 (Mass States Territory)  C405.34 (Mass States Territory)  C405.35 (Mass States Territory)  C405.36 (Mass States Territory)  C405.37 (Mass States Territory)  C405.38 (Mass States Territory)  C405.39 (Mass States Territory)  C405.40 (Mass States Territory)  C405.41 (Mass States Territory)  C405.42 (Mass States Territory)  C405.43 (Mass States Territory)  C405.44 (Mass States Territory)  C405.45 (Mass States Territory)  C405.46 (Mass States Territory)  C405.47 (Mass States Territory)  C405.48 (Mass States Territory)  C405.49 (Mass States Territory)  C405.50 (Mass States Territory)  C405.51 (Mass States Territory)  C405.52 (Mass States Territory)  C405.53 (Mass States Territory)  C405.54 (Mass States Territory)  C405.55 (Mass States Territory)  C405.56 (Mass States Territory)  C405.57 (Mass States Territory)  C405.58 (Mass States Territory)  C405.59 (Mass States Territory)  C405.60 (Mass States Territory)  C405.61 (Mass States Territory)  C405.62 (Mass States Territory)  C405.63 (Mass States Territory)  C405.64 (Mass States Territory)  C405.65 (Mass States Territory)  C405.66 (Mass States Territory)  C405.67 (Mass States Territory)  C405.68 (Mass States Territory)  C405.69 (Mass States Territory)  C405.70 (Mass States Territory)  C405.71 (Mass States Territory)  C405.72 (Mass States Territory)  C405.73 (Mass States Territory)  C405.74 (Mass States Territory)  C405.75 (Mass States Territory)  C405.76 (Mass States Territory)  C405.77 (Mass States Territory)  C405.78 (Mass States Territory)  C405.79 (Mass States Territory)  C405.80 (Mass States Territory)  C405.81 (Mass States Territory)  C405.82 (Mass States Territory)  C405.83 (Mass States Territory)  C405.84 (Mass States Territory)  C405.85 (Mass States Territory)  C405.86 (Mass States Territory)  C405.87 (Mass States Territory)  C405.88 (Mass States Territory)  C405.89 (Mass States Territory)  C405.90 (Mass States Territory)  C405.91 (Mass States Territory)  C405.92 (Mass States Territory)  C405.93 (Mass States Territory)  C405.94 (Mass States Territory)  C405.95 (Mass States Territory)  C405.96 (Mass States Territory)  C405.97 (Mass States Territory)  C405.98 (Mass States Territory)  C405.99 (Mass States Territory)  C405.100 (Mass States Territory)

Notes:  
 \_\_\_\_\_

**CLIMATE ZONE 6**  
**Commercial Plan Review Checklist (Non-residential)**  
 2018 IECC Compliance Paths as amended by 94 CMR 7.00

Project # 20-XXXX-XX (Date) (Name of Evaluator)  
 Building Contact: Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
 Building Name & Address: \_\_\_\_\_  
 Jurisdiction: \_\_\_\_\_ (Lot #) (Conditioned Floor Area) (ft<sup>2</sup>)  
 Climate Zone: 6 (County) (Jurisdiction Contact) \_\_\_\_\_  
 Jurisdiction Contact Phone: \_\_\_\_\_ Jurisdiction Contact E-mail: \_\_\_\_\_  
 Compliance Approach:  Not Indicated  Prescriptive  Trade-Off  Performance  Compliance Software  ASHRAE 90.1  
 Compliance Software Used: \_\_\_\_\_ Green Building/Above-Code Program?  Yes  No  
 Building Use Type: \_\_\_\_\_ Building Construction Type: \_\_\_\_\_  
 Project Type:  New Building  Existing Building Addition  Existing Building Renovation  
 Special Considerations:  Residential Use  Historic Building

Provisions Highlighted in Green are Mandatory, Regardless of Compliance Path

IECC Section #	Pre-Inspection/Plan Review	Code Value	Verified Value	Complies	Notes	Comments/Assumptions
C402	Construction drawings and documentation available. Documentation sufficient to demonstrate energy code compliance of the Building Thermal Envelope			<input type="checkbox"/>		
C402.1.3	Compliance with Table C402.1.3 for appropriate Climate Zone	Climate Zone 6	Climate Zone 6	<input type="checkbox"/>		
Table C402.1.3	Below grade wall exterior insulation R-value	R-7.0 (10" EPS)	R-7.0	<input type="checkbox"/>		
Table C402.1.3	Unheated Slab	R-10 (2" EPS)	R-10	<input type="checkbox"/>		
Table C402.1.3	Heated Slab	R-15 (3" EPS)	R-15	<input type="checkbox"/>		
C303.2.1	Exposed Foundation Insulation Protection	2" Rigid		<input type="checkbox"/>		
Table C402.1.3	Floor (Unheated)	R-30	R-30	<input type="checkbox"/>		
Table C402.1.3	Mass Floor	R-10 (2")	R-10	<input type="checkbox"/>		
Table C402.1.3	Wood Framed Wall and Other	R-13 (R-13.5 or R-20)	R-13	<input type="checkbox"/>		
Table C402.1.3	Mass Framed Wall	R-13 (R-7.5)	R-13	<input type="checkbox"/>		



# Our Tools



**COMcheck Software Version 4.0.8.2**  
**Inspection Checklist**  
 Energy Code: 2015 IECC

Requirements: 59.0% were addressed directly in the COMcheck software  
 Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.	Plan Review	Complies?	Comments/Assumptions
C103.2 (PR1)2	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C103.2 (PR2)2	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and methods.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C103.2 (PR3)2	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C103.2 (PR4)2	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met. Location on plans/specs/Check
C103.2 (PR5)2	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C402.4.1 (PR1)0	The vertical fenestration area = 30 percent of the gross above-grade wall area.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

## Help From COMcheck™



The Mandatory COMcheck™ documents are  
Of Great Help in the Plan Review Process:



- Quality Control check for submitter
- Provides more complete submittal, saving time
- Provides plan review and site inspection document



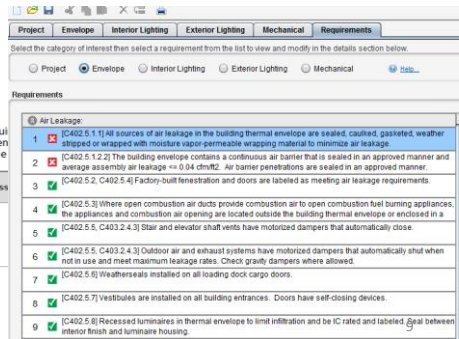
COMcheck Software Version 4.0.8.2

### Inspection Checklist

Energy Code: 2015 IECC

Requirements: 59.0% were addressed directly in the COMcheck software  
Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirement, the user certifies that a code requirement will be met and how that is documented is being claimed. Where compliance is itemized in a separate table, a reference to that table

Section # & ReqID	Plan Review	Complies?	Comments/Ass
C103.2 [PR1]	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	



## Verifying Documentation



- Use a Document Checklist to assure you have all the documentation submitted.
- Make this document available to permit applicants
- Maybe incorporate in the permit application



## Verifying Documentation



- Drawings shall include full Energy Code compliance details and specifications (preferably on a single sheet) including but not limited to:
  - Attic, Walls, Foundation Insulation Specs
  - Window U-Value & Infiltration Specs
  - Air & Vapor Barrier Specs/Details
  - Duct Sealing & Insulation Specs
  - Heating Piping Insulation Specs
  - Commissioning Plan
  - Solar Ready Roof Area
  - Heating & Cooling Systems Specs
  - Service Water Heating Specs
  - Mechanical Ventilation System Specs
  - Elec Power & Lighting System Specs
  - Programmable Thermostat Specs
  - Mechanical System Design Criteria
  - Roof Structural Loading Calculations

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## Verifying Documentation



- Statement on Drawings documenting the Design meets the Energy Code
- Energy Code Compliance Path Documentation
  - One of the following is required:
    - Prescriptive Compliance Path:** The requirements of Sections C402 through C405 including documentation demonstrating all Mandatory Requirements have been met. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1
    - ASHRAE Compliance Path:** The requirements of ASHRAE 90.1-2013 (as amended) including documentation demonstrating all Mandatory Requirements have been met.
    - Performance Compliance Path:** The requirements of Sections C402.5, C403.2, C404, C405.2, C405.3, C405.5, C405.6, and C407 including documentation demonstrating all Mandatory Requirements have been met. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.
    - COMcheck™ Computer Software:** Compliance with the 2015 IECC Commercial Provisions (as amended) or, if applicable, with ASHRAE 90.1-2013 (as amended) can be demonstrated through the use of COMcheck™ computer software including documentation demonstrating all Mandatory Requirements have been met.

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## Verifying Documentation



### Energy Code Compliance Path Documentation (Continued)

One of the following is required:

- RESNET Compliance Path:** Compliance requires that the criteria of C402.4, C403.2, C404 and C405 are met. Requires verification from a HERS Rater and an index score of 55 or less together with a complete Energy Start® Thermal Enclosure Checklist.
- Passive House Institute US (PHIUS):** PHIUS+ 2015: Passive Building Standard – North America, or another approved software by PHIUS or PHI, where Specific Space Heat Demand, as modeled by a Certified Passive House Consultant, is less than or equal to tenkBTU/ft<sup>2</sup>/year. Compliance requires that the criteria of C402.4, C403.2, C404 and C405 are met.
- ENERGY STAR Homes 3.1 path:** New residential structures, or additions to existing residential structures, or portions thereof, as certified to conform with the ENERGY STAR Certified Homes standard, Version 3.1.

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## Verifying Documentation



### COMcheck™ Report or File (Mandatory)

- Envelope Certificate
- Interior Lighting Certificate
- Exterior Lighting Certificate
- Inspection Checklist
- Use Documentation Checklist?

### HVAC Sizing

- per ASHRAE/ANSI/ACCA Standard 183
- Exterior Design Conditions
- Interior Design Conditions

#### COMcheck Software Version 4.0.8.2 Envelope Compliance Certificate

##### Project Information

Energy Code:	2015 IECC
Project Title:	Retail Store
Location:	Worcester, Massachusetts
Climate Zone:	5a
Project Type:	New Construction
Vertical Glazing / Wall Area:	4%

Construction Site:  
123 Main Street  
Worcester, MA

Owner/Agent:  
Retailer

Designer/Contractor:  
Architects R Us

##### Additional Efficiency Package(s)

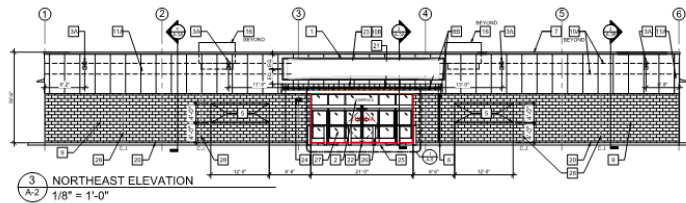
High efficiency HVAC. Systems that do not meet the performance requirement will be identified in the mechanical requirements checklist report.



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### Conducting the Plan Review

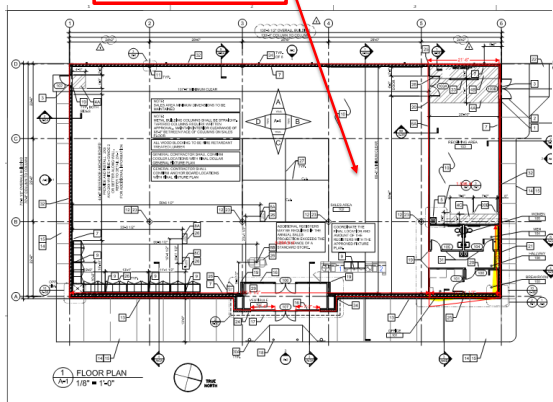
- The Project:
- Single Story, Commercial Structure
- Retail Store
- Metal Building with Aluminum Storefront Entry
- Plans Only provided – not spec book
- Permit Application May, 2018



### Conducting the Plan Review

- Become Familiar with the Plan

Floor Plan for Reviewed Project



**CODE INFORMATION**

ALL CODES REFERRED TO ARE FROM STATE SUPPLEMENTAL TO THE INTERNATIONAL PLUMBING CODE AND ALL CODES REFERRED TO ARE FROM THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES. THE CODES REFERRED TO ARE THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.

SECTION	DESCRIPTION
GENERAL NOTES	<ul style="list-style-type: none"> <li>1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> <li>2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITIES.</li> <li>3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITIES.</li> <li>4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITIES.</li> <li>5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITIES.</li> </ul>
PLUMBING	<ul style="list-style-type: none"> <li>1. ALL PLUMBING SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> <li>2. ALL PLUMBING SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> <li>3. ALL PLUMBING SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> </ul>
Mechanical	<ul style="list-style-type: none"> <li>1. ALL MECHANICAL SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> <li>2. ALL MECHANICAL SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> </ul>
Electrical	<ul style="list-style-type: none"> <li>1. ALL ELECTRICAL SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> <li>2. ALL ELECTRICAL SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL PLUMBING CODE AND THE INTERNATIONAL MECHANICAL AND ELECTRICAL CODES.</li> </ul>

Code Analysis provided by designer



## Conducting the Plan Review



- Start the Checklist
- Have the COMcheck™ Checklist available

Project #: XX-XXXX-XX Date:            Name of Evaluator(s):           

Building Contact: Name:            Phone:            Email:           

Building Name & Address:           

Jurisdiction:            Lot #:            Conditioned Floor Area:            ft<sup>2</sup>

Climate Zone: 5 County:            Jurisdiction Contact:           

Jurisdiction Contact Phone:            Jurisdiction Contact E-mail:           

Compliance Approach:  Not Indicated  Prescriptive  Trade-Off  Performance  Compliance Software  ASHRAE 90.1

Compliance Software Used:            Green Building/Above-Code Program?  Yes  No

Building Use Type:            Building Construction Type:           

Project Type:  New Building  Existing Building Addition  Existing Building Renovation

Special Considerations:  Residential Use  Historic Building

### COMcheck Software Version 4.0.8.2 Inspection Checklist

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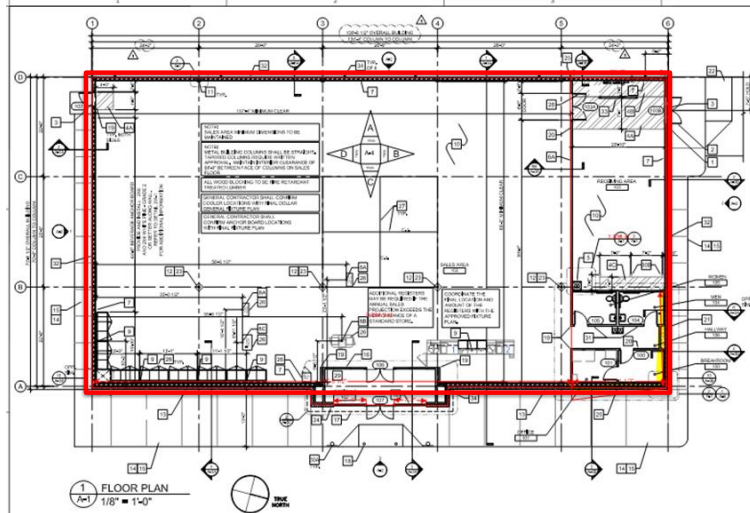
Section # & Req. ID	Plan Review	Complies?	Comments/Assumptions
C101.2 (R61.2)	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

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## Conducting the Plan Review - Envelope



- Determine Conditioned and Unconditioned Space

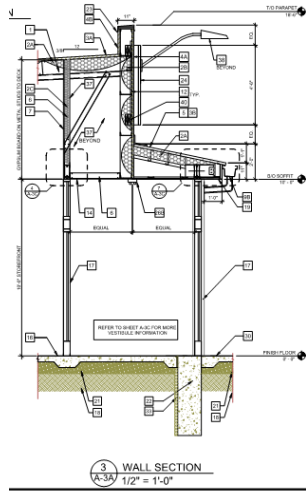


In our plan – all the space is conditioned, within the Thermal (Red) Boundary

## Conducting the Plan Review - Envelope



- Verify R-Values, Insulation location, type and thickness
- Compare to data on COMcheck™



SECTION KEYED NOTES	
1	PRE-ENGINEERED METAL BUILDING SYSTEM BY BUILDING MANUFACTURER.
2A	VINYL FACED R-11 + R-25 LINER SYSTEM BY PEMB MANUFACTURERS. PROVIDE THERMAL BLOCKING AT STEEL SUPPORT MEMBERS
2B	R-30 + 1/8" FOAM TAPE (LAMTEC CORPORATION PRODUCT) (U-VALUE OF 0.652)
3A	VINYL FACED R13 BATT INSULATION BY GENERAL CONTRACTOR
3A	STANDING SEAM METAL ROOF. MAIN COLOR: GALVALUME

- 2A Vinyl Faced R-11 + R-25 Liner System by PEMB. Manufacturers Provide Thermal Blocking at Steel Support Members
- 2B R-30+ 1/8" Foam Tape (Lamtec Corporation (U-Value of 0.652)

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## Conducting the Plan Review - Envelope



- Verify R-Values, Insulation location, type and thickness
- Compare to data on COMcheck™

- 2A Vinyl Faced R-11 + R-25 Liner System by PEMB. Manufacturers Provide Thermal Blocking at Steel Support Members
- 2B R-30+ 1/8" Foam Tape (Lamtec Corporation (U-Value of 0.652)

Data from Plan

COMcheck™ Data

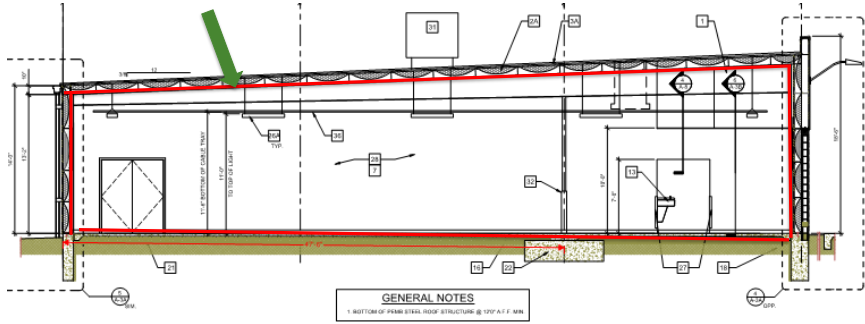
Envelope Assemblies	Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor <sub>req</sub>
Rooftop 1: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]		7722	11.0	25.0	0.038	0.035
Rooftop 2: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]		636	11.0	25.0	0.038	0.035
Exterior Wall 1: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]		4219	30.0	0.0	0.147	0.052
Window 1: Metal Frame with Thermal Break; Fixed, Perf. Specs.: Product ID Storefront, SHGC 0.37, PF 1.00, [Bldg. Use 1 - Sales Floor] (b)		174	---	---	0.350	0.380
Door 1: Insulated Metal, Swinging, [Bldg. Use 1 - Sales Floor]		21	---	---	0.410	0.370
Door 3: Glass (> 50% glazing); Metal Frame, Entrance Door, Perf. Specs.: Product ID 106, SHGC 0.37, PF 1.00, [Bldg. Use 1 - Sales Floor] (b)		42	---	---	0.350	0.770
Exterior Wall 2: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]		648	30.0	0.0	0.147	0.052
Exterior Wall 3: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 2 - Receiving]		1033	30.0	0.0	0.147	0.052
Door 2: Insulated Metal, Swinging, [Bldg. Use 2 - Receiving]		42	---	---	0.410	0.370
Floor 1: Slab-On-Grade/Unheated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)		338	---	10.0	0.480	0.540
Floor 2: Slab-On-Grade/Heated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)		70	---	10.0	0.780	0.790

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# Conducting the Plan Review - Envelope



- Verify Air Barrier assembly and continuity



What is the compliance method for the Air Barrier?  
 (Documentation must specify – this one does not)

- Materials
- Assembly
- Testing

Verify against checklists, plans and specs.

# Conducting the Plan Review - Envelope



- Compare U-Factors and SHGC values for Glazing, Doors, and Skylights

DOOR SCHEDULE									
NO.	Type	SIZE			DETAILS		DOOR HARDWARE	REMARKS	
		W	H	T	HEAD	JAMB			
102	D	3'-0"	7'-0"	1-3/4"	5/8"	4/8"	(1) VON DUPPRIN GUARD-X EXIT ALARM LOCK #2670-28 (1) STANLEY DOOR CLOSER QDC11-489, (1) DOOR PULL BN US38, (1) DOOR SWEEP, WEATHERSTRIPPING, (1) 7015SC8-26D RIM CYLINDER	HOLLOW CORE METAL DOOR, PAINT EXTERIOR SW7041, VAN DYKE BROWN (SEMI-GLOSS); PAINT INTERIOR SW9991, BLACK MAGIC (SEMI-GLOSS)	
103B	E	6'-0"	7'-0"	1-3/4"	5/8"	4/8"	(1) VON DUPPRIN GUARD-X EXIT ALARM LOCK #2670-28 (1) VON DUPPRIN GUARD-X DOUBLE DOOR STRIKE #2608 (1) VETEX DOUBLE DOOR HOLDER #09-2268 TOP & BOTTOM (2) STANLEY DOOR CLOSERS QDC11-489 (2) BURNS PUSH PLATES #54-US320, (1) 2" DOOR SCOPE #0361000MB, (2) 8" DOOR HOLDERS #662, (1) NATIONAL GUARD-HD THREE-HOLE 2-PIES HD-4 FT., (2) DOOR SWEEPS, WEATHERSTRIPPING, (1) 7015SC8-26D RIM CYLINDER	HOLLOW CORE METAL DOOR, PAINT EXTERIOR SW7041, VAN DYKE BROWN (SEMI-GLOSS); PAINT INTERIOR SW9991, BLACK MAGIC (SEMI-GLOSS)	
106	F	6'-0"	7'-0"	---	---	---	BY DOOR MANUFACTURER TO BE REVIEWED BY DOLLAR GENERAL AREA MANAGER WITH (1) 8.00 RIM CYLINDER #7015SC8-26D.	STANLEY SERIES 21" 0" BI-PART WITH TRANSLUM AND GLASS, BRONZE FINISH, TEMPERED GLAZING.	
107	F	6'-0"	7'-0"	---	---	---	BY DOOR MANUFACTURER TO BE REVIEWED BY DOLLAR GENERAL AREA MANAGER WITH (1) 8.00 RIM CYLINDER #7015SC8-26D.	STANLEY SERIES 21" 0" BI-PART WITH TRANSLUM AND GLASS, BRONZE FINISH, TEMPERED GLAZING.	

NOTE: LOCKS DO NOT REQUIRE THE USE OF A KEY, SPECIAL KNOWLEDGE, OR EFFORT TO OPERATE FROM THE INSIDE. RESTROOM DOORS ARE TO BE ACCESSED BY KEY LOCATED AT MANAGER'S OFFICE. SIGNAGE TO BE POSTED BY RESTROOMS

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor <sub>min</sub>
Roof 1: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]	7722	11.0	25.0	0.038	0.035
Roof 2: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]	1536	11.0	25.0	0.038	0.035
Exterior Wall 1: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]	4219	30.0	0.0	0.147	0.052
Window 1: Metal Frame with Thermal Break Fixed, Perf. Specs., Product ID: Bstorefront, SHGC 0.37, PF 1.00, [Bldg. Use 1 - Sales Floor] (b)	174	---	---	0.350	0.380
Door 1: Insulated Metal, Swinging, [Bldg. Use 1 - Sales Floor]	21	---	---	0.410	0.370
Door 2: Glass (0-50% glazing) Metal Frame, Entrance Door, Perf. Specs., Product ID: 160-5H50-037-PF-100, [Bldg. Use 1 - Sales Floor] (b)	42	---	---	0.350	0.770
Exterior Wall 2: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]	648	30.0	0.0	0.147	0.052
Exterior Wall 3: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 2 - Receiving]	1033	30.0	0.0	0.147	0.052
Door 2: Insulated Metal, Swinging, [Bldg. Use 2 - Receiving]	42	---	---	0.410	0.370
Floor 1: Slab-On-Grade Unheated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)	338	---	10.0	0.480	0.540
Floor 2: Slab-On-Grade Heated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)	70	---	10.0	0.780	0.790

For this Project – No Window Schedule or Specifications were provided and not enough information for exterior doors is provided to make a determination – a request for more information is warranted

## Conducting the Plan Review - Envelope



### Verify Envelope Areas –

- Compare your calculations with COMcheck™

#### Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value
Roof 1: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]	7722	11.0
Roof 2: Metal Building, Standing Seam, Liner System with Thermal Blocks (d), [Bldg. Use 1 - Sales Floor]	1536	11.0
Exterior Wall 1: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]	4219	30.0
Window 1: Metal Frame with Thermal Break:Fixed, Perf. Specs.: Product ID Storefront, SHGC 0.37, PF 1.00, [Bldg. Use 1 - Sales Floor] (b)	174	---
Door 1: Insulated Metal, Swinging, [Bldg. Use 1 - Sales Floor]	21	---
Door 3: Glass (> 50% glazing):Metal Frame, Entrance Door, Perf. Specs.: Product ID 106, SHGC 0.37, PF 1.00, [Bldg. Use 1 - Sales Floor] (b)	42	---
Exterior Wall 2: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 1 - Sales Floor]	648	30.0
Exterior Wall 3: Metal Building Wall, Single Layer Mineral Fiber, [Bldg. Use 2 - Receiving]	1033	30.0
Door 2: Insulated Metal, Swinging, [Bldg. Use 2 - Receiving]	42	---
Floor 1: Slab-On-Grade:Unheated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)	338	---
Floor 2: Slab-On-Grade:Heated, Vertical 4 ft., [Bldg. Use 1 - Sales Floor] (c)	70	---

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## Conducting the Plan Review - Envelope



### Solar Ready Compliance

- Roof Area (Flat Roof)(C402.3.2)\*\*

*Our Project:*

8,734 ft<sup>2</sup> x 50% = 4,367ft<sup>2</sup> required

0 ft<sup>2</sup> shown on plans – **Does Not Comply**

- Unobstructed Area (C402.3.3)– not shown
- Structural Documentation(C402.3.4) – Structural LL and DL Roof Load not provided
- Interconnection Pathway(C402.3.5) – Not indicated on plans
- Electrical Service Reserved Space(C402.3.6) – Not provided on plans

**	Building Area	Floor Area
	1-Sales Floor (Retail) : Nonresidential	7624
	2-Receiving (Retail) : Nonresidential	1110

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## Conducting the Plan Review - Envelope



For this Project – The Panel Schedule does not indicate reserved space for future solar therefore it is not compliant and revision/more information is needed.

CIRCUIT #	DESCRIPTION	Phase			CKT #	PANEL A			CKT #	Phase			DESCRIPTION	TYPE
		A	B	C		A	B	C		A	B	C		
M	RTU-1	5.28	5.28	80-3	1				2	201T	0.92		AUTOMATIC DOOR	R
M					3				4	201T	0.36		TELE. BOARD/CHARGER	R
M					5				6	201T	0.18		ENERGY MANAGEMENT	R
M					7				8	201T	0.18		DISPLAY CONTROL	R
M	RTU-2	5.28	5.28	80-3	9				10	201T	0.50		OUTDOOR KEYPAD	R
M					11				12	201T	0.50		OUTDOOR DRINK VENT	R
M					13				14	201T	0.10		EXHAUST FAN #1	M
M	SPARE	0.00	0.00	80-3	15				16	201T	0.10		EXHAUST FAN #2	M
M					17				18	201T	0.50		REFRESH EQUIPMENT	R
M	SPARE	0.00	0.00	80-3	19				20	201T	0.50		VLSAT DATA HARVEST	R
M					21				22	201T	1.25		CEVY EQUIP	R
M					23				24	201T	0.30		JET RECEIPT	R
M	WATER HEATER	1.25	1.25	200V	25				26	201T	1.44		DRINKING FOUNTAIN	R
M	IN RECEIVING AREA				27				28	201T	0.92		AUTOMATIC DOOR	R
S	SPARE	0.00	0.00	200V	29				30	201T	0.18		SHOW WRECK/RECEIPT	R
S					31				32	201T	0.00		SPARE	S
R	HEAT EXCHANGER	0.60	0.60	200V	33				34	300	2.40		CABINET UNIT HEATER	M
R	SMOKE DETECTOR	0.40	0.40	200V	35				36					M
					37				38					X
					39				40	200S	12.55		PANEL 10	X
					41				42		11.94			X
					43				44		16.43	11.69	13.60	X

## Conducting the Plan Review - Mechanical



### Verify Htg & Clg. Loads Information

TAG	MAKE	MODEL	TONS	CFM	O.A. CFM	ESP	HP	HEATING (MBH)		COOLING (MBH)		COOLING DESIGN	IEER	MCA	MOCP	ELECTRICAL	WEIGHT
								INPUT	OUTPUT	TOTAL	SENS.						
RTU-1	CARRIER	48TCFD12A245	10	4000	1060	8"	3	250	205	123.3	95.0	80ab/67wb	12.8	55	60	208/3/60	1400LBS.
RTU-2	CARRIER	48TCFD12A245	10	4000	1060	8"	3	250	205	123.3	95.0	80ab/67wb	12.8	55	60	208/3/60	1400LBS.

- NOTES:
- DESIGN CONDITIONS: SUMMER OUTDOOR AIR 85°/67°wb, WINTER -12°F.
  - FACTORY MOUNTED DISCONNECT.
  - PROVIDE WITH FIELD-INSTALLED ECONOMIZER OPTION WITH BAROMETRIC RELIEF DAMPER.
  - PERM VENDOR TO PROVIDE AND INSTALL MANUFACTURER'S ROOF CURB. ROOF CURB TO BE 14" HIGH, INSULATED AND SHALL MATCH SLOPE OF ROOF.
  - PROVIDE WITH FACTORY MOUNTED NON-POWERED CONVENIENCE OUTLET.
  - PROVIDE WITH VARIABLE FREQUENCY DRIVE MEDIUM STATIC BLOWER OPTION.

Data from Drawings

123 Main Street  
Worcester, MA  
Retailer  
Architects R Us

Additional Efficiency Package(s)  
high-efficiency HVAC. Systems that do not meet the performance requirement will be identified in the mechanical requirements checklist report.

Quantity	System Type & Description
1	HVAC System 1 (Single Zone) Heating: 2 each - Central Furnace, Gas, Capacity = 250 kBtu/h Proposed Efficiency = 85.00% E1, Required Efficiency = 88.00% E1 Cooling: 2 each - Single Package DX Unit, Capacity = 123 MBtu/h, Evaporatively Cooled Condenser, No Economizer, Economizer exception: None Proposed Efficiency = 14.00 IEER, Required Efficiency: 13.09 IEER + 12.1 IEER Fan System: None
1	Water Heater 1: Electric Storage Water Heater, Capacity: 10 gallons No minimum efficiency requirement applies

Data from COMcheck™ Mechanical Certificate

## Conducting the Plan Review - Mechanical

### ☐ Verify Htg & Clg. Loads Information

Load Calcs Must Be Provided and Specified  
 Equipment must match calcs.

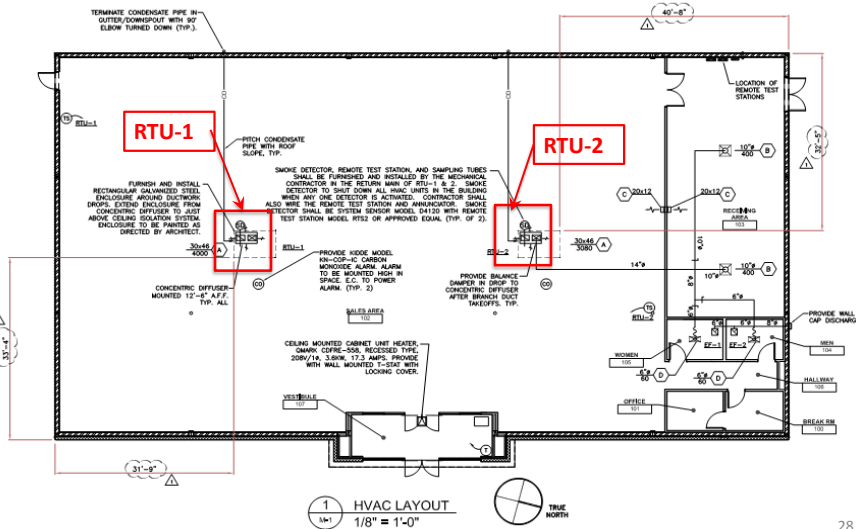
For this Project:

- Design Conditions provided
- Reference to ASHRAE 183 not provided
- Calculations/Reports not provided

**Non Compliant - revision and resubmittal is required**

## Conducting the Plan Review - Mechanical

### ☐ Verify Equipment Specifications (HVAC & SWH)



## Conducting the Plan Review - Mechanical



### Verify Equipment Specifications (HVAC & SWH)

PACKAGED HVAC UNIT SCHEDULE																	
TAG	MAKE	MODEL	TONS	CFM	O.A. CFM	ESP	HP	HEATING (MBH)		COOLING (MBH)		COOLING DESIGN EAT °F	IEER	MCA	MOCP	ELECTRICAL	WEIGHT
								INPUT	OUTPUT	TOTAL	SENS.						
RTU-1	CARRIER	48TDF12A2AS	10	4000	1060	.8"	3	250	205	123.3	95.0	80b/67wb	12.8	55	60	208/3/60	1400LBS.
RTU-2	CARRIER	48TDF12A2AS	10	4000	1060	.8"	3	250	205	123.3	95.0	80b/67wb	12.8	55	60	208/3/60	1400LBS.

- NOTES:
- DESIGN CONDITIONS: SUMMER OUTDOOR AIR 85.0b/73.4w, WINTER +12F.
  - FACTORY MOUNTED DISCONNECT.
  - PROVIDE WITH FIELD-INSTALLED ECONOMIZER OPTION WITH BAROMETRIC RELIEF DAMPER.
  - PEMB VENDOR TO PROVIDE AND INSTALL MANUFACTURER'S ROOF CURB. ROOF CURB TO BE 14" HIGH, INSULATED AND SHALL MATCH SLOPE OF ROOF.
  - PROVIDE WITH FACTORY MOUNTED NON-POWERED CONDENSATE OUTLET.
  - PROVIDE WITH VARIABLE FREQUENCY DRIVE MEDIUM STATIC BLOWER OPTION.

- Look for the following information:
- Make and Model
  - Capacity – Heating/Cooling (*capacity will also dictate if commissioning is required*)
  - Energy Source
  - Efficiency

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## Conducting the Plan Review - Mechanical



### Compare Drawing/Spec Data w/ COMcheck™ data

PACKAGED HVAC UNIT SCHEDULE																	
TAG	MAKE	MODEL	TONS	CFM	O.A. CFM	ESP	HP	HEATING (MBH)		COOLING (MBH)		COOLING DESIGN EAT °F	IEER	MCA	MOCP	ELECTRICAL	WEIGHT
								INPUT	OUTPUT	TOTAL	SENS.						
RTU-1	CARRIER	48TDF12A2AS	10	4000	1060	.8"	3	250	205	123.3	95.0	80b/67wb	12.8	55	60	208/3/60	1400LBS.
RTU-2	CARRIER	48TDF12A2AS	10	4000	1060	.8"	3	250	205	123.3	95.0	80b/67wb	12.8	55	60	208/3/60	1400LBS.

- NOTES:
- DESIGN CONDITIONS: SUMMER OUTDOOR AIR 85.0b/73.4w, WINTER +12F.
  - FACTORY MOUNTED DISCONNECT.
  - PROVIDE WITH FIELD-INSTALLED ECONOMIZER OPTION WITH BAROMETRIC RELIEF DAMPER.
  - PEMB VENDOR TO PROVIDE AND INSTALL MANUFACTURER'S ROOF CURB. ROOF CURB TO BE 14" HIGH, INSULATED AND SHALL MATCH SLOPE OF ROOF.
  - PROVIDE WITH FACTORY MOUNTED NON-POWERED CONDENSATE OUTLET.
  - PROVIDE WITH VARIABLE FREQUENCY DRIVE MEDIUM STATIC BLOWER OPTION.

#### Additional Efficiency Package(s)

High efficiency HVAC. Systems that do not meet the performance requirement will be identified in the mechanical requirements checklist report.

#### Mechanical Systems List

##### Quantity System Type & Description

- HVAC System 1 (Single Zone):  
 Heating: 2 each - Central Furnace, Gas, Capacity = 250 kBtu/h  
 Proposed Efficiency = 88.00% Ef, Required Efficiency = 88.00% Ef  
 Cooling: 2 each - Single Package DX Unit, Capacity = 123 kBtu/h, Evaporatively Cooled Condenser, No Economizer, Economizer exception: None  
 Proposed Efficiency = 14.00 EER, Required Efficiency: 13.09 EER + 12.1 IEER  
 Fan System: None

##### Water Heater 1:

Electric Storage Water Heater, Capacity: 10 gallons  
 No minimum efficiency requirement applies

Compliance – data matches

Non-compliance – data mismatch

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## Conducting the Plan Review - Mechanical

### ☐ Ventilation

*Ventilation is required by Section C401.2;  
Specific requirements are provided in Sections 402 Natural Ventilation and  
C403 Mechanical Ventilation*

VENTILATION SCHEDULE		BASED ON ASHRAE 62.1
RETAIL STORE ST. LEVEL	$((7345 \text{ FT}^2 \times .12 \text{ CFM/FT}^2) + (85 \text{ PEOPLE} \times 7.5 \text{ CFM/PERSON}))/0.80$	= 1898 CFM
RETAIL STOCKROOM	$((982 \text{ FT}^2 \times .12 \text{ CFM/FT}^2) + (2 \text{ PEOPLE} \times 10 \text{ CFM/PERSON}))/0.80$	= 172 CFM
OFFICES	$((147 \text{ FT}^2 \times .06 \text{ CFM/FT}^2) + (4 \text{ PEOPLE} \times 5 \text{ CFM/PERSON}))/0.80$	= 36 CFM
		2106 CFM
	2106 CFM REQUIRED	
	2122 CFM PROVIDED	

From Sht M-1

*The Ventilation Schedule does not indicate how this ventilation is going to be achieved*

*Also –reference to ASHRAE 62.1 is incomplete – which version is being used?*

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## Conducting the Plan Review - Mechanical

### ☐ Ventilation

*Section C403.2.6.1 Requires Demand Control Ventilation (DCV) when the space is  
>500 ft<sup>2</sup> and occupant density is >25 people/1000ft<sup>2</sup>.*

OCCUPANT LOAD:	PUBLIC AREAS (NET) = 7,195 SQ. FT. + 171 OFFICE SQ. FT. + 163 TOILETS SW. FT. = 7,529 SQ. FT. STORAGE AREA (NET) = 1067 SFT. (7,529/30=251) + (1067/300=4) = 255 OCCUPANTS TOTAL
----------------	--

From Sht T-1 Code Analysis

*For This Project:*

*Public Areas: 7529 ft<sup>2</sup>; 251 people, Occupant Density is 3.32 people/1000ft<sup>2</sup>*

*Storage Area: 1067ft<sup>2</sup>, 4 people, Occupant Density 3.74 people/ 1000ft<sup>2</sup>*

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## Conducting the Plan Review - Mechanical

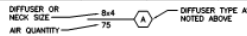


### Ducts

DIFFUSER / GRILLE SCHEDULE											
MARK	SERVICE	CFM	FACE SIZE	FRAME TYPE	PATTERN	DAMPER	MATERIAL	FINISH	MANUFACTURER / MODEL NO.	TYPE	NOTES
(A)	SUPPLY/RETURN	SEE PLANS	30x46	DUCT MOUNTED	4-WAY	YES	STEEL	STANDARD FINISH	MICROMETL 1818-400A	CONCENTRIC DIFFUSER	1, 2, 3, 4
(B)	SUPPLY	SEE PLANS	24x24	DUCT MOUNTED	4-WAY	NO	STEEL	OFF-WHITE	METALARE 5000	CEILING DIFFUSER (LOWERED FACE)	1, 2, 3
(C)	TRANSFER/RETURN	SEE PLANS	20x12	WALL	N/A	NO	STEEL	OFF-WHITE	METALARE H4004	PERFORATED FACE	1, 2, 3
(D)	SUPPLY	SEE PLANS	12x24	LAY-IN	SINGLE REFLECTION	YES	STEEL	OFF-WHITE	METALARE H4002D	REGISTER	1, 2, 3

Information from drawings in reference to ducts, diffusers and grilles

- NOTES:  
 1. DIFFUSER DESIGNATIONS ON PLANS AS FOLLOWS:  
 2. SEE PLAN FOR MECK SIZE.  
 3. TO BE PAINTED BY GENERAL CONTRACTOR. SEE PMB SHEET FOR PAINT COLOR.  
 4. PROVIDE DROP DIFFUSER AS PART OF MICROMETL CONCENTRIC DIFFUSER KIT PER ASSOCIATED AIR HANDLER SUPPLY AIR FLOW.



4. DUCTWORK:  
 A. DUCTWORK SHALL BE OF THE SIZE AS INDICATED ON THE PLANS WITH INTERNAL INSULATION PROVIDED ON ALL RECTANGULAR SUPPLY AND RETURN DUCTWORK. INSULATION SHALL BE 1" THICK, 1-1/2 PCF FIBERGLASS (UNLESS NOTED OTHERWISE).  
 B. ROUND DUCTWORK LOCATED ABOVE CEILINGS, BOTH METAL AND FLEXIBLE SHALL BE INSULATED WITH 1" THICK, 1-1/2 PCF FIBERGLASS INSULATION. ALL DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA RECOMMENDATIONS. ALL DUCTWORK SIZES INDICATED ARE NET SIZES. DUCTWORK SHALL BE INCREASED TO ALLOW FOR INTERNAL INSULATION. ALL SQUARE ELBOWS SHALL INCLUDE SINGLE THICKNESS TURNING VANES.  
 C. EXPOSED DUCTWORK IN CONDITION SPACE IS NOT TO BE INSULATED UNLESS OTHERWISE NOTED ON PLANS.  
 D. FLEXIBLE DUCTWORK SHALL BE THERMAFLEX TYPE MKF 1-1/2" EXTERNALLY INSULATED AND CONFORM TO ALL REQUIREMENTS OF U.L. 181 FOR CLASS 1 DUCTS. ALL TAKE-OFF FITTINGS SHALL HAVE EXTRACTORS AND DAMPERS. STAINLESS STEEL CLAMPS SHALL BE USED FOR ALL FLEXIBLE CONNECTIONS. FLEXIBLE DUCTWORK SHALL BE EXTERNALLY INSULATED AND CONFORM TO U.L. 181.

## Conducting the Plan Review - Mechanical



### Ducts

#### COMcheck™ Checklist

C403.2.9 [ME60]²	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
------------------	---	--	---

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.2.9 [ME10]²	Ducts and plenums sealed based on static pressure and location.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Information not provided</b>
C403.2.9.1.3 [ME11]²	Ductwork operating > 3 in. water column requires air leakage testing.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input checked="" type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.4.4.6 [ME110]²	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input checked="" type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply. <i>See the Mechanical Systems list for values.</i>
C408.2.2.1 [ME53]²	Air outlets and zone terminal devices have means for air balancing.	<input checked="" type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met. <b>Location on plans/spec:</b> Sht M-1

## Conducting the Plan Review - Mechanical



Energy Code  
Technical Support  
Program

### Ducts

COMcheck™ Checklist

Need to compare and verify:

- Duct Location
- Duct Insulation
- Duct Sealing

**Not enough documentation is provided –  
request revision and resubmittal**

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## Conducting the Plan Review - Mechanical



Energy Code  
Technical Support  
Program

HVAC Commissioning Plan is required when

- Cooling Loads  $\geq$  480,000 BTU/hr. OR
- Heating Loads  $\geq$  600,000 BTU/hr.

Our Project: *(Based on data from Equipment Schedule)*

- Cooling Load – 120,000 BTU/hr.
- Heating Load – 205,000 BTU/hr

**Therefore Commissioning is not required**

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## Conducting the Plan Review – Service Water Heating



Compare specifications provided on drawings with code requirements for water heating/storage systems

- Information provided on plans
- Table C404.2 from Code

**1**

					(RIGHT HAND TRIP LEVER), PROVIDE STOP VALVE, FLEXIBLE SUPPLY LINE, OPEN FRONT SEAT (AMERICAN STANDARD #5801.100 OR EQUAL). PROVIDE 10 GALLON ELECTRIC WATER HEATER, 6 KW @ 208V WITH MANUFACTURER SUPPLIED TEMPERATURE AND PRESSURE RELIEF VALVE, A.O. SMITH #EJC-10, OR EQUAL. PROVIDE THERMAL EXPANSION TANK, AMTROL THERM-X-TROL ST-11, OR EQUAL. PROVIDE SEISMIC STRAPPING ON WATER HEATER. TERMINATE DRAIN LINE IN WOP SINK (MS-1). PROVIDE FULL SIZE T&P RELIEF LINE. REFER TO WATER HEATER DETAIL ON SHEET P2 FOR ADDITIONAL INFORMATION.  EXPANSION TANK SUPPORT: IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE SUPPORT FOR THE EXPANSION TANK. SUPPORT TO ADJACENT WALL OR FROM EXISTING STRUCTURE ABOVE WITH UNISTRUT. DO NOT SUPPORT FROM PIPE ALONE.
EWH-1	ELECTRIC WATER HEATER	34"	34"		

**2**

**TABLE C404.2  
MINIMUM PERFORMANCE OF WATER-HEATING EQUIPMENT**

EQUIPMENT TYPE	SIZE CATEGORY (Input)	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED <sup>a, b</sup>	TEST PROCEDURE
Water heaters, electric	≤ 12 kW <sup>d</sup>	Resistance	0.97 - 0.00 132V, EF	DOE 10 CFR Part 430
	> 12 kW	Resistance	(0.3 + 27/P <sub>in</sub> ), %/h	ANSI Z21.10.3
	≤ 24 amps and ≤ 250 volts	Heat pump	0.93 - 0.00 132V, EF	DOE 10 CFR Part 430 39

## Conducting the Plan Review – Service Water Heating



Compare specifications provided on drawings with code requirements for water heating/storage systems

		Compressors	Per 403.5.2			
C404 Service Water Heating	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance Service Water Heating Systems and Equipment.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.2	Service Water (SW) Heating Equipment Efficiency	Per Table C404.2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.3	SW Heat Traps Non circulation system	Required	<input type="checkbox"/> Piped Heat trap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.4	SW Pipe Insulation	Per Table C403.2.10 Full length	<input type="checkbox"/> Integral <input type="checkbox"/> Meets exception	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.5	Efficient Heated Water Supply Piping	Per Section C404.5.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.6.3	Pump Controls for Hot Water Storage	Per Section C404.5.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.7	Demand Recirculation Controls	<5 min. operation cycle		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.1	Swimming Pool Heaters	> 5 minutes after end of cycle	Accessible Controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.2	Pool Heater Time Switch	Automatic		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.3	Pool Covers	Required Vapor Retardant		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		70% recovered energy	<input type="checkbox"/> Exempt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.11	Service Water Heating System Commissioning	Per Section C408.2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C405 Lighting and Electrical Systems	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance Lighting and Electrical Systems and Equipment.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Does our Project Comply?



**Not Yet!**  
More Information is required to make a determination

Code Checklist

# Conducting the Plan Review – Service Water Heating



## Piping Insulation Requirements

**TABLE C403.2.8 MINIMUM PIPE INSULATION THICKNESS (thickness in inches)<sup>a</sup>**

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	Conductivity $k$ , in.(ft. <sup>2</sup> ·h <sup>o</sup> ·°F) <sup>-1</sup>	Mean Rating Temperature, °F	< 1	1 to < 1½	1½ to < 4	4 to < 8	≥ 8
> 350	0.32 – 0.34	250	4.5	5.0	5.0	5.0	5.0
251 – 350	0.29 – 0.32	200	3.0	4.0	4.5	4.5	4.5
201 – 250	0.27 – 0.30	150	2.5	2.5	2.5	3.0	3.0
141 – 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 – 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40 – 60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	0.20 – 0.26	75	0.5	1.0	1.0	1.0	1.5

- a. For piping smaller than 1½ inches (38 mm) and located in partitions within conditioned spaces, reduction of these thicknesses by 1 inch (25 mm) shall be permitted (before thickness adjustment required in footnote b) but not to a thickness less than 1 inch (25 mm).
- b. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:  
 $T = r_i / (1 + i)^{0.25} - 1$   
 where:  
 $T$  = minimum insulation thickness,  
 $r_i$  = actual outside radius of pipe,  
 $i$  = insulation thickness listed in the table for applicable fluid temperature and pipe size,  
 $k$  = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature ( $k_{alt} = i_{alt} \times R^{-1} = °F$ ) and  
 $k$  = the upper value of the conductivity range listed in the table for the applicable fluid temperature.
- c. For direct heated heating and hot water system piping, reduction of these thicknesses by 1½ inches (38 mm) shall be permitted (before thickness adjustment required in footnote b) but not to thicknesses less than 1 inch (25 mm).

**PLUMBING SPECIFICATIONS**

1. ALL PLUMBING WORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH 2014 INTERNATIONAL PLUMBING CODE (WITH 2014 NEW YORK STATE SUPPLEMENTS) AND LOCAL CODES.
2. PLUMBING WORK SHALL BE AS INDICATED ON THE PLANS AND AS HEREIN SPECIFIED. IT IS THE INTENTION OF THESE DRAWINGS TO COVER ALL WORK FOR A COMPLETE FIRST CLASS PLUMBING INSTALLATION. ANY EQUIPMENT TRIM, HARDWARE AND/OR DEVICES USUALLY UTILIZED IN THE CLASS OF WORK, THOUGH NOT SPECIFICALLY IDENTIFIED OR SHOWN ON THE DRAWINGS, BUT WHICH MAY BE NECESSARY FOR THE SATISFACTORY COMPLETION OF THE WORK AS DETERMINED BY THE ARCHITECT SHALL BE PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR AS PART OF HIS TOTAL WORK. WORK SHALL CONSIST OF PROVIDING A COMPLETE AND OPERATIONAL SYSTEM INCLUDING ALL FITTINGS, PIPING, VALVES AND OTHER REQUIRED DEVICES, EQUIPMENT, ETC. ALL WORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL STATE AND LOCAL CODE REQUIREMENTS, WHERE THERE ARE CONFLICTS BETWEEN THE PLANS, SPECIFICATIONS AND CODE REQUIREMENTS, THE CONTRACTOR SHALL MAKE ANY ADJUSTMENTS AS REQUIRED FOR COMPLIANCE WITH ALL CODES AND FOR APPROVAL OF THE SYSTEM, THE SYSTEM SHALL EXTEND TO AND CONNECT INTO THE EXISTING MUNICIPAL SEWER AND WATER UTILITIES.
3. WHENEVER A MATERIAL, ARTICLE OR PIECE OF EQUIPMENT IS IDENTIFIED ON THE DRAWINGS BY REFERENCE TO MANUFACTURER, BRAND OR TRADE NAME, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IDENTIFICATION FOR THE PURPOSE OF ESTABLISHING A STANDARD, AND ANY MATERIAL, ARTICLE, OR PIECE OF EQUIPMENT OR OTHER MANUFACTURER OR VENDOR WHICH DOES NOT MEET THE ABOVE REQUIREMENTS SHALL BE SUBSTITUTED BY THE CONTRACTOR WITH AN EQUIVALENT OF EQUAL OR BETTER QUALITY, APPEARANCE, AND FUNCTION.
4. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO BEGINNING WORK FOR THE PURPOSE OF OBSERVING EXISTING CONDITIONS AND TO DETERMINE THE EXTENT OF THE WORK. THE CONTRACTOR SHALL MAKE ALLOWANCES FOR PROVIDING ALL MATERIAL, EQUIPMENT, AND LABOR AS REQUIRED FOR THE COMPLETE AND OPERATIONAL SYSTEM WITHIN ACCORDANCE WITH THE REQUIREMENTS OF THE DRAWINGS, SPECIFICATIONS AND ALL CODE REQUIREMENTS.
5. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF DOORS, WINDOWS, PLUMBING FIXTURES, ETC.
6. ALL PLUMBING WORK SHALL BE COORDINATED WITH THE WORK PERFORMED UNDER OTHER DIVISIONS TO AVOID INTERFERENCE. FIELD VERIFY ROUTING OF ALL WORK.
7. ALL PIPING, LEVELS, ETC. EXTENDING THROUGHOUT THE WALL AND/OR ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.
8. ALL PIPING INSULATION SHALL RUN CONTINUOUSLY THROUGH FLOOR, WALLS AND PARTITIONS.
9. ALL UNDERGROUND WATER PIPING SHALL BE TYPE "K" COPPER MINIMUM. ALL ABOVE GROUND WATER PIPING SHALL BE TYPE "K" COPPER MINIMUM. PROVIDE WROUGHT COPPER FITTINGS. JOINTS SHALL BE SOLDERED WITH LEAD FREE SOLDER. ADAPTERS SHALL BE CAST BRONZE. ALL EXPOSED PIPING SHALL BE CHROME PLATED WASTE AND VENT PIPING SHALL BE MINIMUM 1/2" SERVICE WEIGHT CAST IRON WITH LISTED NO-HUE OR "CLEAN" FITTINGS. JOINTS, NO-HUE JOINTS ARE NOT PERMITTED BELOW GRADE. SCHEDULE 40 PIPING SHALL NOT BE USED IF ALLOWED BY LOCAL CODES. ALL EQUIPMENT REQUIRING PLUMBING CONNECTIONS SHALL BE CONNECTED TO THE PLUMBER OR HANDS OFF WHO PROVIDES THE EQUIPMENT OR FUTURE COPPER PIPING SHALL NOT BE ALLOWED TO COME IN CONTACT WITH MASONRY OR DISSIMILAR METALS. PIPING SHALL BE PROTECTED BY COPPER HANGERS AND SLEEVES.
10. PEK ELASTIC ACCORDING TO ASTM F876 AND ASTM F877 MAY BE SUBSTITUTED FOR ABOVE GROUND COPPER PIPING. FITTINGS SHALL BE ASTM F1307 METAL INSERT AND COPPER CRIMP RINGS. METAL PEK TUBING WITH LOGIC AT EACH CHANGE OF DIRECTION OR ABOVE THAN 30 DEGREES. INITIAL WOOD COATED HANGERS FOR PEK SHALL BE THE FOLLOWING SPACING: HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS: 16'S 1 AND SMALLER: 32 INCHES WITH 3/8 INCH ROD.
11. ALL HOT AND COLD WATER PIPING AND DUCTWORK ABOVE GRADE SHALL BE INSULATED WITH MINIMUM 1" THICK 3" PFD DENSITY FIBERGLASS FIBRE COVERING WITH UNPOWDERED ADHESIVE OR AS REQUIRED BY CODE. ALL JOINTS SHALL BE TAPPED AND SEALED WITH AN APPROVED TYPE ADHESIVE AND END STRIPS AS RECOMMENDED BY THE INSULATION SUPPLIER AND/OR MANUFACTURER.
12. VACUUM BREAKERS SHALL BE PROVIDED FOR ALL HOSE CONNECTIONS AND OTHER POINTS WHERE CROSS CONNECTION CAN OCCUR. REDUCED PRESSURE BACKFLOW PREVENTERS SHALL BE PROVIDED WHERE REQUIRED BY CODE. ALL FIXTURES, HOSE BIBBS, FLOOR DRAINS, ETC. SHALL BE PROVIDED AS INDICATED AND IDENTIFIED ON THE PLANS. THE SYSTEM SHALL BE TESTED, CLEANED, AND DISINFECTED IN ACCORDANCE WITH THE STATE AND LOCAL REQUIREMENTS.
13. THE ENTIRE PLUMBING SYSTEM SHALL BE UNCONDITIONALLY GUARANTEED FOR 1 YEAR FROM ACCEPTANCE BY THE OWNER. ALL GUARANTEES SHALL BE WRITTEN, DATED, AND FORWARDED TO THE OWNER. ALL DEFECTIVE EQUIPMENT AND/OR MATERIAL SHALL BE REPLACED AT NO EXPENSE TO OWNER.

# Conducting the Plan Review – Service Water Heating



## Piping Insulation Requirements

		Compressors	Per 403.5.2			
C404 Service Water Heating	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance Service Water Heating Systems and Equipment.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.2	Service Water (SW) Heating Equipment Efficiency	Per Table C404.2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.3	SW Heat Traps Non circulation system	Required	<input type="checkbox"/> Piped Heat trap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.4	SW Pipe Insulation	Per Table C403.2.10 Full length	<input type="checkbox"/> Integral <input type="checkbox"/> Meets exception	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.5	Efficient Heated Water Supply Piping	Per Section C404.5.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.6.3	Pump Controls for Hot Water Storage	Per Section C404.5.2 <5 min. operation cycle		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.7	Demand Recirculation Controls	> 5 minutes after end of cycle		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.1	Swimming Pool Heaters	Accessible Controls		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.2	Pool Heater Time Switch	Automatic		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.9.3	Pool Covers	Required Vapor Retardant		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C404.11	Service Water Heating System Commissioning	Per Section C408.2	<input type="checkbox"/> Exempt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C405 Lighting and Electrical Systems	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance Lighting and Electrical Systems and Equipment.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Conducting the Plan Review – Interior Lighting



Interior Lighting and Exterior Lighting are considered separately

First Step (interior) is to determine the path of compliance

- ✓ Building Area Method or
- ✓ Space by Space Method

The best and easiest way to review is to use the COMcheck™ reports

Verify the information in COMcheck™ with that provided on drawings

## COMcheck Software Version 4.0.8.2 Interior Lighting Compliance Certificate

**Project Information**

Energy Code: 2015 IECC  
 Project Title: Retail Store  
 Project Type: New Construction

Construction Site: 123 Main Street, Worcester, MA  
 Owner/Agent: Retailer  
 Designer/Contractor: Architects R Us

**Additional Efficiency Package(s)**  
 High efficiency HVAC. Systems that do not meet the performance requirement will be identified in the mechanical requirements checklist report.

**Allowed Interior Lighting Power**

Area Category	A Floor Area (sq ft)	B Allowed Watts / ft <sup>2</sup>	C Allowed Watts (B x C)	D Allowed Watts (B x C)
1-Sale Area (Retail Sales Area)	7767	1.59	12350	
2-Receiving (Warehouse Fine Material Storage)	1010	0.95	960	
			Total Allowed Watts =	13309

**Proposed Interior Lighting Power**

Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	A Lamps/ Fixture	B # of Fixtures	C Fixture Watt.	D [C X D]	E
<b>1-Sale Area (Retail Sales Area)</b>					
LED 4: A4X: 4' LED Linear 2-10 cables: LED Linear 15W:	2	76	30	2280	
LED 5: B: 2' LED Linear Surface Mt. LED Linear 15W:	1	4	15	60	
LED 6: D: Emer-Est Combo: LED MR 2W:	2	3	4	12	
LED 7: E: Emergency Light: LED MR 2W:	2	12	4	48	
LED 8: F: Emergency Light: LED MR 2W:	2	3	2	6	
<b>2-Receiving (Warehouse Fine Material Storage)</b>					
LED 1: A: 4' LED Linear 2-10 cables: LED Linear 15W:	2	4	30	120	
LED 2: D: Emer-Est Combo: LED MR 2W:	2	1	4	4	
LED 3: E: Emergency Light: LED MR 2W:	2	1	4	4	
			Total Proposed Watts =	2534	

**Interior Lighting PASSES: Design 81% better than code**

# Conducting the Plan Review – Interior Lighting



SYMB	TYPE	MANF	PART #	DESCRIPTION	COUNT	WATTS
	A	LSG	LSPRO18M-48 CW80 30W FR MVOLT	4' LED STRIP (INC. 32) 10 FT CABLES) AERIAL MOUNT.	74	30
	A1	LSG	LSPRO18M-48 CW80 30W FR MVOLT-ST	4' LED STRIP, SURFACE MOUNT	2	30
	B	LSG	LSPRO18M-24 CW80 15W FR MVOLT-ST	2' LED STRIP, SURFACE MOUNT	4	15
	C	EXTRONEX	VEK-02-8P-W8-WH	LED EXIT SIGN	8	3.4
	D	EXTRONEX	VEK5-0-10W-F100-R	EMERGENCY LIGHT/EXIT COMBO 2 HEAD	4	4
	E	EXTRONEX	LED-90	EMERGENCY LIGHT (Z) HEADS	13	2
	F	EXTRONEX	CE02-AP	EGRESS EMERGENCY LIGHT (Z) HEAD	3	4
	G	TECHLIGHT	LHSWP-1-C-4-T3-F1-B2	LED WALL PACK	5	36
	H	TECHLIGHT	LSBT-1-C-X-T3-F1-B2 WMMP542	LED AREA LIGHT FOR EXT. ARM 42" EXTENSION ARM WITH WALL MOUNTS	4	147

Use this Light Fixture Schedule from Drawings to compare the the Interior Lighting Certificate from COMcheck™

# Conducting the Plan Review – Exterior Lighting



Use COMcheck™ to compare and verify:

- Area/Surface Category
- Quantities
- Allowed Wattage
- Compliance Calculation



## COMcheck Software Version 4.0.8.2 Exterior Lighting Compliance Certificate

### Project Information

Energy Code: 2015 IECC  
 Project Title: Retail Store  
 Project Type: New Construction  
 Exterior Lighting Zone: 2 (Neighborhood business district)

Construction Site: 123 Main Street, Worcester, MA  
 Owner/Agent: Retailer  
 Designer/Contractor: Architects R Us

### Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
Parking Lot (Parking area)	14824 R2	0.06	Yes	889
Side Walls (Illuminated area of facade wall or surface)	450 R2	0.1	No	45
Front Facade (Entry canopy)	950 R2	0.25	Yes	238
Total Tradable Watts (a) =				1127
Total Allowed Watts =				1172
Total Allowed Supplemental Watts (b) =				600

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.  
 (b) A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

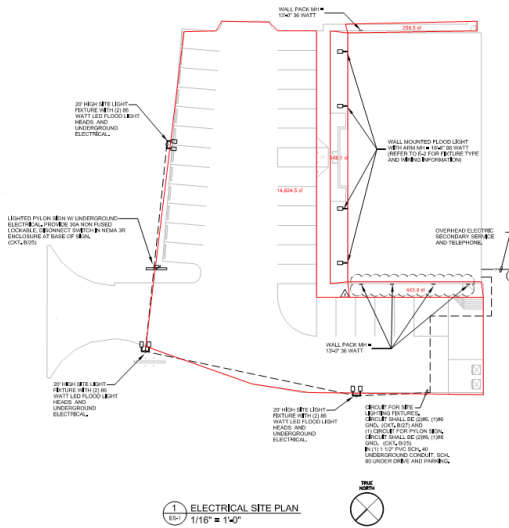
### Proposed Exterior Lighting Power

A Fixture ID - Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Parking Lot (Parking area 14824 R2) Tradable Wattage				
LED 1: Pole Mt. LED Roadway-Parking Unit 88W	2	6	88	516
Side Walls (Illuminated area of facade wall or surface 450 R2) Non-tradable Wattage				
LED 2: C- Wall Pack. LED Other Fixture Unit 30W	1	5	36	180
Front Facade (Entry canopy 950 R2) Tradable Wattage				
LED 3: H- Area Light on Arm. LED Other Fixture Unit 125W	1	4	147	588
Total Tradable Proposed Watts =				1104

Exterior Lighting PASSES: Design 31% better than code

Exterior Lighting Compliance Statement

# Conducting the Plan Review – Exterior Lighting



Verify specified items match the Compliance Certificate

1 ELECTRICAL SITE PLAN  
 1/16" = 1'-0"

## Conducting the Plan Review – Lighting Controls

C405.2 details where controls area required

Utilize the Plan Review Checklist

To compare requirements with information proposed on drawings.

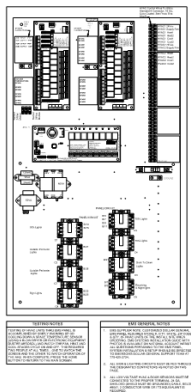
System Commissioning					
C405 Lighting and Electrical Systems	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance Lighting and Electrical Systems and Equipment.				
C405.2	Lighting Controls	Within each enclosed area	<input type="checkbox"/> Dwelling Unit Exception	<input type="checkbox"/>	<input type="checkbox"/>
C405.2.1	Occupant Sensor Controls	Required: 1) 30 min. shutoff 2) Manual 50% power 3) Manual Control		<input type="checkbox"/>	<input type="checkbox"/>
C405.2.2.1	Time-switch Controls	In areas with no occupant sensor controls	<input type="checkbox"/> Meets function requirements <input type="checkbox"/> Meets exception	<input type="checkbox"/>	<input type="checkbox"/>
C405.2.2.2	Occupant Override	If Automatic Controls	50%	<input type="checkbox"/>	<input type="checkbox"/>
C405.2.3	Daylight Controls	Only in defined daylight zones		<input type="checkbox"/>	<input type="checkbox"/>
C405.2.4	Specific Application Controls	Display Accounttask Sleeping Units		<input type="checkbox"/>	<input type="checkbox"/>
C405.3	Exit Signs	Internally illuminated 5 watts per side		<input type="checkbox"/>	<input type="checkbox"/>
C405.4	Interior Lighting Power Requirements	Table C405.4.2(1) ≤ Interior Lighting Power C405.4.2	Show Calculations	<input type="checkbox"/>	<input type="checkbox"/>

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## Conducting the Plan Review – Lighting Controls



PROGRAMMER CONTROLLER  
N.T.S.



CONTROLLER WIRING DIAGRAM  
N.T.S.



CPU TERMINAL DIAGRAM  
N.T.S.

Our project includes electronic controls for lighting and HVAC

This schematic and image was taken from project drawings

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## Conducting the Plan Review – Lighting System Commissioning



### C408.3 Requires Functional Testing and Commissioning

- The *construction documents* shall specify that documents certifying that the installed lighting controls meet documented performance criteria of Section C405 are to be provided to the building owner within 90 days from the date of receipt of certificate of occupancy

Our project does not include this statement nor a reference to commissioning

C408.3	Vertical Transport Lighting System Commissioning	Testing of control hardware and software	<input type="checkbox"/> Documents state who performs the test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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## Communicating the Results . . .



- Compliance
  - Endorse Drawings – stamp “Reviewed for Code Compliance”
  - Note on the plans - “ Plans are not to be changed, modified or altered without authorization from the Code Official”
  - Retain one set of CDs
  - Return one set of CDs to applicant to be kept at the site of work.
  - Include checklists with CDs and Permit
- Non-Compliance
  - Request revisions and resubmittal
  - Convey this request in written format
  - Letter detailing missing information
  - Copy annotated checklist

Your communication should be:

- ✓ Clear and Concise
- ✓ Helpful but not suggestive – let the designer design!

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## Next Steps . . .



- ✓ You've completed your review . . .
- ✓ You need more information prior to approving submittal . . .

### Now What?

- ✓ Request additional information in written format
- ✓ Use the checklists to convey what information is missing
  - ✓ Cites code section
  - ✓ Provides description of required documentation

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## Preparing for Site Inspections



The Plan Review should be used to prepare for the field inspections

- ✓ Use the Plan Review Checklist to verify proposed components to actual in the field
  - ✓ Insulation Materials and R-Values
  - ✓ Fenestration match submittal
  - ✓ Air Barrier materials, location and continuity (Visual Inspection)
  - ✓ Mechanical systems and controls
  - ✓ Lighting and controls
  - ✓ Service Water Heating Systems
  - ✓ Solar Ready Conditions

All of these items are on your checklist and in one location for accessibility

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## QUESTIONS?



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## Energy Code Support



Questions about the energy code?

**Energy Code Support Hotline:**

855-757-9717

**Energy Code Support Email:**

[energycodesma@psdconsulting.com](mailto:energycodesma@psdconsulting.com)

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We Speak Building



Energy Code  
Technical Support  
Program

# Thanks!

**Art Pakatar**  
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