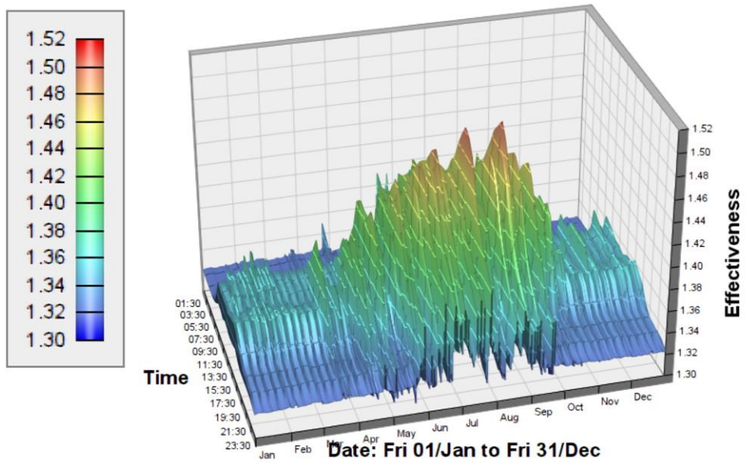
Building Code Compliance - IECC 2021



Internship Project – AMPS – ARCO Murray

Location – Chicago, USA

Software Used – IESVE

The project aimed to run a energy code compliance analysis for a self-storage facility using IESVE. The study evaluated in detail the building envelope, HVAC, and lighting systems against IECC 2021 standards. Generated simulation-based compliance reports, technical documentation for city approval, compared baseline and proposed performance, and recommended design adjustments to ensure regulatory approval and optimized energy efficiency.
Since the main objective was to reduce the construction cost, after simulating and troubleshooting the unmet hours, there were major recommendations in reducing the reducing the insulation while still complying with the code. This resulted with major cost reductions.

IES INTEGRATED ENVIRONMENTAL SOLUTIONS

International Energy Conservation Code (IECC) Page 1 of 2

International Energy Conservation Code (IECC) Page 1 of 2

Project Name:		
Project Address:		Date: 25-Jun-2025
Designer of Record:	Email:	Telephone:
Contact Person:	Email:	Telephone:
City: Colorado Springs		Principal Heating Source ☑ Fossil Fuel ☐ Electricity ☐ Solar/site recovered ☐ Other
Weather Data: USA_CO_Colorado.Springs.AP-Peterson.Field.724660_T...		

Space Summary

Building Use	Conditioned Area (ft²)	Unconditioned Area (ft²)	Total Area (ft²)
IECC SPACE: Electrical/ Mechanical	285.1	0	285.1
IECC SPACE: Elevators - Equipment	590.8	0	590.8
IECC SPACE: Lounge/ Recreation	135.5	0	135.5
IECC SPACE: Office - Open plan	737.2	0	737.2
IECC SPACE: Restrooms	152.9	0	152.9
IECC SPACE: Stairway	472.2	0	472.2
IECC SPACE: Warehouse - Medium/ Bulky material storage	111417.1	0	111417.1
Total	113790.7	0	113790.7

Advisory Messages

	Proposed Building Design	Standard Reference Building	Difference Proposed/Standard Ref
Number of hours heating loads not met (system/plant)	19	36	17
Number of hours cooling loads not met (system/plant)	1	2	1

Spaces Excluded from UMLH Test per space type or application:

Voids, plenums, unconditioned spaces, and non-master rooms in an HVAC zone are always excluded.

FR000002: FF_ DIsplay 01
FR000003: FF_ Display 02
SC000001: SF_ Display 01
SC000002: SF_ Display 02

Spaces Excluded from UMLH Test per inclusion in ASHRAE 55 Thermal Comfort Analysis:

N/A

IES INTEGRATED ENVIRONMENTAL SOLUTIONS

International Energy Conservation Code (IECC)

Energy Results

End Use	Energy Type	Proposed Building		Standard Reference Building		Proposed/ Standard Ref Energy (%)
		Energy (kBtu/yr)	Peak (kBtu/h)	Energy (kBtu/yr)	Peak (kBtu/h)	
Lighting - conditioned	Electricity	227,141.5	79.2	443,778.0	156.3	48.8%
Lighting - unconditioned	Electricity	7,461.5	1.4	49,752.6	9.3	85.0%
Space Heating	Gas	661,793.7	482.2	270,643.1	312.0	-144.5%
Space Heating	Electricity	18,310.2	12.9	5,469.2	4.4	-234.8%
Space Cooling	Electricity	2,261.1	5.4	2,260.8	4.4	-0.0%
Heat Rejection	Electricity	144.3	0.3	144.3	0.3	-0.0%
Pumps	Electricity	1,494.5	0.2	1,494.5	0.2	0.0%
Fans Interior	Electricity	33,540.3	19.9	23,271.0	20.6	-44.1%
Fans Exhaust	Electricity	768.0	0.6	713.6	0.6	-7.6%
Services Water Heating	Electricity	2,712.9	0.5	2,712.9	0.5	0.0%
Receptacle Equipment	Electricity	51,021.4	16.5	51,021.4	16.5	0.0%
Office Equipment	Electricity	3,258.7	1.0	3,258.7	1.0	0.0%
Elevators Escalators	Electricity	26,043.0	9.2	26,043.0	9.2	0.0%
Total building consumption		1,035,951.2		880,563.3		-17.6%

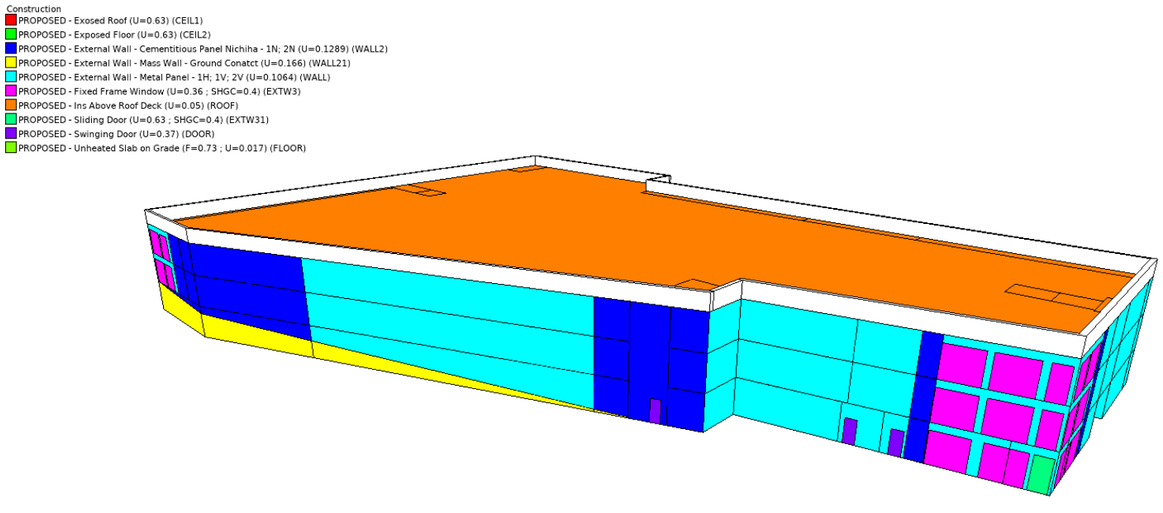
Energy and Cost Summary by Fuel Type

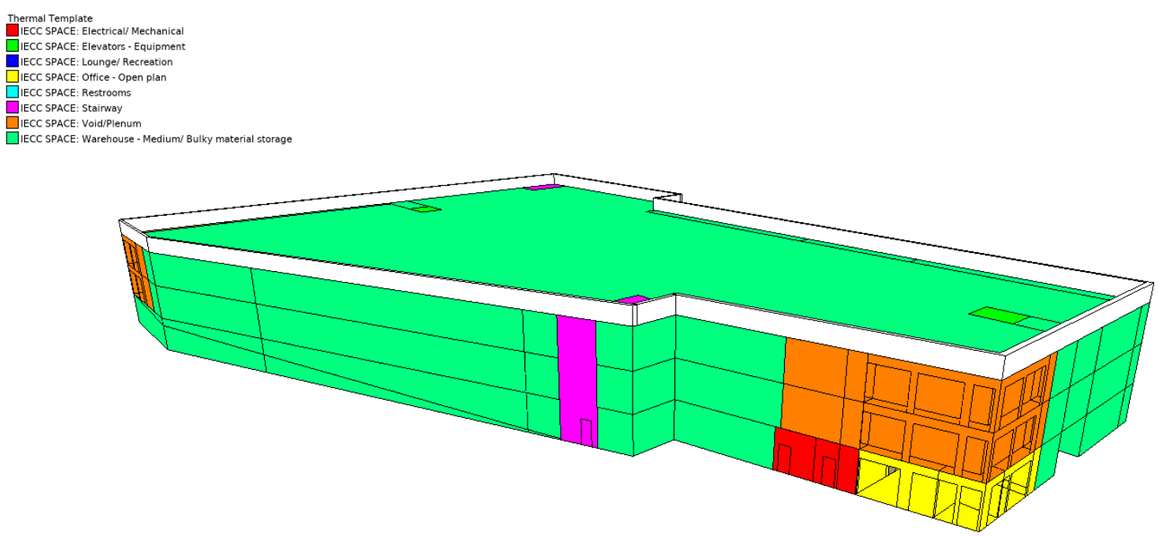
	Proposed Building		Standard Reference Building		Proposed/Standard Reference	
	Energy (kBtu/yr)	Cost ($/yr)	Energy (kBtu/yr)	Cost ($/yr)	Energy (%)	Cost (%)
Electricity	374,157.5	12,445.8	609,920.2	20,288.12	38.65%	38.65%
Gas	661,793.7	5,586.87	270,643.1	2,284.78	-144.53%	-144.53%
Total ex Onsite Generation	1,035,951.2	18,032.67	880,563.3	22,572.9	-17.6%	20.11%
Total inc Onsite Generation	1,035,951.2	18,032.67	880,563.3	22,572.9	-17.6%	20.11%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Notes: The results are based on 8760 simulated hours

CONSTRUCTION





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(Dollars per Thousand Cubic Feet, except where noted)

Data Series: Commercial Price **Period:** Monthly

Download Series History | Definitions, Sources & Notes

Show Data By: Data Series | Area (Graph Clear)

	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	View History
U.S.	10.52	10.21	9.93	9.75	10.26	11.07	1973-2025
Alabama	14.17	14.47	12.99	12.59	12.89	13.09	1989-2025
Alaska	10.90	10.82	10.77	10.82	10.90	10.94	1989-2025
Arizona	12.00	10.20	10.09	10.01	9.83	8.59	1989-2025
Arkansas	9.26	12.55	10.28	9.50	9.38	9.59	1989-2025
California	13.34	13.84	15.16	16.07	17.65	17.40	1989-2025
Colorado	9.29	8.25	8.31	8.41	8.24	8.44	1989-2025
Connecticut	11.77	9.99	9.36	8.68	9.75	10.46	1989-2025

eia + Sources & Uses + Topics + Geography + Tools + Education + News

Profile Data

Print State Energy Profile (overview, data, & analysis)

Last Update: June 20, 2025 **Next Update:** July 17, 2025

See full record of updates

Data in this section highlight only a small number of the many series available for this state. Use the "more" links on this page or the "Find" tool to access EIA's additional state-level data.

+ EXPAND ALL

Energy Indicators

Prices

Petroleum	Colorado	U.S. Average	Period	find more
Domestic Crude Oil First Purchase	$ 65.07 /barrel	$ 67.07 /barrel	Mar-25	
Natural Gas	**Colorado**	**U.S. Average**	**Period**	**find more**
City Gate	$ 4.04 /thousand cu ft	$ 4.88 /thousand cu ft	Mar-25	find more
Residential	$ 10.29 /thousand cu ft	$ 14.57 /thousand cu ft	Mar-25	find more
Coal	**Colorado**	**U.S. Average**	**Period**	**find more**
Average Sales Price	$ 59.12 /short ton	$ 54.04 /short ton	2023	
Delivered to Electric Power Sector	$ 1.78 /million Btu	$ 2.44 /million Btu	Mar-25	
Electricity	**Colorado**	**U.S. Average**	**Period**	**find more**
Residential	15.14 cents/kWh	17.11 cents/kWh	Mar-25	find more
Commercial	11.35 cents/kWh	13.27 cents/kWh	Mar-25	find more
Industrial	8.61 cents/kWh	8.26 cents/kWh	Mar-25	find more

Note: The above highlighted price/cost for electricity and gas were used in analysis from U.S. Energy Information Administration Website

1.4 - Comparison of Proposed versus Baseline Design

Model Input parameter Construction		Proposed		Baseline	
		Description	Input U value / % (area weighted)	Description	Input U value / % (area weighted)
Exterior wall construction		PROPOSED - External Wall - Metal Panel - 1H; 1V; 2V (U=0.1064)	0.10	IECC - CZ5 - External Wall - Metal Framed (U=0.055)	0.05
Exterior wall construction		PROPOSED - External Wall - Cementitious Panel Nichiha - 1N; 2N (U=0.1289)	0.12	IECC - CZ5 - External Wall - Metal Framed (U=0.055)	0.05
Exterior wall construction	1" Rigid Insulation on Below Grade Wall →	PROPOSED - External Wall - Mass Wall - Ground Contact (U=0.166)	0.16	IECC - CZ5 - External Wall - Mass Wall - Below Grade (U=0.1190)	0.11
Roof construction	R-20 Roof Insulation →	PROPOSED - Unins Above Roof Deck (U=0.05)	0.05	IECC - CZ5 - Roof - Ins Above Deck (U=0.0320)	0.03
Floor/slab construction	No Perimeter Insulation →	PROPOSED - Unheated Slab on Grade (F=0.73 ; U=0.017)	0.02	IECC - CZ5 - Unheated Slab on Grade (F=0.54 ; U=0.012)	0.01
Floor/slab construction		PROPOSED - Exposed Floor (U=0.63)	0.63	IECC - CZ5 - Exposed Floor (U=0.074)	0.07
Window to gross wall ratio		Overal	6%	Overal	6%
Window to gross wall ratio		North / South / East / West	5 / 14 / 0 / 9%	North / South / East / West	5 / 14 / 0 / 9%
Fenestration U-Value		PROPOSED - Fixed Frame Window (U=0.36 ; SHGC=0.38)	0.36	IECC - CZ5 - Fixed Frame Window (U=0.36 ; SHGC=0.38)	0.36
Fenestration U-Value		PROPOSED - Sliding Door (U=0.63 ; SHGC=0.33)	0.63	IECC - CZ5 - Sliding Door (U=0.63 ; SHGC=0.33)	0.63
Fenestration SHGC		PROPOSED - Fixed Frame Window (U=0.36 ; SHGC=0.38)	0.38	IECC - CZ5 -Fixed Frame Window (U=0.36 ; SHGC=0.38)	0.38
Fenestration SHGC		PROPOSED - Sliding Door (U=0.63 ; SHGC=0.33)	0.33	IECC - CZ5 - Sliding Door (U=0.63 ; SHGC=0.33)	0.33

Table 1.4 - Proposed vs Baseline MEP

Model Input parameter MEP	Proposed		Baseline	
	Description	Input (area weighted)	Description	Input (area weighted)
Other Lighting Controls				
Interior lighting power density	Total power density ($Btu/h \cdot ft^2$)	0.75	Total power density ($Btu/h \cdot ft^2$)	1.48
Day lighting controls	Radiance simulation	Yes	Radiance simulation	Yes
Exterior lighting power	Total power consumption (kBtu/h)	1.39	Total power consumption (kBtu/h)	9.28
Process lighting	Total power density ($Btu/h \cdot ft^2$)	0.00	Total power density ($Btu/h \cdot ft^2$)	0.00
Receptacle equipment	Total power density ($Btu/h \cdot ft^2$)	0.19	Total power density ($Btu/h \cdot ft^2$)	0.19
Elevators/escalators	Total power consumption (kBtu/h)	9.2	Total power consumption (kBtu/h)	9.2
Refridgeration equipment	Total power density ($Btu/h \cdot ft^2$)	0.00	Total power density ($Btu/h \cdot ft^2$)	0.00
Cooking equipment	Total power density ($Btu/h \cdot ft^2$)	0.00	Total power density ($Btu/h \cdot ft^2$)	0.00
Data processing/centre equipment	Total power density ($Btu/h \cdot ft^2$)	0.00	Total power density ($Btu/h \cdot ft^2$)	0.00

Building Construction Template		Proposed Model		R value
PROPOSED - External Wall Metal Panel	External Wall 1H	Air Film - Exterior vertical surfaces		0.17
		Metal Panel		0
		6" Metal stud @ 24" O.C. w/ R19 batt insulation		8.55
		Air Film - Interior vertical surfaces		0.68
		U value	0.1064	9.4
PROPOSED - External Wall Metal Panel	External Wall 1V , 2V	Air Film - Exterior vertical surfaces		0.17
		Metal Panel		0
		6" Metal stud @ 24" O.C. w/ R19 batt insulation		8.55
		Air Film - Interior vertical surfaces		0.68
		U value	0.1064	9.4
PROPOSED - External Wall Cementitious Panel Nichiha	External Wall 1N , 2N	Air Film - Exterior vertical surfaces		0.17
		6" Metal stud @ 16" O.C. w/ R19 batt insulation		7.03
		1x layer - 5/8" DensGlass		0.56
		Nichiha Fiber Cement Panel		1.23
		Air Film - Interior vertical surfaces		0.68
		U value	0.1289	7.76
PROPOSED - External Wall Mass Wall - Ground Contact	External Wall 1H			
		1" Rigid Insulation		3.75
		Concrete		1.56
		Air Film - Interior vertical surfaces		0.68
		U value	0.1669	5.99
PROPOSED - Un Ins Above Roof Deck	ROOF	Air Film - Exterior horizontal surfaces = 0.17		0.17
		TPO Membrane		0.24
		3" POLYISO RIGID INSULATION ON METAL DECK		18.91
		Air Film - Interior horizontal surfaces = 0.61		0.68
		U value	0.05	20

Swinging doors for proposed and baseline both were assumed to have insulation of U-0.37 per IECC 2021.

IT IS THE RESPONSIBILTY OF THE ARCHITECT TO COMPLY WITH MANDATORY REQUIREMENTS OF IECC 2021

MANDATORY PROVISIONS

International Energy Conservation Code 2021 (IECC 2021) w/ Virginia Amendments - Commercial Provisions				Last Update:	6/17/2025
Project Title:					
Project Address:				Date:	6/17/2025
Project Manager:		Contact:			

The Mandatory Checklist is to support IECC 2021 C407 Total Building Performance Submittals.
The requirements of Sections C402.5, C403.1.1, C403.2, C403.3 through C403.3.2, C403.4 through C403.4.2.3, C403.5.5, C403.7 except C403.7.4.1, C403.8.1 through C403.8.5, C403.9, C403.11 except C403.11.3, C403.12, C403.13, C404, C405 except C405.3, and C408. The building energy cost shall be equal to or less than 80 percent of the standard reference design building.

ENVELOPE PROVISIONS C402.5 Air Leakage—Thermal Envelope (Mandatory)

Architect:		Contact:		License Number	

The thermal envelope of buildings shall comply with Sections C402.5.1 through C402.5.11

Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Comply?	Location in Documents
YES	C402.5.1.1	Air barrier construction and sealing	Identify location and provide diagram of continuous air barrier in plans and sections; Provide details for all joints, transitions in materials, penetrations in air barrier and note method of sealing (caulked, gasketed, or other approved method)	YES	Refer to architectural drawing set for details.
YES	C402.5.1.2, C402.5.1.3, C402.5.1.4, C402.5.1.5	Air Barrier Compliance (Materials and Assemblies)	Materials with an air permeability not greater than 0.004 cfm/ft2 (0.02 L/s • m2) under a pressure differential of 0.3 inch water gauge (75 Pa) when tested in accordance with ASTM E 2178 shall comply with this section. Materials in Items 1 through 16 shall be deemed to comply with this section, provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions. Assemblies of materials and components with an average air leakage not greater than 0.04 cfm/ft2 (0.2 L/s • m2) under a pressure differential of 0.3 inch of water gauge (w.g.)(75 Pa) when tested in accordance with ASTM E 2357, ASTM D805OR ASTM E283 shall comply with this section. Assemblies listed in Items 1 through 3 shall be deemed to comply, provided joints are sealed and the requirements of Section C402.5.1.1 are met.	YES	Refer to architectural drawing set for details.
NA	C402.5.2	Dwelling and Sleeping Unit Enclosure Testing	The building thermal envelope shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E1827 or an equivalent method approved by the code official. The measured air leakage shall not exceed 0.30 cfm/ft2 (1.5 L/s m2) of the testing unit enclosure area at a pressure differential of 0.2 inch water gauge (50 Pa). Where multiple dwelling units or sleeping units or other occupiable conditioned spaces are contained within one building thermal envelope, each unit shall be considered an individual testing unit, and the building air leakage shall be the weighted average of all testing unit results, weighted by each testing unit's enclosure area. Units shall be tested separately with an unguarded blower door test as follows: 1. Where buildings have fewer than eight testing units, each testing unit shall be tested. 2. For buildings with eight or more testing units, the greater of seven units or 20 percent of the testing units in the building shall be tested, including a top floor unit, a ground floor unit and a unit with the largest testing unit enclosure area. For each tested unit that exceeds the maximum air leakage rate, an additional two units shall be tested, including a mixture of testing unit types and locations.	NA	No dwelling or sleeping units on-site.
YES	C402.5.3	Building Thermal Envelope Testing	The building thermal envelope shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E3158 or ASTM E1827 or an equivalent method approved by the code official. The measured air leakage shall not exceed 0.40 cfm/ft2 (2.0 L/s × m2) of the building thermal envelope area at a pressure differential of 0.3 inch water gauge (75 Pa). Alternatively, portions of the building shall be tested and the measured air leakages shall be area weighted by the surface areas of the building envelope in each portion. The weighted average test results shall not exceed the whole building leakage limit. In the alternative approach, the following portions of the building shall be tested: 1. The entire envelope area of all stories that have any spaces directly under a roof. 2. The entire envelope area of all stories that have a building entrance, exposed floor, or loading dock, or are below grade. 3. Representative above-grade sections of the building totaling at least 25 percent of the wall area enclosing the remaining conditioned space.	YES	To be noted and discussed with mechanical subcontractor.
YES	C402.5.4	Air Leakage of Fenestration	The air leakage of fenestration assemblies shall meet the provisions of Table C402.5.4. Testing shall be in accordance with the applicable reference test standard in Table C402.5.4 by an accredited, independent testing laboratory and labeled by the manufacturer. Exceptions: 1. Field-fabricated fenestration assemblies that are sealed in accordance with Section C402.5.1. 2. Fenestration in buildings that comply with the testing alternative of Section C402.5 are not required to meet the air leakage requirements in Table C402.5.4.	YES	To be noted and discussed with mechanical subcontractor.
NA	C402.5.5	Rooms Containing Fuel-Burning Appliances	In Climate Zones 3 through 8, where open combustion air ducts provide combustion air to open combustion space conditioning fuel-burning appliances, the appliances and combustion air openings shall be located outside of the building thermal envelope or enclosed in a room isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table C402.1.3 or C402.1.4, where the walls, floors and ceilings shall meet the minimum of the below-grade wall R-value requirement. The door into the room shall be fully gasketed, and any water lines and ducts in the room insulated in accordance with Section C403. The combustion air duct shall be insulated, where it passes through conditioned space, to a minimum of R-8. Exceptions: 1. Fireplaces and stoves complying with Sections 901 through 905 of the International Mechanical Code, and Section 2111.14 of the International Building Code.	NA	No combustion air supplied or no fuel burning appliance present on-site.

YES	C402.5.6	Doors and Access Openings to Shafts, Chutes, Stairways and Elevator Lobbies	Indicate locations of all access openings and doors to shafts, chutes, stairways and elevators. Provide detail of required gasket, weather stripping or seals. Exceptions: 1.Door openings required to comply with Section 716 of the International Building Code. 2.Doors and door openings required to comply with UL 1784 by the International Building Code.	YES	Refer to architectural drawing set for details.
YES	C402.5.7	Air Intakes, Exhaust Openings, Stairways and Shafts	Stairway enclosures, elevator shaft vents and other outdoor air intakes and exhaust openings integral to the building envelope shall be provided with dampers in accordance with Section C403.7.7. Outdoor air intake and exhaust openings and stairway and shaft vents shall be provided with Class I motorized dampers. The dampers shall have an air leakage rate not greater than 4 cfm/ft2 (20.3 L/s • m2) of damper surface area at 1.0 inch water gauge (249 Pa) and shall be labeled by an approved agency when tested in accordance with AMCA 500D for such purpose. Outdoor air intake and exhaust dampers shall be installed with automatic controls configured to close when the systems or spaces served are not in use or during unoccupied period warm-up and setback operation, unless the systems served require outdoor or exhaust air in accordance with the International Mechanical Code or the dampers are opened to provide intentional economizer cooling. Stairway and shaft vent dampers shall be installed with automatic controls configured to open upon the activation of any fire alarm initiating device of the building's fire alarm system or the interruption of power to the damper.	YES	M0.1, M0.5, M3.1, M4.1, M6.1
NA	C402.5.8	Loading Dock Weatherseals	Cargo doors and loading dock doors shall be equipped with weatherseals to restrict infiltration when vehicles are parked in the doorway.	NA	No cargo or dock doors present.
YES	C402.5.9	Vestibules	Building entrances shall be protected with an enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. The installation of one or more revolving doors in the building entrance shall not eliminate the requirement that a vestibule be provided on any doors adjacent to revolving doors. Exceptions: Vestibules are not required for the following: 1. Buildings in Climate Zones 0 though 2. 2. Doors not intended to be used by the public, such as doors to mechanical or electrical equipment rooms, or intended solely for employee use. 3. Doors opening directly from a sleeping unit or dwelling unit. 4. Doors that open directly from a space less than 3,000 square feet (298 m2) in area. 5. Revolving doors. 6. Doors used primarily to facilitate vehicular movement or material handling and adjacent personnel doors. 7. Doors that have an air curtain with a velocity of not less than 6.56 feet per second (2 m/s) at the floor that have been tested in accordance with ANSI/AMCA 220 and installed in accordance with the manufacturer's instructions. Manual or automatic controls shall be provided that will operate the air curtain with the opening and closing of the door. Air curtains and their controls shall comply with Section C408.2.3.	YES	A2.1.0, A2.2.1
NA	C402.5.10	Recessed Lighting	Recessed luminaires installed in the building thermal envelope shall be all of the following: 1. IC-rated. 2. Labeled as having an air leakage rate of not more 2.0 cfm (0.944 L/s) when tested in accordance with ASTM E 283 at a 1.57 psf (75 Pa) pressure differential. 3. Sealed with a gasket or caulk between the housing and interior wall or ceiling covering.	NA	No recessed luminaires installed in the building envelope.
YES	C402.5.11	Operable Openings Interlocking	Where occupancies utilize operable openings to the outdoors that are larger than 40 square feet (3.7 m2) in area, such openings shall be interlocked with the heating and cooling system so as to raise the cooling setpoint to 90°F (32°C) and lower the heating setpoint to 55°F (13°C) whenever the operable opening is open. The change in heating and cooling setpoints shall occur within 10 minutes of opening the operable opening. Exceptions: 1. Separately zoned areas associated with the preparation of food that contain appliances that contribute to the HVAC loads of a restaurant or similar type of occupancy. 2. Warehouses that utilize overhead doors for the function of the occupancy, where approved by the code official. 3. The first entrance doors where located in the exterior wall and are part of a vestibule system.	YES	Refer to mechanical and electrical drawing sets for details.
If "no" is selected for any question, provide explanation:					

IT IS THE RESPONSIBILTY OF THE MECHANICAL ENGINEER TO COMPLY WITH MANDATORY REQUIREMENTS OF IECC 2021

MECHANICAL PROVISIONS Applicable to All Mechanical Systems (Mandatory)

Mechanical systems and equipment serving the building heating, cooling or ventilating needs shall comply with C403.1.1, C403.1.2, C403.2, C403.3, C403.4 through C403.4.2.3, C403.5.5, C403.7 except C403.7.4.1, C403.8 except C403.8.6, C403.9, C403.11 except C403.11.3, C403.12, C403.13, and C408.

Project Title:				**Date:**	6/12/2025
Project Address:					
Mechanical Engineer:		**Contact:**		**License Number:**	
Climate Zone:	5B	**Summer Design OA DB:**	89.3F	**Winter Design Outside Temp:**	-1.5F
		Summer Design OA WB:	56.2F		

General Mandatory Requirements

Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Comply?	Location in Documents
YES	C403.1.1	Heating and Cooling Loads	Design loads associated with heating, ventilating and air conditioning of the building shall be determined in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure using the design parameters specified in Chapter 3.	Yes	Mechanical Engineer to provide load calculations if requested.
NA	C403.1.2	Data Centers	Data Centers shall comply with the requirements of C403.1.2	NA	Facility classified as a self-storage building.
NA	C403.2.1	Zone Isolation	Zone Isolation control complies with the requirements of C403.2.1	NA	No HVAC system serves multiple floors and all zones assumed to be occupied simultaneously.
YES	C403.2.2	Ventilation	Ventilation, either natural or mechanical, meets the requirement of Chapter 4 of the International Mechanical Code	YES	M4.1
NA	C403.2.3	Fault Detection and Diagnostics	New buildings with an HVAC system serving a gross conditioned floor area of 100,000 square feet (9290 m2) or larger shall include a fault detection and diagnostics (FDD) system to monitor the HVAC system's performance and automatically identify faults.	NA	No single HVAC system serves 100,000 square feet or more at the facility.
YES	C403.3.1	Equipment Sizing	Heating and cooling equipment installed in mechanical systems shall be sized in accordance with Section C403.3.1 and shall be not less efficient in the use of energy than as specified in Section C403.3.2.	YES	Mechanical Engineer to provide equipment sizing/selection details if requested.
YES	C403.3.2	HVAC Equipment Performance Requirements	All heating and cooling equipment meet minimum efficiencies as required in Tables C403.3.2(1) through C403.3.2(16), C403.3.2.1, and C403.3.2.2 and AHRI 400	YES	M4.1
YES	C403.4.1	Thermostatic Controls	Zone and equipment control comply with the requirements of Section C403.4.1	YES	M0.2, M0.3, M0.4, M0.5, M4.1, M6.1
YES	C403.4.2	Off-Hour Controls	Zone control complies with the requirements of Section C403.4.2	YES	M0.2, M0.3, M0.4, M0.5, M4.1, M6.1
NA	C403.5.5	Economizers	Economizer fault detection and diagnostics.	NA	No economizer present as exception taken in terms of equipment sizing.
NA	C403.7.1	Demand Controlled Ventilation	Demand Controlled Ventilation meets the requirements of C403.7.1	NA	Average occupant load less than 15 people per 1000 ft2.
NA	C403.7.2	Enclosed Parking Garage Ventilation Controls	Enclosed parking garage ventilation systems meet the requirements of C403.7.2	NA	No parking garage on-site.
NA	C403.7.3	Ventilation Air Heating Control	Units that provide heated ventilation air in conjunction with another heating and cooling system meet the requirements of C403.7.3	NA	No HVAC systems with ventilation purpose serve multiple zones or operating in conjunction with heating and cooling systems.
NA	C403.7.4	Energy Recovery Ventilation Systems	Energy Recovery Ventilation Systems meet the requirements of C403.7.4	NA	Energy recovery not needed per Table C403.7.4(2).
NA	C403.7.6	Automatic Control of HVAC Systems Serving Guestrooms	Buildings containing more than 50 guestrooms provide each with controls complying with Sections C403.7.6.1 and C403.7.6.2	NA	No guestrooms on-site.
YES	C403.7.7	Shutoff Dampers	Outdoor air intake and exhaust openings and stairway and shaft vents comply with the requirements of C403.7.7	YES	M0.1, M0.5, M3.1, M4.1, M6.1
YES	C403.8	Fans and Fan Controls	Fans in HVAC systems shall comply with the provisions of Sections C403.8.1 through C403.8.4	YES	M0.5, M4.1, M6.1
NA	C403.9	Large-Diameter Ceiling Fans	Where provided, large-diameter ceiling fans shall be tested and labeled in accordance with AMCA 230.	NA	No large-diameter ceiling fans on-site.
NA	C403.11	Refrigeration Equipment Performance	Refrigeration Equipment Performance meets the requirements of Sections C403.11.1 through C403.11.2	NA	No coolers or freezers on-site.
YES	C403.12	Construction of HVAC System Elements	Ducts, plenum, and pipe systems meet the requirements of Sections C403.12.1 through C403.12.3.1	YES	M4.1, M5.1, M5.2, M6.1
NA	C403.13	Heating Outside a Building	Heating Outside a Building meets the requirements of C403.13.1 through C403.13.3	NA	No heating outside the building.
YES	C408	Maintenance Information and System Commissioning	Mechanical, Electrical, and Plumbing equipment to meet the requirements of C408.	YES	To be discussed and satisfied by Mechanical, Electrical, and Plumbing contractors.

Mandatory Equipment Efficiency Worksheet (Section C403.3.2)

SYSTEM TAG	EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	REQUIRED MINIMUM EFFICIENCY	RATED MINIMUM EFFICIENCY
AHU-1 to AHU-6	Air Cooled (Cooling Mode)	<65,000 Btu/hr	Split System, 3 Phase	13.4 SEER	13.5 SEER
AHU-7	Air Cooled (Cooling Mode)	<65,000 Btu/hr	Split System, 3 Phase	13.4 SEER	14 SEER
AHU-8 to AHU-13	Air Cooled (Cooling Mode)	<65,000 Btu/hr	Split System, 3 Phase	13.4 SEER	13.5 SEER
AHU-14 to AHU-19	Air Cooled (Cooling Mode)	<65,000 Btu/hr	Split System, 3 Phase	13.4 SEER	13.5 SEER
AHU-1 to AHU-6	Air Cooled (Heating Mode)	<225,000 Btu/hr	Maximum Capacity	81% Et	93% Et
AHU-7	Air Cooled (Heating Mode)	<225,000 Btu/hr	Maximum Capacity	81% Et	93% Et
AHU-8 to AHU-13	Air Cooled (Heating Mode)	<225,000 Btu/hr	Maximum Capacity	81% Et	93% Et
AHU-14 to AHU-19	Air Cooled (Heating Mode)	<225,000 Btu/hr	Maximum Capacity	81% Et	93% Et

IT IS THE RESPONSIBILTY OF THE ELECTRICAL ENGINEER TO COMPLY WITH MANDATORY REQUIREMENTS OF IECC 2021

ELECTRICAL POWER AND LIGHTING SYSTEMS PROVISIONS C405

Electrical power and lighting systems shall comply with Sections C405 except C405.3

Project Title:				**Date:**	6/12/2025
Project Address:					
Electrical Engineer:		**Contact:**		**License Number:**	

General Mandatory Requirements

Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Comply?	Location in Documents
YES	C405.2	Lighting Controls	All applicable lighting controls meet the requirements of C405.2	YES	E0.1, E1.1, E2.5, E3.1, E3.2, E3.3, E4.3, E4.4
YES	C405.2.1	Occupant Sensor Controls	Occupant sensor controls shall be installed to control lights in applicable spaces as listed in C405.2.1 and meet the requirement of C405.2.1.1, C405.2.1.2, C405.2.1.3 and C405.2.1.4	YES	See lighting controls details as mentioned above for C405.2
YES	C405.2.2	Time-Switch Controls	Time-Switch Controls comply with the requirements of Section C405.2.2.1	YES	See lighting controls details as mentioned above for C405.2
YES	C405.2.3	Light-Reduction Controls	Light-Reduction Controls comply with the requirements of C405.2.3.1	YES	See lighting controls details as mentioned above for C405.2
YES	C405.2.4	Daylight-responsive controls	Daylight-Responsive Controls comply with the requirements of C405.2.4	YES	See lighting controls details as mentioned above for C405.2
NA	C405.2.5	Specific Application Controls	Specific Application Controls comply with the requirements of C405.2.5	NA	
YES	C405.2.6	Manual Controls	Where manual controls are required, they meet the requirements of C405.2.6	YES	See lighting controls details as mentioned above for C405.2
YES	C405.2.7	Exterior Lighting Controls	Exterior Lighting Controls meet the requirements of C405.2.7	YES	See lighting controls details as mentioned above for C405.2
NA	C405.2.8	Parking Garage Lighting Control	Parking Garage Lighting shall comply with the requirements of Section C405.2.9	NA	No Parking Garage on-site.
NA	C405.4	Lighting for Plant Growth and Maintenance	Luminaires for plant growth and maintenance shall comply with the requirements of Section C405.4	NA	
YES	C405.5	Exterior Lighting Power Requirements	Exterior Building Lighting shall comply with the requirements of C405.5	YES	See site plan and exterior lighting on latest electrical drawing set for details including E1.1, E4.3, and E4.4.
NA	C405.6	Dwelling Electrical Meter	Each dwelling unit located in a Group R-2 building shall have a separate electrical meter.	NA	The project falls under non-residential category.
YES	C405.7	Electrical Transformers	Electrical transformers meet the requirements of C405.7	YES	E0.1, E1.1, E4.1, E4.2, E4.3, E4.4
NA	C405.8	Electric Motors	Electric motors meet the requirements of C405.8	NA	Built-in motors for equipment (refer to manufacturer details for efficiency)
YES	C405.9	Vertical and Horizontal Transportation Systems and Equipment	Vertical and horizontal transportation systems and equipment meet the requirements of C405.9	YES	E2.5, E4.1, E4.2, E4.3
YES	C405.10	Voltage Drop	The total voltage drop across the combination of feeders and branch circuits shall not exceed 5 percent.	YES	E0.1
YES	C405.11	Automatic Receptacle Control	Automatic Receptacle Controls where applicable shall comply with the requirements of C405.11	YES	See lighting controls details as mentioned above for C405.2
YES	C405.12	Energy Monitoring	Building to measure, monitor, record, and report energy consumption data in compliance with C405.12.1 through C405.12.5	YES	Onwer/Client to make sure the condition gets satisfied once the building starts operations.
YES	C408	Maintenance Information and System Commissioning	Mechanical, Electrical, and Plumbing equipment to meet the requirements of C408.	YES	To be discussed and satisfied by Mechanical, Electrical, and Plumbing contractors.

Interior Lighting Power Allowance (Building Area Method - TABLE C405.3.2(1)

Building ID	Building Area Type (Table C405.4.2(1))	Lighting Power Density (W/ft² or W/m²)	Building Area (ft² or m²)	Lighting Power Allowance (W)
	Warehouse	0.45	112,554	50,649
				-
				-
				-
				-
				-
				-
				-
Total			112554	50,649

Interior Connected Lighting Power

ID	Luminaire Description (including number of lamps per fixture, watts per lamp, type of ballast, type of fixture)	Number of Luminaires	Watts/ Luminaire	Total Watts
A	48" LED STRIP W/ LENS	400	41	16400
AEM	48" LED STRIP W/ LENS & EMERGENCY DRIVER	94	41	3854
B	STORAGE UNIT DROPDOWN LIGHTS	305	16	4880
D	ELEVATOR PIT LIGHTS	4	42	168
F	96" LED STRIP W/ LENS	1	82	82
FEM	96" LED STRIP W/ LENS	1	82	82
WPA	LED WALL PACK	12	34	408
X	EXIT SIGNS	35	1	35
			Total	25909

Exterior Lighting Zone 3 — Base Site Allowance: 500

Tradable Maximum Allowed Lighting Wattage

Tradable Surfaces	Surface Description	Area (ft²), perimeter (lf) or # of items	Allowed Watts per ft² or per lf	Allowed Watts x ft² (or x lf)
Parking Area		37009	0.06	2221
			Total Allowed Tradable + Site Allowance Watts (Bldg 1):	2721

Tradable Proposed Lighting Wattage

Tradable Surface	Fixture Description	Number of Fixtures	Watts per Fixture	Watts Proposed
	WPA	12	34	408
				0
				0
				0
			Total Proposed Tradable Watts (Bldg 1):	408
			Comply?	YES

IT IS THE RESPONSIBILTY OF THE PLUMBING ENGINEER TO COMPLY WITH MANDATORY REQUIREMENTS OF IECC 2021

SERVICE WATER HEATING PROVISIONS C404

Service Water Heating shall comply with Sections C404

Project Title:				**Date:**	6/12/2025
Project Address:					
Engineer:		**Contact:**		**License Number:**	

General Mandatory Requirements

Applicability (yes,no,na)	Code Section	Component	Compliance information required in permit documents	Comply?	Location in Documents
YES	C404.2	Service Water-Heating Equipment Performance Efficiency	Equipment efficiencies meet or exceed the requirements of TABLE C404.2	YES	P4.1
NA	C404.2.1	High Input-Rated Service Water-Heating Systems	Gas-fired water-heating equipment installed in new buildings shall be in compliance with this section.	NA	No gas fired heating equipment present.
YES	C404.3	Heat Traps	Water-heating equipment not supplied with integral heat traps and serving noncirculating systems shall be provided with heat traps on the supply and discharge piping associated with the equipment.	YES	Refer to plumbing drawings for details.
YES	C404.4	Insulation of Piping	Insulation of Piping meets the requirements of C404.4 and C403.12.3	YES	P4.2, P5.1