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Overview

- Ventilation Design Basics
- Ventilation Changes – 2021 Interim Mechanical Code Amendments
- Ventilation Requirements for Construction Documents
- Summary and Contact Info



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Ventilating Requirements

**Table 18-28-403.3
Ventilating Requirements***

* S = Mechanical Supply; E = Mechanical Exhaust From Room; RO = Relief Opening; NR = No Requirement; NV = Natural Ventilation; Vent opening = percentage of floor area.

Room Purpose	Vent Opening Percent of Floor Area		Mechanical Ventil. CFM/SF		Remarks
	Less Than	Not Less Than	S, Supply	E, Room Exhaust	
Correctional					
Cell rooms	4	4	0 1.2	0 1.2	
Dry Cleaners/Laundries					
Dry Cleaning	4	4	0 1.5	4 4	See 18-28-403.3.3.
Laundries (Residential for less than 30 units)	4	4	0 0	0 1	
Laundries serving general public			1.5	1.5	See 18-28-403.3.3.
Linen Rooms			0.5	0.5	
Education					
Music Rooms		4	0	0	

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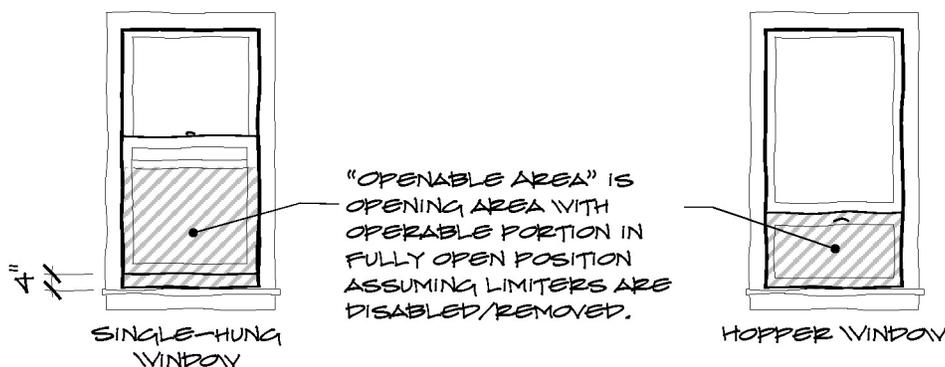
Residential Living, Dining, and Sleeping Rooms

- Residential living, dining and sleeping rooms (70 ft² or larger) require natural ventilation
- Courts and yards for natural ventilation must be dimensioned on drawings
- Borrowed ventilation designs must be detailed and dimensioned to show code compliance



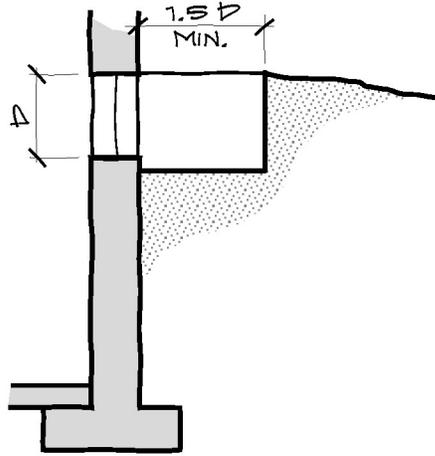
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Natural Ventilation



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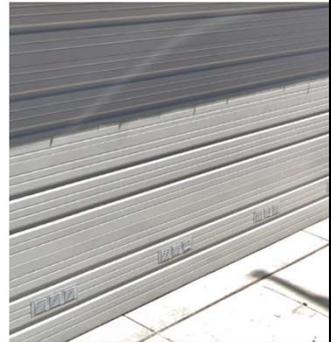
Natural Ventilation



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Relief Openings (Private Garages)

- Garage relief openings should be shown and dimensioned on drawings as 1 square foot of free area per car, and not just noted as such (mostly applies to residential).



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Clothes Dryer Venting

- Clothes dryer exhaust vents must be a non-flammable material
- Dryer vents must terminate to the outdoors
- Concealed dryer vents must be rigid metal
- Up to 8' flexible transition duct allowed (not concealed in construction)



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Furnace Installation

- Warm air furnaces should be installed such that a 90-degree angle between return air and combustion air is provided.



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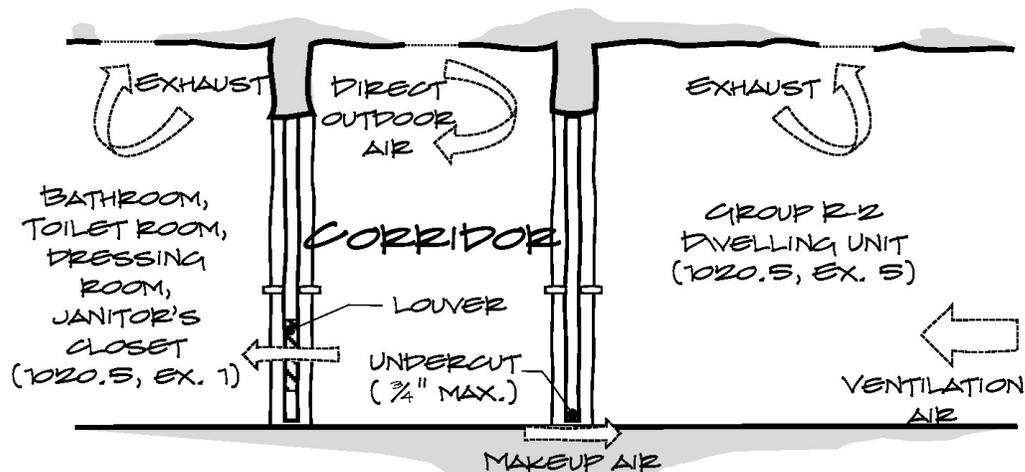
Direct Vent Appliances

- Appliances can be direct vented with a sealed combustion chamber.



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Residential Corridors for Makeup Air



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Outside Air Intake

- Outside air intake louvers for ventilation that terminates in alleys or driveways must be protected.
- Outside air intake louvers should be sized for 100% of code supply.



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Plenums

- Plenums for supply or return should normally be constructed from sheet metal at built-out locations other than under the floor or ceilings.
- Fan housings should be constructed from sheet metal. Alternate materials are allowed for return plenums only.
- Access to fans and motors is required for servicing and maintenance (including permanently lubricated motors with sealed bearings).



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Separation of Intake and Exhaust

- Air intake openings (including required natural ventilation openings) must be at least 15 feet from roof top unit exhaust, exhaust fans, kitchen exhaust, plumbing vents, chimneys or similar exhaust openings.
- This does not apply to intake and exhaust that is part of the same packaged rooftop HVAC unit—the separation designed by the manufacturer is sufficient.



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Economizers

- Where economizer exhaust is provided for ventilation, verification should be provided that exhaust will be available at times other than economizer or free cooling mode.

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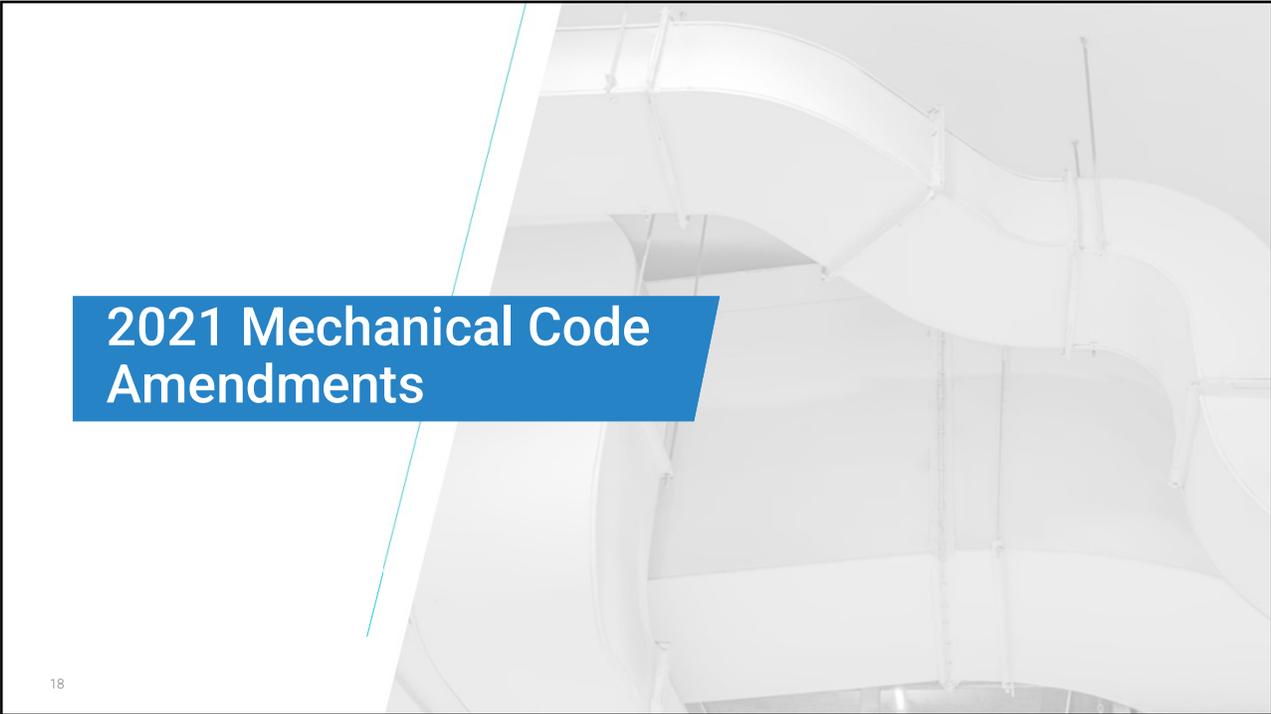
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2021 Mechanical Code Amendments

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Standardize method of accepting listed and labeled HVAC appliances

Listed and labeled heating, cooling, and ventilation appliances, which have been manufactured and tested to standards listed in the Chicago Mechanical Code, will no longer be subject to requests for in-field modifications that might void product warranties or result in unsafe conditions.



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Adopt standards for the use of energy-efficient (electric) condensing domestic clothes dryers.

Adopts consistent standards for the safe installation of condensing clothes dryers, which do not require an exterior vent.



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18-28-504.1 Installation.

Clothes dryers shall be exhausted in accordance with the manufacturer's instructions. Dryer exhaust systems shall convey the moisture and any products of combustion to the outside of the building.

Exception: This section shall not apply to listed and labeled condensing (ductless) electric clothes drying machines plumbed to drains in accordance with the Chicago Plumbing Code.

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Update requirements for exhaust for domestic cooking appliances.

Recognizes recirculating hoods within dwelling units, consistent with national standards.

Exterior exhaust is still required for commercial-grade appliances.



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New standards for exhaust fans, pollution control units (PCUs), and ventless appliances for commercial kitchens

Criteria for exhaust fans, pollution control units (PCUs), and ventless appliances for use in commercial kitchens.

This will reduce the need for specialized approvals for restaurant exhaust systems.



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18-28-507.2 Where required.

A Type I or Type II hood shall be installed at or above all commercial food heat-processing appliances. A Type II hood shall be installed above commercial dishwashing machines.

Exceptions:

1. Food heat-processing appliances installed within a dwelling unit.
2. Under-counter-type commercial dishwashing machines.
3. For **electric cooking appliances** where an approved testing agency provides documentation that the appliance effluent contains **5 mg/m³ or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m³/s) in accordance with UL 710B.**

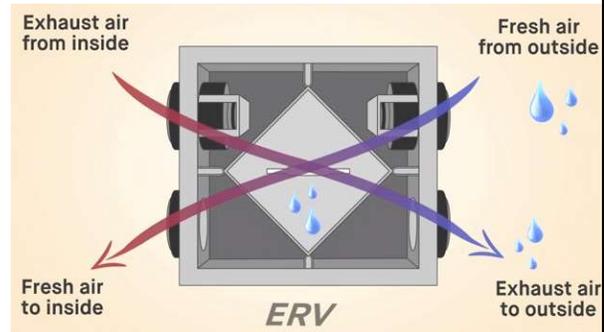
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Recognize energy recovery ventilation (ERV) systems.

Ventilation is required for indoor air quality in newer, better-insulated buildings.

Captures energy contained in exhaust air to pre-condition incoming ventilation air, reducing energy usage.

Facilitates compliance with 2019 Chicago Energy Conservation Code.



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18-28-514.3 Access.

A means of access shall be provided to the heat exchanger and other components of the system as required for service, maintenance, repair or replacement.

18-28-514.4 Recirculated air.

Air conveyed within energy recovery ventilation systems shall not be considered as recirculated air where the energy recovery ventilation system is constructed to limit cross-leakage between air streams to less than 10 percent of the total airflow design capacity.

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Heating Data

HEATING DATA WORKSHEET
(Based on Ordinance Requirements)

Index (or) Room No.	Use of Space	Basis of Heat Loss Calculation	Actual	Ordinance Requirements	Actual
			B.T.U.H. Heat Loss	Supply C.F.M. At 175° F	Supply C.F.M. At 175° F
TOTAL			_____	_____	_____

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Equipment Schedule

EQUIPMENT SCHEDULE

Furnace Manufacture _____ Location _____
 Input BTU's _____ Output BTU's _____ CFM's _____
 Flu Size Type _____ Combustion Air _____

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HVAC Notes

- All ductwork to be galvanized sheet metal.
- Provide locking type dampers to be installed in all supply branches.
- Floor registers shall not exceed 9" from the wall.
- Interior spaces shall be provided with space heating system capable of maintaining an indoor temperature of not less than 68°F at a point 3 feet above the floor when the outdoor temperature is -7°F.
- Provide C.O. detectors.
- Noise level not to exceed 55 dB



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Summary



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Summary

- Review the ventilation requirements for each project.
- Provide required ventilation, heat, HVAC and equipment data with construction documents.
- Follow the guidelines discussed for important issues where they apply.

**Feel free to call with questions
at 312-744-7563**



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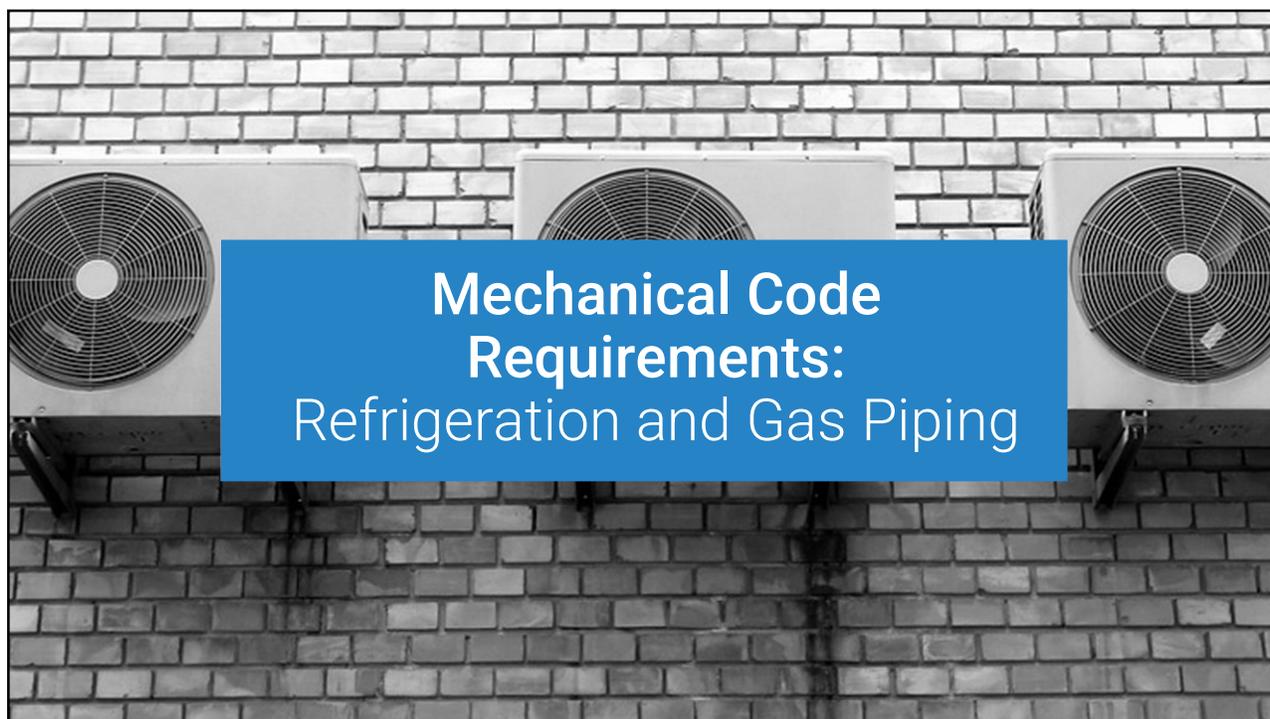
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Overview

- Refrigeration and natural gas design basics
- 2021 interim Mechanical Code amendments
- What refrigeration and natural gas piping information is required in construction documents?
- Summary and Contact Information

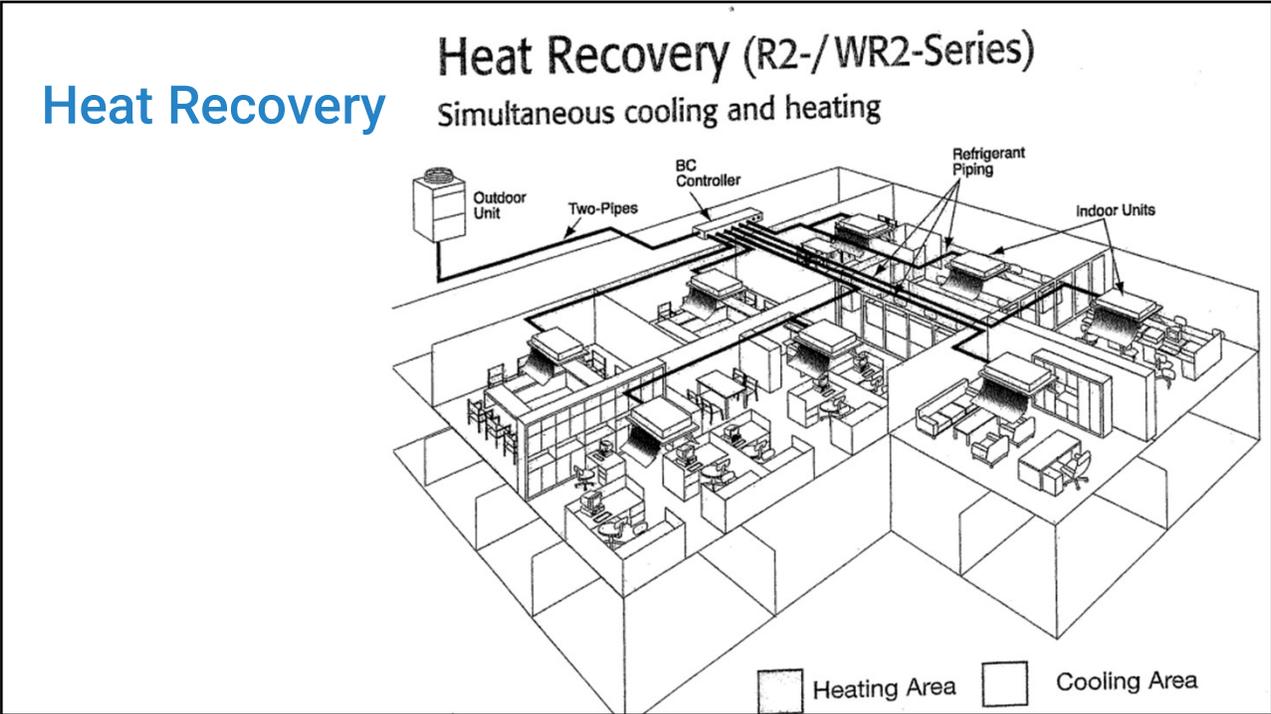


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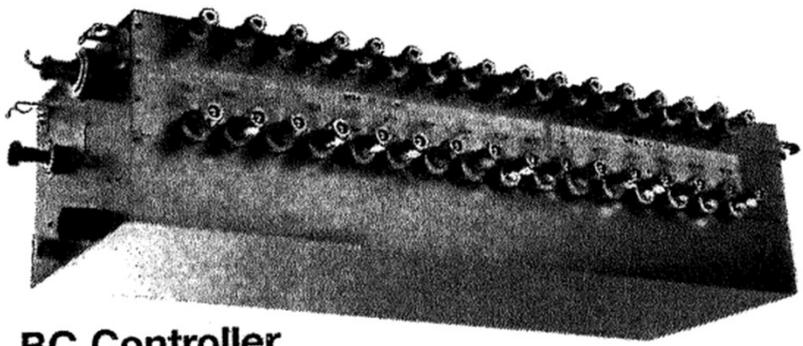
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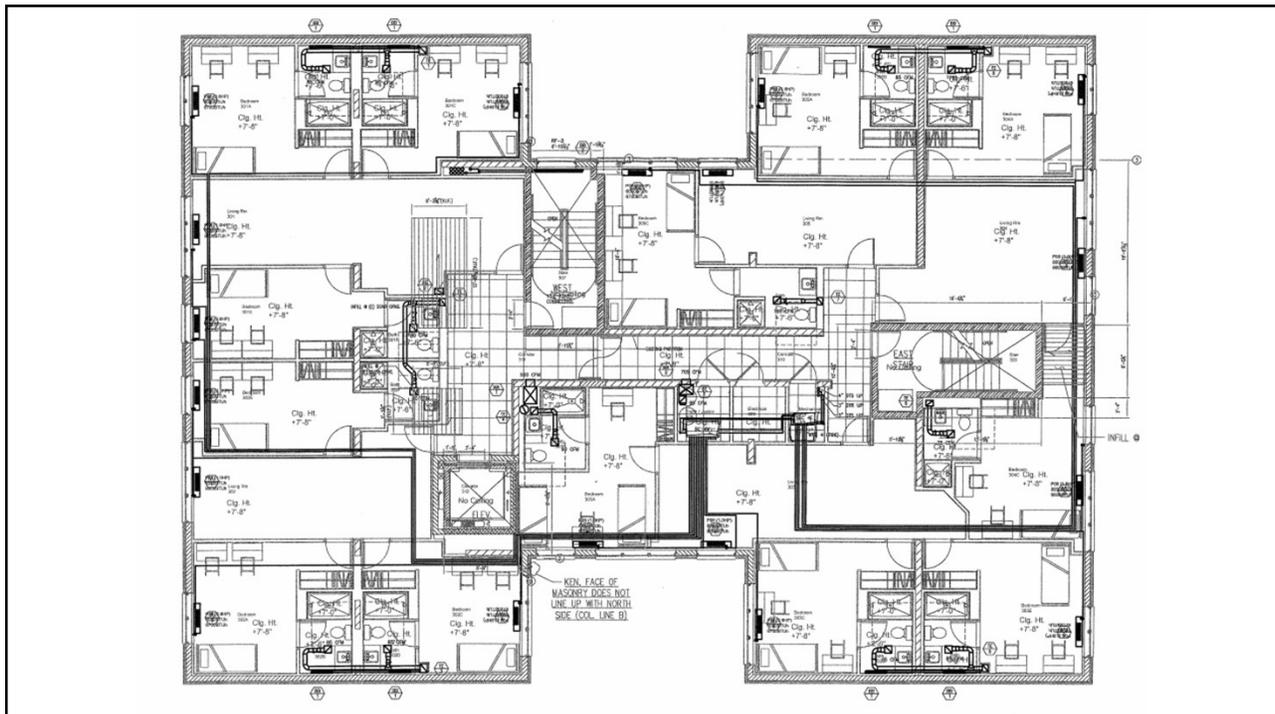
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BC Controller



BC Controller

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Gas Distribution Piping Inside Buildings

- Must comply with 2016 memorandum
- Only rigid schedule 40 black steel gas pipe may be installed in concealed locations
- Fittings larger than 2" must be welded
- Use of flexible appliance connectors (FACs) limited to 6 feet in length, cannot be concealed in walls
- Every appliance connection must have an individual shut-off valve w/in 6 feet



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Updated method of accepting listed and labeled HVAC appliances

- Accepts listed and labeled appliances
- Consistent with 2018/2021 *International Mechanical Code*
- Reduces requests for in-field modifications that might void product warranties or result in unsafe conditions.



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Updated refrigerant requirements

- All refrigerants recognized by the 2021 *International Mechanical Code* have been added to the Mechanical Code
- Pipe joining methods based on refrigerant category
- Outdated references to refrigerants banned by federal law have been removed



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18-28-1107.4.4 Copper tube joints.

Copper tubing used in refrigerating systems containing Group A2, A3, B1, B2 or B3 refrigerants shall be brazed. Soldered joints and mechanical joints shall not be used in such refrigerating systems.

- Group A1 refrigerants (lower toxicity, low/no flammability) may now be used with soldered or mechanical joints

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Required Information

- Layout of all equipment
- Refrigerant piping
- Natural gas piping
- Condenser water piping (if used)

A photograph showing a person's hands reviewing architectural blueprints on a desk. The person is using a pen to point at a specific area on the drawing. A calculator and a laptop are also visible on the desk. The blueprints are spread out, and the person is looking intently at the work.

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Refrigeration Schedule

Refrigeration

These Refrigeration Notes must appear on Mechanical Page:

- Install pressure relief valve on high pressure side of system, upstream of any intervening valves
- Remove expansion valves, devices, and connections from air stream
- Refrigeration piping to type "K" copper or Type "ACR" copper
- All connection and devices to be brazed

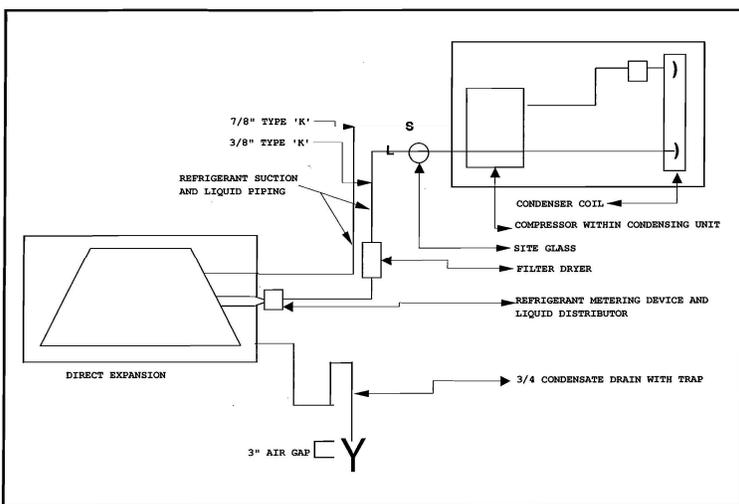
Sample Schedule

REFRIGERATION SCHEDULE

Tag # Unit #	No. Units	Total # of Comp. each	Comp /Ton	Comp/HP	Refrigerant	Wt. Ref	Remote	Self- Contained	Location	Air Cooled	Water Cooled

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Refrigerant Piping Diagram



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Required Notes / Details

- Install pressure relief valve on high pressure side of system, upstream of any intervening valves
- Remove expansion valves, devices and connections from air stream
- Refrigeration piping top be type "K" copper or type ACR
- All connections and devices for Group A2, A3, B1, B2 or B3 refrigerants to be brazed



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Mechanical Express Permits



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Eligibility Summary

Additional terms, conditions, and limitations may apply.

Eligible

- ✓ Replacing existing mechanical (heating, ventilation, or air conditioning or "HVAC") equipment with equipment performing the same function (OK to change energy source)
- ✓ Installing a new heat pump or air conditioning system serving a single residential or nonresidential unit, based on appropriate HVAC load calculations

With a structural evaluation letter prepared by an Illinois-licensed architect or structural engineer:

- ✓ Installing or replacing rooftop equipment
- ✓ Installing or replacing equipment attached to a truss

With specifications prepared by an Illinois-licensed architect, structural engineer, or professional engineer:

- ✓ Installing new refrigeration equipment serving more than one residential or nonresidential unit
- ✓ Installing new refrigeration equipment for food cooling

Not Eligible

- ✗ Installing a new type of mechanical equipment not specifically identified in the "eligible" section (for example, installing an exhaust hood where one did not exist)
- ✗ Reconfiguring existing commercial kitchen exhaust ductwork
- ✗ Performing mechanical (HVAC) work in a hazardous (Group H) or institutional (Group I) occupancy
- ✗ Installing new refrigeration equipment in an educational (Group E), factory/industrial (Group F), or storage (Group S) occupancy
- ✗ Creating a new or expanded penetration or opening in a wall or floor that separates a residential unit or non-residential unit from another unit, a shared corridor, or a stairway
- ✗ Installing any piping, ductwork, or equipment in an enclosed exit stairway or other type of exit
- ✗ Installing equipment that does not meet the minimum energy efficiency requirements of the Chicago Energy Transformation Code

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Energy and Water Efficiency Certification
EXPRESS PERMIT PROGRAM

Express Permit Program Application Details
Begin an online Express Permit Program permit application at <http://api.cityofchicago.org> and obtain an application number before completing this form.

Project Address: # Permit Application Number:

*** Exterior Door, Window, or Skylight Replacement—Energy Efficiency**
The Chicago Energy Transformation Code establishes energy efficiency criteria for replacement exterior doors, windows, and skylights.

Residential Buildings Up to 4 Stories		Skylights		SHGC - Solar Heat Gain Coefficient	
U-Factor	SHGC	U-Factor	SHGC	U-Factor	SHGC
0.30 max.	0.40 max.	0.30 max.	0.40 min.	0.30 max.	0.40 min.

All Other Buildings

Main Entrance Doors		Operable Windows and Doors		Fixed Windows		Skylights	
U-Factor	SHGC	U-Factor	SHGC	U-Factor	SHGC	U-Factor	SHGC
0.77 max.	0.51 min.	0.45 max.	0.51 min.	0.38 max.	0.38 min.	0.50 max.	0.40 min.

Work under this permit will comply Not applicable

*** Mechanical (HVAC) Equipment—Energy Efficiency**
The Chicago Energy Transformation Code establishes energy efficiency criteria for new and replacement mechanical equipment.
In residential buildings up to 4 stories, new heating and cooling equipment must be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J. Replacement mechanical equipment must meet the energy efficiency requirements in Section R603 of the Chicago Energy Transformation Code. New mechanical system piping capable of carrying fluids greater than 105°F or less than 50°F must be insulated to an R-value of not less than R-3.
In all other buildings, new heating and cooling equipment and piping insulation must meet the energy efficiency requirements in Section C403 of the Chicago Energy Transformation Code.
 Work under this permit will comply Not applicable

*** Plumbing Work—Energy Efficiency and Water Efficiency**
The Chicago Energy Transformation Code establishes water efficiency criteria for certain replacement plumbing fixtures.
New and replacement water closets (toilets), urinals, shower heads, weather-based irrigation controllers, spray sprinkler bodies, commercial pre-mix spray valves, and private residential lavatory faucets must meet the specifications required for the US EPA's WaterSense program label and shall bear such label or be individually approved by the Building Commissioner.
 Work under this permit will comply Not applicable

*** Certification**
I certify that to the best of my knowledge and belief, the answers provided above are accurate and complete.

Printed Name: Signature: Date:

Instructions
This form is required for certain types of work when applying for a building permit using the Express Permit Program, including exterior window or door replacement, mechanical (HVAC) work, plumbing work, and some nonstructural interior alterations.
This form may be completed by either a representative of the primary applicant (property owner or tenant) or a representative of the contractor responsible for the work.
Fields and sections marked with a red star (*) are required. Where a section is applicable, all fields in that section are required.
If you are applying for mechanical (HVAC) work through the Express Permit Program, it is strongly encouraged that you also complete the Mechanical Equipment Worksheet on page 2.

Fillable PDF available at www.chicago.gov/permits. Form 408EX rev. 11/13/2023

Page 2

Mechanical Equipment Worksheet

Heating Equipment
When applying to replace heating equipment, providing this information will assist with the review of your application.

Make and Model of Unit(s): Quantity:

Calculated Heat Loss (BTU/hour): Rated Output (BTU):

Location of Unit(s):

Area(s) the Unit(s) Serve(s)
Examples: daycare center, grocery store, medical office, apartment 2A

Refrigeration Equipment
When applying to replace air conditioning/refrigeration equipment, providing this information will assist with the review of your application.

Make and Model of Unit(s): Quantity:

Type of Compressor(s): Quantity:

Unit Tons or Unit HP: Refrigerant Type: Refrigerant Weight Per Circuit (Pounds):

Choose one: Air Cooled Water Cooled Remote Self Contained

Location of Unit(s):

Area(s) the Unit(s) Serve(s)
Examples: daycare center, grocery store, medical office, apartment 2A

Fillable PDF available at www.chicago.gov/permits. Form 408EX rev. 11/13/2023

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Architect or Structural Engineer's Letter

Date:

Application #:

Project address:

Letter to be on firm's letterhead, sealed and signed by person sealing letter.

Letter must state that the area under consideration, has been visually inspected by an Architect or Structural Engineer licensed by the state of Illinois and that he or she has calculated the new roof load and found it to be safe or that the area needs the following corrections:

include the number of units, weight of each unit and the outside dimensions of each unit.

Address to:

Executive Director
Department of Buildings
Room # 906
121 N LaSalle St
Chicago, IL 60602

Return Letter to Refrigeration Plan Desk

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Summary

- Review the requirements for each project.
- Provide required equipment and piping information in construction documents.
- Follow the guidelines discussed for important issues where they apply.

**Feel free to call with questions
at 312-744-7694**



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