

# Technical Bulletin

## Impact Analysis

### EPA's Updated Refrigerant Standard

THANK YOU FOR YOUR PARTNERSHIP.



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# What the end of the R-410A phase-down could mean for you.

As part of the AIM Act, passed December 2020, the US EPA is phasing out the production and consumption of hydrofluorocarbons (HFCs). Availability of R-410A, the refrigerant used today in residential and light commercial air conditioning, heat pump and variable refrigerant flow systems, will end in favor of refrigerants with lower global warming potential (GWP).

We want to make you aware of the key takeaways from our review of this transition as it progresses.

The manufacture and import of R-410A equipment is scheduled to end effective January 1, 2025 per the table below adapted from the initial October 2023 Transitions Rule<sup>1</sup>.

Refrigeration, Air Conditioning, and Heat Pump Systems			
Subsector	Systems	Global Warming Potential Limit or Prohibited Substances	Installation Compliance Date
Stationary air conditioning and heat pumps	Residential and light commercial air conditioning and heat pump systems	700	January 1, 2025
	Variable refrigerant flow systems	700	January 1, 2026

However, a subsequent December, 2023 ruling extended the final permissible *installation date* for air conditioning and heat pump systems manufactured or imported prior to January 1, 2025 and utilizing the older refrigerants, to January 1, 2026.<sup>2</sup>

Note that in this interim final rule, “the Agency is not considering the January 1, 2026, installation compliance date applicable to VRF systems; however, EPA intends to consider VRF systems in a separate notice and comment action.”

<sup>1</sup> [FACT SHEET Final Rule - Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons under Subsection \(i\) of the American Innovation and Manufacturing Act of 2020](#), EPA Office of Air & Radiation, p. 11

<sup>2</sup> Interim Final Rule extending the deadline: [Federal Register – Phasedown of Hydrofluorocarbons: Technology Transitions Program Residential and Light Commercial Air Conditioning and Heat Pump Subsector, Section III.A.](#)

# What the end of the R-410A phase-down could mean for you (continued).

## Anticipated Impact

Over the past two months, MaGrann has been in communication with designers, developers, HVAC contractors and equipment manufacturers to understand the impact of this change in the multifamily new construction and substantial rehabilitation markets for projects currently under construction, projects in the design phase and future projects.

The replacement refrigerants, predicted to be R32 or R454b (based on manufacturer), fall into the Category A2L, which have the same toxicity classification as R-410A - low toxicity (A), but a higher flammability rating - low flammability (2L), R-410A is considered non-flammable. In accordance with Section 1109 of the 2021 IMC, refrigerant linesets with A2L refrigerants that penetrate two or more floor/ceiling assemblies will need to be installed within a fire-rated shaft that is either naturally or mechanically ventilated to prevent refrigerant from accumulating. Because the shafts will be ventilated, they will need to be insulated and air sealed to separate them from surrounding conditioned space. The requirements have been illustrated in the diagrams below.

As we move forward as an industry that works extensively in mid-rise construction that is often between 4 and 7 stories, we are becoming more aware of unresolved questions, largely because specific data on new equipment is not yet available from manufacturers. See the still growing list of unknowns below:

- It is not clear if existing product lines that we are currently specifying and installing will still be available with a new refrigerant.
- We do not know if or how efficiency will be impacted. Will there be benefits or penalties associated with the changes?
- Lineset lengths and height differentials are currently an issue, particularly with small (approximately 1 ton) variable speed systems. We do not know if there will be an impact on line set lengths or if the current limitations will continue to exist.
- We do not know when design data and the new equipment will be available (Mitsubishi is projecting Fall 2024). For larger projects with multi-year design and/or construction schedules, we do not know if these competing schedules will cause delays in design and/or construction and if these delays will require the redesign of large and complex buildings.
- We do not know the cost and availability impacts of this change.
- The path forward is also less clear for jurisdictions using 2018 and older I-Codes. The older codes don't formally recognize the 2L refrigerant classification and the specific provisions for its use.

## Potential Solutions:

We are collaborating with design and construction teams that are already working on solutions for the problems that we are likely to encounter over the next few years. These include:

- **Using split system product type:**
  - Enclose refrigerant piping penetrating two or more rated floor/ceiling assemblies in a vented, rated shaft. Requirements for venting and clearances will need to be considered. See details below.
  - Use the following techniques to eliminate the penetration of two or more floor/ceiling assemblies and the need to install fire-rated shafts.
    - Place the condensers for 1st and 2nd floor systems around the building at grade. Fire seal the linesets for these systems at the 1<sup>st</sup> and 2<sup>nd</sup> floor floor/ceiling penetrations.
    - Place condensers for the top two floor systems on roof. Fire seal the linesets for these systems at the roof and floor ceiling penetrations.
    - Use balcony mounted, wall hung or through wall located condensers to eliminate floor penetrations.
    - Run refrigerant lines on the exterior of the building enclosed in chase or conduit. There is no need for rated and vented shafts in this condition.

# What the end of the R-410A phase-down could mean for you (continued).

## Potential Solutions (continued):

- **Use alternative equipment types:**
  - Through-wall combined equipment with air handlers and condensers in the same cabinet, such as PTHPs, VTACs, SPVHPs, etc. to eliminate linesets.
  - VRF type, central systems in lieu of smaller unitary systems to decrease the number and locations of refrigerant shafts that will need to be constructed.
  - Centrally produced heating and cooling distributed to fan coils through water loop.

## Considerations for Design and Construction:

1. How can we locate and build fire-rated shafts that are outside the thermal/air envelope and are sufficiently well insulated, air-sealed and vented to maintain air tightness of building envelopes needed for today's energy standards? How can we minimize the re-design of multi-family spaces and the lost rentable square footage for these shafts?
2. How can we incorporate chases/refrigerant linesets into façades that do not require insulation, air sealing or ventilation? Interior located common area equipment could still require chases.
3. How can we locate interior, exterior and combined equipment to eliminate or minimize length of linesets and total refrigerant used in systems to minimize risk, save money and increase performance?
  - a. At grade equipment that is shielded from view and secure.
  - b. Balcony/through wall equipment that is visually appealing.

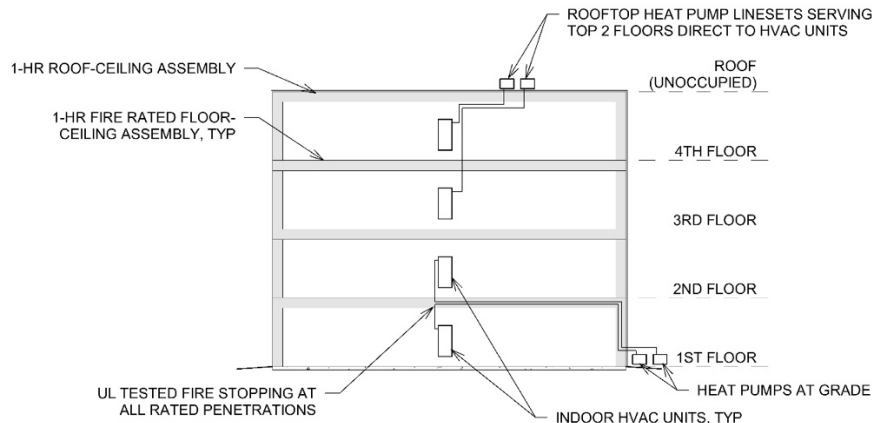
## Secondary Implications:

1. Work In Progress – which projects can be brought to successful completion while meeting EPA's phase-down timeline? Project teams will need to work with product vendors to allocate equipment before production ends later this year, and the industry may need to advocate for additional timeline extensions.
2. Existing equipment – how long will those systems that have recently been installed be serviceable with the existing stock of R-410A refrigerant? Will linesets for these systems need to be replaced when these systems are taken offline and upgraded?
3. What is the value of recovered R-410A refrigerant? Can it be stockpiled for future repairs and/or sold to offset the upgrade cost for new systems?
4. Packaged Systems – will renewed interest in systems without linesets result in a resurgence of innovation and investment? Many of these systems have not kept up with the efficiency advances of competing systems due to space constraints. However, new technologies developed for the existing buildings market may have application in new construction.
5. Central Systems - Should we be re-evaluating central systems using delivered water or refrigerant as alternatives?

This bulletin represents our current understanding of this developing issue. We recommend consulting the resources linked above for additional clarification. We will continue to monitor updates and will reach out again as more information becomes available and solutions become clearer.

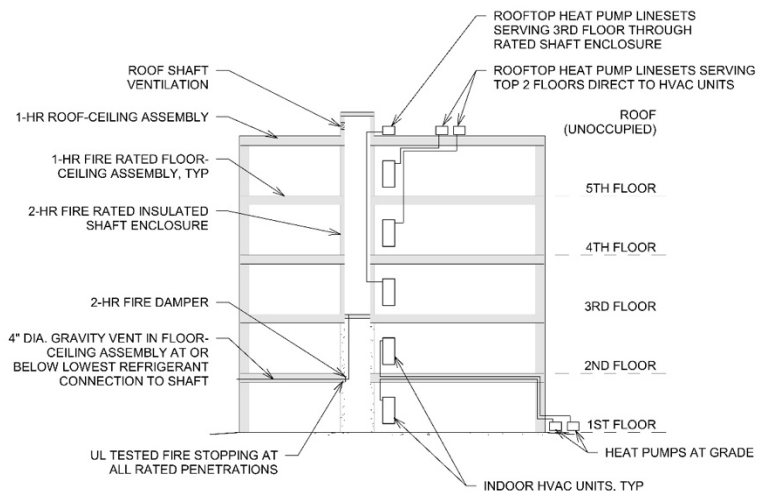
**MaGrann's engineering, design and sustainability teams are here to help you navigate this change while optimizing construction timelines, cost effectiveness, building and energy performance. Please reach out for assistance or if you have any questions.**

**In 3- and 4-story buildings where condensers can be located at grade, the construction of fire-rated shafts can be avoided.** Maximum refrigerant lineset lengths (unknown at this time) will need to be considered. A 4-story building is shown to the right. Where equipment cannot be located at grade, insulated 1-hour fire-rated shafts will be required for refrigerant lines that penetrate 2 or more rated floor ceiling assemblies.



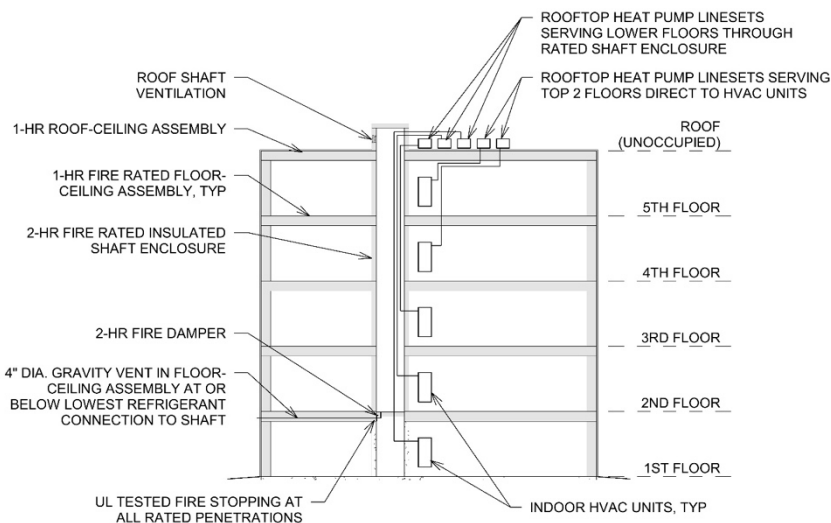
## 4 STORY BUILDING - AVOIDING RATED SHAFTS FOR A2L REFRIGERANTS

**In 5-story and taller buildings where condensers can be located at grade, the construction of insulated 2-hour fire-rated shafts can be minimized.** Maximum refrigerant lineset lengths (unknown at this time) will need to be considered. A 5-story building is shown to the right.



## 5 STORY BUILDING - MINIMIZING RATED SHAFTS FOR A2 REFRIGERANTS

**In 5-story and taller buildings where condensers cannot be located at grade, the construction of 2-hour fire-rated shafts will be required for refrigerant lines that penetrate 2 or more rated floor ceiling assemblies.** Maximum refrigerant lineset lengths (unknown at this time) will need to be considered. A 5-story building is shown to the right.



5 STORY BUILDING - WITH RATED  
SHAFTS FOR A12 REFRIGERANTS