A2L ESSENTIALS

Issue 1

HEATCRAFT Worldwide Refrigeration

Heatcraft Refrigeration Products is your complete partner for the transition to Low GWP refrigerants. We're here to help you navigate the landscape of current and future regulations, across your business, at every level.

What are A2L refrigerants?

A2L refrigerants are gaining prominence in commercial refrigeration. The designation "A2L" signifies:

A: Non-toxic
2: Flammable
L: Low burning velocity

Although mildly flammable, A2L refrigerants are safe, climate-friendly and cost-effective solutions for HVACR applications. A2Ls are characterized by their mild flammability, low toxicity and low global warming potential (GWP). GWP measures a substance's impact on climate change, and A2L refrigerants have a significantly lower GWP than legacy refrigerants.

Some A2Ls have a GWP of less than 150, which makes them ideal for California Air Resource Board (CARB) requirements and the Environmental Protection Agency (EPA) Technology Transition.

A2L refrigerants include hydrofluoroolefins (HFOs) and other blends. They operate similarly to legacy hydrofluorocarbon (HFC) refrigerants and are safe to use in compliance with Underwriters Laboratories (UL) 60335-2-89.

A2L refrigerants have been in development for many years and products that use them already exist in Europe. Moving forward, A2Ls will play a significant role in North American industry as Low GWP refrigerants are adopted.

ASHRAE Classification of Refrigerants

INCREASING FLAMMABILITY	Lower Toxicity	Higher Toxicity
Higher Flammability	A3	B3
Flammable	A2	B2
Lower Flammability	**A2L**	B2L
No Flame Propagation	A1	B1

INCREASING TOXICITY

A2L refrigerants are safe, climate-friendly and cost-effective.

Heatcraft Engineering has reviewed, tested and/or analyzed more than 30 A2L refrigerants.

Here is a sample of A2Ls compared to other refrigerants.

	R-404A	R-448A	R-290	R-455A	R-454C	R-454A	R-515B	R-457A	R-1234yf
GWP	3,943	1,273	3	146	148	238	292	139	4
ASHRAE Classification	A1	A1	A3	**A2L**	**A2L**	**A2L**	A1	**A2L**	**A2L**

Basics of regulations

The EPA is issuing regulations to implement certain provisions of the American Innovation and Manufacturing Act of 2020, codified at 42 U.S.C. 7675 (AIM Act).

The AIM Act authorizes the EPA to address the use of HFCs in three main ways:

1. Phase down HFC production and consumption through an allowance allocation program.
2. Promote certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs from equipment.
3. Facilitate sector-based transitions to next-generation technologies.

To meet EPA requirements, refrigerants must have certain GWP levels. If the refrigerant charge is greater than 200 lbs., then a refrigerant with a GWP of less than 150 is required. If the refrigerant charge is less than 200 lbs., then a refrigerant with a GWP of less than 300 is required.

A2L Characteristics: With refrigerant charge limits ranging from ~160 lbs. to 260 lbs., depending on the specific refrigerant type, A2Ls satisfy the Technology Transitions requirement of the AIM Act.

A2L mitigation

Because of the mild flammability of A2L refrigerants, leak sensing and controls to monitor leaks are generally required. Additionally, mitigation to exhaust the room at certain thresholds may be needed.

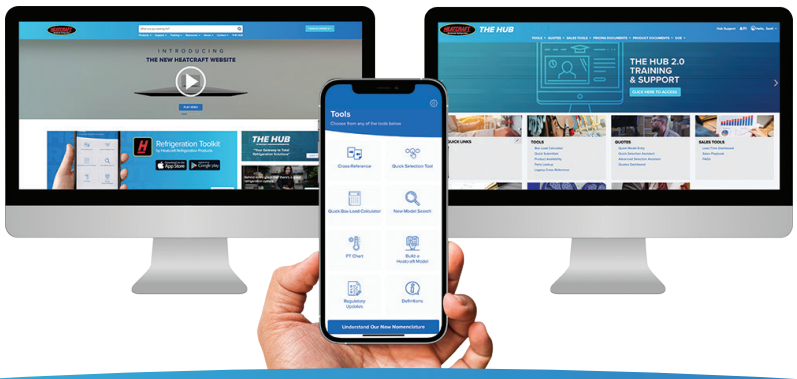
Based on limits of applicability, there are different mitigation requirements for A2Ls, distinguishable between four main zones of a building as defined by the UL safety organization.

Circulation	Mitigation mechanism required. When a leak is identified, fans must be turned on.
Not Allowed	Equipment cannot be installed (based on minimum room internal area allowed).
Volume	Mitigation mechanism required. When a leak occurs, the system must be shut down.
Ventilation	Mitigation mechanism required. When a leak occurs, the refrigerated space must be exhausted outdoors.

To ensure compliance, Heatcraft will be supplying a mitigation mechanism, or safety kit, including controllers, sensors and isolation valves.

Plan for selection tools

With A2L products, you can expect the same level of product selection experience you've come to expect from Heatcraft, including integration across The HUB, the Refrigeration Toolkit mobile app and the Heatcraft website.



DON'T MISS!

A2L Essentials is a series of updates on the EPA's Technology Transition designed to educate and inform the industry. From regulation basics and definitions to mitigation requirements and product sell-through allowances, Heatcraft is decoding these complex topics. Our expertise is your expertise!

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For more information, to speak to an expert or to set up training, please contact your Heatcraft representative or visit **heatcraftrpd.com/regulatory**.