MASSACHUSETTS
DEPARTMENT OF
ENERGY RESOURCES

MA Refrigerant transition in Heat Pumps & A/C

EEAC February 2025

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ASHRAE Std 34:

A safety / hazard standard for refrigerants.

For USA indoor use, the International Mechanical Code (IMC 2021) requires A1 refrigerants – due to their fire safety benefits:

1. **No flame propagation – doesn't burn**
2. **Non-toxic (below 400ppm)**

No problem with leaks… except:

1. **Early A1 refrigerants (HFCs) damaged the Ozone layer and had very Global Warming Potential (GWP)**
2. **Newer A1 refrigerants (HCFCs) avoid Ozone layer damage but still have high GWP**

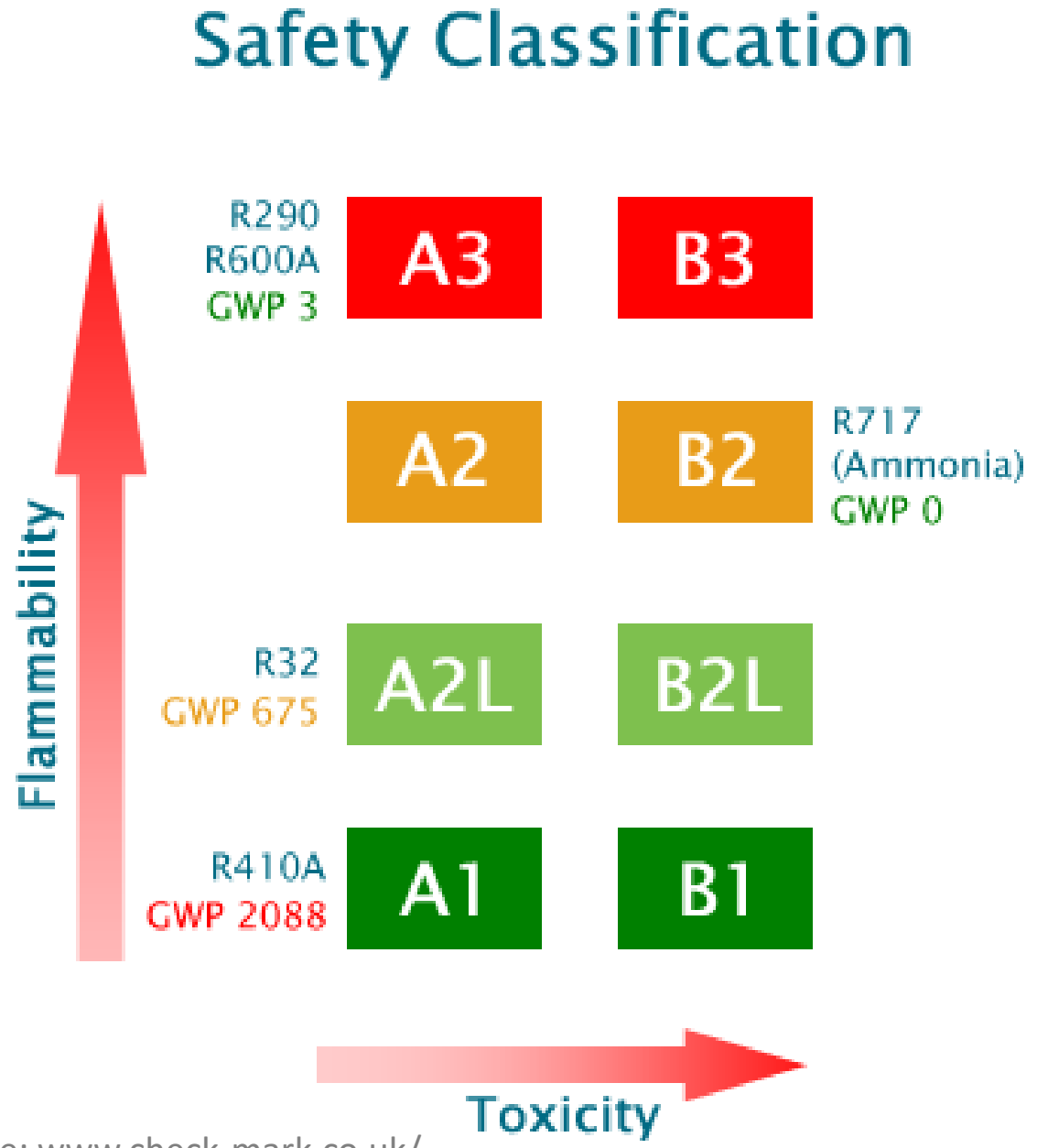

Image: www.check-mark.co.uk/

Moving from A1 to A2L:

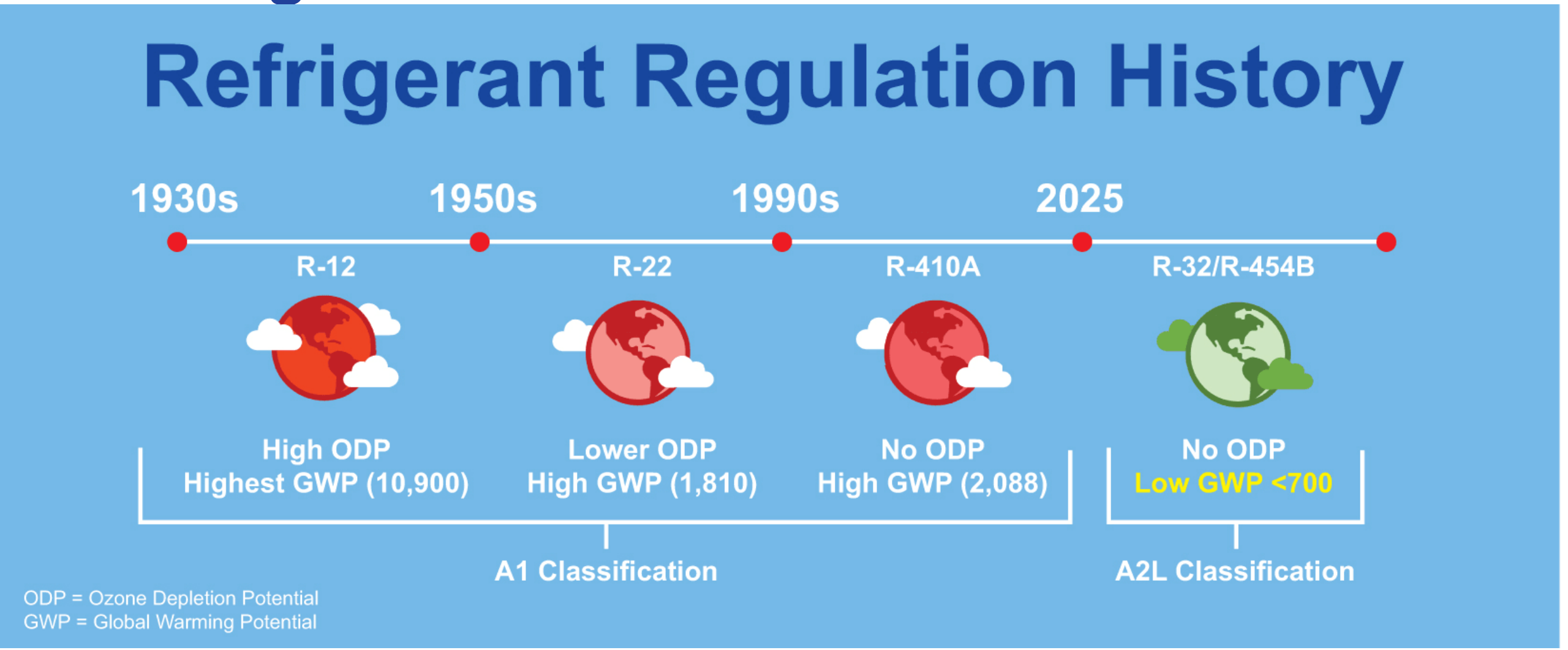

Image source: www.keeprite.com

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Refrigerants in transition:

Existing Residential equipment: A1 (can't burn)	
R410a (central A/C, ducted heat pumps)	GWP: 2088
R134a (vehicle A/C, window A/C, grocery freezers)	GWP: 1300
New equipment- A2L (can burn, won't sustain flame)	
R32 (e.g. mini-splits or window A/C)	GWP: 675
R454B (e.g. ducted heat pumps or central A/C)	GWP: 466
New equipment- Mono-block (outdoor units)	
R290 (A3) Propane (flammable)	GWP: ~10
R744 (A1) CO_2 (high pressure piping)	GWP: 1

State regulations: Mechanical Code & DEP

Following the Federal AIM act **: High GWP HFC production and consumption must be reduced by 85% from 2022 to 2036.**

310 CMR: MassDEP regulations

(310 CMR 7.76) prohibit certain new air conditioning equipment (chillers, including air-to-water heat pumps) that uses older high-GWP refrigerants from being sold, leased, rented, offered for sale, installed, used or manufactured, on or after ***January 1, 2024*** *unless installed as part of a project that* ***received a building permit before January 1, 2024****.*

MassDEP anticipated that equipment using A2L refrigerants would be allowed by the building code in short order after January 1, 2024.

780 CMR: Massachusetts Mechanical Code (Part of BBRS building code)

2 pathways to approve A2L refrigerants: 2024 International Mechanical Code (**IMC 2024**) or ASHRAE **Standard 15 2022**.

780 CMR currently using **IMC 2021**, but BBRS has voted to update to ASHRAE 15-2022

Requires a public hearing and regulation update to the current 10th edition MA building code.

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BBRS Advisory Nov 12, 2024

DIVISION of OCCUPATIONAL LICENSURE

ADVISORY REGARDING USE OF A2L REFRIGERANTS

Issued November 12, 2024

The following advisory was issued pursuant to M.G.L. c. 30A, §8 by the Board of Building Regulations and Standards ("BBRS") at its regular meeting held on November 12, 2024. The purpose of this advisory will be to advise stakeholders, including registered design professionals, installers, and building officials of the BBRS' interpretation of the application of the 10th Edition Massachusetts Building Code (780 CMR) to the use of equipment utilizing A2L refrigerants.

It is the interpretation of the BBRS that the 10th edition of the Massachusetts Building Code allows the installation of equipment utilizing A2L refrigerants based on the following pathway:

Authority of Building Officials to approve Alternative Materials, Design and Methods of Construction and Equipment

Even though the 2021 International Mechanical Code does not facilitate A2L refrigerants, the 10th Edition foresaw this issue and was able to adopt four important referenced standards which do, specifically the following are adopted in 780 CMR 2802:

1. **ASHRAE 15-2022 - Safety Standard for Refrigeration Systems**

https://www.mass.gov/doc/2024-01-a2l-refrigerants-advisory/download

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TIMELINE: A1(HCFC) refrigerant phase-out

- **1 Jan 2024:** Mass DEP regulations took effect for **newly permitted projects – no A1(HCFC)** refrigerant use. Projects with permits issued prior to 1-1-24 are exempt.
- **12 Nov 2024:** Board of Building Regulations and Standards (BBRS) issues Advisory **allowing installation of A2L refrigerants** under 10th edition building code.
- **1 Jan 2025:** Federal AIM act – EPA rules takes effect, no new HVAC **equipment manufactured** using A1(HCFC) refrigerants.
- **2025 Tbd:** BBRS updates 10th edition to formally adopt **ASHRAE standard 15-2022** mechanical code pathway.
- **1 Jan 2026: A1(HCFC) refrigerant equipment no longer allowed for new installations.**

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Thank You!

Natural refrigerant alternatives in US market

Carbon Dioxide (GWP 1) and Propane (GWP ~10)

- Mitsubishi Electric / Trane US (METUS) has a CO2 (R744) heat pump water heater, the Heat2O, in select markets in the U.S. delivering heating up to 176°F at outdoor temperatures down to -13°F . The design is modular, for capacities between 40kW and 640kW.

METUS Heat2O
QAHV N560YA HPB

- Carrier has a new Propane AquaSnap 61AQ heat pump system can deliver high-temperature heating up to 167 F at outdoor temperatures as low as -13 F. The new product is available with capacities ranging from 40 kW to 140 kW.

Carrier AquaSpan 61Aq heat pump
Image: Carrier

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Rest of the World: Lots of natural refrigerant use

Australia, China, EU, Korea, New Zealand, UK etc.