HVAC Regulatory Change

Regulatory Update and Opportunities

March 2024

Agenda

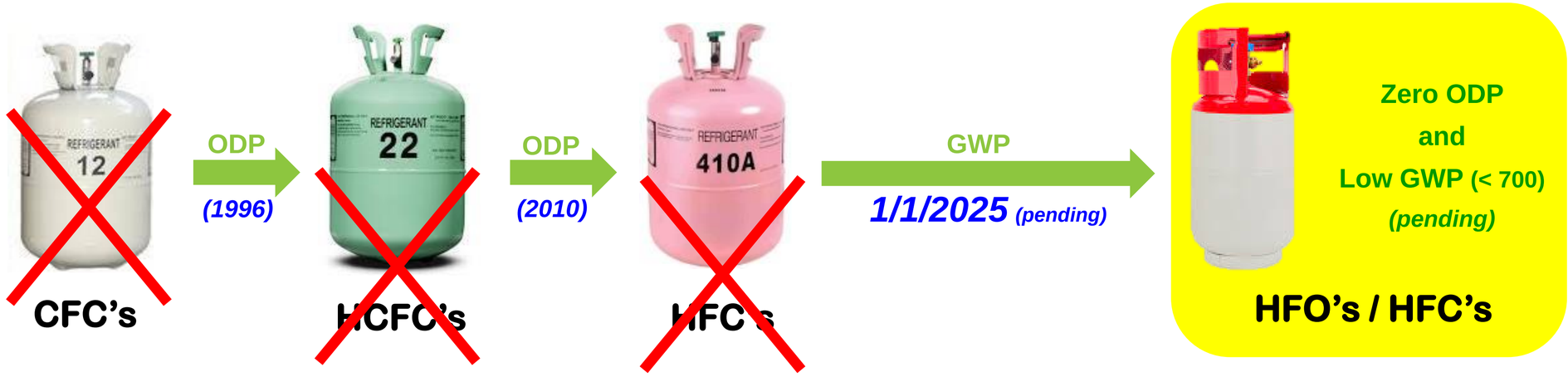
- Why Refrigerants are Changing
- When Refrigerants are Changing & What HVAC Equipment is Impacted
- What Refrigerants are We Changing To
- How Flammable Are the New Low GWP Refrigerants
- What About Building Codes, Storage and Transportation
- What Software Tools will be Available to Help Apply these Flammable Refrigerants
- Safety: Refrigerant Detection Systems
- Tool Requirements
- What Should Distributors and Technicians Do to Prepare

Why Are Refrigerants Changing

Unitary Refrigeration Transition

The history

- **Past “Unitary” Transitions were driven by Ozone Depletion Potential (ODP)**
- **The focus is now on GWP**
- **Some new Low GWP fluids are referred to as HFO’s**
  - **Hydrofluoroolefins (HFO’s)**
  - **Some HFC’s also qualify as Low GWP (R32)**



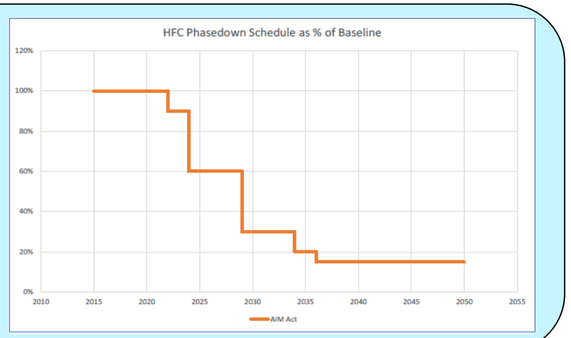
HFC Phase-Down: American Innovation & Manufacturing Act

We are well into the phase-down and on the doorstep of equipment prohibitions

AIM Act Components for EPA to Execute

Status

1) Virgin Bulk Phase-Down & Allocations



In Process – 40% Down

2) Technology Transitions

(Equipment Prohibitions)

Sector	Prohibition
Residential / Light Commercial AC	700 GWP, 1/1/2025
Chillers	700 GWP, 1/1/2025
VRF	700 GWP, 1/1/2026
Etc.	

In Process – 2025 Start

3) Refrigerant Management

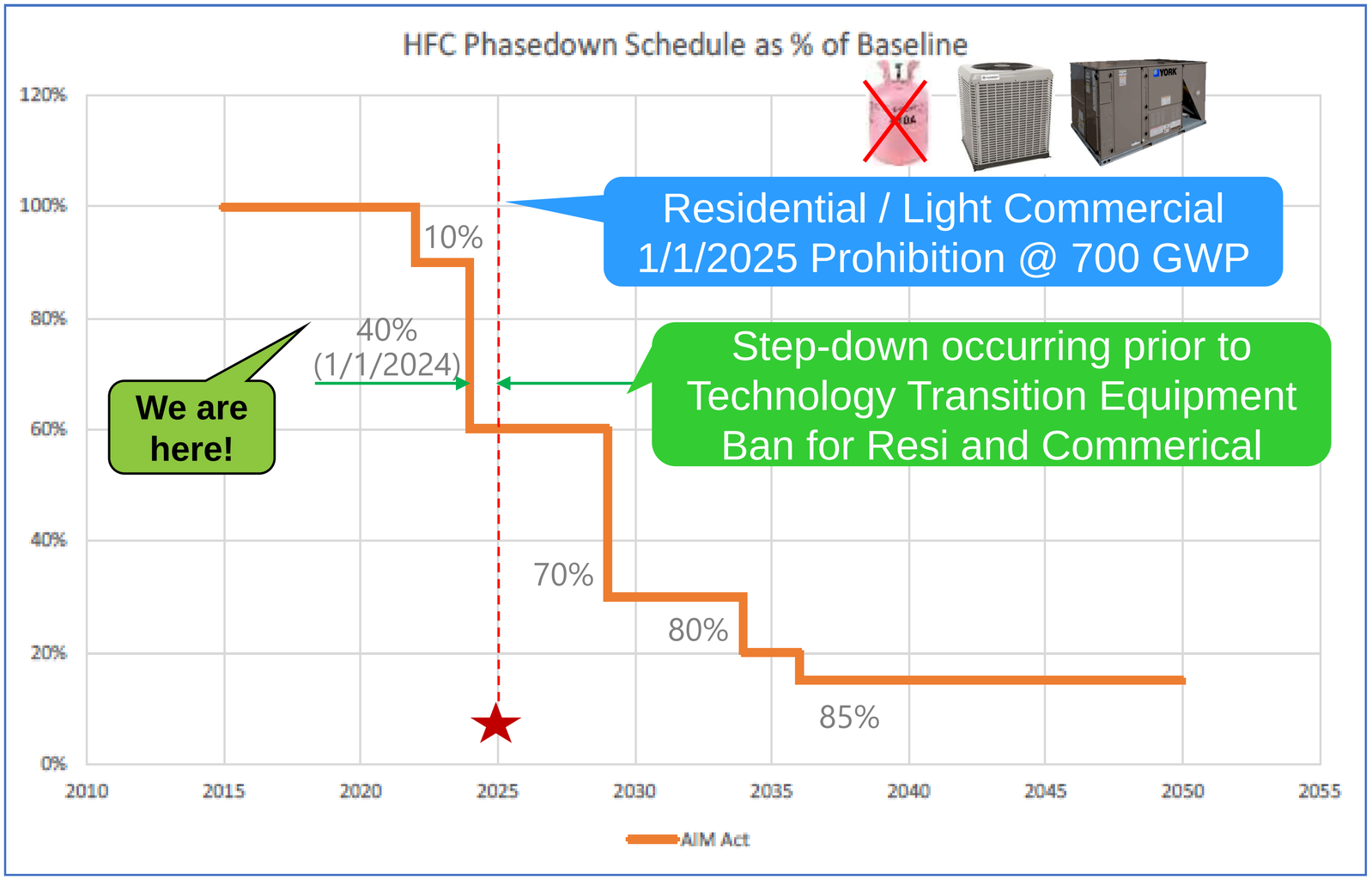
(Reclaim & EPA Section 608 – No new licensing requirements - yet)

Pending – 2024

When Are Refrigerants Changing

1) The AIM Bulk Phase Down vs Equipment Prohibitions

2024 will constrict the existing HFC supply ahead of a pending ★2025 Unitary Equipment Ban



- **Availability of HFC's like R410A, R134a, etc. will decrease and price will continue to increase**
  - **By Design…**
- **2023 will be particularly volatile; both OEM's and service competing for less virgin gas**
- **No drop-in for R410A like there was for R22 (must be < 700 GWP & A1)**
- **R410A service life 5 yrs in CA… 2025 – 2030, EPA has not established for US**
- **Reclaim refrigerants will be needed to fill the virgin gaps**
- **Need more dirty HFC gas returned**
- **EPA may revise section 608 rules regarding licensing (pending)**

2) EPA Technology Transitions (Equipment Bans) Begin 1/1/2025

Subsector	System	GWP	Compliance Date
Stationary Residential / Light Comm AC/HP	* Unitary, Mini-splits, window units, etc.	700	1/1/2025
Residential Dehumidifiers	Residential Dehumidifiers	700	1/1/2025
Stationary AC and HP	VRF (> 65K Btu/hr – excludes mini-VRF < 65K)	700	1/1/2026
Chillers (stand alone)	Comfort Cooling	700	1/1/2025
Chillers (stand alone)	Industrial Process Ref < -50C	N/A	Not Covered
Chillers	Industrial Process Ref -50 to -30C	700	1/1/2028
Chillers	Industrial Process Ref >-30C	700	1/1/2026
Data Centers, CRAC / IT Equipment Cooling	Data Centers, CRAC/IT	700	1/1/2027
Etc. (see the actual rule for a complete list)	~ 40 Total subsectors…		

** - Compliance date for unitary / mini-split, split systems applies to both indoor & outdoor components installed as a new "system"*

VRF Requirements for > 65K Btu/hr also not expected

2) Technology Transitions Differ by Factory or Field Charge

Replacement components enabled indefinitely by EPA but DOE efficiencies must still be met

Compliance Based on Definition of Products, Systems, and Specified Components

Factory Charged System

- ***Compliance - date of manufacture***
- ***3 year sell through or Export***

Field Charged, Assembly of Components into a System

- ***Compliance – date of manufacture***
- ***1 yr sell through for components for new systems built prior to 1/1/2025****

Replacement Components – Compressor, Condenser, Evaporator, valves, etc.

- ***Labeled "For Service Only" if built after 1/1/2025***
- ***No limitations on refrigerants***

**Good cause rule published Dec 26 will allow 1-year sell through for 410A Residential and Light Commercial AC/HP systems if manufactured prior to Jan 1, 2025*

3. AIM Refrigerant Management

Pending Rule

Aggressive Reclaim Mandate and renewed call for cylinder tracking but no 608 Licensing Changes (yet…)

Bar Codes & Record Keeping

Starting 1/1/2025

Disposable Cylinders Allowed

But must remove residual refrigerant before destruction

Reclaim Refrigerant Mandate 1/1/2028

Includes new low GWP equipment with R32 or R454B

Leak Repair and Automatic Leak Detection

Systems with 15 – 50 lbs (60 days /1 year after final rule) & Systems > 1500 lbs

What Refrigerants are We Changing To?

R410A Replacements: R454B vs R32

The lower the GWP the better

Fluid	ASHRAE 34	GWP	Component Mix - Ratio %	Exposure Limit	Operating Pressure	LFL	UFL	Burning Velocity	MIE	Auto Ignition	Hot Surface Temperature	Efficiency	Capacity
		CO_2e		ppm	psia	% v/v	% v/v	cm/sec	mJ	C	C	vs R410A	vs R410A
R410A	A1	2,088	R-32/R-125 - 50/50	140,000	434	-	-	-	-	> 750	-	-	-
R454B	A2L	466	R-32/R-1234yf - 69/31	30,000	405	11.8	21.5	5.2	100-300	498	700	=	<
R32	A2L	675	R-32 - 100%	36,000	444	14.4	29.3	6.7	21-40	648	700	+	+

LFL - Lower flamability limit

UFL - Upper flammability limit

MIE - minimum ignition energy

- **Both R454B and R32 are A2L; mildly flammable**
- **R32's higher operating pressure requires special design considerations**
  - **R454B's characteristics are much closer to R410A**
- **Neither R32 nor R454B can replace R410A for service**
- **There is no non-flammable < 700 GWP drop-in for R410A…**

ASHRAE 34

Increased flame propagation	Lower Toxicity	Higher Toxicity
Higher Flammability	A3	B3
Flammable	A2	B2
Lower Flammability	A2L	B2L
No Flame Propogation	A1	B1

Increased toxicity

Why JCI Select Opteon™ XL41 (R-454B) for its Ducted Products?

Ductless / VRF to remain with R32 due to Asian sourcing

Key Characteristics	Benefits
Lowest GWP of all approved R-410A-like alternatives	Enables equipment production longevity as HFC refrigerants phase down
Similar operating conditions to R-410A and compatible with POE lubricants	**Minimum design changes** and fast "learning curve" for technicians
Near-performance match to R-410A with improved efficiency	Can leverage many existing R-410A components and service tools
Endorsed by a majority of US OEM's	Improved availability and lower cost

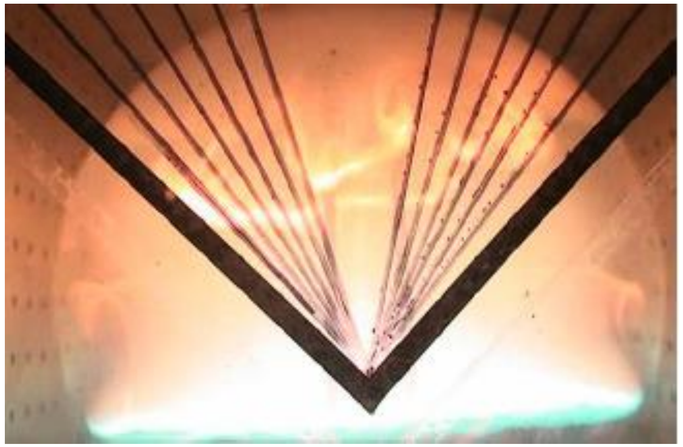
R454B could help avoid a second, near term transition for unitary equipment

How Flammable Will the New Refrigerants Be?

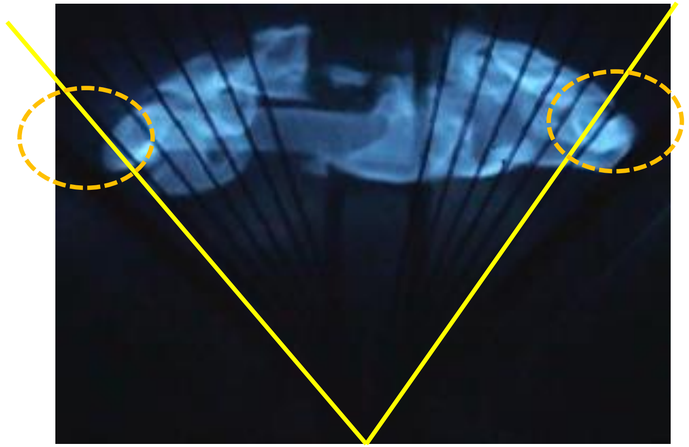
The Difference Between ASHRAE Refrigerant Flammability

There are "no" Hydrocarbons in A2L's…

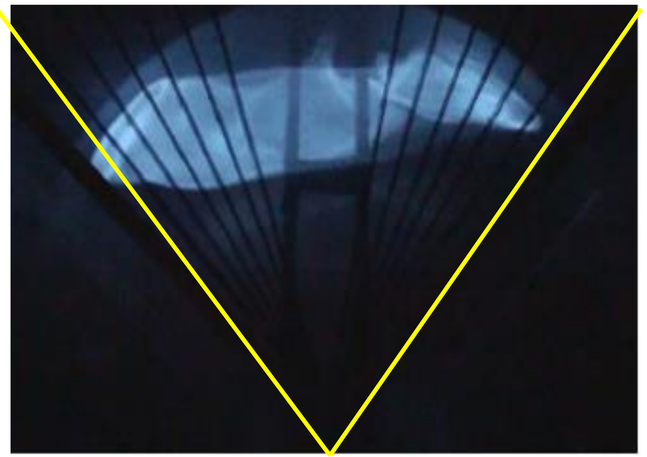
ASTM E681



Class 3 (Propane)



Class 2L (R454B / R32)



Class 1 (R410A no oil)

ASHRAE 34

Higher Flammability	A3	B3
Flammable	A2	B2
Lower Flammability	A2L	B2L
No Flame Propogation	A1	B1
	Lower Toxicity	Higher Toxicity

Increased flame propagation

- The difference between Class 1 & Class 2L is a few degrees
- A2L's like R454B / R32 have far less ignition energy than A3's
- Toasters, electric heaters, cigarettes and other common household products typically will not ignite an A2L.
- Even R410A will create a flame under the right conditions

A2L Ignition Temperature >1472°F

What About Transportation, Cylinders and Codes & Standards, for the New Flammable Refrigerants?

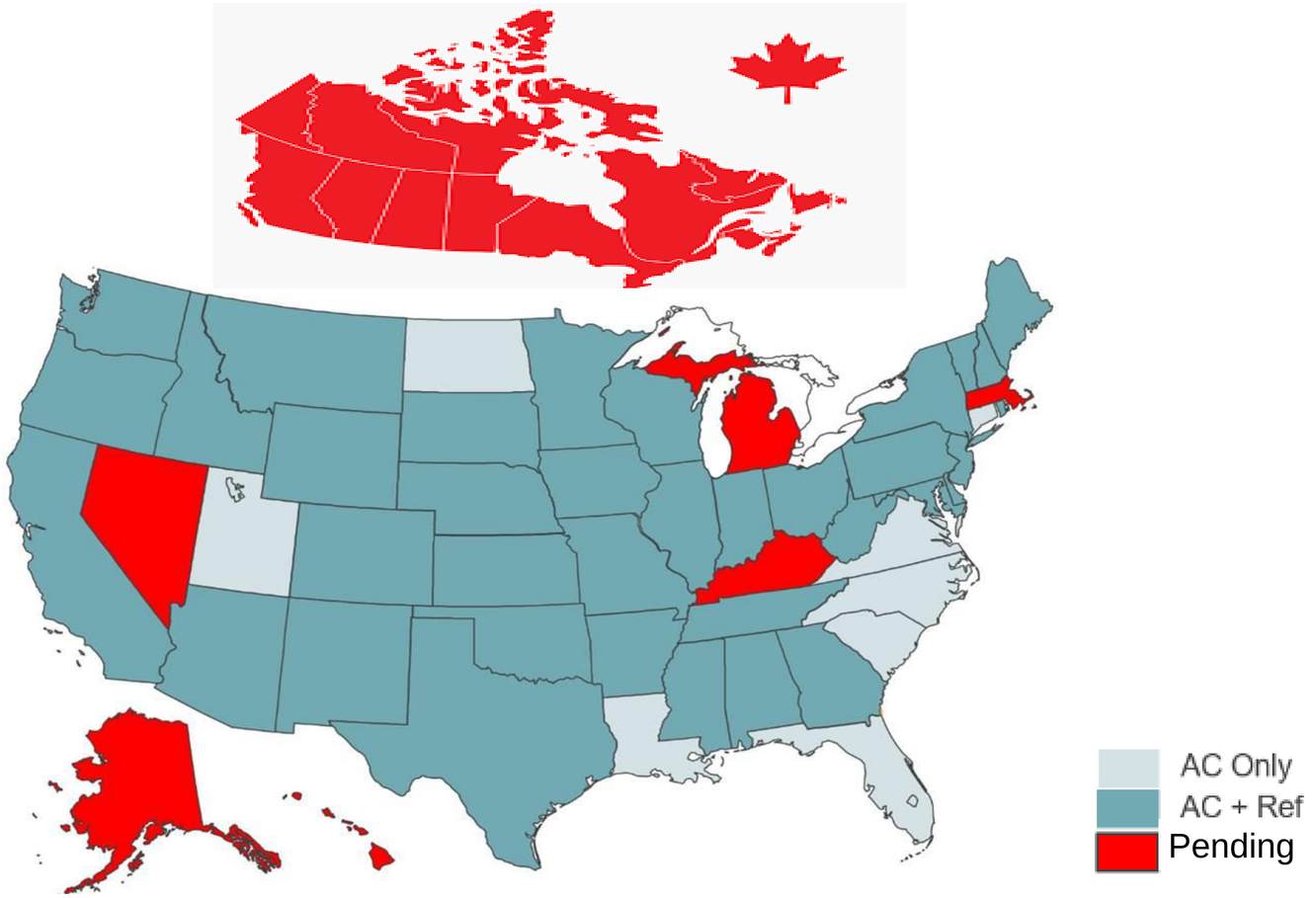
Most States Have Updated Building Codes or Legislation

Building codes are preferred if adoption timing supports, if not legislation is the fallback

Updates

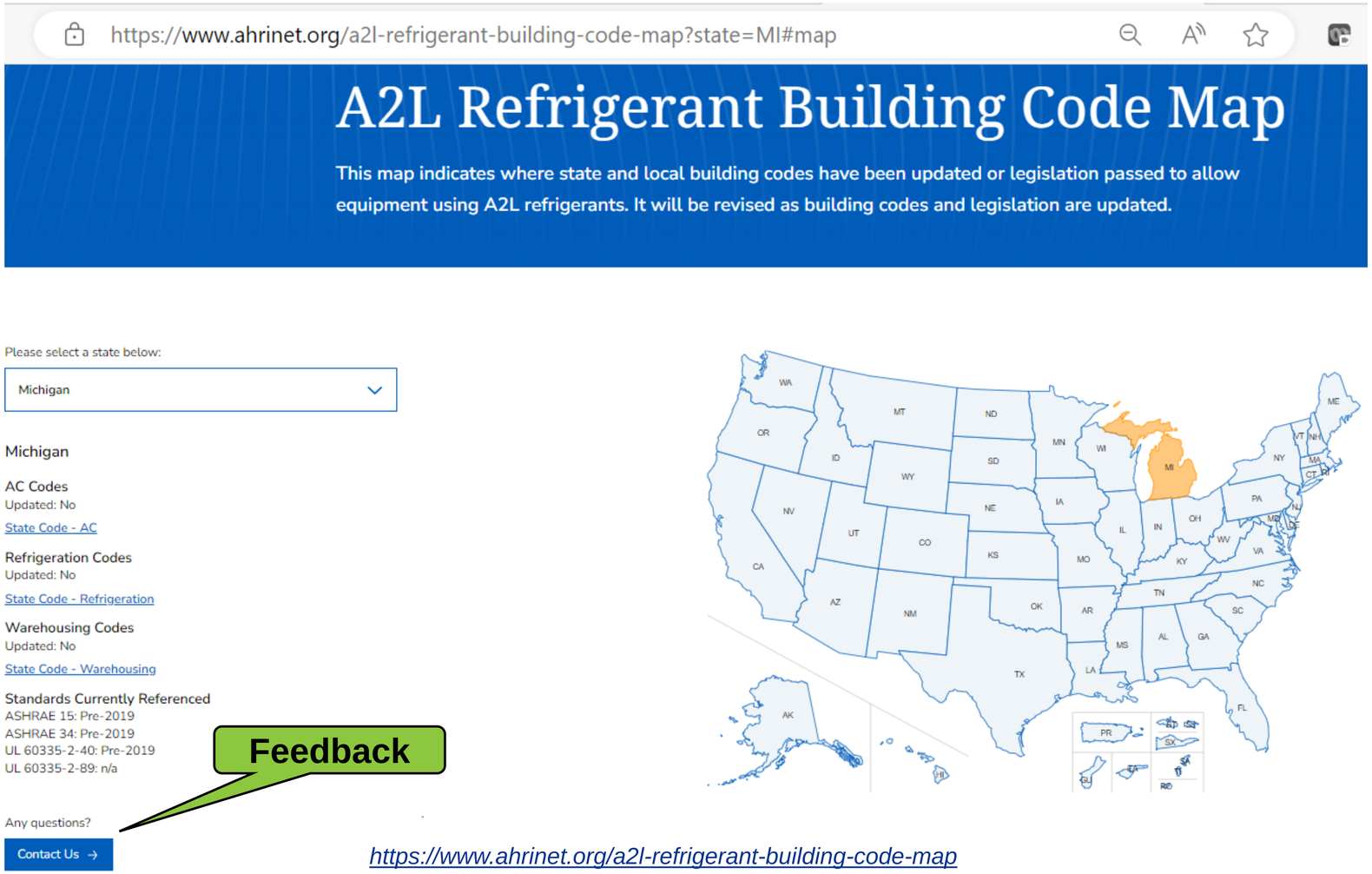
- **Still working on updates in AK, HI, KY, MI & NV, etc.**
  - **First install awareness**
  - **Know your AHJ's & State / City Codes**
- **Expect a high volume of AHJ / Inspector questions for initial installation of A2L's**

A2L Codes & Legislation Status



New AHRI A2L Interactive Website Now Live

Permits Public Access to State Level Building Code Status, shows adoption of A2L Standards



https://www.ahrinet.org/a2l-refrigerant-building-code-map

- **Initial launch January 2024**
- **Public, interactive, state level**
  - Cities for home rule states being added
- **A2L Standards Adoption Status**
  - UL 60335-2-40 & …-2-89
  - ASHRAE 15 & 34
  - NFPA 1 & 55, etc.
- **Equipment Categories**
  - AC
  - Refrigeration
  - Warehousing
- **Updated as information changes**
- **Canadian provinces to be added in 2024; adoption of B52-2023**

Installation, Service & Repairs of A2L's

ACTION	A1s	A2Ls
Safely remove refrigerant following local & national regs	Required	Required
Purge circuit with inert gas (e.g., oxygen-free nitrogen)	Best Practice	Required
Evacuate circuit	Best Practice	Required
Open circuit by cutting or brazing	Required	Required
Make repairs, purging with nitrogen while brazing	Required	Required
Leak and Pressure Test	Best Practice	Required
Evacuate the system	Required	Required
Charge the system	Required	Required

New A2L Cylinders: No More Kaleidoscope of Colors

•Adapter 1/4" LH FFL
TO 1/4" RH MFL, STR

Left Handed Threads…

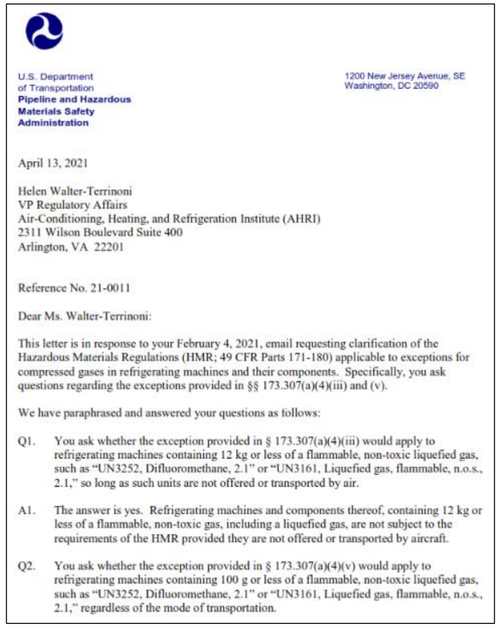
- Elimination of multiple colors – Red band with gray colors
- A2L's refillable cylinders Red Top or Red Stripe
  - Left-Handed Threads on cylinders only – no change on equipment
- New Pressure Relief Valve vs Rupture Disk
- EPA no longer proposing to ban disposables but now proposing* recovery of residual / heel

* - Proposed as part of AIM Refrigerant Management, subsection "h"

A2L Transportation: Similar but Different from A1's

Residential exempted, special permits for larger A2L charges; avoids HazMat

- **AC/HP Systems Up to 26 lbs. total**
  - DOT Letter of Interpretation – no changes
    - Ref #: 21-0011 (April 13, 2021)
  - **Systems > 26 lbs. and up to 2,000 lbs.**
    - OEM's securing special permits directly or via "party status" (OEM's secured 2 special permits)
- **Contractor Van / Truck Transportation**
  - Up to 440 lbs okay as DOT Materials of Trade
  - > 440 lbs considered a refrigerant transporter…
- **Effort underway to get A2L's qualified as Class 2.2 gases, instead of 2.1 flammable gases**
  - Would allow for horizontal transport in racks, vertical transport still required for now



U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

April 13, 2021

Helen Walter-Terrinoni
VP Regulatory Affairs
Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
2311 Wilson Boulevard Suite 400
Arlington, VA 22201

Reference No. 21-0011

Dear Ms. Walter-Terrinoni:

This letter is in response to your February 4, 2021, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to exceptions for compressed gases in refrigerating machines and their components. Specifically, you ask questions regarding the exceptions provided in §§ 173.307(a)(4)(iii) and (v).

We have paraphrased and answered your questions as follows:

Q1. You ask whether the exception provided in § 173.307(a)(4)(iii) would apply to refrigerating machines containing 12 kg or less of a flammable, non-toxic liquefied gas, such as "UN3252, Difluoromethane, 2.1" or "UN3161, Liquefied gas, flammable, n.o.s., 2.1," so long as such units are not offered or transported by air.

A1. The answer is yes. Refrigerating machines and components thereof, containing 12 kg or less of a flammable, non-toxic gas, including a liquefied gas, are not subject to the requirements of the HMR provided they are not offered or transported by aircraft.

Q2. You ask whether the exception provided in § 173.307(a)(4)(v) would apply to refrigerating machines containing 100 g or less of a flammable, non-toxic liquefied gas, such as "UN3252, Difluoromethane, 2.1" or "UN3161, Liquefied gas, flammable, n.o.s., 2.1," regardless of the mode of transportation.

A2L Indoor Storage: Increased Volumes Allowed but..

Special provisions required for separation from other combustible liquids

Max Allowable Quality (MAQ) per Control Area		
Occupancy Classification	Non-Sprinklered	Sprinklered
	Liquified Gas in Cylinders	Liquified Gas in Cylinders
M - Mercantile	20,000 lbs	40,000 lbs
S – Storage / Warehouse	20,000 lbs	40,000 lbs
F – Factory / Filling Station	10,000 lbs	20,000 lbs

Control Area #1	1 HR Fire Barrier	Control Area #2	1 HR Fire Barrier	Control Area #3	1 HR Fire Barrier	Control Area #4
40,000 lbs max		40,000 lbs max		40,000 lbs max		40,000 lbs max

- Per IFC / NFPA 55, states & cities must adopt the latest versions, much work remains at the state level, pre-qualify with your AHJ

Characteristic	Shelf Storage	Rack Storage	Solid-pile
Storage design	Shelf cannot exceed 30" from front to back	Each level designed to hold pallet loads	Pallets stacked one upon another
Construction materials	Steel shelves	Steel rack	NA
Storage height	Maximum 6' to top of product	Can exceed 6' Limited by sprinkler design	Can exceed 6' Limited by sprinkler design
Sprinkler system design	Ordinary Hazard Group 2	Extra Hazard Group 1	Extra Hazard Group 1
Separation from flammable liquids	Required	Required	Required
Storage of other flammable or combustible products above A2L refrigerants	Prohibited	Prohibited	Prohibited
Storage of flammable liquids adjacent to A2L refrigerants	20' separation	20' separation	20' separation
Storage of flammable liquids with secondary containment adjacent to A2L refrigerants	10' separation to containment area	10' separation to containment area	10' separation to containment area


Shelf


Rack

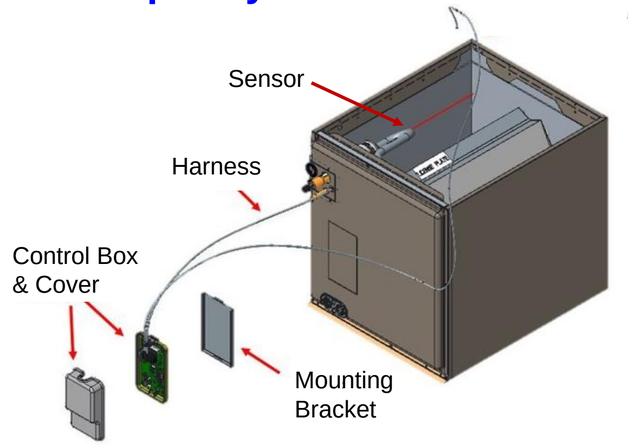

Pile

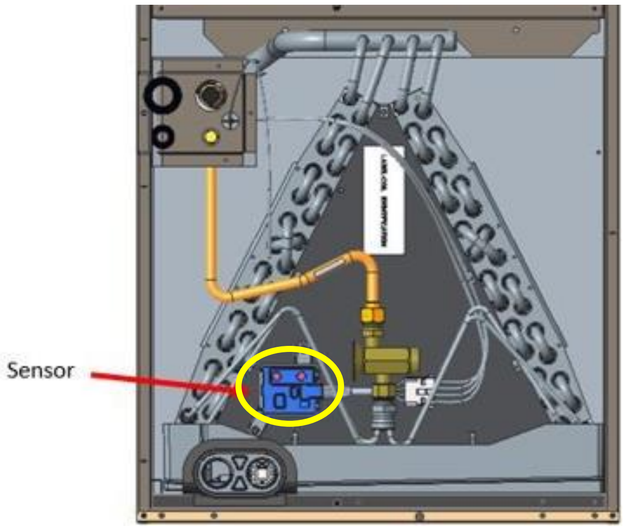
What Safety Precautions are Required for the New Flammable Refrigerants?

A2L Equipment – Refrigerant Detection Systems

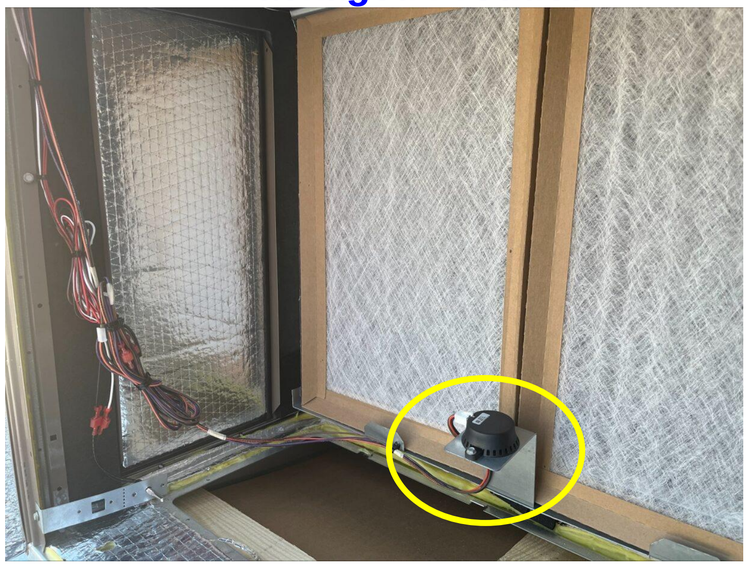
- **RDS can be factory mounted or field installed – location pre-determined**
- **“Generic” RDS “kits” not allowed**
- **All RDS will be listed by a safety agency for the specific units to which they are applied**
  - **Per UL 60335-2-40, ASHRAE 15 & 15.2**
  - **Set to activate at 25% of the Lower Flammability Limit**
- **RDS not required in all applications**
  1. **Below LFL - large zones / small charges**
  2. **Below minimum’s charge size (< 4 lbs)**
  3. **Constant Airflow above minimum cfm**

Split System Product





Packaged Product

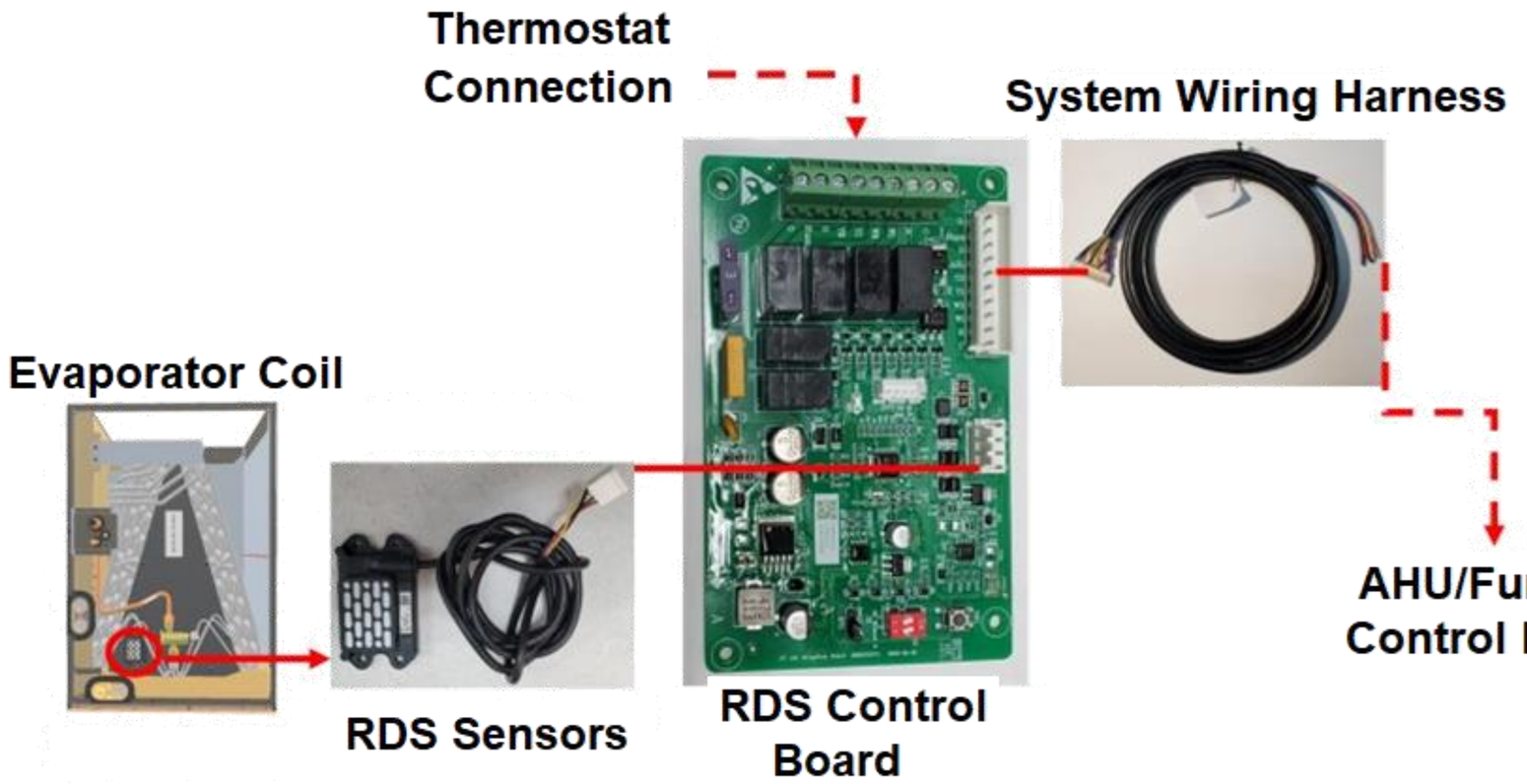


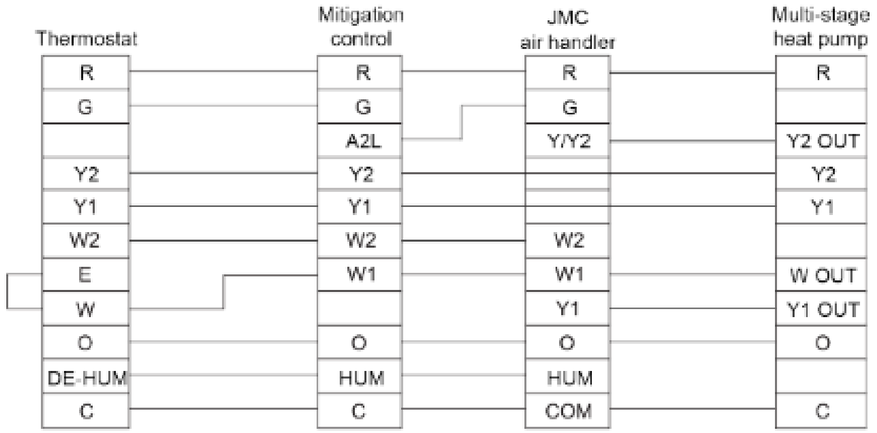
RDS function is to turn on the blower to dilute any leak from reaching the LFL

RDS - Refrigerant Detection Systems / LFL – Lower Flammability Limit

WARNING This information is unique to Johnson Controls, information may vary by specific model, always consult the manufacturers specific installation and safety instructions prior to service or maintenance

RDS Components & Wiring (Residential)





Generic Sample Only, wiring varies by product type

RDS – Refrigerant Detection System

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What Software Will Be Available to Help Apply New Flammable Refrigerants?

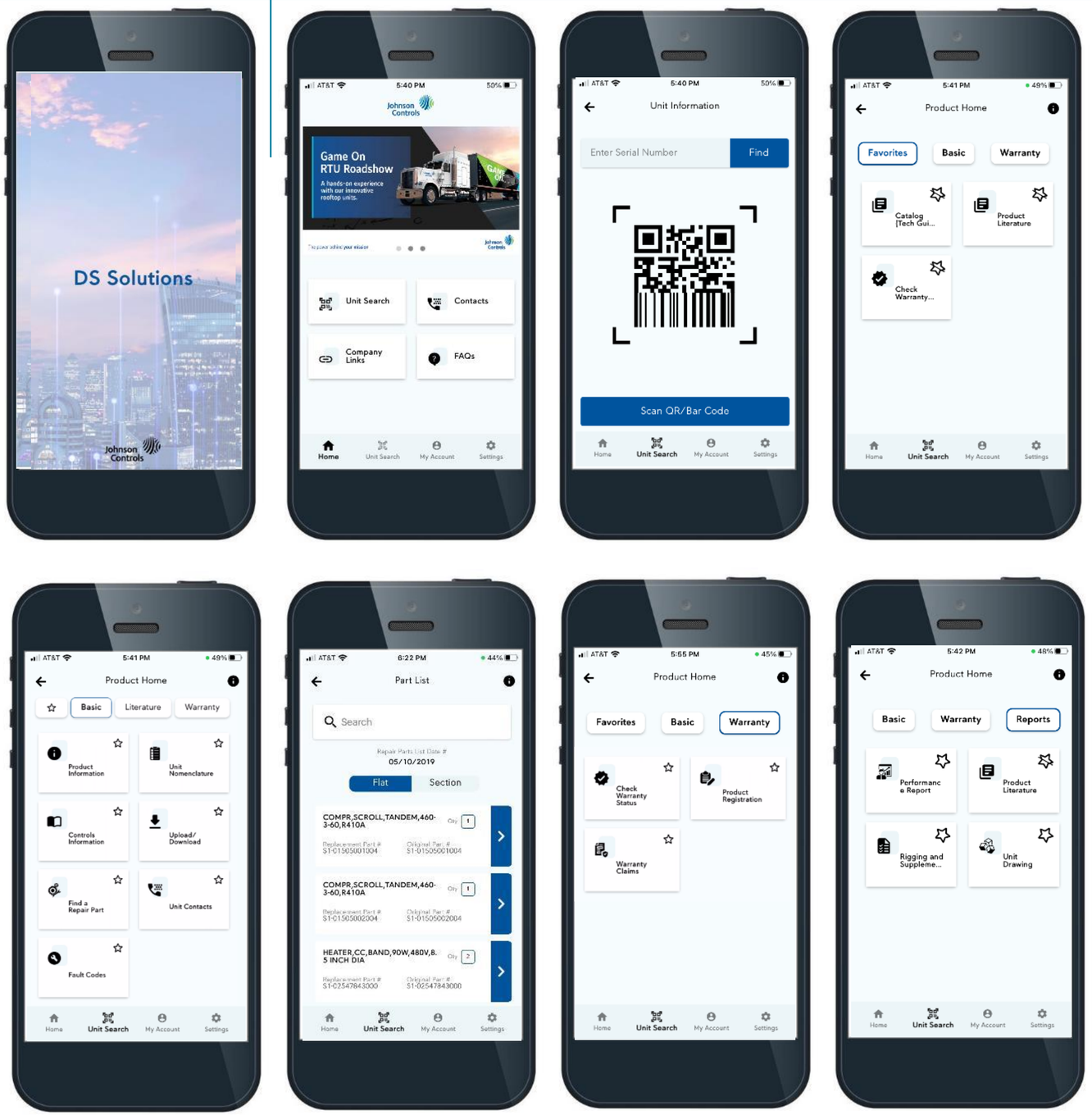
Ducted Systems Solutions

Available on the App Store

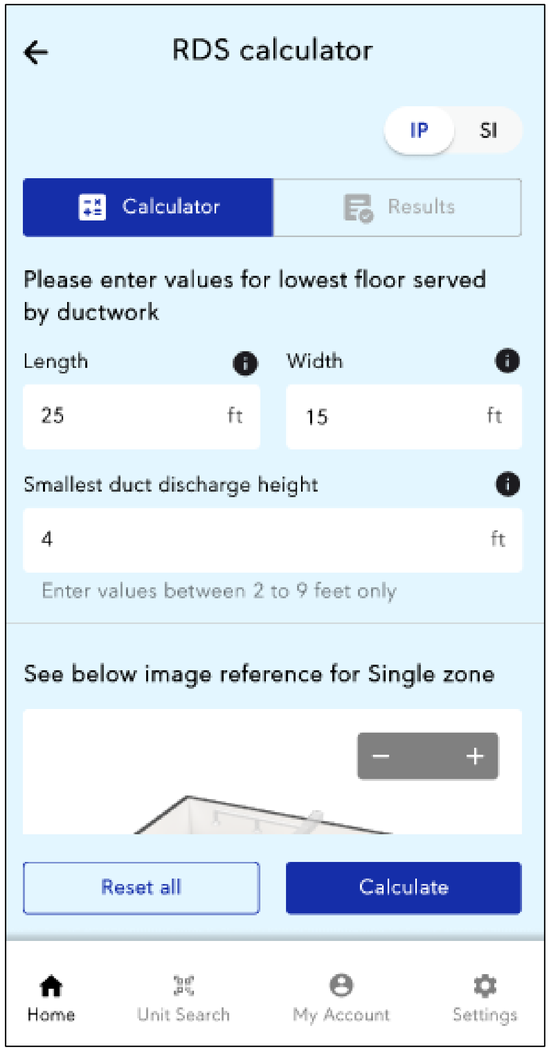
Get it on Google play

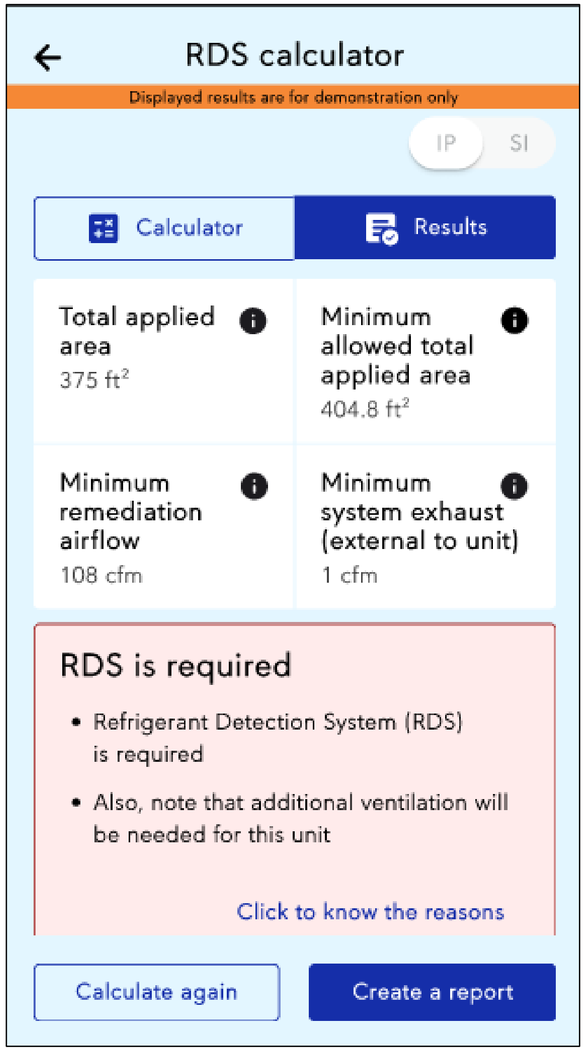
Released in June 2022

- Supports – Light Commercial, Commercial and Residential Ducted Systems products
- Ideal tool for contractors on the jobsite
- Provides critical information at your fingertips such as Nomenclature, Literature (Tech guide, IOM's, Wiring drawings), Parts list, Warranty information, Field reference guides, Controls data, Fault codes, etc. ..which are specific to the unit, so no more digging through catalogues for specific unit information
- Uses Navigator login credentials but makes login easy with biometric and facial recognition
- Leverages the power of modern mobile technology like camera-integration and geolocation services
- Promotional Labor warranty of up to 1 year for RTU's by using the DS App.

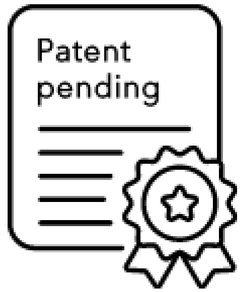


Refrigerant Detection System (RDS) Calculator – Coming soon !





" The RDS (Refrigerant Detection System) Calculator determines if and when commercial and residential products using R-454B refrigerant require a refrigerant leak detection system per standard UL/CSA-60335-2-40 based on actual building applications. This tool takes into account the refrigerant volume, supply air discharge height, total area being conditioned, and potential individual zone impact, to determine if an RDS is required. It will also determine if exhaust air is required in the conditioned space. The user-friendly calculator gives straightforward results in a couple of simple steps. "

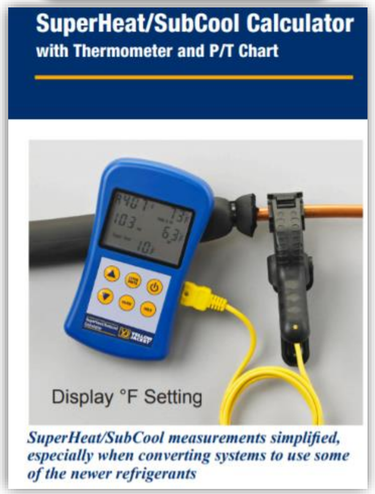


What’s Changing for Tools to Service Flammable Refrigerants?

A2L Equipment: Servicing Very Similar to A1's

Many installation & service tools are similar; however, you need to confirm they have been approved.

Service Item (versus R-410A)	A2L
Refrigerant Recovery Cylinder	Flammable (GHS label, left-handed threads)
Vacuum Pump	Check with manufacturer (switch located away from work zone)
Recovery Machines	Move to 2L compatible
Gas Detector	Move to 2L compatible
Electronic Leak Detector	Move to 2L compatible
Scales	No changes
Ventilation Fan	Similar (may be differences in machine rooms)
Electrical Hand Tools	Non-sparking preferred (AHRI – 8017)
Dry Chemical/CO_2 Fire Extinguisher	Chemical compatible



A2L Certified Tools

Many installation & service tools are being upgraded to include A2L refrigerants here is just some examples of those companies.

- Appion
- Bacharach
- Yellow Jacket
- NAVAC
- Inficon
- CPS
- When in doubt, check with component manufacturer

NAVAC
Empowering you to work smarter

SERVICE NOTICE

Subject	A2L Usage
Date	1/1/2020
Product	DC Pumps, DC Recovery Units & DC Station
Relevant Models	NP2DLM NP4DLM NRP6Di NRP6DV NRP8DV NP12DM NRRD NRDC4M

The recent increase of the HVACR industry using lower Global Warming Potential (GWP) refrigerants means the markets for those refrigerants, and tools to service equipment equipped with these refrigerants are rapidly growing. These refrigerants fall into the safety classification of A2/A2L/A3.

In North America, the rise of A2L mildly flammable refrigerants such as R32, R454B, R1234ZE/YF, etc. has necessitated the need for recovery machines and vacuum pumps that may be used with mildly flammable refrigerants.

NAVAC's **NRDD** and **NRDC4M** refrigerant recovery machines and the **NP2DLM, NP4DLM, NRP6Di, NRP8Di, NRP6DV, NRP8DV,** and **NP12DM** vacuum pumps and the **NRC62D** charging machine are compatible with A2L refrigerant systems.

Appion

Safety Alert

A2L Refrigerant Recovery Suitability

A2L "mildly flammable" refrigerants, such as R32 and R1234yf, are becoming increasingly popular due to better efficiencies and lower ODP/GWP numbers than other refrigerants. However, due to the mildly flammable nature of these refrigerants, it is important to ensure proper technical training and compatible equipment is in place prior to recovering these refrigerants.

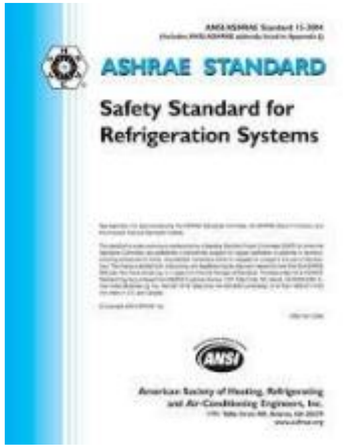
With proper training and technical procedures, the G5Twin and G1Single units can safely be used to recover A2L refrigerants, in accordance with relevant regulatory guidance.

What’s Should Technicians Do to Prepare for Flammable Refrigerants

What Distributors and Contractors Need to do to Prepare

Understanding Codes, Communication and Training are key

- **Start flammable refrigerants training now (ESCO, ACCA, HARDI JCI, etc.)**
- **Know your areas building codes (UMC, IMC, IRC, etc.)**
- **Understand UL 60335-2-40 & ASHRAE 15 & 15.2 – calculate conditioned space volumes and critical refrigerant charges**
  - Determines if Refrigerant Detection Systems will be required
- **Develop a communications plan; why flammable refrigerants? Etc.**
- **Secure sources of reclaim and virgin R410A now; it's only going to become less available and more expensive… Certified Reclaim – good!**
- **Inform contractors not to mix dirty gas – it will be worth less…**
- **Update your EPA Section 608 licenses, Review the new AIM Act requirements (phase-out of disposable cylinders, cylinder tracking)**
- **Upgrade any service equipment that isn't A2L compatible**



Best Practices and Resources

A2L Best Practices

Before Installing or Servicing Equipment

- **SAFETY FIRST!**
- Read SDS and OEM Equipment Manual.
- Follow lockout/tagout procedures when needed.
- Verify no voltage is present before working.
- Ensure area is well ventilated.
- Evaluate jobsite for a) ignition sources, b) flammable vapors, c) controlling area, d) confined spaces, and e) clear exit points.

A2L Installation

- Follow OEM guidelines for minimum room area/refrigerant charge limits.
- Ensure mitigation components are installed and operating per OEM instructions.
- Use locking refrigerant caps to prevent unauthorized access to the system.
- Ensure a filter drier is installed.

A2L Evacuation and Pressure Test

- Consult the OEM instructions to determine proper evacuation targets/procedures.
- Pressure test field erected components.
- Evacuate the system before charging using an A2L rated vacuum pump.
- Record a) *date*, b) *test pressure, and* c) *vacuum level on the label* (UL 60335-2-40).

SAFE REFRIGERANT TRANSITION TASK FORCE

A2L Charging (if required)

- Do NOT exceed the maximum allowable refrigerant charge per OEM instructions. (Charge amounts may vary due to line-sets.)
- Follow OEMs procedure for proper charging techniques. (Superheat/Subcooling)
- If refrigerant is a 400-series, the refrigerant must leave the cylinder in 'liquid form.'
- Record a) *date* and b) *total refrigerant charge weight on the unit label* (UL 60335-2-40).

A2L System Repairs

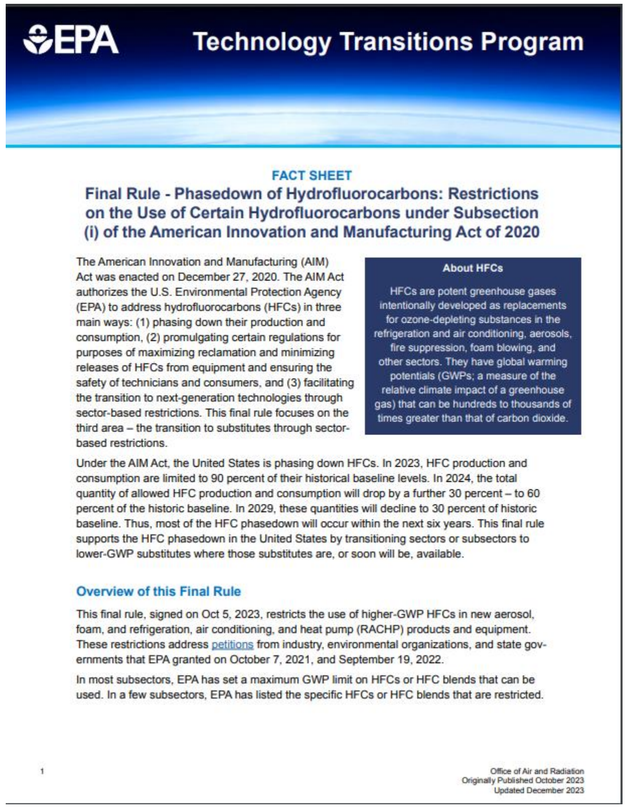
- Leak check to verify no refrigerant is present.
- Ensure equipment is grounded before working.
- Use proper capacitor discharge methods.
- Use only OEM approved replacement parts.
- Use nitrogen before and during all brazing.

A2L Recovery

- Do NOT vent.
- Do NOT mix refrigerants.
- Use recovery tools rated for use with A2L refrigerants.
- Recover all refrigerants before opening system.
- Recover into DOT approved recovery cylinder.
- Do not exceed cylinder fill weights.
- Label recovery cylinder contents.

Refrigerant Resources

- **JCI Public Refrigerant Resources**
  - https://www.johnsoncontrols.com/navigating-the-refrigerant-transition
- **ESCO A2L On-Line Training**
  - https://www.escogroup.org/training/lowgwprefrigerant.aspx
- **EPA Technology Transition Fact Sheet:**
  - https://www.epa.gov/system/files/documents/2023-10/technology-transitions-final-rule-fact-sheet-2023.pdf
- **EPA Technology Transition Frequent Questions (updated)**
  - https://www.epa.gov/climate-hfcs-reduction/frequent-questions-phasedown-hydrofluorocarbons#technology-transitions-program
- **AHRI Safe Refrigerant Transition Research and Testing**
  - https://www.ahrinet.org/advocacy/safe-refrigerant-transition
- **ACCA A2L On-Line Training**
  - https://www.acca.org/education/a2ltraining



EPA Technology Transitions Program

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

The American Innovation and Manufacturing (AIM) Act was enacted on December 27, 2020. The AIM Act authorizes the U.S. Environmental Protection Agency (EPA) to address hydrofluorocarbons (HFCs) in three main ways: (1) phasing down their production and consumption, (2) promulgating certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs from equipment and ensuring the safety of technicians and consumers, and (3) facilitating the transition to next-generation technologies through sector-based restrictions. This final rule focuses on the third area – the transition to substitutes through sector-based restrictions.

About HFCs

HFCs are potent greenhouse gases intentionally developed as replacements for ozone-depleting substances in the refrigeration and air conditioning, aerosols, fire suppression, foam blowing, and other sectors. They have global warming potentials (GWPs; a measure of the relative climate impact of a greenhouse gas) that can be hundreds to thousands of times greater than that of carbon dioxide.

Under the AIM Act, the United States is phasing down HFCs. In 2023, HFC production and consumption are limited to 90 percent of their historical baseline levels. In 2024, the total quantity of allowed HFC production and consumption will drop by a further 30 percent – to 60 percent of the historic baseline. In 2029, these quantities will decline to 30 percent of historic baseline. Thus, most of the HFC phasedown will occur within the next six years. This final rule supports the HFC phasedown in the United States by transitioning sectors or subsectors to lower-GWP substitutes where those substitutes are, or soon will be, available.

Overview of this Final Rule

This final rule, signed on Oct 5, 2023, restricts the use of higher-GWP HFCs in new aerosol, foam, and refrigeration, air conditioning, and heat pump (RACHP) products and equipment. These restrictions address petitions from industry, environmental organizations, and state governments that EPA granted on October 7, 2021, and September 19, 2022.

In most subsectors, EPA has set a maximum GWP limit on HFCs or HFC blends that can be used. In a few subsectors, EPA has listed the specific HFCs or HFC blends that are restricted.

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Thank You