



EPA's Final Refrigerant Ruling

Its Impact on Your Business

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Reference and Disclaimer

- **Reference: Federal Register Vol. 80 No. 138, July 20, 2015, 42870-42959**
- **Read the regulation and seek legal help as needed to clarify**
- **Contact the EPA for details about the ruling and to confirm impact on your products**

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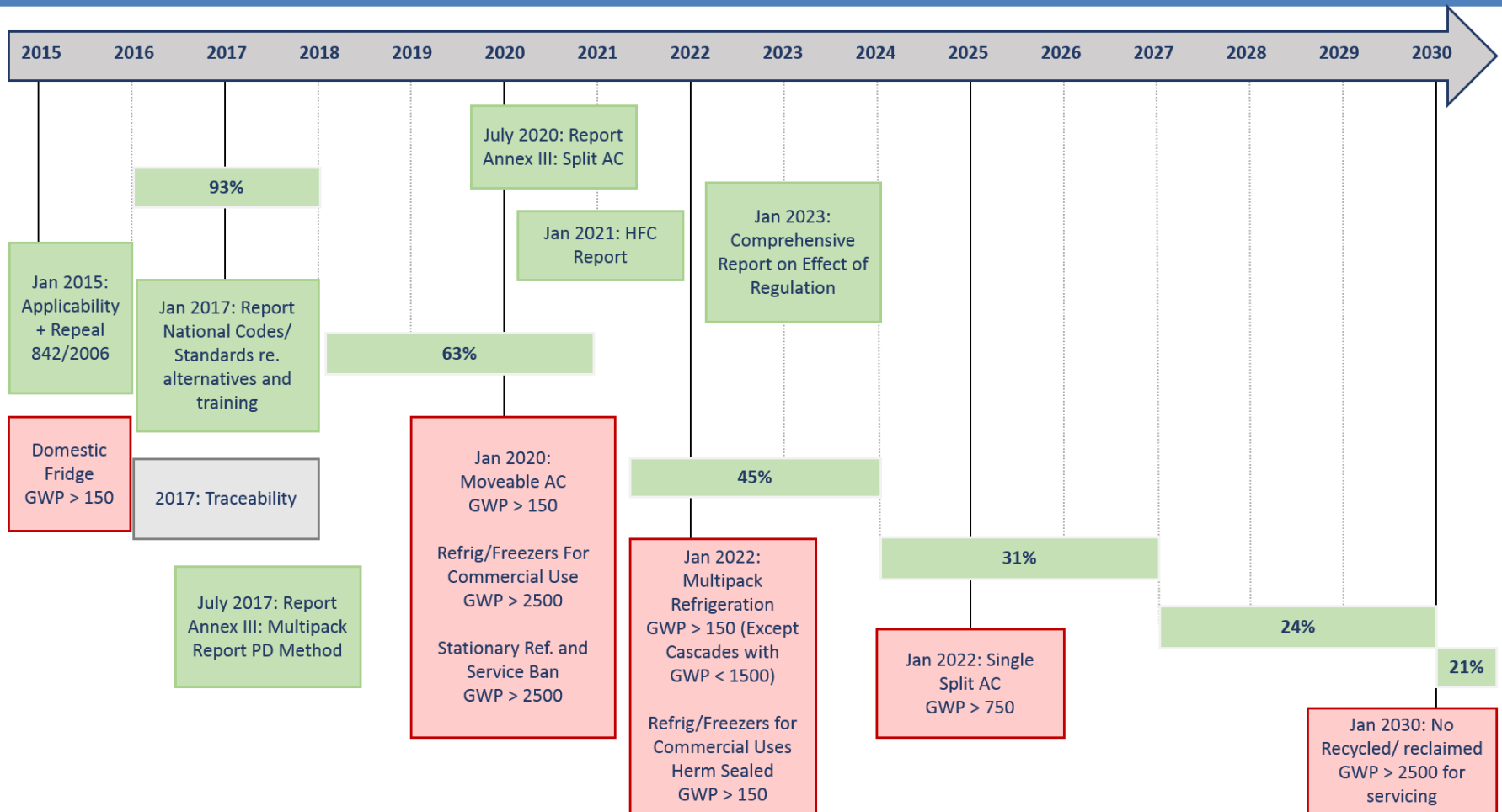


Agenda

- **A Quick Review of Recent Refrigerant Regulations**
- **Environmental Protection Agency (EPA) Rule**
 - Background
 - Proposed rule to delist some existing refrigerants
 - Final rule to delist some existing refrigerants by end-use
 - Emerson's perspective
- **What's Next?**

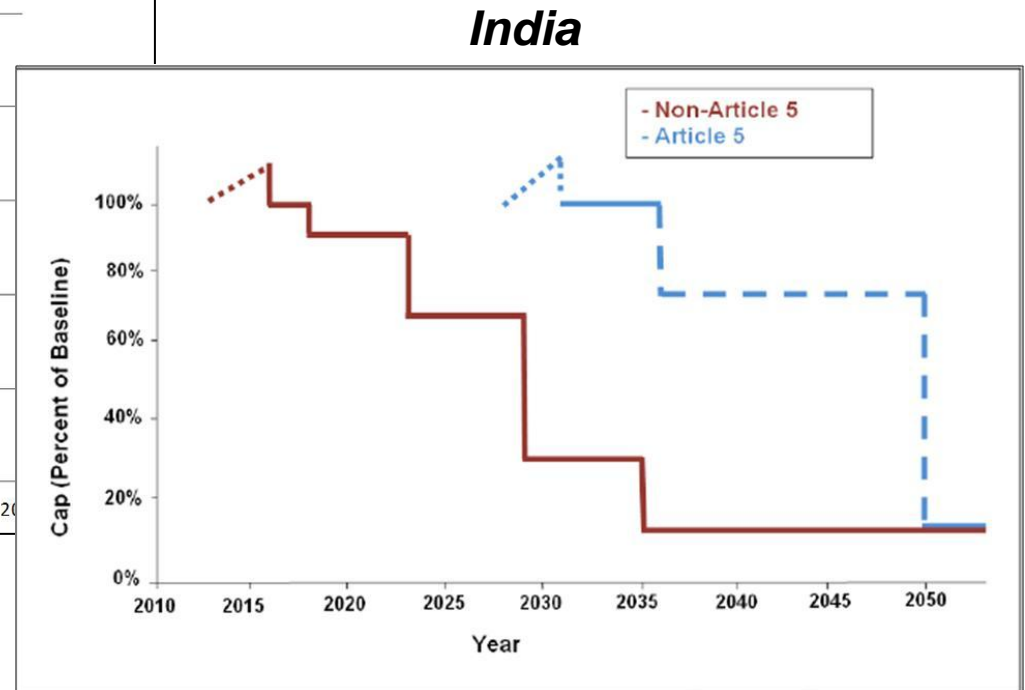
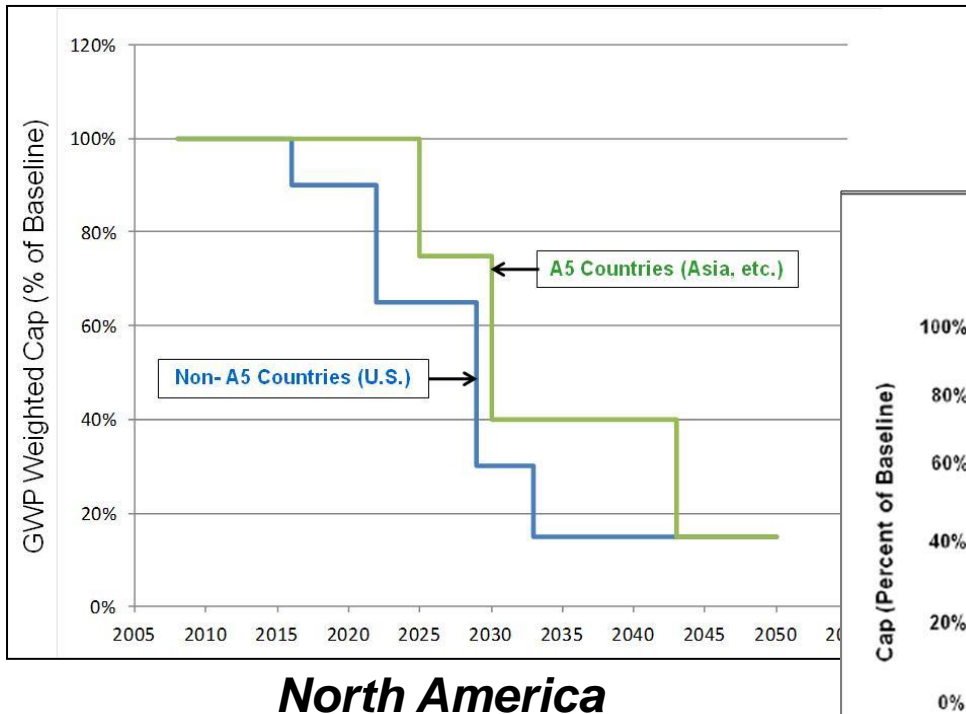


European F-Gas Regulation: Phase-Down HFC and Application Bans



Europe preparing for phase-down and ban impact

North America and India Proposals for Amendment to the Montreal Protocol



Meeting in Paris ended July 24 without “contact group”, which is needed for next step of Montreal Protocol supported phase-down discussions

Environmental Protection Agency (EPA): What Is SNAP? What Are NOPRs?

- **SNAP stands for *Significant New Alternatives Policy***
 - Environmental Protection Agency's program to approve alternative refrigerants to ozone-depleting potential CFCs, HCFCs
 - Approval specific to refrigerant and application or end-use
 - Website: <http://www.epa.gov/ozone/snap/index.html>
- **When EPA approves a refrigerant, a Notice of Public Rulemaking (NOPR) is issued in the Federal Register**
 - Public has opportunity to review and comment
- **Final rule gets published in the Federal Register**
 - This final rule was published in the Federal Register on July 20, 2015



EPA Original Proposal To Delist Refrigerants Published August 6, 2014

Emerson response in red

Refrigerant	Supermarket*		Condensing Units* (field charged)	Standalone Self Contained Comm. Ref. Eqpt* (factory charged sealed systems)	Vending Machines *	Foam	Auto AC
	Direct	Sec.					
R404A/507A	JAN 2016	JAN 2016	JAN 2016 Delay 6 years	JAN 2016 Delay 6 years	JAN 2016		
HFC-227 ea., R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A	JAN 2016	JAN 2016					
R407A, R407F				JAN 2016 (New) Do not delist			
R134a				JAN 2016 (New) Do not delist	JAN 2016 (New)	JAN 2017 Delay 6 years	2021 Model (New)
Various Blends, GWP 600-3990**				JAN 2016 (New)			
Various Foam Refs**						JAN 2017 Delay 6 years	
Various Auto Blends**							2017 Model (New)

**Do Not Delist Now in Industrial and Ice: No Alternates Without Glide
S. Mkt, Transport — No Comment**

*New and retrofit only; Service is allowed

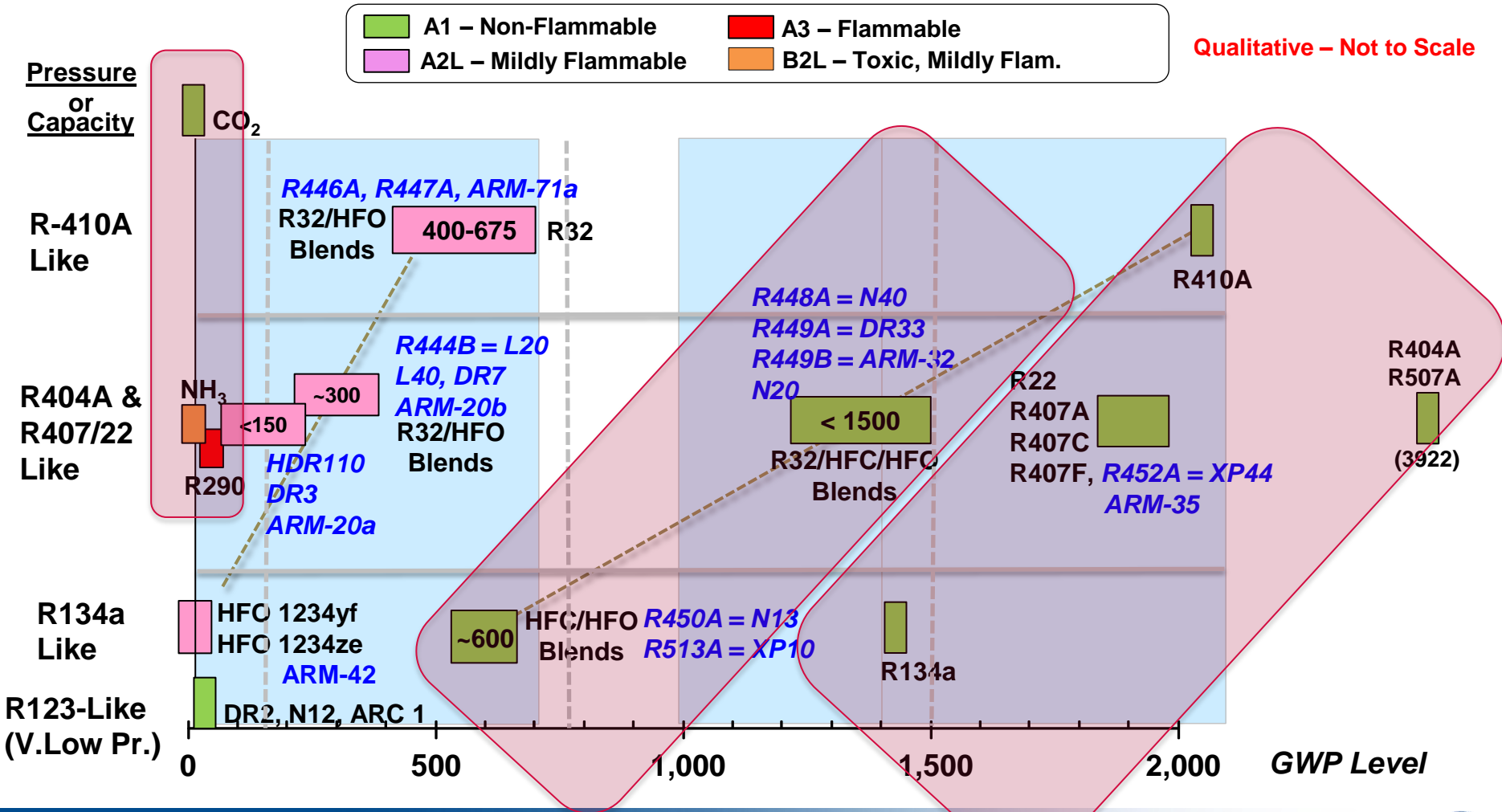
**Check EPA Documents for details

Aerosol Application not shown in above table

Industrial, Ice Making heads, Warehouses and Transport Applications are not Included in This NOPR but comments have been requested.



Alternatives for Refrigeration Applications



EPA's Final Rule To Change Listing Status Of Certain HFCs



FEDERAL REGISTER

Vol. 80 Monday,
No. 138 July 20, 2015

Part II

Environmental Protection Agency

40 CFR Part 82

Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes Under the Significant New Alternatives Policy Program; Final Rule

42870 Federal Register / Vol. 80, No. 138 / Monday, July 20, 2015 / Rules and Regulations

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[EPA-HQ-OAR-2014-0198; FRL-9926-55-OAR]

RIN 2060-AS18

Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes Under the Significant New Alternatives Policy Program

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action changes the status from acceptable to unacceptable; acceptable, subject to use conditions; or acceptable, subject to narrowed use limits for a number of substitutes, pursuant to the U.S. Environmental Protection Agency's Significant New Alternatives Policy program. We make these changes based on information showing that other substitutes are available for the same uses that pose lower risk overall to human health and the environment. Specifically, this action changes the listing status for certain hydrofluorocarbons in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors. This action also changes the status from acceptable to unacceptable for certain hydrochlorofluorocarbons being phased out of production under the Montreal Protocol on Substances that Deplete the Ozone Layer and section 605(a) of the Clean Air Act.

DATES: This rule is effective on August 19, 2015.

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA-HQ-OAR-2014-0198. All

the telephone number for the Air and Radiation Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT:

Margaret Sheppard, Stratospheric Protection Division, Office of Atmospheric Programs, Mail Code 6205J, Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460; telephone number (202) 343-9163; fax number (202) 343-2338, email address: sheppard.margaret@epa.gov. Notices and rulemakings under EPA's Significant New Alternatives Policy (SNAP) program are available on EPA's Stratospheric Ozone Web site at www.epa.gov/ozone/snap/regs.

SUPPLEMENTARY INFORMATION:

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- I. General Information
 - A. Executive Summary
 - B. Does this action apply to me?
 - C. What acronyms and abbreviations are used in the preamble?
 - II. How does the SNAP program work?
 - A. What are the statutory requirements and authority for the SNAP program?
 - B. What are EPA's regulations implementing CAA section 612?
 - C. How do the regulations for the SNAP program work?
 - D. What are the guiding principles of the SNAP program?
 - E. What are EPA's criteria for evaluating substitutes under the SNAP program?
 - F. How are SNAP determinations updated?
 - C. What does EPA consider in deciding whether to modify the listing status of an alternative?
 - H. Where can I get additional information about the SNAP program?
 - III. What actions and information related to greenhouse gases have bearing on this final action to modify prior SNAP determinations?
 - IV. What petitions has EPA received requesting a change in listing status for HFCs?
 - A. Summary of Petitions
 - B. How This Action Relates to the Climate
1. Background
 2. What is EPA finalizing regarding MVAC systems for newly manufactured light-duty motor vehicles?
 - (a) HFC-134a
 - (b) Refrigerant Blends
 3. MVAC Servicing
 4. Would this action affect EPA's LD GHG Rule?
 5. How will the change of status apply to exports of MVAC systems?
 - (a) SNAP Interpretation
 - (b) Narrowed Use Limit for MVAC
 6. How is EPA responding to comments concerning this end-use?
 - (a) Timeline
 - (b) Interaction With EPA's LD GHG Rule
 - (c) Environmental Impacts
 - (d) Cost Impacts of Rule
 - (e) Servicing and Retrofits
 - (f) Refrigerant Blends for Retrofits of MVAC Systems
 - (g) Use Conditions for HFC-134a
 - (h) Flexibility for Exports
 - C. Retail Food Refrigeration and Vending Machines
 1. Background
 - (a) Overview of SNAP End-Uses, End-Use Categories, and Commonly-Used Refrigerants
 - (b) Terms and Coverage
 - (c) The Terms "New" and "Retrofit" and How They Apply to Servicing
 2. What is EPA finalizing for retail food refrigeration (supermarket systems)?
 - (a) New Supermarket Systems
 - (1) What other alternatives does EPA find pose lower overall risk to human health and the environment?
 - (2) When will the status change?
 - (b) Retrofit Supermarket Systems
 - (1) What other alternatives does EPA find pose lower overall risk to human health and the environment?
 - (2) When will the status change?
 - (c) How is EPA responding to comments on retail food refrigeration (supermarket systems)?
 3. What is EPA finalizing for retail food refrigeration (remote condensing units)?
 - (a) New Remote Condensing Units
 - (1) What other alternatives does EPA find



End Uses Impacted by Final Rule

- **Retail food refrigeration**
 - Stand-alone
 - Remote condensing unit
 - Supermarket systems
- **Stand-alone**
 - Refrigerators, freezers and reach-in coolers, open or with door...
 - Fully charged with refrigerant at factory and typically only power required for operation to start
- **Remote condensing unit (typically 0.3 – 5.7 Tons)**
 - One or two compressors, one condenser, one receiver in single unit
 - Normally located outside sales area
- **Supermarket Systems**
 - Multiplex or centralized, direct or indirect systems
 - Distributed refrigeration system (direct system), secondary loop and cascade refrigeration (indirect system)
 - Generally more than two compressors per system
- **Application temperature — no distinction for supermarket and remote condensing unit systems, only stand alone**
 - Medium temp: above 32°F product temp
 - Low temp: below 32°F product temp
- **Ice makers connected to a supermarket system**

End Uses Impacted by Final Rule (cont'd)

- **Not impacted by this rule...**

- Industrial process refrigeration
- Blast chillers or blast freezers (falls under industrial process refrigeration)
- Ice makers not connected to supermarket systems, self-contained or connected to a dedicated condensing unit
- Very low temperature equipment, -50°F or lower
- Equipment designed to make or process cold food and beverage that are dispensed via a nozzle, including ice cream machines, slushy iced beverage dispenser, and soft-drink dispensers

- **Service**

- “..existing systems may continue to be serviced and maintained for the useful life of that equipment using the original refrigerant,...”

New vs. Retrofit Systems

■ New

- “Date upon which the refrigeration circuit is complete, the system can function, the system holds a full refrigerant charge, and the system is ready for its intended purpose”
- Supermarket may undergo an expansion and continue to use existing refrigerant “if there is sufficient cooling capacity within the system to support the expansion” — considered “not changing the intended purpose of the system”
 - Adding additional cases, compressors and refrigerant that were not supported by original system would be “new”

■ Retrofit

- Use of a refrigerant in an appliance that was designed for and originally operated using a different refrigerant
- Recognize that expansion devices, filter driers, gaskets and oils may need replacement due to compatibility properties of the different refrigerants

EPA's Final Rule

Phase-Out Candidates*, Likely Alternatives* and Dates

Phase-Out Refrigerant	Super-market New	Super-market Retrofit	Remote Cond. Unit New	Remote Cond. Unit Retrofit	Stand-Alone			
					MT <2,200 BTU/hr. and not contain flooded evap. New	MT ≥2,200 BTU/hr. with or without flooded evap. New	LT New	LT and MT Retrofit
R-404A/507A	Jan 1, 2017	July 20, 2016	Jan 1, 2018	July 20, 2016	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	July 20, 2016
R-410A	OK	-	OK	-	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	-
R-407A/C/F	OK	OK	OK	OK	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	OK
HFC-134a	OK	OK	OK	OK	Jan 1, 2019	Jan 1, 2020	OK	OK
Likely Alternatives (Emerson Perspective)								
R448A/449A	OK	OK	OK	OK	Neither SNAP-approved, nor banned	Neither SNAP approved, nor banned	OK	OK for LT only
R-450A/513A	OK	OK	OK	OK	OK	OK	OK	OK
R-290	-	-	-	-	OK	OK	OK	-
R-744	OK	-	OK	-	OK	OK	OK	-
R-717	OK (in primary loop of secondary CO2 sys.)	-	OK (in primary loop of secondary CO2 sys.)	-	-	-	-	-

* Abbreviated; see EPA final rule for complete listing

EPA's Final Rule and DOE Energy Regulation Timing

Phase-Out Refrigerant	Super-market New	Super-market Retrofit	Remote Cond. Unit New	Remote Cond. Unit Retrofit	Stand-Alone			LT and MT Retrofit
					MT <2,200 BTU/hr. and not contain flooded evap. New	MT ≥2,200 BTU/hr. with or without flooded evap. New	LT New	
R-404A/507A	Jan 1, 2017	July 20, 2016	Jan 1, 2018	July 20, 2016	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	July 20, 2016
R-410A	OK	-	OK	-	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	-
R-407A/C/F	OK	OK	OK	OK	Jan 1, 2019	Jan 1, 2020	Jan 1, 2020	OK
HFC-134a	OK	OK	OK	OK	Jan 1, 2019	Jan 1, 2020	OK	OK
DOE Energy Reduction Compliance			Jan 1, 2020 (Walk-in)		March 27, 2017	March 27, 2017	March 27, 2017	

- R404A medium temperature stand-alone cases – redesign and retest for efficiency in 2017 and then again for replacement refrigerant in 2019/2020 with no 404A-like options
- Low-temperature and HFC-134a stand-alone cases have some options, but timing issue remains and additional cooling may be required for compressors which will add components and cost

Some Questions and Answers

- **If a supermarket rack system gets built and shipped on Dec 31., 2016 and gets installed on Jan. 15, 2017, can it use R404A?**
 - No. The shipment date is not relevant for determining compliance with the rule for a rack system. It is “the date upon which the refrigeration circuit is complete, the system can function, the system holds a full charge, and the system is ready for use for its intended purposes” which is relevant.
- **Would a line-up of closed door freezer cases connected to a remote condensing unit fall under the remote condensing unit or stand-alone category?**
 - Remote condensing unit
- **Can a new ice machine connected to a supermarket use R404A?**
 - Yes, if the refrigeration circuit is complete, the system can function, the system holds a full charge, and the system is ready for use for its intended purposes before Jan. 1, 2017; not if it is on or after Jan 1, 2017

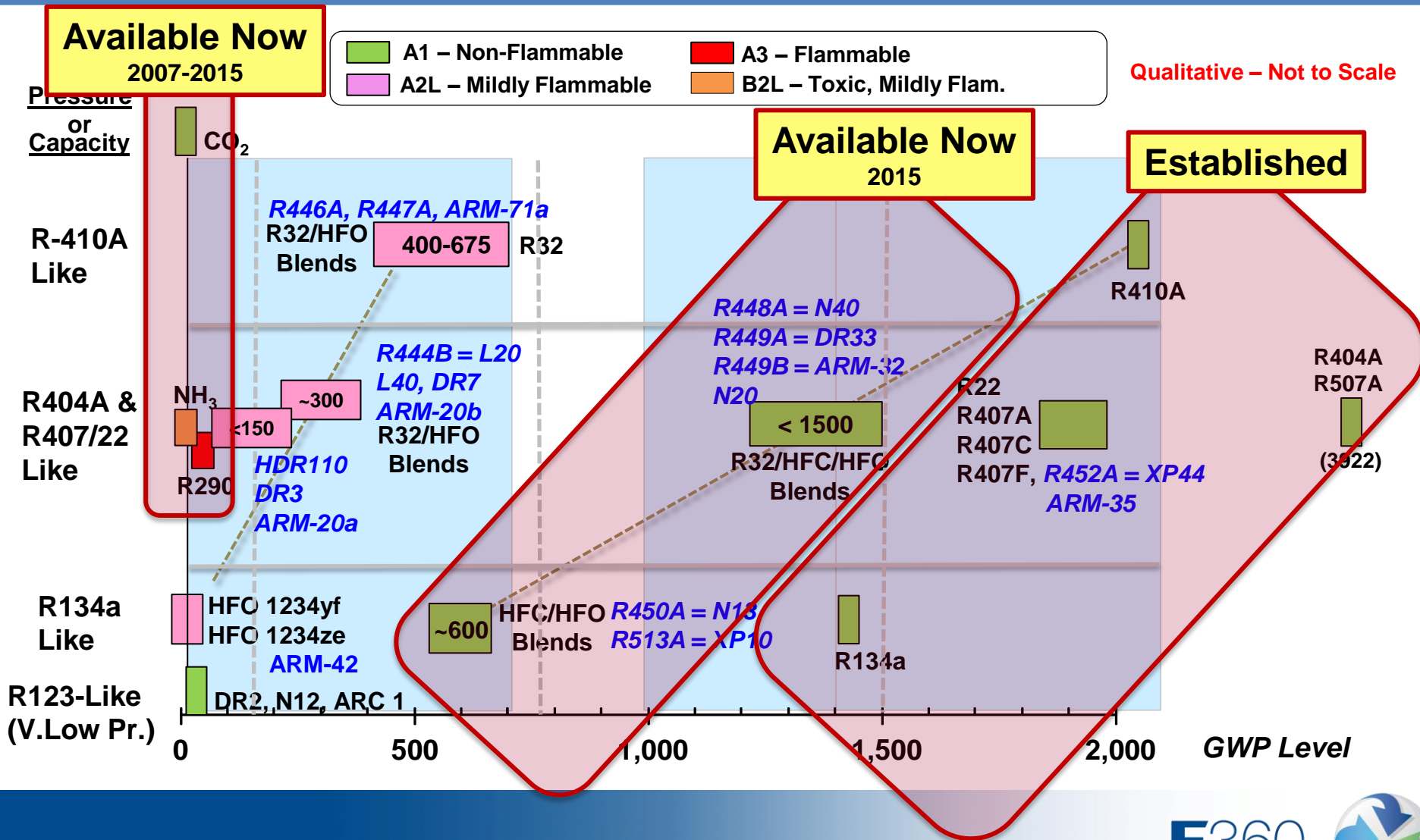
Some Questions and Answers (cont'd)

- **How about a new ice machine connected to a remote condensing unit using R404A after Jan. 1, 2017?**
 - It is allowed, since this configuration of ice machine is not covered by this rule.
- **Can existing equipment be serviced with delisted refrigerants?**
 - Yes, “..existing systems may continue to be serviced and maintained for the useful life of that equipment using the original refrigerant,…”
- **Can reclaimed or recovered R404A be used for service?**
 - Yes, only for “existing systems”
- **I’m replacing a failed condensing unit. Is that considered a retrofit?**
 - No. A “retrofit” is defined as “the use of a refrigerant in an appliance that was designed for and originally operated using a different refrigerant”.



Recap of Alternatives for Refrigeration Applications

* Emerson products – check website www.EmersonClimate.com



Refrigerant Options Emerson Plans To Support In Refrigeration

Refrigerant	Stand Alone	Remote Condensing Unit	Supermarket Rack
Today	404A 134a	404A 407A/F	404A 407A/F
<1,500 GWP A1 Non-Flammable	450A, 513A 134a, 448A, 449A, (LT only)	450A, 513A 134a, 448A, 449A,	450A, 513A 134a, 448A, 449A,
<150 GWP Mildly Flammable	HDR110*	HDR110*	-
<10 GWP	290 744 HFO-1234yf* HFO-1234ze*	290 744 HFO-1234yf* HFO-1234ze*	744 HFO-1234yf* HFO-1234ze*

*Likely To Support. Timing TBD.

Other refrigerants may be added based on completing application development and qualification approvals



What should I Consider?

- **Supermarket Systems**
 - Move to adopt R-407A/R-407F or even lower GWP alternatives like R-448A and R-449A; expect CO₂ use to increase and R290 and Ammonia trials to continue
- **Remote Condensing Units**
 - Redesign for alternatives; for walk-ins, redesign to meet efficiency requirements
- **Stand-Alone (Self-Contained) Systems**
 - Request SNAP approval for A1 R-404A like replacements such as R-448A and R-449A
 - Combine meeting DOE efficiency standards and EPA refrigerant changes into one qualification step – will not be easy!
- **Watch for new alternatives to be SNAP approved; contact Emerson to check status of product approvals**
- **Continue to request the DOE and EPA to better coordinate their actions**
- **Train and keep up with technology changes**
- **Use Emerson and forums like E360 to help you**

Other Applications and End Uses

- **On next several pages, the change of status of refrigerants in other end uses like foam, aerosol, MVAC are listed for reference purposes**
- **Further details can be obtained in the published final rule**



Change of Status for Aerosols

TABLE 2—CHANGE OF STATUS DECISIONS FOR AEROSOLS

End-use	Substitutes	Decision	Uses that are acceptable, subject to use conditions
Propellants	HFC-125	Unacceptable as of January 1, 2016.	None.
Propellants	HFC-134a	Unacceptable as of July 20, 2016 except for uses listed as acceptable, subject to use conditions.	<p><i>From July 20, 2016 to January 1, 2018:</i> Products for smoke detector functionality testing; products for which new formulations require governmental review, including: EPA pesticide registration, military or space agency specifications, or FDA approval (other than MDIs).</p> <p><i>As of July 20, 2016:</i> Cleaning products for removal of grease, flux and other soils from electrical equipment; refrigerant flushes; products for sensitivity testing of smoke detectors; lubricants and freeze sprays for electrical equipment or electronics; sprays for aircraft maintenance; sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents and mold cleaners; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment; adhesives and sealants in large canisters; document preservation sprays; FDA-approved MDIs for medical purposes; wound care sprays; topical coolant sprays for pain relief; and products for removing bandage adhesives from skin.</p> <p><i>As of July 20, 2016:</i> FDA-approved MDIs for medical purposes.</p>
Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a.	Unacceptable as of July 20, 2016 except for uses listed as acceptable, subject to use conditions.	<p><i>As of July 20, 2016:</i> FDA-approved MDIs for medical purposes.</p>



Change of Status for Foam-Blowing Agents

TABLE 8—CHANGE OF STATUS DECISIONS FOR FOAM BLOWING AGENTS

End-use	Substitutes	Decision*
Rigid Polyurethane: Appliance	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2020</i> . Unacceptable for all uses as of January 1, 2022.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels.	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2020</i> . Unacceptable for all uses as of January 1, 2022.
Rigid Polyurethane: Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2020</i> . Unacceptable for all uses as of January 1, 2022.
Rigid Polyurethane: Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2019</i> . Unacceptable for all uses as of January 1, 2022.

Change of Status for Foam-Blowing Agents (cont'd)

TABLE 8—CHANGE OF STATUS DECISIONS FOR FOAM BLOWING AGENTS—Continued

End-use	Substitutes	Decision *
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock.	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2017</i> . Unacceptable for all uses as of January 1, 2022.
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2017</i> . Unacceptable for all uses as of January 1, 2022.
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2017</i> . Unacceptable for all uses as of January 1, 2022.
Polystyrene: Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2017</i> . Unacceptable for all uses as of January 1, 2022.
Polystyrene: Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2021</i> . Unacceptable for all uses as of January 1, 2022.
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2020</i> . Unacceptable for all uses as of January 1, 2022.
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof.	Acceptable subject to narrowed use limits for military or space- and aeronautics-related applications* and unacceptable for all other uses as of <i>January 1, 2017</i> . Unacceptable for all uses as of January 1, 2022.

* Under the narrowed use limit, use is limited to military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.

Change of Status for Motor Vehicle Air Conditioning (MVAC) and Vending Machines

TABLE 3—CHANGE OF STATUS DECISIONS FOR MVAC

End-use	Substitutes	Decision
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	HFC-134a	Unacceptable as of Model Year (MY) 2021, except where allowed under a narrowed use limit through MY 2025. Acceptable, subject to narrowed use limits, for vehicles exported to countries with insufficient servicing infrastructure to support other alternatives, for MY 2021 through MY 2025; Unacceptable for all newly manufactured vehicles as of MY 2026.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	R-406A, R-414A (HCFC Blend Xi, GHG-X4), R-414B (HCFC Blend Omicron), HCFC Blend Delta (Free Zone), Freeze 12, GHG-X5, HCFC Blend Lambda (GHG-HP), R-416A (FRIGC FR-12, HCFC Blend Beta), SP34E, R-426A (RS-24, new formulation).	Unacceptable as of MY 2017.

TABLE 7—CHANGE OF STATUS DECISIONS FOR VENDING MACHINES

End-use	Substitutes	Decision
Vending machines (new only) ..	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E.	Unacceptable as of January 1, 2019.
Vending machines (retrofit only)	R-404A, R-507A	Unacceptable as of July 20, 2016.

Thank You!

Questions?

Reference: Federal Register / Vol. 80, No. 138 / Monday, July 20, 2015 /
Rules and Regulations, 42870-42959

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