

Federal Regulation on HFC – July 2015

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

AGENCY: Environmental Agency

Protection (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.

CONTENT:

Motor vehicle air conditioning (MVAC)

Systems	Refrigerant	Decision	Exception
newly manufactured light-duty vehicles	HFC-134a	Unacceptable beginning in Model Year (MY) 2021	except as allowed under a narrowed use limit ; destined for use in countries that do not have infrastructure in place for servicing with other acceptable refrigerants.
newly manufactured light-duty vehicles	HFC-134a	Unacceptable beginning in Model Year (MY) 2026	narrowed use limit will be in place through MY 2025

EPA is also listing the use of certain refrigerant blends as unacceptable in newly manufactured light-duty motor vehicles starting with MY 2017.

Retail Food Refrigeration and Vending Machines

-Retail food refrigeration, as affected by today's rule, is composed of three main categories of equipment: Stand-alone equipment; remote condensing units; and supermarket systems.

-Stand-alone equipment consists of refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and, for the smallest types, the refrigeration circuit is entirely brazed or welded.

-Condensing units, called remote condensing units in this final action, exhibit refrigerating capacities that typically range from 1 kW to 20 kW (0.3 to 5.7 refrigeration tons) and are composed of one (and sometimes two) compressor(s), one condenser, and one receiver assembled into a single unit, which is normally located external to the sales area.

-Typical supermarket systems are known as multiplex or centralized systems. They operate with racks of compressors installed in a machinery room. Two main design classifications are used: Direct and indirect systems. At least 70% of supermarkets in the United States use centralized direct expansion (DX) systems to cool their display cases.

Retail food refrigeration and vending machines EPA is listing a number of refrigerants as unacceptable in a number of retail food refrigeration categories and in the vending machines end-use, as follows:

Systems	Refrigerant	Decision
Retrofitted supermarket systems	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	Unacceptable as of July 20, 2016
New supermarket systems	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	Unacceptable as of Jan 1, 2017
Retrofitted remote condensing units	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	Unacceptable as of July 20, 2016
New remote condensing units	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	Unacceptable as of Jan 1, 2018
Retrofitted vending machines	R-404A and R-507A	Unacceptable as of July 20, 2016
New vending machines	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), and SP34E	Unacceptable as of January 1, 2019
Retrofitted stand-alone retail food refrigeration equipment	R-404A and R-507A	Unacceptable as of July 20, 2016
New stand-alone medium temperature units with a compressor capacity below 2,200 Btu/hr and not containing a flooded evaporator	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	Unacceptable as of January 1, 2019
New stand-alone medium temperature units with a compressor capacity equal to or greater than 2,200 Btu/hr and stand-alone medium temperature units containing a flooded evaporator	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	Unacceptable as of January 1, 2020
New stand-alone low-temperature units	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, and RS-44 (2003 formulation)	Unacceptable as of January 1, 2020

What other alternatives does EPA find pose lower overall risk to human health and the environment?

Systems	Refrigerant	Alternatives
Retrofitted supermarket systems and Retrofitted remote condensing units	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	FOR12A, FOR12B, HFC-134a, IKON A, IKON B, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-407A, R-407C, R-407F, R-417A, R-417C, R-421A, R-422B, R-424A, R-426A, R-427A, R-437A, R-438A, R-448A, R-449A, R-450A, R-513A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-02, and THR-03
New supermarket systems and New remote condensing units	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, and R-507A	FOR12A, FOR12B, HFC-134a, IKON A, IKON B, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-407A, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-422B, R-424A, R-426A, R-437A, R-438A, R-448A, R-449A, R-450A, R-513A, R-744, RS-24(2002 formulation), RS-44 (2003 formulation), SP34E, THR-02, and THR-03 In addition, R-717 is as acceptable when used as the primary refrigerant in a secondary loop system.
Retrofitted vending machines	R-404A and R-507A	FOR12A, FOR12B, HFC-134a, IKON A, IKON B, KDD6, R-125 290/134a/600a (55.0/1.0/42.5/1.5), R-407C, R-417A, R-417C, R-421A, R-422B, R-422C, R-422D, R-426A, R-437A, R-438A, R-448A, R-449A, R-450A, R-513A, RS-24 (2002formulation), SP34E, and THR-02.83
New vending machines	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), and SP34E	acceptable or acceptable subject to use; IKON A, IKON B, R-290, R-441A, R-450A, R-513A, R-600a, R-744, and THR-02
Retrofitted stand-alone retail food refrigeration equipment	R-404A and R-507A	FOR12A, FOR12B, HFC-134a, IKON A, IKON B, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-407A, R-407B, R-407C, R-407F, R-417A, R-417C, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-427A, R-428A, R-434A, R-437A, R-438A, R-450A, R-513A, RS-24 (2002 formulation), RS-44(2003 formulation), SP34E, THR-02, andTHR-03. R-448A and R-449A
New stand-alone medium temperature units with a compressor capacity below 2,200 Btu/hr and not containing a flooded evaporator	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B,	R-290, R-600a and R-441A acceptable subject to use conditions R-450A, R-513A, R-744, IKON A, IKON B and THR-02 are acceptable substitutes without use conditions

	R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	
New stand-alone medium temperature units with a compressor capacity equal to or greater than 2,200 Btu/hr and stand-alone medium temperature units containing a flooded evaporator	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	
New stand-alone low-temperature units	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, and RS-44 (2003 formulation)	In addition, HFC-134a, FOR12A, FOR12B, R-426A, RS-24 (2002 formulation), SP34E and THR-03 remain acceptable without use conditions and are not subject to a change of status date. R-448A and R-449A acceptable without use conditions for new standalone low-temperature equipment

In summary, the other available substitutes all have zero ODP

Systems	ODP	GWP
New supermarket systems	0	0 – 2,630
New stand-alone	0	0 – 630
New vending machines	0	0 – 630

REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Retail food refrigeration (supermarket systems) (new).	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A.	Unacceptable as of January 1, 2017.	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (supermarket systems) (retrofit).	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A.	Unacceptable as of July 20, 2016.	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (remote condensing units) (new).	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A.	Unacceptable as of January 1, 2018.	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (remote condensing units) (retrofit).	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A.	Unacceptable as of July 20, 2016.	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity below 2,200 Btu/hr and not containing a flooded evaporator) (new).	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03.	Unacceptable as of January 1, 2019.	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32°F (0 °C).
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity below 2,200 Btu/hr and containing a flooded evaporator) (new).	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03.	Unacceptable as of January 1, 2020.	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32°F (0 °C).
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity equal to or greater than 2,200 Btu/hr) (new).	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03.	Unacceptable as of January 1, 2020.	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32°F (0 °C).
Retail food refrigeration (stand-alone low-temperature units) (new).	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation).	Unacceptable as of January 1, 2020.	These refrigerants have GWPs ranging from approximately 1,800 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Low-temperature" refers to equipment that maintains food or beverages at temperatures at or below 32°F (0 °C).

End-use	Substitute	Decision	Further information
Retail food refrigeration (stand-alone units only) (retrofit).	R-404A, R-507A	Unacceptable as of July 20, 2016.	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
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.	These refrigerants have GWPs ranging from approximately 1,100 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Vending machines (retrofit only).	R-404A, R-507A.	Unacceptable as of July 20, 2016.	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

REFRIGERANTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Comments
* Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	* HFC-134a	* Unacceptable as of Model Year 2021 except where allowed under narrowed use limit.	* HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-134a has a GWP of 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. This listing does not prohibit the servicing or replacement of motor vehicle air conditioning systems manufactured to use HFC-134a.
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).	Unacceptable as of Model Year 2017.	These refrigerants all contain HCFCs. They have GWPs ranging from 1,080 to 2,340 and ODPs ranging from 0.008 to 0.056. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	SP34E, R-426A (RS-24, new formulation).	Unacceptable as of Model Year 2017.	These blends have GWPs ranging from approximately 1,410 to 1,510. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

REFRIGERANTS—ACCEPTABLE SUBJECT TO USE CONDITIONS

Application	Substitute	Decision	Conditions	Comments
CFC-12 Automobile Motor Vehicle Air Conditioning (New Equipment/NIKs only).	HFC-134a	Acceptable subject to use conditions, for passenger cars and light-duty trucks manufactured for Model Year 2020 or earlier, and for vehicles other than passenger cars or light-duty trucks.	—must be used with unique fittings. —must be used with detailed labels.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment.
CFC-12 Automobile Motor Vehicle Air Conditioning (New Equipment/NIKs only).	HCFC Blend Beta (R-416A).	Acceptable subject to use conditions, for passenger cars and light-duty trucks manufactured for Model Year 2016 or earlier, and for vehicles other than passenger cars or light-duty trucks.	—must be used with unique fittings. —must be used with detailed labels.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment.
CFC-12 Automobile Motor Vehicle Air Conditioning (New Equipment/NIKs only).	R-401C	Acceptable subject to use conditions	—must be used with unique fittings. —must be used with detailed labels.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment.
CFC-12 Automobile Motor Vehicle Air Conditioning (Retrofit Equipment only).	HFC-134a, R-401C, HCFC Blend Beta (R-416A).	Acceptable subject to use conditions	—must be used with unique fittings. —must be used with detailed labels. —all CFC-12 must be removed from the system prior to retrofitting. Refer to the text for a full description.	EPA is concerned that the existence of several substitutes in this end-use may increase the likelihood of significant refrigerant cross-contamination and potential failure of both air conditioning systems and recovery/recycling equipment. No distinction is made between “retrofit” and “drop-in” refrigerants; retrofitting a car to use a new refrigerant includes all procedures that result in the air conditioning system using a new refrigerant.
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REFRIGERANTS—ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Comments
*	*	*	*
Motor vehicle air conditioning (new equipment in passenger cars and light-duty trucks only).	HFC-134a	Acceptable for use in Model Year (MY) 2021 through MY 2025 passenger cars and light-duty trucks destined for export, where reasonable efforts have been made to ascertain that other alternatives are not technically feasible because of lack of infrastructure for servicing with alternative refrigerants in the destination country.	Vehicle manufacturers must document their determination that the infrastructure is not in place for each country to which they plan to export vehicles and must retain the documentation in their files for at least five years after date of its creation for the purpose of demonstrating compliance. Documentation is to include descriptions of: <ul style="list-style-type: none"> • Products in which the substitute is needed; • Substitutes examined and rejected for the destination country; • Reason for rejection of other alternatives; and • Anticipated date other substitutes will be available and projected date of transition in the destination country.

Source:

- “Federal Regulation RULES and REGULATION July 2015 on HFC” : www.federalregister.gov/articles/2015/07/20/2015-17066/protection-of-stratospheric-ozone-change-of-listing-status-for-certain-substitutes-under-the