ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[EPA–HQ–OAR–2019–0698; FRL–10020–41–OAR]

RIN 2060–AU81

Protection of Stratospheric Ozone: Listing of Substitutes Under the Significant New Alternatives Policy Program

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Pursuant to the U.S. Environmental Protection Agency's (EPA) Significant New Alternatives Policy program, this action lists certain substances in the refrigeration and air conditioning sector. For the retail food refrigeration—medium-temperature stand-alone units (new) end-use, EPA is listing three substitutes as acceptable subject to narrowed use limits. For the residential and light commercial air conditioning and heat pumps (new) end-use, EPA is listing six substitutes as acceptable subject to use conditions. Through this action, EPA is incorporating by reference the 2019 Underwriters Laboratories (UL) Standard 60335–2–40, 3rd Edition, which establishes requirements for the evaluation of electrical air conditioners, heat pumps, and dehumidifiers, and safe use of flammable refrigerants. This action also removes an acceptable subject to use conditions listing for the fire suppression sector because EPA more recently listed the substitute as acceptable with no use restrictions.

DATES: This rule is effective June 7, 2021. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of June 7, 2021.

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2019–0698. All documents in the docket are listed on the *https://www.regulations.gov* website. Although listed in the index, some information is not publicly available, *e.g.,* Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *https://www.regulations.gov* or in hard copy at the Air and Radiation Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Avenue NW, Washington, DC 20460. EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID–19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. For further information on EPA Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets.*

FOR FURTHER INFORMATION CONTACT: Christina Thompson, Stratospheric Protection Division, Office of Atmospheric Programs (Mail Code 6205T), Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460; telephone number: 202–564–0983; email address: *thompson.christina@epa.gov.* Notices and rulemakings under EPA's Significant New Alternatives Policy program are available on EPA's Stratospheric Ozone website at *https://www.epa.gov/snap/snap-regulations.*

SUPPLEMENTARY INFORMATION:

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I. General Information

A. Executive Summary and Background

This final rule lists new alternatives for the refrigeration and air conditioning sector and changes an existing listing for the fire suppression sector. Specifically, EPA is:

- Listing R–448A, R–449A and R–449B as acceptable, subject to narrowed use limits, for use in retail food refrigeration—medium-temperature stand-alone units for new equipment;
- Listing R–452B, R–454A, R–454B, R–454C and R–457A as acceptable, subject to use conditions, for use in residential and light commercial air conditioning (AC) and heat pumps for new equipment; and R–32 as acceptable, subject to use conditions, for use in residential and light commercial AC and heat pumps—equipment other than self-contained room air conditioners, for new equipment; and
- Removing Powdered Aerosol E from the list of fire suppression substitutes acceptable subject to use conditions in total flooding applications.

EPA is finalizing these new listings after its evaluation of human health and environmental information for these substitutes under the Significant New Alternatives Policy (SNAP) program. The Agency is taking final action on these new listings in the refrigeration and air conditioning sector and the change to the listings in the fire suppression sector based on consideration of the information that supported the June 12, 2020 Notice of Proposed Rulemaking (''2020 NPRM'') (85 FR 35874), the public comments and publicly-available information that EPA has included in the docket. This action provides additional flexibility for industry by providing new options in specific uses.

EPA is not taking final action at this time on listings for three foam blowing agent blends for extruded polystyrene: Boardstock and billet that were also proposed in the 2020 NPRM. Based on public comments and new information that EPA has received after issuing the proposed rule, the Agency is considering future action on these substitutes. EPA's consideration of options for these substitutes is not related to and does not affect this final action on the remainder of the proposal.

In this final action, EPA refers to listings made in a final rule issued July 20, 2015, at 80 FR 42870 (''2015 Rule''). The 2015 Rule, among other things, changed the listings for certain hydrofluorocarbons (HFCs) and blends from acceptable to unacceptable in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors. After a challenge to the 2015 Rule, the United States Court of Appeals for the District of Columbia Circuit (''the court'') issued a partial vacatur of the 2015 Rule ''to the extent it requires manufacturers to replace HFCs with a substitute substance'' [1] and remanded the rule to the Agency for further proceedings.[2] The court also upheld EPA's listing changes as being reasonable and not ''arbitrary and capricious.'' [3] This final rule is not EPA's response to the court's decision.

SNAP Program Background

The SNAP program implements section 612 of the Clean Air Act (CAA). Several major provisions of section 612 are:

1. Rulemaking

Section 612(c) requires EPA to promulgate rules making it unlawful to replace any class I (chlorofluorocarbon (CFC), halon, carbon tetrachloride, methyl chloroform, methyl bromide, hydrobromofluorocarbon, and chlorobromomethane) or class II (hydrochlorofluorocarbon (HCFC)) ozone-depleting substances (ODS) with any substitute that the Administrator determines may present adverse effects to human health or the environment where the Administrator has identified an alternative that (1) reduces the overall risk to human health and the environment and (2) is currently or potentially available.

2. Listing of Unacceptable/Acceptable Substitutes

Section 612(c) requires EPA to publish a list of the substitutes that it finds to be unacceptable for specific uses and to publish a corresponding list of acceptable substitutes for specific uses.

3. Petition Process

Section 612(d) grants the right to any person to petition EPA to add a substance to, or delete a substance from, the lists published in accordance with section 612(c).

4. 90-Day Notification

Section 612(e) directs EPA to require any person who produces a chemical substitute for a class I substance to notify the Agency not less than 90 days before a new or existing chemical is introduced into interstate commerce for significant new use as a substitute for a class I substance. The producer must also provide the Agency with the producer's unpublished health and safety studies on such substitutes.

The regulations for the SNAP program are promulgated at 40 CFR part 82, subpart G, and the Agency's process for reviewing SNAP submissions is described in regulations at 40 CFR 82.180. Under these rules, the Agency has identified five types of listing decisions: Acceptable; acceptable subject to use conditions; acceptable subject to narrowed use limits; unacceptable; and pending (40 CFR 82.180(b)). Use conditions and narrowed use limits are both considered ''use restrictions,'' as described below. Substitutes that are deemed acceptable with no use restrictions (no use conditions or narrowed use limits) can be used for all applications within the relevant end-uses in the sector. After reviewing a substitute, the Agency may determine that a substitute is acceptable only if certain conditions in the way that the substitute is used are met to minimize risks to human health and the environment. EPA describes such substitutes as ''acceptable subject to use conditions.'' (40 CFR 82.180(b)(2)). For some substitutes, the Agency may permit a narrowed range of use within an end-use or sector. For example, the Agency may limit the use of a substitute to certain end-uses or specific applications within an industry sector. EPA describes these substitutes as ''acceptable subject to narrowed use limits.'' Under the narrowed use limit, users intending to adopt these substitutes ''must ascertain that other alternatives are not technically feasible.'' (40 CFR 82.180(b)(3)).

In making decisions regarding whether a substitute is acceptable or unacceptable, and whether substitutes present risks that are lower than or comparable to risks from other substitutes that are currently or potentially available in the end-uses under consideration, EPA examines the criteria in 40 CFR 82.180(a)(7): (i) Atmospheric effects and related health and environmental impacts; (ii) general population risks from ambient exposure to compounds with direct toxicity and to increased ground-level ozone; (iii) ecosystem risks; (iv) occupational risks; (v) consumer risks; (vi) flammability; and (vii) cost and availability of the substitute.

Many SNAP listings include ''comments'' or ''further information'' to provide additional information on substitutes. Since this additional information is not part of the regulatory decision, these statements are not binding for use of the substitute under the SNAP program. However, regulatory requirements so listed are binding under other regulatory programs (*e.g.,* worker protection regulations promulgated by the U.S. Occupational Safety and Health Administration (OSHA)). The ''further information'' classification does not necessarily include all other legal obligations pertaining to the use of the substitute. While the items listed are not legally binding under the SNAP program, EPA encourages users of substitutes to apply all statements in the ''further information'' column in their use of these substitutes. In many instances, the information simply refers to sound operating practices that have already been identified in existing industry and/or building codes or standards. Thus, many of the statements, if adopted, would not require the affected user to make

[1] *Mexichem Fluor, Inc.* v. *EPA,* 866 F.3d 451, 462 (D.C. Cir. 2017).

[2] Later, the court issued a similar decision on portions of a similar final rule issued December 1, 2016 at 81 FR 86778 (''2016 Rule''). *See Mexichem Fluor, Inc.* v. *EPA,* Judgment, Case No. 17–1024 (D.C. Cir., April 5, 2019), 760 Fed. Appx. 6 (Mem). That rule is not relevant for this action.

[3] *Mexichem Fluor,* 866 F.3d at 462–63.

significant changes in existing operating practices.

For additional information on the SNAP program, visit the SNAP portion of EPA's Ozone Layer Protection website at *https://www.epa.gov/snap.* Copies of the full lists of acceptable substitutes for ODS in all industrial sectors are available at *https://www.epa.gov/snap/snap-substitutes-sector.* For more information on the Agency's process for administering the SNAP program or criteria for evaluation of substitutes, refer to the initial SNAP rulemaking published March 18, 1994 (59 FR 13044), codified at 40 CFR part 82, subpart G. SNAP decisions and the appropriate **Federal Register** citations found at: *https://www.epa.gov/snap/snap-regulations.* Substitutes listed as unacceptable; acceptable, subject to narrowed use limits; or acceptable, subject to use conditions, are also listed in the appendices to 40 CFR part 82, subpart G.

B. Does this action apply to me?

The following list identifies regulated entities that may be affected by this rule and their respective North American Industrial Classification System (NAICS) codes:

- All Other Basic Organic Chemical Manufacturing (NAICS 325199)
- Air Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing (NAICS 333415)
- Refrigeration Equipment and Supplies Merchant Wholesalers (NAICS 423740)
- Supermarkets and Other Grocery (except Convenience) Stores (NAICS 44511 & 445110)
- Convenience Stores (NAICS 445120)
- Limited-Service Restaurants (NAICS 722513)
- Cafeterias, Grill Buffets, and Buffets (NAICS 722514)
- Snack and Nonalcoholic Beverage Bars (NAICS 722515)
- Fire Protection (NAICS 922160)

This list is not intended to be exhaustive, but rather to provide a guide for readers regarding entities likely to be affected by this action. To determine whether your facility, company, business, or organization could be affected by this action, you should carefully examine the regulations at 40 CFR part 82, subpart G and the revisions below. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

C. What acronyms and abbreviations are used in the preamble?

Below is a list of acronyms and abbreviations used in the preamble of this document:

AC—Air Conditioning
ACCA—Air Conditioning Contractors of America
ADA—Americans with Disabilities Act
AEL—Acceptable Exposure Limit
AHIA—American Industrial Hygiene Association
AHJ—Authority Having Jurisdiction
AHRI—Air-Conditioning, Heating, and Refrigeration Institute
AHRTI—Air-Conditioning, Heating, and Refrigeration Technology Institute
Alliance—Alliance for Responsible Atmospheric Policy
ANSI—American National Standards Institute
ASHRAE—American Society of Heating, Refrigerating and Air-Conditioning Engineers
CAA—Clean Air Act
CARB—California Air Resources Board
CAS Reg. No.—Chemical Abstracts Service Registry Identification Number
CBI—Confidential Business Information
CFC—Chlorofluorocarbon
CFR—Code of Federal Regulations
CRA—Congressional Review Act
CO_2—Carbon Dioxide
DOE—United States Department of Energy
EIA—Environmental Investigation Agency
EPA—United States Environmental Protection Agency
FR—Federal Register
GSHP—Ground-Source Heat Pump
GWP—Global Warming Potential
HARDI—Heating, Air-conditioning, & Refrigeration Distributors International
HCFC—Hydrochlorofluorocarbon
HFC—Hydrofluorocarbon
HFO—Hydrofluoroolefin
HVAC—Heating, Ventilation, and Air Conditioning
HPPH—Heat Pump Pool Heaters
HPWH— Heat Pump Water Heaters
ICF—ICF International, Inc.
IEC—International Electrotechnical Commission
IPCC—Intergovernmental Panel on Climate Change
LFL—Lower Flammability Limit
NAAQS—National Ambient Air Quality Standards
NAFEM—North American Association of Food Equipment Manufacturers
NAICS—North American Industrial Classification System
NARA—National Archives and Records Administration
NATE—North American Technician Excellence
NPRM—Notice of Proposed Rulemaking
NRDC—Natural Resources Defense Council
ODP—Ozone Depletion Potential
ODS—Ozone Depleting Substances
OMB—United States Office of Management and Budget
OSHA—United States Occupational Safety and Health Administration
PFAS—Perfluoroalkyl Substances, Polyfluoroalkyl Substances
PPM—Parts Per Million
PRA—Paperwork Reduction Act
PTAC—Packaged Terminal Air Conditioner
PTHP—Packaged Terminal Heat Pump
RCL—Refrigerant Concentration Limit
RCRA—Resource Conservation and Recovery Act
RFA—Regulatory Flexibility Act
RSES—Refrigeration Service Engineers Society
SDS—Safety Data Sheet
SIP—State Implementation Plan
SNAP—Significant New Alternatives Policy
TLV–TWA—Threshold Limit Value-Time-Weighted Average
TFA—Trifluoroacetic Acid
TSCA—Toxic Substances Control Act
TWA—Time Weighted Average
UL—Underwriters Laboratories Inc
UMRA—Unfunded Mandates Reform Act
VOC—Volatile Organic Compounds
VRF—Variable Refrigerant Flow
VSLS—Very Short-Lived Substances
WEEL—Workplace Environmental Exposure Limit
WMO—World Meteorological Organization
WSHP—Water-Source Heat Pump

II. What is EPA finalizing in this action?

A. Retail Food Refrigeration—Listing of R–448A, R–449A and R–449B as Acceptable, Subject to Narrowed Use Limits, for Retail Food Refrigeration—Medium-Temperature Stand-Alone Units (New)

As proposed, EPA is listing R–448A, R–449A, and R–449B as acceptable, subject to narrowed use limits, in new equipment only for new medium-temperature stand-alone units in retail food refrigeration (hereafter, ''new medium-temperature stand-alone units'').[4] As explained below, we have revised the regulatory text from the 2020 NPRM to indicate that failure to comply with the Americans with Disabilities Act (ADA) requirements is not the only reason other alternatives can be deemed infeasible under the narrowed use limit.

[4] EPA previously divided the retail food refrigeration end-use into separate categories, including stand-alone equipment (76 FR 78832, December 20, 2011). The Agency further subdivided stand-alone equipment to distinguish between medium-temperature equipment, which maintains products above 32 °F (0 °C), and low-temperature equipment, which maintains products at or below 32 °F (0 °C) (80 FR 42870, July 20, 2015).

1. Background on Retail Food Refrigeration—Medium-Temperature Stand-Alone Units (New)

Retail food refrigeration is characterized by storing and displaying, generally for sale, food and beverages at different temperatures for different products (*e.g.,* chilled and frozen food). Stand-alone units in retail food refrigeration (hereafter, ''stand-alone units'') consist 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. For purposes of the SNAP program, medium-temperature stand-alone units maintain a temperature above 32 °F (0 °C). For further background on this end-use, see the 2020 NPRM at 85 FR 35877.

In the 2015 Rule, EPA changed the listing of 31 refrigerants [5] from acceptable to unacceptable for new medium temperature stand-alone units. At that time, EPA indicated that it believed that other alternatives that posed lower risk were available for this end use. After the 2015 Rule, as part of a petition from the Air-Conditioning, Heating, and Refrigeration Institute (AHRI),[6] described in section 3 below, EPA received information indicating that manufacturers were unable to design certain types of medium-temperature stand-alone equipment with the available acceptable alternatives, and that certain equipment configurations would require significantly larger refrigeration equipment that could jeopardize compliance with the ADA for those types of equipment.

2. What are R–448A, R–449A and R–449B and how do they compare to other refrigerants in the same end-use?

R–448A, marketed under the trade name Solstice® N–40, is a weighted blend of 26 percent HFC–32,[7] which is also known as difluoromethane (Chemical Abstracts Service Registry Number [CAS Reg. No.] 75–10–5); 26 percent HFC–125, which is also known as 1,1,1,2,2-pentafluoroethane (CAS Reg. No. 354–33–6); 21 percent HFC–134a, which is also known as 1,1,1,2-tetrafluoroethane (CAS Reg. No. 811–97–2); 20 percent HFO–1234yf, which is also known as 2,3,3,3-tetrafluoroprop-1-ene (CAS Reg. No. 754–12–1); and seven percent HFO–1234ze(E), which is also known as trans-1,3,3,3-tetrafluoroprop-1-ene (CAS Reg. No. 29118–24–9). R–449A, marketed under the trade name Opteon® XP 40, is a weighted blend of 24.3 percent HFC–32, 24.7 percent HFC–125, 25.7 percent HFC–134a, and 25.3 percent HFO–1234yf. R–449B, marketed under the trade name Forane® 449B, is a weighted blend of 25.2 percent HFC–32, 24.3 percent HFC–125, 27.3 percent HFC–134a, and 23.2 percent HFO–1234yf.

EPA previously listed R–448A, R–449A, and R–449B as acceptable refrigerants in a number of other refrigeration and air conditioning end-uses, including other retail food refrigeration end-use categories (*e.g.,* 80 FR 42053, July 16, 2015; 81 FR 70029, October 11, 2016; 82 FR 33809, July 21, 2017; 83 FR 50026, October 4, 2018; 84 FR 64765, November 25, 2019).

Redacted submissions and supporting documentation for R–448A, R–449A, and R–449B are provided in the docket for this rule (EPA–HQ–OAR–2019–0698) at *https://www.regulations.gov.* EPA performed an assessment to examine the health and environmental risks of each of these substitutes, and these assessments are also available in the docket for this rule.[8] [9] [10]

Environmental information: R–448A, R–449A, and R–449B have an ozone depletion potential (ODP) of zero.[11] Their components, HFC–32, HFC–125, HFC–134a, HFO–1234yf, and in the case of R–448A, HFO–1234ze(E), have global warming potentials (GWPs) of 675; 3,500; 1,430; [12] less than one to four; [13] [14] [15] and less than one to six; [16] [17] respectively. If these values are weighted by mass percentage, then R–448A, R–449A, and R–449B have GWPs of about 1,390, 1,400, and 1,410, respectively. HFC–32 (CAS Reg. No. 75–10–5), HFC–125 (CAS Reg. No. 354–33–6), HFC–134a (CAS Reg. No. 811–97–2), HFO–1234yf (CAS Reg. No. 754–12–1) and HFO–1234ze(E) (CAS Reg. No. 29118–24–9)—the components of R–448A, R–449A, and R–449B—are excluded from the definition of volatile organic compounds (VOC) under CAA regulations (see 40 CFR 51.100(s)) addressing the development of state implementation plans (SIPs) to attain and maintain the national ambient air quality standards (NAAQS).

Knowingly venting or otherwise knowingly releasing or disposing of these refrigerant blends in the course of maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration is prohibited as provided in section 608(c)(2) of the CAA and EPA's regulations at 40 CFR 82.154(a)(1).

Flammability information: R–448A, R–449A, and R–449B as formulated, and even considering the worst-case fractionation for flammability, are not flammable.

Toxicity and exposure data: Potential health effects of exposure to these substitutes include drowsiness or dizziness. The substitutes may also irritate the skin or eyes or cause frostbite. At sufficiently high concentrations, the substitutes may cause irregular heartbeat. The substitutes could cause asphyxiation if

[5] Specifically, FOR12A, FOR12B, HFC–134a, HFC–227ea, KDD6, R125/290/134a/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.

[6] AHRI, 2017. Petition Requesting EPA SNAP Approval of R–448A/449A/449B for Medium Temperature, Stand-Alone Retail Food Refrigeration Equipment. Submitted March 20, 2017.

[7] In this final rule, we refer to this refrigerant with the technical prefix (*i.e.,* R–32) and with the composition designating prefix (*i.e.,* HFC–32) interchangeably.

[8] ICF, 2020a. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–448A.

[9] ICF, 2020b. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–449A.

[10] ICF, 2020c. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–449B.

[11] If a compound contains no chlorine, bromine, or iodine, or if it is a solid under conditions of use, its ODP is generally considered to be zero. Unless otherwise stated, all non-zero ODPs in this document are from EPA's regulations at appendix A to subpart A of 40 CFR part 82.

[12] Unless otherwise specified, GWP values are from IPCC (2007) Climate Change 2007: *The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). Cambridge University Press. Cambridge, United Kingdom 996 pp.

[13] Nielsen et al., 2007. Nielsen, O.J., Javadi, M.S., Sulbaek Andersen, M.P., Hurley, M.D., Wallington, T.J., Singh, R. 2007. Atmospheric chemistry of $CF_3CF{=}CH_2$: Kinetics and mechanisms of gas-phase reactions with Cl atoms, OH radicals, and O_3. Chemical Physics Letters 439, 18–22. Available online at *http://www.cogci.dk/network/OJN_174_CF3CF=CH2.pdf.*

[14] Hodnebrog Ø. et al., 2013. Hodnebrog Ø., Etminan, M., Fuglestvedt, J.S., Marston, G., Myhre, G., Nielsen, C.J., Shine, K.P., Wallington, T.J.: Global Warming Potentials and Radiative Efficiencies of Halocarbons and Related Compounds: A Comprehensive Review, Reviews of Geophysics, 51, 300–378, doi:10.1002/rog.20013, 2013.

[15] WMO (World Meteorological Organization), Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project—Report No. 58, 588 pp., Geneva, Switzerland, 2018. Available at: *https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf.* In this action, the 100-year GWP values are used.

[16] Ibid.

[17] Hodnebrog Ø. et al., 2013 and Javadi et al., 2008. M.S. Javadi, R. Søndergaard, O.J. Nielsen, M.D. Hurley, and T.J. Wellington, 2008. Atmospheric chemistry of trans-$CF_3CH{=}CHF$: Products and mechanisms of hydroxyl radical and chlorine atom-initiated oxidation. Atmospheric Chemistry and Physics Discussions 8, 1069–1088, 2008.

air is displaced by vapors in a confined space. These potential health effects are common to many refrigerants.

The American Industrial Hygiene Association (AIHA) has established workplace environmental exposure limits (WEELs) of 1,000 parts per million (ppm) as an eight hour time-weighted average (8-hr TWA) for HFC–32, HFC–125, and HFC–134a, and 500 ppm as an 8-hr TWA for HFO–1234yf, the components of R–448A, R–449A, and R–449B; and 800 ppm as an 8-hr TWA for HFO–1234ze(E), also a component of R–448A. The manufacturer of R–448A recommends an acceptable exposure limit (AEL) of 890 ppm on an 8-hr TWA for the blend. The manufacturer of R–449A recommends an AEL of 830 ppm on an 8-hr TWA for the blend. The manufacturer of R–449B recommends an AEL of 865 ppm on an 8-hr TWA for the blend. EPA anticipates that users will be able to meet the AIHA WEELs and manufacturers' AELs and address potential health risks by following requirements and recommendations in the manufacturers' safety data sheets (SDS), in American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 15, and other safety precautions common to the refrigeration and air conditioning industry.

Comparison to other substitutes in this end-use: R–448A, R–449A, and R–449B have ODPs of zero, comparable to or lower than other acceptable substitutes in this end-use, with ODPs ranging from zero to 0.098.

R–448A's GWP of 1,390, R–449A's GWP of 1,400, and R–449B's GWP of 1,410 are higher than those of other acceptable substitutes for retail food refrigeration—medium-temperature stand-alone units (new), including ammonia absorption, R–744, R–450A, and R–513A with GWPs ranging from zero to 630.

Information regarding the flammability and toxicity of other available alternatives are provided in the listing decisions previously made (see *https://www.epa.gov/snap/substitutes-stand-alone-equipment*). Flammability and toxicity risks for R–448A, R–449A, and R–449B are comparable to or lower than flammability and toxicity risks of other available substitutes in the same end-use. Toxicity risks can be minimized by use consistent with ASHRAE Standard 15 and other industry standards, recommendations in the manufacturers' SDS, and other safety precautions common in the refrigeration and air conditioning industry.

Although R–448A, R–449A, and R–449B present a higher overall risk to human health and the environment than other acceptable alternatives in this end-use category based on significantly higher GWPs than other available alternatives, with GWPs ranging from zero (ammonia in a secondary loop) to 630 (R–513A), as provided below, EPA has determined that other alternatives may not be available for certain uses and users of medium-temperature stand-alone equipment. Thus, EPA is listing these substitutes as acceptable subject to narrowed use limits in this end-use. Under the SNAP program, when using an alternative listed as acceptable with narrowed use limits, users, including manufacturers, of new medium-temperature stand-alone equipment will need to ascertain that the other alternatives are not technically feasible before using R–448A, R–449A, or R–449B in such equipment.[18] Consistent with existing SNAP regulations, they must document the results of their evaluation that showed the other alternatives to be not technically feasible and maintain that documentation in their files. This documentation, which does not need to be submitted to EPA unless requested to demonstrate compliance, ''shall include descriptions of substitutes examined and rejected, processes or products in which the substitute is needed, reason for rejection of other alternatives, *e.g.,* performance, technical or safety standards, and the anticipated date other substitutes will be available and projected time for switching to other available substitutes.'' (40 CFR 82.180(b)(3)).[19]

3. AHRI Petition

AHRI petitioned EPA under CAA section 612(d) to add R–448A, R–449A, and R–449B to the list of acceptable substitutes for new and retrofit medium-temperature stand-alone units. See 40 CFR 82.184 for further information regarding petitions under the SNAP program. EPA and AHRI exchanged information related to this petition between March 2017 and November 2018. Information received as part of this petition is relevant to this listing, and EPA's action in this rulemaking may be considered responsive to certain aspects of this petition, although EPA is not taking formal action on the petition in this rulemaking. We describe the contents of the petition, including elements that we are not considering in this action, in detail in the 2020 NPRM, and the petition is available in the docket for this rulemaking.

4. What is EPA's final listing decision for R–448A, R–449A and R–449B?

EPA is listing R–448A, R–449A, and R–449B as acceptable, subject to narrowed use limits, for new medium-temperature stand-alone units in this final rule.

EPA understands that to construct certain medium-temperature stand-alone units with the available acceptable refrigerants would require significantly larger components, or the addition of multiple refrigeration systems, which may lead to redesigning the units in such a manner that could be inconsistent with the ADA requirements. AHRI's petition specifically pointed to R–448A, R–449A, and R–449B as refrigerants that would, on the contrary, be feasible in such equipment and requested that those refrigerants be added to the list of acceptable refrigerants for new medium-temperature stand-alone units.

Users under SNAP, including manufacturers, using a substitute listed as acceptable, subject to narrowed use limits, must ascertain that other substitutes or alternatives are not technically feasible. As explained in the initial SNAP rulemaking (59 FR 13063, March 18, 1994), under the narrowed use limit, ''[u]sers are expected to undertake a thorough technical investigation of alternatives before implementing the otherwise restricted substitute'' (*i.e.,* R–448A, R–449A or R–449B for this rule). Further, ''[t]he Agency expects users to contact vendors of alternatives to explore with experts whether or not other acceptable substitutes are technically feasible for the process, product or system in question'' (*i.e.,* in new medium-temperature stand-alone units for this rule) to the otherwise restricted substitute. The initial SNAP rule also explained that ''[a]lthough users are not required to report the results of their investigations to EPA, companies must document these results, and retain them in company files for the purpose of demonstrating compliance'' for up to five years after the date of creation of the records. This information includes descriptions of:

[18] As noted in the proposal, under the SNAP regulations the definition of ''use'' includes ''but [is] not limited to use in a manufacturing process or product, in consumption by the end-user, or in intermediate uses, such as formulation or packaging for other subsequent uses;'' hence, this definition includes the manufacture of a product pre-charged with a particular refrigerant. (40 CFR 82.172).

[19] In the regulatory text of the 2020 NPRM, the description of the information to document was included in the ''Further information'' column. Because this information is required under the existing SNAP regulations at 40 CFR 82.180(b)(3), we have listed this in the ''Narrowed use limits'' column in this final action.

• Process or product in which the substitute is needed;
• Substitutes examined and rejected;
• Reason for rejection of other alternatives, *e.g.,* performance, technical or safety standards; and/or
• Anticipated date other substitutes will be available and projected time for switching.

An example of a viable explanation under a narrowed use limit in this circumstance could include information such as a market analysis of the components for other alternatives that indicate a lack of availability in the required sizes or with required features, or design diagrams that indicate excessive loss of refrigerated volumes or failure to meet ADA requirements. As explained below, we have revised the regulatory text from the 2020 NPRM to indicate that failure to comply with ADA requirements is not the only reason the other alternatives can be deemed infeasible under the narrowed use limit.

5. How is EPA responding to comments on retail food refrigeration—medium-temperature stand-alone units?

EPA received comments from organizations with various interests in retail food refrigeration regarding the proposed listing of R–448A, R–449A and R–449B. Most commenters supported the proposed listings, although some supported listing these refrigerants as acceptable without narrowed use limits and others did not support the listing at all. Other commenters addressed the environmental impacts of the proposed listing of R–448A, R–449A and R–449B and the proposed narrowed use limits. Other comments unrelated to these listings and beyond the scope of this final action are addressed in section III.

Commenters on these proposed listings were AHRI, the Alliance for Responsible Atmospheric Policy (the Alliance), North American Association of Food Equipment Manufacturers (NAFEM), and Heating, Air-conditioning, & Refrigeration Distributors International (HARDI), four industry organizations; Chemours and Honeywell, two chemical producers; Hussmann Corporation, Johnson Controls, Lennox International Inc., Parker Hannifin Corporation, and Rheem Manufacturing Company, five equipment manufacturers; and the Natural Resource Defense Council (NRDC) and the Environmental Investigation Agency (EIA), two environmental organizations.

We have grouped comments together and responded to the issues raised by the comments in the sections that follow.

a. Support Listings

Comment: HARDI indicated that it ''supports the overall effort to phase down the use of HFC refrigerants'' and held that the listing of R–448A, R–449A, and R–449B (and others discussed later in its comments) ''is one part of a larger process in the industry's effort to phase down older refrigerants.'' Lennox International Inc. also supported the proposed listing of R–448A, R–449A, and R–449B for use in medium temperature stand-alone refrigeration applications indicating that ''[t]hese refrigerants generally replace R404[A] and provide significant environmental benefits while providing the appropriate technology to meet the ongoing regulatory requirements.''

Response: The Agency acknowledges HARDI's and Lennox's support for this proposed listing. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.A.

Comment: Parker Hannifin Corporation's Sporlan division ''agrees with AHRI's positions and statements concerning this proposed listing, and [they] support it and the narrowed use limits as proposed.''

Response: To the extent this comment refers to comments from the AHRI, we have responded separately. To the extent Sporlan is supporting the proposed listing including the narrowed use limits, we acknowledge this support. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.A.

b. Support Listings Without Narrowed Use Limits

i. Comparison to Other Acceptable SNAP Listings

Comment: The Alliance, Chemours, Honeywell and Rheem supported finding R–448A, R–449A, and R–449B acceptable, but they did not support the proposal to make such listings subject to narrowed use limits. NAFEM also supported approval of R–448A, R–449A, and R–449B without use restrictions ''so that those refrigerants still can be allowed for critical applications.'' Noting that these blends are listed as acceptable for low temperature stand-alone equipment, Rheem commented that ''a common platform of low-GWP refrigerants is more beneficial to the installer and service personnel as well as for the manufacturer.''

Response: In this final rule, EPA is including the narrowed use limits for these refrigerants. EPA explained why these alternatives posed higher risk to human health and the environment than other acceptable substitutes in this end-use in the proposal (85 FR 35879–35880, June 12, 2020) and summarized those findings again above. In the proposal, EPA noted that the GWPs of these compounds, ranging from 1,390 to 1,410, ''are higher than those of other acceptable substitutes for retail food refrigeration—medium-temperature stand-alone units (new)'' (85 FR 35878, June 12, 2020) and pointed to examples of such acceptable substitutes with lower GWPs and otherwise similar overall risk to human health and the environment. For those same reasons, EPA concludes in this final action that these alternatives pose higher risk to human health and the environment than other acceptable substitutes in this end-use. By finding these higher-GWP blends acceptable subject to narrowed use limits, EPA is allowing for these refrigerants to be used under SNAP as long as the requirements for the narrowed use limit have been met. Further, we note that because EPA evaluates the available or potentially available alternatives for different end-use categories separately, given that each intersection of an alternative and end-use category poses unique risk to human health and the environment, as well as unique technical challenges and requirements that must be met in order for a substitute to be available in a particular end-use or application, we would not necessarily list the same refrigerant as acceptable across multiple end-use or end-use categories. For example, in low temperature stand-alone equipment, EPA has listed a number of other refrigerants as acceptable with overall risk, including GWPs, similar to or greater than the overall risk, including GWPs, of R–448A, R–449A, and R–449B, unlike in medium temperature stand-alone equipment. To the extent industry stakeholders see a benefit for a single refrigerant for use across all their equipment, and find that the required analysis to use R–448A, R–449A, or R–449B under a narrowed use limit does not support such across-the-board use, we note that there are already several alternatives that are listed acceptable for both medium and low temperature equipment that they can pursue.

Comment: Chemours notes that R–448A, R–449A, and R–449B have been listed as acceptable in several other end-uses. They contend that ''EPA fails to provide a rational basis for treating R–448A, R–449A and R–449B differently

in this proposed rule as opposed to past approvals.''

Response: Since the inception of the SNAP program, alternatives are evaluated on an end-use by end-use (or in this case, an end-use category) basis. There is no reason to believe whether and how an alternative is listed in one end-use would be the same as a different end-use. In this case, as described above and in the proposal, EPA finds that, with other criteria being comparable, the GWP of R–448A, R–449A, and R–449B, each of which has a GWP of approximately 1,400 that is higher compared to other acceptable alternatives in the medium temperature stand-alone equipment end-use, justifies the need for narrowed use limits. Other acceptable alternatives are available for this end-use which have GWPs of approximately 630 or lower, and some of which have already been implemented in equipment within this end-use category. EPA had not listed R–448A, R–449A, and R–449B as acceptable without restriction in this end-use before this final rule specifically because the higher GWPs indicate they pose a greater overall risk to human health and the environment. After receiving information indicating that manufacturers were unable to design certain types of medium-temperature stand-alone equipment with the available acceptable alternatives, we are finding the use of these high-GWP blends acceptable in this end-use consistent with the narrowed use limit established by this final rule.

Comment: Chemours states that R–448A, R–449A, and R–449B have substantially lower GWPs compared with current refrigerants.

Response: EPA understands Chemours' comment to refer to substitutes in existing equipment that have higher GWPs, such as HFC–134a, R–404A or R–507A, with GWPs of 1,430, 3,920 and 3,990, respectively. EPA changed the listing for these and certain other high-GWP refrigerants to unacceptable in stand-alone equipment and other end-uses in the 2015 Rule. EPA compared the substitutes under consideration in this action with other available or potentially available substitutes and not with unacceptable substitutes which are prohibited under SNAP. While some acceptable alternatives for new medium temperature stand-alone equipment do have higher GWPs than the three refrigerant blends under consideration in this action, EPA notes that those refrigerants have an ODP being comprised in part of ozone-depleting chemicals, *e.g.,* HCFCs. However, regulations promulgated under CAA section 605 phasing out the production and import of HCFCs also ban their use in new equipment. All acceptable non-ozone depleting alternatives for this end-use category have GWPs lower than R–448A, R–449A, and R–449B, in some cases significantly so (*e.g.,* GWPs less than 10 compared to GWPs of approximately 1,400 for these three blends).

ii. Insufficient Justification for Narrowed Use Limits

Comment: The Alliance stated that EPA ''does not offer justification why the [narrowed] use limits are necessary.'' Chemours says that ''EPA fails to provide any independent rationale supporting such [narrowed use limits] conditions'' and Honeywell added that ''the proposed rule offers no justification for such [narrowed] use limits and indeed they are not necessary.'' Honeywell contended that EPA did not explain the specific reasons why narrowed use limits are necessary. Johnson Controls requested EPA to add justification for the narrowed use limits.

Response: EPA provided justification for the narrowed use limits in the proposal (85 FR 35879–35880, June 12, 2020). These alternatives pose higher risk to human health and the environment than other acceptable substitutes listed in this end-use. Relying on information submitted by AHRI in its petition to EPA, the proposal explained that while other acceptable alternatives were available for certain types of equipment within this end-use, the thermodynamic properties of other acceptable alternatives would require larger components and potentially lead to designs that would fail to comply with the ADA for certain equipment. For instance, in its comments, the Alliance quoted EPA statements from the proposal to this effect. EPA provided some examples of equipment within the medium-temperature stand-alone equipment category that have been manufactured with other acceptable alternatives that are available and for which there is no known conflict with the ADA requirements. Other commenters such as EIA added to this record. Hence, based on the information from AHRI and the evidence of existing, available equipment using acceptable refrigerants, EPA is concluding in this final action that within this end-use category, while some models can be manufactured using other acceptable alternatives, those alternatives might not be feasible for other models which could be manufactured with R–448A, R–449A, or R–449B. This conclusion warrants the narrowed use limit for these alternatives and conforms with the instances where listing with a narrowed use limit is justified as discussed in the original SNAP Rule (59 FR 13044, March 18, 1994) and codified in our regulations. Specifically, ''[e]ven though the Agency can restrict the use of a substitute based on the potential for adverse effects, it may be necessary to permit a narrowed range of use within a sector end-use because of the lack of alternatives for specialized applications'' (40 CFR 82.180(b)(3)). Here we find there may be specialized applications where the other acceptable alternatives are not feasible and use of R–448A, R–449A, or R–449B may be feasible. Thus, although we find R–448A, R–449A, or R–449B have the potential adverse effects due to their higher GWP compared to the other alternatives in this end-use category, we find that their use may be justified in certain equipment under a narrowed use limit.

iii. Clarification of Narrowed Use Limits

Comment: Johnson Controls requests that EPA provide clarification regarding the narrowed use limits.

Response: Because this comment was not specific on what needs to be clarified, no specific response is possible. However, we note that other comments had clearer requests for clarification on the narrowed use limits and we have addressed those in this final rule. These clarifications may also respond to Johnson Controls' request.

Comment: Hussmann Corporation asked whether the narrowed use limit requirement to analyze and document that the other alternatives are infeasible before using R–448A, R–449A, or R–449B is to be performed for each model or a family of models. AHRI also asked whether the justification document would be required for each piece of equipment. Similarly, NAFEM stated ''EPA is unclear whether documentation may be kept by product number or for a group of similar products or group of alternatives.'' NAFEM also quoted the text in the ''Further information'' column on 85 FR 35893 and stated this was ambiguous in the level of detail being requested. They said that it was important to receive clarification that EPA's expectations of the documentation ''will be flexible to recognize the different ways manufacturers may be able to categorize products, document by issue, or perhaps individual products based on a particular manufacturer's operations.''

Response: EPA's SNAP regulations do not specify whether the analysis should be performed or documented for models

or families of models or group of alternatives. A manufacturer or other user wishing to avail itself of the flexibility provided by the narrowed use limit under the SNAP program is required to conduct the evaluation described in the SNAP regulations (see 40 CFR 82.180(b)(3)), document that the circumstances described in the those regulations have been met, and retain such documentation as required under those regulations. NAFEM said ''[t]here can be great variability in these products, with certain features perhaps customized for particular customers.'' Thus, a single analysis might not be able to adequately cover an entire family of models for these products or their customized design. EPA can envision scenarios where an analysis that shows other alternatives are infeasible could cover more than one model, however. For instance, models of similar size that differ in some characteristics—facings, shelf placements, etc.—without affecting the load, the required refrigeration equipment, and the determination that other alternatives are not feasible (*e.g.,* due to ADA concerns) might be grouped together under a single analysis. Another example might include a model that is offered with doors and without. If the analysis addresses both types of equipment and concludes the with-doors version cannot use the other alternatives due to refrigeration equipment sizes leading to noncompliance with ADA, and the open-type version is of higher capacity and requires even larger refrigeration equipment to maintain the refrigeration load that has increased because the case is open to the surrounding air rather than enclosed by the doors, then the analysis could be applied to both models. In any such situation the analysis and any other documentation would need to address the factors listed in 40 CFR 82.180(b)(3), including listing the different products being evaluated, the reasons for rejection of other alternatives, the anticipated date other alternatives will be available, and the projected time for switching to available alternatives. If the analysis relies on a conclusion that the inability of one product to use the other acceptable alternatives also logically means the additional product(s) would not be able to use the other alternatives, the basis for that conclusion should be explained.

Comment: Hussmann Corporation asked what would be required to show that other alternatives are not feasible, giving examples of testing results and calculations. Rheem similarly requested that EPA ''[c]larify the burden of proof required for Narrowed Use Limits for R–448A, R–449A, and R–449B'' asking ''[w]hat type of calculations or test results constitute sufficient proof of design unfeasibility.''

Response: EPA does not dictate how a manufacturer or other user must prove that other alternatives are not feasible, as long as the requirements of the regulations regarding narrowed use limits are met. The regulations regarding narrowed use limits likewise give some leeway in how one determines the need for the otherwise restricted substitute. The regulations state that the user must ascertain that other alternatives are not technically feasible and that the documented analysis must include the other substitutes examined and rejected, the products where the alternatives (R–448A, R–449A, or R–449B) are needed, and the reason for rejecting the other alternatives. EPA responds to several comments, summarized below, that address the suitability of certain types of information that could be used and retained as part of the analysis required under the narrowed use limits.

Comment: AHRI asked whether ''a description of the enabling regulations needed plus a period of time for preparation might be sufficient documentation'' to meet the requirements to use R–448A, R–449A, or R–449B under the narrowed use limits. They provided as an example ''higher charge limits allowed for A2L refrigerant plus three years to prepare for the transition.''

Response: The regulations pertaining to narrowed use limits require manufacturers or other users to include an anticipated time other alternatives might be available and a projected time for switching to other alternatives. Therefore, information such as what AHRI describes could be useful as part of addressing this portion of the analysis that must be performed and documented before relying on the flexibility under SNAP provided by the narrowed use limit that allows use of R–448A, R–449A, or R–449B in appropriate circumstances. As described elsewhere, other information must also be included in this analysis. EPA does not generally believe, however, an open-ended time period (*e.g.*, when ''enabling regulations'' are completed) would meet the intent of the requirement to address the anticipated time other alternatives might be available and the projected time for transitioning to other substitutes because that kind of general statement does not speak directly to the anticipated timing for availability or the projected timing for making the transition. Instead, EPA anticipates that manufacturers would use their technical expertise to describe the projected timing for these steps. For example, manufacturers could use their technical expertise to describe the regulations or standards that might need updating and how those items affect the choice of refrigerant, what steps must be taken to update the regulations and how long those steps are expected to take, and ultimately what steps are needed to implement the change in refrigerant in their equipment and whether those steps can commence even before the regulation and standard updates are final. On this last item of implementing the new refrigerant, EPA believes the additional three years in AHRI's comments could be reasonable for this type of equipment in appropriate circumstances. We note this is similar to the three years and five months found as an achievable transition time in previous regulations specifically for small medium temperature stand-alone equipment (80 FR 42870, July 20, 2015).

iv. Grounds for Utilizing the Narrowed Use Limits

Comment: The Alliance requested clarification on whether R–448A, R–449A, and R–449B may be used in products that did conform with the ADA requirements but for other reasons the other alternatives are not able to be used. AHRI maintained that ADA compliance ''would not be the only reason that would allow for the use of these products'' and requested clarification of such.

Response: The Alliance did not provide specifics on what these other reasons could be, so EPA is not addressing whether a given reason would or would not justify the use of R–448A, R–449A, or R–449B under the narrowed use limit. In considering this comment, EPA acknowledges that under the existing requirements in the SNAP regulations for utilizing a substitute under a narrowed use limit, it is possible that there are other reasons beside ADA requirements that the other alternatives could not be used and that inclusion of the phrase ''due to the inability to meet ADA requirements'' in the regulatory text as part of the narrowed use limit could unnecessarily limit users' ability to meet the requirements for using these substitutes under the narrowed use limit. Accordingly, EPA concludes that it is appropriate to clarify the text as the comment requests and is finalizing the regulatory text without this phrase included in the narrowed use limit. Thus, compared to the regulatory text of the proposed rule (85 FR 35892), under the ''Narrowed use limits'' column, EPA in this final action is not including the phrase ''due to the inability to meet

ADA requirements'' but maintains the information in the ''Further information'' column that mentions ADA requirements as a possible reason for rejection of other alternatives. Under the final action, a manufacturer relying on ''other reasons'' for the narrowed use limit would need to document their analysis justifying this use, including the required information as described in the existing SNAP regulations, the same as those that found ADA requirements would be violated using the other alternatives must document their analysis.

Comment: NAFEM noted the proposed rule pointed to the possible inability to comply with the ADA with the other alternatives as a justification to use R–448A, R–449A, and R–449B. NAFEM contended that other reasons may exist that would render the other alternatives not feasible for new medium temperature stand-alone equipment. They listed technical challenges such as ''[s]afety standards, user space constraints, energy efficiency requirements, and other performance considerations'' as reasons where use of R–448A, R–449A, or R–449B might be justifiable.

Response: EPA agrees that there could be other reasons to determine that other alternatives are infeasible under the narrowed use limit. EPA concludes that in reviewing the AHRI petition and similar information such as that supplied in NAFEM's comments, including the September 1, 2015 letter attached to their comments, requesting R–448A and R–449A be acceptable for this equipment, the Agency considers ADA compliance to be one possible reason for the use of these high-GWP blends. That said, we cannot predict if all the other challenges listed by NAFEM, or any future challenges, might render the other alternatives technically infeasible for certain equipment in this end use, but acknowledge that such situations could arise. In this final rule, we clarify that compliance with the ADA is one example that a manufacturer might find makes the other alternatives technically infeasible, and thereby justify the use of R–448A, R–449A, or R–449B under the narrowed use limit, but that other reasons, if supported by the manufacturer's analysis under the SNAP regulations, might likewise justify use of these high-GWP blends under the narrowed use limit.

v. Narrowed Use Limits Are Burdensome

Comment: Chemours was opposed to the narrowed use limits and stated that the narrowed use limits ''impose unnecessary burden on the industry's transition away from high global warming potential ('GWP') refrigerants.'' They stated that other alternatives have GWPs up to 65% higher than those of R–448A, R–449A, and R–449B and implied that approving these three blends without the narrowed use limit would support industry transition from high GWP refrigerants.

Response: EPA disagrees that the narrowed use limits impose unnecessary burden. As described above, EPA finds that the narrowed use limits are necessary in this circumstance and without their inclusion, the Agency would not be able to find these three refrigerants acceptable for this specific end-use. These refrigerants present an overall greater risk to human health and the environment due to their higher GWP but for other factors have similar risks to other acceptable alternatives. All other zero-ODP alternatives that are acceptable within this end-use category have lower GWPs than the three found acceptable subject to narrowed use limits in this action. The listing of these three refrigerants subject to narrowed use limits under the SNAP regulations provides an option to use R–448A, R–449A, or R–449B, despite the higher GWP and higher overall risk to human health and the environment that these refrigerants pose compared to other acceptable refrigerants, when use of the other lower GWP alternatives is determined to be technically infeasible.

Comment: Chemours contends that manufacturers should not be required to conduct the technical analysis to justify the use of R–448A, R–449A, and R–449B under the narrowed use limit because AHRI has already completed this effort.

Response: EPA disagrees with this comment. While EPA relies on information provided by AHRI to justify the listing of these high GWP blends, AHRI did not provide an analysis on any specific model that manufacturers offer and did not perform such analysis for all types of equipment that fall within this end-use category. Accordingly, the AHRI petition does not satisfy the requirements of 40 CFR 82.180(b)(3) for users who wish to avail themselves of the flexibility provided by the narrowed use limit to use R–448A, R–449A, and R–449B where other alternatives are found to be technically infeasible.

Comment: Chemours points out that how a unit is placed within a store could impact aisle widths and compliance with ADA. Chemours says that manufacturers would need to know the layout of any store that would use a medium temperature stand-alone unit in order to justify the need for R–448A, R–449A, or R–449B as the only available alternatives that would comply with the ADA. They held that knowing the layout of each location where a unit is placed was an unreasonable burden. As such, they concluded that EPA should list these alternatives as acceptable without imposing narrowed use limits.

Response: EPA disagrees that manufacturers would necessarily need to know the layout of the store to meet the requirements of the narrowed use limit. For example, information in the AHRI petition contended certain equipment models would not comply with the ADA using other available alternatives due to counter height requirements. If the required analysis shows that other alternatives are technically infeasible in such models due to counter height requirements and the ADA requirements, that could support a manufacturer's justification for reliance on the narrowed use limit in this equipment without knowledge of store layouts. In addition, as noted above, there may be justifications other than ADA compliance that could be used for relying on the narrowed use limit, as long as the requirements of 40 CFR 82.180(b)(3) are met.

Comment: Chemours also states that conducting a pre-manufacture analysis to justify the use of R–448A, R–449A, or R–449B based on ADA issues would not account for situations in which a unit was moved within a store or perhaps transferred to another retail location where a unit manufactured with another alternative would be feasible. They held that this possibility of a user moving a unit would make the narrowed use limit requirement to justify the use of the alternative ineffective and therefore argued for removing those narrowed use limits.

Response: EPA understands that equipment may be moved or sold on a secondary market. However, the intent of this action is that for those availing themselves of the narrowed use limits provided in this rule conduct the necessary analysis and maintain the necessary documentation. Such documentation provides the justification to use these refrigerants under SNAP which otherwise would be unacceptable due to the higher risk to human health and the environment that they impose. If a chemical manufacturer or original equipment manufacturer is concerned with downstream users, they could consider options such as including relevant information about the narrowed use limit with their sales documentation. In addition, as noted above, there may be justifications other than ADA compliance that could be

used for relying on the narrowed use limit, as long as the requirements of 40 CFR 82.180(b)(3) are met.

Comment: Chemours says the narrowed use limits ''unreasonably discourage the use of R–448A, R–449A and R–449B'' as compared to finding these refrigerants acceptable without use restrictions. They say that instead approving, without narrowed use limits, these refrigerants with a GWP lower than the currently used refrigerants would meet the Agency's duty to evaluate when an alternative would reduce overall risk to human health and the environment.

Response: Although EPA lists refrigerants under CAA section 612, we do not encourage or discourage the use of any particular refrigerant. There are several alternatives listed as acceptable, some with use conditions, some, as in this final rule, with narrowed use limits, and some without use restrictions. In this final rule, we have evaluated these refrigerants under the SNAP program's comparative risk framework and concluded the narrowed use limits are appropriate because they present an overall greater risk to human health and the environment due to their higher GWP but for other factors have similar risks to other acceptable alternatives. Given that R–448A, R–449A and R–449B were not listed as acceptable for medium temperature stand-alone equipment prior to this final rule, the listing, even with a narrowed use limit, would not limit the use of these refrigerants. Rather, it could serve to increase the use of these refrigerants should manufacturers choose to adopt them based on their analyses.

Comment: Chemours indicated that requirements of a narrowed use limit including the need for a documented transition plan to other alternatives are unworkable, as they require understanding when other substitutes will be available and a timeline for transitioning. They say users would not know what future regulations or requirements may exist, or what new alternatives may be introduced in the future, and would therefore need to speculate on these aspects in their analysis to justify the use of R–448A, R–449A, or R–449B. As such, Chemours says these refrigerants should be found acceptable without narrowed use limits.

Response: EPA finalized regulations on narrowed use limits in 1994 and has implemented such narrowed use limits in past decisions with no indication that such listings are unworkable. EPA further notes that the existing regulations, quoted in the proposal, require an ''*anticipated* date other substitutes will be available and *projected* time for switching to other available substitutes.'' (emphasis added). Thus, EPA does not view these requirements as requiring manufacturers to provide a precise date of what will be available and when a transition will occur, but rather a reasonable assessment of such dates based on their technical expertise. It would be reasonable to assume chemical producers and suppliers could assist in this evaluation for users that choose to avail themselves of the flexibility offered by listing these refrigerants subject to narrowed use limits. Accordingly, EPA disagrees that it should find these refrigerants acceptable without narrowed use limits based on the uncertainties identified in this comment.

Comment: Chemours further argues against including the narrowed use limits by indicating that the requirement to retain any analysis that supports the use of R–448A, R–449A, or R–449B in medium temperature stand-alone equipment is to support potential enforcement actions, and that developing such documentation including a transition plan is unreasonable ''when the Agency cannot concurrently provide clarity for this segment.''

Response: EPA is not addressing enforcement in this final rule. However, we note that the existing regulations covering narrowed use limits, as quoted in the proposal, require a manufacturer to ''retain the results on file *for purposes of demonstrating compliance*.'' (emphasis added). As the requirement to retain the analysis is consistent with the existing SNAP regulations, which are not modified in this action, EPA disagrees with the suggestion that it should not finalize the narrowed use limits based on the points identified in this comment. The comment was unclear on what type of ''clarity for this segment'' Chemours is seeking; however, we have provided clarity for this end-use category including the listings to date of multiple alternatives as acceptable and the listing in this final rule providing flexibility to use R–448A, R–449A, and R–449B under SNAP subject to narrowed use limits.

c. Oppose Listings

i. Other Alternatives Available With Lower GWP

Comment: The EIA and the NRDC opposed the listing of R–448A, R–449A and R–449B as acceptable subject to narrowed use limits. They indicated that because of these refrigerants' high GWP, they should not be listed for this type of equipment. EIA claimed that better alternatives, ''R–513C, R–290, and R–600a'' exist and pointed to three different manufacturers that offer a wide range of equipment that meets ADA requirements and uses lower-GWP refrigerants. NRDC likewise noted SNAP-acceptable alternatives for this end-use category include lower-GWP options such as ''ammonia vapor compression with secondary loop, carbon dioxide, R–290, R–441A, R–450A, R–513A, and isobutane'' and stated that ''[s]everal companies are already producing and selling compliant products that use already-approved, low-GWP refrigerants'' without identifying those companies.

Response: EPA agrees there is a variety of equipment using other acceptable alternatives with lower GWPs in medium temperature stand-alone equipment and therefore did not propose to list the three refrigerants as acceptable but instead included a narrowed use limit to address specific circumstances that would render the other refrigerants as technically infeasible in particular applications within this end use. EPA is aware of such equipment using R–290, R–600a (isobutane), and R–744 (carbon dioxide). We also noted in the 2015 Rule that R–450A and R–513A were designed as HFC–134a replacements and therefore were potentially available for medium temperature stand-alone units that previously relied on HFC–134a. (We are not aware of a refrigerant being designated R–513C as noted by EIA and believe it may have been a typographical error for R–513A; regardless R–513C is not listed acceptable for this end-use category.) EPA also pointed to examples of medium temperature stand-alone equipment using lower-GWP refrigerants in our proposed rule. We further note that even manufacturers that do offer such equipment using the available alternatives may find such alternatives technically infeasible for some applications. Other information in the record elaborates on the limitations of the other acceptable alternatives in certain circumstances. For instance, in its comments on the 2020 NPRM, Hussmann Corporation stated ''[f]lammable and non-flammable refrigerant options currently approved by SNAP have less capacity and may require the use of multiple condensing units. This in turn creates additional heat rejection into stores, an increase in noise, store infrastructure issues that don't have the capacity for the electrical loads, increased design feasibility risks for the stand-alone units due to increased piping, and increased

difficulty for servicing. Other refrigerant options may also require redesign due to the larger sizes of the condensing units which will limit the equipment installation due to narrow aisle and doorway openings.'' Accordingly, EPA concludes that the fact that other lower GWP refrigerants are listed as acceptable under SNAP for this end use does not mean that it should not list R–448A, R–449A and R–449B as acceptable subject to narrowed use limits.

ii. Adoption of Safety Standard UL 60335–2–89 2nd Ed.

Comment: EIA notes that a proposal to modify UL 60335–2–89 is being considered. The proposal would allow up to 500 grams of R–290, or 13 times the lower flammability limit (LFL) of other A3 refrigerants such as R–600a. EIA expects the revision to be complete in March 2021 and urges EPA to adopt it when available. EIA expects that adoption by EPA would further limit any need for R–448A, R–449A, or R–449B as it would allow feasible designs, *e.g.,* requiring a single refrigeration circuit as opposed to a physically larger multi-circuit approach, over a broader range of equipment. With respect to the listing of R–448A, R–449A, and R–449B under narrowed use limits, NRDC agreed that ''EPA should revisit this approval upon adoption of safety standard UL 60335–2–89 2nd Ed. which will make it simpler to design compliant products with low-GWP refrigerants.'' Further, NRDC maintained that any rulemaking listing R–448A, R–449A or R–449B should only apply ''until products can be designed and sold to the specifications of the new UL standard.''

Response: EPA acknowledges the ongoing process to update on UL 60335–2–89. We also note that revisions to this standard were released for public comment in December 2020. As EIA notes, if we were to change use conditions that currently exist for R–290, R–600a and R–441A in stand-alone equipment (both medium and low temperature), we would undertake a rulemaking to do so. We cannot predict if or when we would do so before that standard is finalized and we can evaluate it to assess whether a change in use conditions is warranted; therefore, we have not limited the time that the listing of R–448A, R–449A, and R–449B applies as NRDC suggests. That said, manufacturers availing themselves of the flexibilities offered by these SNAP listings subject to narrowed use limits could assess the status of this UL Standard and the possibility of adoption by EPA as part of their analyses that require an anticipated date other substitutes would be available and a projected time for switching.

d. Narrowed Use Limits Description

i. Narrowed Use Limits Should Be Temporary

Comment: AHRI requested that R–448A, R–449A, and R–449B be listed as acceptable without narrowed use limits but felt that was only needed ''until additional alternatives become available.''

Response: To the extent that this comment suggests that R–448A, R–449A, and R–449B may not be needed in the future, EPA agrees. Even if the current acceptable refrigerants are not currently feasible in this equipment, additional alternatives being investigated, if added to the list of acceptable substitutes, may take the place of these high-GWP blends. As explained above, should additional alternatives become available in the future, or use conditions of existing alternatives change in the future, a manufacturer using R–448A, R–449A, or R–449B under the narrowed use limit may need to consider the implications of such a change for its future use of R–448A, R–449A, or R–449B under the narrowed use limits for new medium temperature stand-alone equipment.

ii. Scope of Narrowed Use Limits

Comment: NAFEM stated that the proposal to list R–448A, R–449A, and R–449B as acceptable subject to narrowed use limits ''is too narrowly defined and there should be other circumstances under which these refrigerants can be used for medium temperature applications.'' NAFEM pointed out that their member companies produce a wide range of equipment types and held that some of these do not fit neatly into EPA's end-use category of medium temperature stand-alone equipment and requested ''EPA to expand the product uses in which R–448A, R–449A, and R–449B may be used.'' NRDC however felt that should EPA list these refrigerants acceptable subject to narrowed use limits—which NRDC did not support—EPA should limit the listing ''to only specific product subtypes for which no alternatives are currently or potentially available.''

Response: EPA has previously listed R–448A, R–449A, and R–449B as acceptable under several end-uses, some of which may operate at medium temperature, including supermarket systems, refrigerated transport, cold storage, refrigerated food processing and dispensing equipment, and others. We expect that some NAFEM members manufacture equipment under these end-uses; however, the comment is unclear as to whether NAFEM is requesting EPA ''to expand the product uses'' for these other end-uses where R–448A, R–449A, and R–449B are already listed as acceptable. To the extent NAFEM is referring to a broader list of circumstances in medium-temperature stand-alone equipment only, the specific types of such equipment were not defined, and thus EPA cannot judge whether they fit in the subject end-use category or another end-use or if the end-use category might be further broken down into separate end-use subcategories. Accordingly, EPA is not expanding the product uses in which R–448A, R–449A, and R–449B may be used in this final rule. Likewise, NRDC did not specifically list the product subtypes in their comments, except to mention that more equipment could feasibly use lower GWP refrigerants in the future should EPA adopt revised use conditions for certain acceptable refrigerants based on a UL standard under development. Because information was not presented that would allow EPA to distinguish the product types within the medium-temperature stand-alone equipment end-use category that are and are not feasible with the acceptable alternatives, EPA is not limiting or expanding the narrowed use limits beyond new medium-temperature stand-alone equipment as proposed. As discussed in other responses, should additional alternatives be listed in this end-use category, a manufacturer utilizing R–448A, R–449A, or R–449B under the narrowed use limits may need to consider the implications of such a change for its future use of R–448A, R–449A, or R–449B under the narrowed use limits for new medium temperature stand-alone equipment.

iii. Routinely Submit Narrowed Use Limits Information

Comment: Notwithstanding their argument against the listing, NRDC urged that if R–448A, R–449A, and R–449B were listed for this equipment, EPA should ''require that users of these three blends actively and periodically submit to EPA the specified required information under the narrowed use limits.''

Response: Regulations for listing alternatives subject to narrowed use limits were established in the original SNAP rule (59 FR 13044, March 18, 1994) and were not reopened in the 2020 NPRM. The 1994 final regulations do not require or provide for users to submit their analysis, except when requested to demonstrate compliance.

To the extent the comment is suggesting that EPA should add a separate submission requirement for this particular listing, EPA is not establishing such a requirement because doing so would be inconsistent with the requirements of narrowed use limits that have existed for 27 years and as indicated in this document and the proposal, EPA's intention is to maintain consistency with those existing requirements. If EPA decides in the future that additional reporting may be needed under narrowed use limits, either in general or for specific alternatives so listed, we can consider any relevant changes and if any revisions to this final rule should be proposed.

e. Approve for Retrofits

Comment: Chemours requests that the Agency list R–448A, R–449A, and R–449B as acceptable for retrofits of medium temperature stand-alone equipment.

Response: EPA has consistently viewed refrigerant listings for new equipment and for retrofitting existing equipment separately, as the overall risk to human health and the environment differs depending on whether equipment is newly manufactured (for this equipment, in a factory environment) compared to retrofitted (*e.g.,* in the field or at a service center). We appreciate Chemours' comments; however, we did not propose the use of R–448A, R–449A, and R–449B in retrofits. There is not enough information in the record to make a determination for retrofits of this equipment in this rule, but we will take the suggestion under advisement for potential future listings.

f. Request for Cost-Benefit Analysis

Comment: NAFEM ''encourages EPA to consider a benefit-cost analysis before finalizing this rulemaking.''

Response: The listing of R–448A, R–449A, and R–449B as acceptable subject to narrowed use limits imposes no costs compared to the previous state where such refrigerants were not listed as acceptable for the subject end-use category. Instead, this final rule allows these three refrigerants to be used in instances where they were not allowed before and thus provides additional flexibilities under SNAP that manufacturers may choose to pursue. While there may be costs borne by those pursuing these refrigerants, it is a manufacturer's decision whether to pursue these alternatives and not a requirement that EPA is imposing on the manufacturer.

B. Residential and Light Commercial Air Conditioning and Heat Pumps—Listing of R–452B, R–454A, R–454B, R–454C, and R–457A as Acceptable, Subject to Use Conditions, for Use in Residential and Light Commercial Air Conditioning and Heat Pumps End-Use for New Equipment; and R–32 as Acceptable, Subject to Use Conditions, for Use in Residential and Light Commercial Air Conditioning and Heat Pumps—Equipment Other Than Self-Contained Room Air Conditioners for New Equipment

As proposed, EPA is listing R–452B, R–454A, R–454B, R–454C, and R–457A (hereafter called ''the five refrigerant blends'') as acceptable subject to use conditions as substitutes in residential and light commercial air conditioning and heat pumps for both self-contained and split systems, and R–32 as acceptable subject to use conditions in residential and light commercial air conditioning and heat pumps for split systems and for specific types of self-contained systems that are part of the residential and light commercial air conditioning and heat pump end-use but for which R–32 has not been previously listed.

We note references to hydrocarbons mistakenly included in the ''Further information'' column of the regulatory text in the 2020 NPRM are not included in this final rule. Also, in the 2020 NPRM we used the term ''mildly flammable'' in the ''Further information'' column of the regulatory text. Based on comments received, we have changed that term to ''flammable.'' [20] Finally, we note that where the use requirement for red markings appeared in regulatory text of the 2020 NRPM, we indicated initially that it must be applied to ''pipes, hoses, or other devices through which the refrigerant passes.'' In this final action we are adding ''service ports'' there to be consistent with the sentence that follows. We offer clarification on this requirement below.

1. What use conditions is EPA finalizing?

EPA is finalizing the use conditions as proposed, except for a revision, explained in subsections II.B.1.b and II.B.5.a below, to what constitutes ''new'' equipment. The use conditions were proposed and are finalized as a means to reduce the risk that exists when using flammable refrigerants. EPA has adopted similar use conditions in the past when listing flammable refrigerants acceptable, including the listing of HFC–32 for some of the equipment types that are included in the listing of the five refrigerant blends in this final rule (*e.g.,* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015). Further discussion of these use conditions is in section 5 below.

Under this listing, use of these refrigerants under the SNAP program requires adhering to all of the following use conditions:

a. UL Standard

These refrigerants may be used only in AC equipment, both self-contained equipment and split-systems, that meet all requirements listed in the 3rd edition, dated November 1, 2019, of UL Standard 60335–2–40, ''Standard for Safety for Household And Similar Electrical Appliances—Safety—Part 2–40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers'' (UL Standard).[21] The UL Standard contains requirements for the types of equipment covered here, including testing, charge sizes, ventilation, usage space requirements, and certain hazard warnings and markings, among other topics. In cases where this final rule includes requirements more stringent than those of UL Standard 60335–2–40, the appliance will need to meet the requirements of this final rule in place of the requirements in the UL Standard. See section II.B.5 below for further discussion on the requirements of this UL Standard that EPA is incorporating by reference.

EPA finds, as in past rules, that it is appropriate to reference consensus standards that set conditions to reduce risk. As in past listings of flammable refrigerants, we find that such standards have already gone through a development phase that incorporates the latest findings and research. Likewise, such standards have gone through a vetting and refinement process that provides the affected parties an opportunity to comment. For the U.S. stationary air conditioning and refrigeration industry, EPA sees UL standards in general as a pervasively used body of work to address risks and these standards are the most applicable and recognized by the U.S. market. Most, and likely nearly all, covered equipment in the U.S. is listed as complying with the appropriate UL standard. In this case, UL 60335–2–40 covers, with modifications, equipment

[20] In the NPRM, EPA used the term ''mildly flammable'' to describe A2L refrigerants. Based on comment as explained below, this is not the correct term used in ASHRAE Standard 34 and hence it has been revised throughout this final rule.

[21] All references to UL Standard 60335–2–40 are to the third edition unless otherwise noted.

also covered by other UL standards previously finalized and incorporates the works of international standards setting bodies; specifically, the International Electrotechnical Commission (IEC) standard IEC 60335–2–40 was used in the development of UL 60335–2–40.

b. New Equipment Only

These refrigerants are being listed under SNAP only for use in new equipment designed specifically and clearly identified for the refrigerant; *i.e.,* none of these substitutes are being listed for use as a conversion or ''retrofit'' refrigerant for existing equipment. In the 2020 NPRM, we stated in a footnote that we intended ''new'' equipment to include a new compressor, evaporator, condenser and refrigerant tubing (85 FR 35884). Based on consideration of public comments on the 2020 NPRM, we conclude that existing tubing can be inspected and if suitable re-used and the system would still be considered ''new'' for the purpose of this final rule.

Given the possible ignition sources that exist in equipment designed for non-flammable refrigerants, EPA finds that retrofitting such equipment to use flammable refrigerants presents additional risks not adequately addressed by this standard. This position is widely supported by the comments as described below.

c. Warning Labels

The following markings, or the equivalent, must be provided in letters no less than 6.4 mm (¼ inch) high and must be permanent:

i. On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing''

ii. On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used''

iii. On the inside of the air conditioning equipment near the compressor: ''WARNING—Risk of Fire. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting to Service This Product. All Safety Precautions Must be Followed''

iv. For any equipment pre-charged at the factory, on the equipment packaging: ''WARNING—Risk of Fire due to Flammable Refrigerant Used. Follow Handling Instructions Carefully in Compliance with National Regulations''

v. On the indoor unit [22] near the nameplate:

(a) At the top of the marking: ''Minimum Installation height, X m (W ft)''. This marking is only required if the similar marking is required by the UL Standard. The terms ''X'' and ''W'' shall be replaced by the numeric height as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the height in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis.

(b) Immediately below the warning label indicated in (a) above or at the top of the marking if (a) is not required: ''Minimum room area (operating or storage), Y m^2 (Z ft^2)''. The terms ''Y'' and ''Z'' shall be replaced by the numeric area as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the area in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis.

vi. For non-fixed equipment, including portable air conditioners, window air conditioners, packaged terminal air conditioners and packaged terminal heat pumps, on the outside of the product: ''WARNING—Risk of Fire or Explosion—Store in a well-ventilated room without continuously operating flames or other potential ignition.''

vii. For fixed equipment, including rooftop units and split air conditioners, ''WARNING—Risk of Fire—Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.''

The text of these labels is nearly identical to those in UL 60335–2–40, with slight modifications noted above. We highlight this difference above and repeat those labels whose text we have not changed here to emphasize the importance of including such labels and to provide the labels we are requiring in a single place. We find labels as one of two marking conventions (the other being red markings as explained in section II.B.1.d below) that combined will provide adequate warning of the presence of a flammable refrigerant to those who may come into contact with it in potentially dangerous quantities and situations (*i.e.,* in concentrations above the LFL and in the presence of an ignition source).

EPA believes that it would be difficult to see warning labels with the minimum lettering height requirement of ⅛ inch provided in the UL Standard. Therefore, consistent with the use conditions in our previous rules listing flammable refrigerants, including HFC–32, acceptable subject ot use conditions (*e.g.,* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015), the minimum height for lettering must be ¼ inch as opposed to ⅛ inch, which will make it easier for technicians, consumers, retail storeowners, and emergency first responders to view the warning labels.

d. Markings

Equipment must have distinguishing red (Pantone® Matching System (PMS) #185 or RAL 3020) color-coded hoses and piping to indicate use of a flammable refrigerant. The air conditioning equipment shall have marked service ports, pipes, hoses and other devices through which the equipment's refrigerant circuit is serviced. Markings shall extend at least 1 inch (25mm) and shall be replaced if removed. As noted in comments below, there were some questions of what this use condition requires; EPA clarifies this requirement as follows. For equipment that contain field-constructed parts (*i.e.,* finished at the site where the installation occurs), the connections to be finished in the field shall be marked red as described. For equipment with service ports, the service ports and/or piping extending therefrom shall be marked red as described. We note equipment might fit both categories above and hence must have both sets of red markings. For self-contained equipment without service ports, the location the manufacturer recommends as the place to access the refrigerant circuit (*e.g.,* process tube) shall be marked red as described.

[22] This labeling is required for split systems and self-contained equipment alike.

The reason to include red markings in combination with warning labels is noted above. EPA finds that when combined with labels, such markings will provide adequate warning of the presence of a flammable refrigerant to those who may come into contact with it in potentially dangerous quantities and situations (*i.e.,* in concentrations above the LFL and in the presence of an ignition source). As in previous rulemakings on flammable refrigerants cited above, we conclude that the red markings will provide an additional warning for technicians, consumers, retail storeowners, first responders, and those disposing the appliance to understand that a flammable refrigerant is used and appropriate caution should be taken. Furthermore, the red markings, as with symbols required by the UL Standard, provide a more universally-understood warning demarcation, which would be useful for those who may not be able to read or understand the English language labels.

The regulatory text of our decisions for the end-uses discussed above appears in tables at the end of this document. This text will be codified in appendix W of 40 CFR part 82 subpart G. EPA notes that there may be other legal obligations pertaining to the manufacture, use, handling, and disposal of the refrigerants that are not included in the information listed in the tables (*e.g.,* the CAA section 608(c)(2) prohibition on knowingly venting or otherwise knowingly releasing or disposing of substitute refrigerants in the course of maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration, or Department of Transportation requirements for transport of flammable gases). Flammable refrigerants being recovered or otherwise disposed of from residential and light commercial air conditioning appliances are likely to be hazardous waste under the Resource Conservation and Recovery Act (RCRA) (see 40 CFR parts 260–270).

2. Background on Residential and Light Commercial Air Conditioning and Heat Pumps (New)

The residential and light commercial air conditioning and heat pumps end-use includes equipment for cooling air in individual rooms, in single-family homes, and in small commercial buildings. This end-use includes both self-contained and split systems. For further background on this end-use, see the 2020 NPRM (85 FR 35881–35882).

3. What are the ASHRAE classifications for refrigerant flammability?

The six refrigerants that we are listing in this final rule for residential and light commercial AC and heat pumps are all assigned a safety group classification of ''A2L'' by The American National Standards Institute/American Society of Heating, Refrigerating and Air Conditioning Engineers (ANSI/ASHRAE) Standard 34–2019. ASHRAE classifies Class A refrigerants as refrigerants for which toxicity has not been identified at concentrations less than or equal to 400 ppm by volume, based on data used to determine threshold limit value-time-weighted average (TLV–TWA) or consistent indices. The flammability classification ''2L'' is given to refrigerants that, when tested, exhibit flame propagation, have a heat of combustion less than 19,000 kJ/kg (8,169 BTU/lb), have an LFL greater than 0.10 kg/m^3, and have a maximum burning velocity of 10 cm/s or lower when tested in dry air at 73.4 °F (23.0 °C) and 14.7 psia (101.3 kPa). ASHRAE Standard 34–2019 requires testing at that temperature to determine if flame propagation exists and if not, tests at 140 °F (60 °C) are conducted to determine the refrigerant flammability classification. For further information on the ASHRAE safety group classifications, see the 2020 NPRM at 85 FR 35882.

4. What are R–32, R–452B, R–454A, R–454B, R–454C and R–457A and how do they compare to other refrigerants in the same end-use?

R–32 is a refrigerant with lower flammability, and the five refrigerant blends are refrigerant blends with lower flammability, all with an ASHRAE safety classification of A2L. The respective CAS Reg. Nos. of R–32 and the components of the five refrigerant blends are listed below.

R–32 is also known as HFC–32 or difluoromethane (CAS Reg. No. 75–10–5). EPA previously listed R–32 as an acceptable refrigerant for some types of residential and light commercial air conditioning and heat pumps end-use categories, specifically self-contained room air conditioners such as window units, packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs), portable room AC, and wall-mounted AC (80 FR 19454, April 10, 2015). As noted in the 2020 NPRM, this action adds a listing for this substitute to include rooftop units, ground-source heat pump (GSHPs) and water-source heat pump (WSHPs), which are typically self-contained but not sized for a single room, and various types of split systems.

R–452B, also known by the trade name ''Opteon™ XL 55,'' and also known as ''Solstice® L41y,'' is a blend with lower flammability consisting of 67 percent by weight HFC–32; seven percent HFC–125, also known as 1,1,1,2,2-pentafluoroethane (CAS Reg. No. 354–33–6); and 26 percent HFO–1234yf, also known as 2,3,3,3-tetrafluoroprop-1-ene (CAS Reg. No. 754–12–1). R–454A, also known by the trade name ''Opteon™ XL 40,'' is a blend with lower flammability consisting of 35 percent HFC–32 and 65 percent HFO–1234yf. R–454B, also known by the trade names ''Opteon™ XL 41'' and ''Puron Advance™,'' is a blend with lower flammability consisting of 68.9 percent HFC–32 and 31.1 percent HFO–1234yf. R–454C, also known by the trade name ''Opteon™ XL 20,'' is a blend with lower flammability consisting of 21.5 percent HFC–32 and 78.5 percent HFO–1234yf. R–457A, also known by the trade name ''Forane® 457A,'' is a blend with lower flammability consisting of 70 percent HFO–1234yf, 18 percent HFC–32, and 12 percent HFC–152a, which is also known as ethane, 1,1-difluoro (CAS Reg. No. 75–37–6).

Redacted submissions and supporting documentation for R–32 and the five refrigerant blends are provided in the docket for this rule (EPA–HQ–OAR–2019–0698) at *https://www.regulations.gov.* EPA performed an assessment to examine the health and environmental risks of each of these substitutes, and these assessments are also available in the docket for this rule.[23] [24] [25] [26] [27] [28]

Environmental information: R–32, R–452B, R–454A, R–454B, R–454C and R–457A have ODPs of zero.

[23] ICF, 2020d. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: HFC–32.

[24] ICF, 2020e. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–452B.

[25] ICF, 2020f. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454A.

[26] ICF, 2020g. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454B.

[27] ICF, 2020h. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454C.

[28] ICF, 2020i. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–457A.

R–32 has a GWP of 675. The five refrigerant blends are made up of the components HFC–32, HFC–125, HFO–1234yf and HFC–152a, which have GWPs of 675, 3,500, less than one to four, and 124, respectively.[29] [30] [31] [32] If these values are weighted by mass percentage, then R–452B, R–454A, R–454B, R–454C and R–457A have GWPs of about 700, 240, 470, 150 and 140 respectively.

HFC–32 (CAS Reg. No. 75–10–5), HFC–125 (CAS Reg. No. 354–33–6), HFC–152a (CAS Reg. No. 75–37–6), and HFO–1234yf (CAS Reg. No. 754–12–1)—the components of the five refrigerant blends—are excluded from the definition of VOC under CAA regulations (see 40 CFR 51.100(s)) addressing the development of SIPs to attain and maintain the NAAQS.

Knowingly venting or otherwise knowingly releasing or disposing of these refrigerants in the course of maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration is prohibited as provided in section 608(c)(2) of the CAA and EPA's regulations at 40 CFR 82.154(a)(1).

Flammability information: R–32 and the five refrigerant blends are designated under ASHRAE flammability classification of 2L, which is a classification for refrigerants also referred to as ''lower flammability'' (*i.e.,* lower than those designated as 2 or 3) in ASHRAE Standard 34–2019. See section 3 above for information on ASHRAE classifications.

Toxicity and exposure data: Potential health effects of exposure to these substitutes include drowsiness or dizziness. The substitutes may also irritate the skin or eyes or cause frostbite. At sufficiently high concentrations, the substitutes may cause irregular heartbeat. The substitutes could cause asphyxiation if air is displaced by vapors in a confined space. These potential health effects are common to many refrigerants.

ASHRAE Standard 34–2019 classifies HFC–32 and the five refrigerant blends under the toxicity classification A (''lower toxicity''). The AIHA has established WEELs of 1,000 ppm as an 8-hr TWA for HFC–32 and the component refrigerants HFC–125 and HFC–152a; the AIHA has established a WEEL of 500 ppm as an 8-hr TWA for HFO–1234yf. The manufacturer of R–452B, R–454A, R–454B, and R–454C recommends AELs, respectively, of 874, 690, 854, and 615 ppm on an 8-hr TWA for these blends. EPA anticipates that users will be able to meet the AIHA WEEL and manufacturers' AELs and address potential health risks by following requirements and recommendations in the manufacturers' SDS, in ASHRAE Standard 15, and other safety precautions common to the refrigeration and air conditioning industry.

Comparison to other substitutes in this end-use: R–32 and the five refrigerant blends all have an ODP of zero, the same as other acceptable substitutes in this end-use.

R–32 and the five refrigerant blends' GWPs, ranging from about 140 to about 700, are higher than some of the acceptable substitutes for residential and light commercial air conditioning and heat pumps, including ammonia absorption, R–290, and R–441A with GWPs ranging from zero to three. R–32 and the five refrigerant blends' GWPs are lower than some of the acceptable substitutes for residential and light commercial air conditioning and heat pumps, such as HFC–134a, R–410A, and R–507A with GWPs of 1,430, 2,087.5 and 3,985 respectively.

Information regarding the toxicity of other available alternatives are provided in the listing decisions previously made (see *https://www.epa.gov/snap/substitutes-residential-and-light-commercial-air-conditioning-and-heat-pumps*). Toxicity risks for R–32 and the five refrigerant blends are comparable to or lower than toxicity risks of other available substitutes in the same end-use. Toxicity risks can be minimized by use consistent with ASHRAE 15 and other industry standards, recommendations in the manufacturers' SDS, and other safety precautions common in the refrigeration and air conditioning industry.

Although flammability risk may be greater than flammability risks of other available substitutes in the same end-use, this risk can be minimized by use consistent with ASHRAE 15 and other industry standards such as UL 60335–2–40, recommendations in the manufacturers' SDS, and other safety precautions common in the refrigeration and air conditioning industry. The use conditions reduce the potential risk associated with the flammability of these alternatives so that they will not pose significantly greater risk than other acceptable substitutes in this end-use.

5. Why is EPA finalizing these specific use conditions?

As finalized, the use conditions in this SNAP listing include: Use only in new equipment, which can be specifically designed for the refrigerant; use consistent with the UL 60335–2–40 industry standard, including testing, charge sizes, ventilation, usage space requirements, and certain hazard warnings and markings; and warnings and markings on equipment to inform consumers and technicians of potential flammability hazards. Each of these is described in greater detail below. The listings with specific use conditions are intended to allow for the use of these refrigerants with lower flammability in a manner that will ensure they do not pose a greater overall risk to human health and the environment than other substitutes in this end-use.

a. New Equipment Only; Not Intended for Use as a Retrofit Alternative

Under this listing, these refrigerants may be used under the SNAP program only in new equipment [33] designed to address concerns unique to flammable refrigerants—*i.e.,* this listing does not allow these substitutes to be used as a conversion or ''retrofit'' refrigerant for existing equipment. These flammable refrigerants were not submitted under the SNAP program to be used in retrofitted equipment, and no information was provided on how to address hazards if these flammable refrigerants were to be used in equipment that was designed for non-flammable refrigerants.

b. UL Standard

Under this listing, the flammable refrigerants may be used under the SNAP program only in equipment that meets all requirements in UL Standard

[29] Unless otherwise specified, GWP values are from IPCC (2007) Climate Change 2007: *The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). Cambridge University Press. Cambridge, United Kingdom 996 pp.

[30] Nielsen et al., 2007. Nielsen, O.J., Javadi, M.S., Sulbaek Andersen, M.P., Hurley, M.D., Wallington, T.J., Singh, R. 2007. Atmospheric chemistry of $CF_3CF{=}CH_2$: Kinetics and mechanisms of gas-phase reactions with Cl atoms, OH radicals, and O_3. Chemical Physics Letters 439, 18–22. Available online at *http://www.cogci.dk/network/OJN_174_CF3CF=CH2.pdf.*

[31] Hodnebrog Ø. et al., 2013. Hodnebrog Ø., Etminan, M., Fuglestvedt, J.S., Marston, G., Myhre, G., Nielsen, C.J., Shine, K.P., Wallington, T.J.: Global Warming Potentials and Radiative Efficiencies of Halocarbons and Related Compounds: A Comprehensive Review, Reviews of Geophysics, 51, 300–378, doi:10.1002/rog.20013, 2013.

[32] WMO (World Meteorological Organization), Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project—Report No. 58, 588 pp., Geneva, Switzerland, 2018. Available at: *https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf.* In this action, the 100-year GWP values are used.

[33] This is intended to mean a completely new refrigeration circuit containing a new compressor, evaporator, and condenser.

60335–2–40, Edition 3 for air conditioning equipment. This UL Standard indicates that refrigerant charges greater than a specific amount (called ''m_3'' in the UL Standard and based on the refrigerant's LFL) are beyond its scope and that national standards might apply, such as for instance ANSI/ASHRAE 15–2019.

Those participating in the UL 60335–2–40 consensus standards process (hereafter ''UL'') have tested equipment for flammability risk in residential applications and evaluated the relevant scientific studies. Further, UL has developed safety standards including requirements for construction and system design, for markings, and for performance tests concerning refrigerant leakage, ignition of switching components, surface temperature of parts, and component strength after being scratched. Certain aspects of system construction and design, including charge size, ventilation, and installation space, and greater detail on markings, are discussed further below in this section. The UL Standard was developed in an open and consensus-based approach, with the assistance of experts in the air conditioning industry as well as experts involved in assessing the safety of products. While similar standards exist from other bodies, such as the IEC, we are relying on a specific UL standard because it is the most applicable and recognized by the U.S. market. This approach is the same as that in previous rules on flammable refrigerants (*e.g.* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015).

A description of the requirements of UL 60335–2–40 as they affect the refrigerants and end-use addressed in this section of our final rule follows. This description is offered for information only and does not provide a complete review of the requirements in this standard.

Under this SNAP listing, the refrigerant charge size for residential and light commercial air conditioning and heat pumps is limited in accordance with the UL Standard. EPA is requiring as a use condition adherence to the standard; hence, charge size limits for each of the refrigerants by equipment type in accordance with the UL Standard apply to this SNAP listing. Annex GG of the standard provides the charge limits, air circulation requirements and requirements for secondary circuits. The standard specifies requirements for installation space of an appliance (*i.e.,* room floor area) and/or air circulation or other requirements which are determined according to the refrigerant charge used in the appliance, the installation location and the type of air circulation of the location or of the appliance. In some applications the introduction of outdoor air into a space, also known as ventilation, is required. Within Annex GG, Table GG.1 describes how to apply the requirements to allow for safe use of flammable refrigerants. The UL Standard contains provisions for safety mitigation. These mitigation requirements were developed to ensure the safe use of flammable refrigerants over a range of appliances. In general, as larger charge sizes are used, more stringent mitigation requirements are required. In certain applications refrigerant detection systems (as described in Annex LL, *Refrigerant detection systems for A2L refrigerants*) must be factory installed as part of the equipment. Likewise, in some cases refrigerant sensors (as described in Annex MM, *Refrigerant sensor location confirmation tests*) are required. The standard does not require audible alarms in most cases and instead relies on sensors/detectors to initiate a mitigation strategy such as activating ''fan operation and air circulation or ventilation'' if refrigerant concentrations are found to exceed certain thresholds. Where mechanical ventilation (*i.e.,* fans) is required in accordance with Annex GG or Annex 101.DVG, it must be initiated by a separate refrigerant detection system either as part of the appliance or installed separately. In a room with no mechanical ventilation, Annex GG provides requirements for openings to rooms based on several factors, including the charge size and the room area. The minimum opening is intended to be sufficient so that natural ventilation would reduce the risk of using a flammable refrigerant. The standard also includes specific requirements for split system appliances using A2L refrigerants covering construction, instruction manuals, and allowable charge sizes, mechanical ventilation, safety alarms, and, for variable refrigerant flow (VRF) systems, shut off valves.

In addition to Annex GG and Table GG.1 mentioned above, UL 60335–2–40 has a requirement for the maximum charge for an appliance using an A2L refrigerant. If the appliance is a portable appliance, a non-fixed factory-sealed single package, or a cord-connected appliance which may be periodically or seasonally relocated (excluding servicing) by the end user, there are no additional requirements for room area and air circulation if the charge is sufficiently small—under three times the LFL; however risk mitigation for labeling, ignition source controls and other features are required. Additional requirements exist for charge sizes exceeding three times the LFL.

i. Incorporation by Reference

Through this action, EPA is incorporating by reference the 2019 UL Standard 60335–2–40, 3rd Edition, which establishes requirements for the evaluation of electrical air conditioners, heat pumps, and dehumidifiers, and safe use of flammable refrigerants. The standard is discussed in greater detail elsewhere in this preamble. This approach is the same as that used to incorporate the 8th edition of UL Standard 484 in our previous rule in which we listed R–32 as acceptable, subject to use conditions, for use in self-contained room air conditioners for residential and light commercial AC (80 FR 19454, April 10, 2015).

The 2019 UL Standard 60335–2–40, 3rd Edition, is available at *https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=36463,* and for purchase by mail at: Comm 2000, 151 Eastern Avenue, Bensenville, IL 60106; Email: *orders@shopulstandards.com;* Telephone: 1–888–853–3503 in the U.S. or Canada (other countries dial 1–415–352–2178); internet address: *https://www.shopulstandards.com.* The cost of the 2019 UL Standard 60335–2–40, 3rd Edition is $440 for an electronic copy and $550 for hardcopy. UL also offers a subscription service to the Standards Certification Customer Library that allows unlimited access to their standards and related documents. The cost of obtaining this standard is not a significant financial burden for equipment manufacturers and purchase is not necessary for those selling, installing, and servicing the equipment. Therefore, EPA concludes that the UL standard being incorporated by reference is reasonably available.

c. Labeling

As a use condition, EPA is requiring labeling of residential and light commercial air conditioning and heat pump equipment. EPA is requiring the warning labels on the equipment contain letters at least ¼ inch high. The label must be permanently affixed to the equipment. Warning label language requirements are described in section II.B.1.c of this rule as well as in the regulatory text. The warning label language is similar to or exactly the same as that required in UL 60335–2–40.

d. Markings

Our understanding of the UL Standard is that red markings, similar to

those EPA has applied as use conditions in past actions for flammable refrigerants (76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015), are required by the UL Standard for A2 and A3 refrigerants but not A2L refrigerants. The final use condition requires that such markings apply to these A2L refrigerants as well to establish a common, familiar and standard means of identifying the use of a flammable refrigerant.

These red markings will help technicians immediately identify the use of a flammable refrigerant, thereby potentially reducing the risk of using sparking equipment or otherwise having an ignition source nearby. The AC and refrigeration industry currently uses red-colored hoses and piping as means for identifying the use of a flammable refrigerant based on previous SNAP listings. Likewise, distinguishing coloring has been used elsewhere to indicate an unusual and potentially dangerous situation, for example in the use of orange-insulated wires in hybrid electric vehicles. Currently in SNAP listings, color-coded hoses or pipes must be used for ethane, HFC–32, isobutane, propane, or R–441A in certain types of equipment. All such SNAP listings indicate that the tubing, hoses, etc. must be colored red PMS #185 or RAL 3020 to match the red band displayed on the container of flammable refrigerants under the AHRI Guideline N, ''2016 Guideline for Assignment of Refrigerant Container Colors.'' EPA is requiring red markings in this SNAP final action to ensure that there is adequate notice for technicians and others that a flammable refrigerant is being used within a particular piece of equipment or appliance. These requirements are also intended to provide adequate notification of the presence of flammable refrigerants for personnel disposing of appliances containing flammable refrigerants. Consistent with a previous SNAP rule, one mechanism to distinguish hoses and pipes is to add a colored plastic sleeve or cap to the service tube. (80 FR 19465, April 10, 2015). The colored plastic sleeve or cap would have to be forcibly removed in order to access the service tube. Likewise, red tape adhered to or around the tube would meet the intent of this use condition. These types of red markings would signal to the technician that the refrigeration circuit that she/he was about to access contained a flammable refrigerant, even if all warning labels were somehow removed or were illegible or not understood (*e.g.,* for non-English speakers), and would provide similar notification to consumers, retail store owners, building owners and operators, first responders, and those disposing the appliance. This sleeve or other marking would be of the same red color (PMS #185 or RAL 3020) and could also be boldly marked with a graphic to indicate the refrigerant was flammable. This could be a cost-effective alternative to painting or dyeing the hose or pipe.

In this SNAP listing, EPA is requiring the use of color-coded service ports, hoses or piping as a way for technicians and others to recognize that a flammable refrigerant is used in the equipment. This will be in addition to the use of warning labels discussed above. EPA believes having two such warning methods is reasonable and consistent with other general industry practices. This approach is the same as that adopted in our previous rules on flammable refrigerants (*e.g.,* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015).

6. What additional information is EPA including in these listings?

EPA is including recommendations, found in the ''Further information'' column of the regulatory text at the end of this document, to inform personnel of other practices to protect them from the risks of using flammable refrigerants. Similar to our previous listing of flammable refrigerants for this end-use (80 FR 19454, April 10, 2015), EPA is including information on the OSHA requirements at 29 CFR part 1910, proper ventilation, personal protective equipment, fire extinguishers, use of spark-proof tools and equipment designed for flammable refrigerants, and training.

Since this additional information is not part of the regulatory decision, these statements are not binding for the use of the substitutes under the SNAP program. However, the information so listed may be binding under other regulatory programs (*e.g.,* worker protection regulations promulgated by OSHA). The ''Further information'' identified in the listing does not necessarily include all other legal obligations pertaining to the use of the substitutes. While the items listed would not be legally binding under the SNAP program, EPA encourages users of substitutes to apply all statements in the ''Further information'' column in their use of these substitutes. In many instances, the information simply refers to sound operating practices that have already been identified in existing industry and/or building codes or standards. Thus, many of the statements, if adopted, would not result in the user making significant changes in existing operating practices.

EPA notes that Annex HH of UL 60335–2–40, *Competence of service personnel,* provides guidelines for service personnel to ensure they receive training specifically to address potential risks of servicing equipment using flammable refrigerants. Annex HH provides recommendations that such training cover several aspects relevant to flammable refrigerants including recognition of ignition sources, information about refrigerant detectors, and other safety concepts. The training information recommended in Annex HH would address the proper working procedures for equipment commissioning, maintenance, repair, decommissioning and disposal. The Agency notes that this section of the UL Standard is described as informational, rather than ''normative,'' *i.e.,* it is intended to provide information but not to be an absolute requirement under the UL standard. Because Annex HH is informative, rather than normative, it is not a requirement of the UL Standard and following it is not required under the use conditions finalized in this action. Nonetheless, EPA is providing as ''Further information'' some information on training, including a recommendation that personnel follow Annex HH.

7. How is EPA responding to comments on residential and light commercial air conditioning and heat pumps?

EPA received several comments from organizations with various interests in residential and light commercial AC. Most commenters supported the proposed listing decision in general. Major topics raised by commenters included the proposed use conditions, industry standards, and training for technicians. Other comments unrelated to these listings and beyond the scope of this final action are addressed in section III below.

Commenters included AHRI, Air Conditioning Contractors of America (ACCA), the Alliance, and HARDI, four industry organizations; Chemours and Honeywell, two chemical producers; Carrier, Daikin, Johnson Controls, Lennox International Inc., the Sporlan division of Parker Hannifin Corporation (Sporlan), Rheem Manufacturing Company, and Trane Technologies (Trane), seven equipment manufacturers; and two environmental organizations, NRDC and EIA.

We have grouped comments together and responded to the issues raised by the comments in the sections that follow.

a. Substitutes and End-Use Proposed

Comment: Several commenters voiced general support for the proposed listing of HFC–32, R–452A, R–454A, R–454B, R–454C, and R–457A as acceptable subject to use conditions in residential and light commercial air conditioning and heat pumps. Chemours likewise supported the proposal. Daikin voiced strong support and encouraged EPA to approve HFC–32 quickly, noting that ''[o]ver 100 million R–32 split system air conditioners have been sold since 2012'' and provided a list showcasing their and other manufactures' implementation of air conditioning products using A2L refrigerants in other countries. HARDI supported these listings as ''one part of a larger process in the industry's effort to phase down older refrigerants.''

Response: EPA acknowledges these commenters' general support for this proposed listing and appreciates the additional information provided by Daikin on the use of HFC–32. We add to that information that it has been reported that products using HFC–32 are operating in over 90 countries.[34] After considering all the public comments on this proposal, we are finalizing this portion of the rule as proposed with only a few modifications discussed elsewhere in this final rule.

b. Clarifications

Comment: AHRI suggested that rather than ''mildly flammable refrigerants'' EPA use the term ''refrigerants with lower flammability'' to remain consistent with ASHRAE classifications.

Response: EPA acknowledges this correction and has used the ''lower flammability'' description for the A2L refrigerants in the preamble to this final rule. In the ''Further information'' column of the regulatory text in this final rule, we have used the term ''Flammable'' to replace the term ''Mildly flammable'' that was contained in the 2020 NPRM.

Comment: AHRI pointed out that EPA indicated class 2L flammability is determined based on testing at 73.4 °F (23.0 °C). They noted that ASHRAE Standard 34–2019 requires testing at that temperature to determine if flame propagation exists and if not, tests at 140 °F (60 °C) are conducted to determine the refrigerant flammability classification.

Response: EPA acknowledges this clarification, which is incorporated in the description of the ASHRAE standard testing procedures to determine flammability classification in section II.B.3 above.

Comment: AHRI provided additional detail on requirements contained in UL 60335–2–40 and stated that some of the summary information EPA provided (85 FR 35884–34885, June 12, 2020) may be taken out of context or be incorrect. For instance, they stated alarms might not be required for most systems and if refrigerant concentrations are found to exceed certain thresholds a mitigation strategy such as ''fan operation and air circulation or ventilation'' would be activated; shut-off valves are only an option for VRF systems; connected space requirements exist for duct-free equipment but are not required for ducted systems with sensors/detectors; mitigation requirements for labeling, ignition source controls, and other features are required for portable appliances with charge sizes less than three times the LFL; that similar requirements exist for fixed appliances where the charge is less than six times the LFL; that detectors are required to be factory installed, qualified and listed with the product for equipment above a charge size calculated per the standard; outdoor air ventilation is required ''[o]nly in a few cases;'' and while Annex HH is informative as EPA stated in the proposal, installation and service instructions are required by the UL standard and that these instructions would tailor Annex HH recommendations to the specific product. Carrier pointed out that Annex DD of the standard, while also informative, provides guidance on what information should be included in operation, service and installation manuals.

Response: EPA acknowledges these clarifications and we agree with the commenters' more detailed characterization of certain aspects of UL Standard 60335–2–40. Our description in section II.B.5 above is offered only for informational purposes and is not meant to be an exhaustive summary of the standard. We emphasize that our use conditions are not reliant on that informational description but rather adherence to the actual requirements in the standard, which is incorporated by reference in this rulemaking.

Comment: AHRI stated that the proposed rule would require the use of spark-free equipment but states such tools ''are not required for A2L refrigerants as these refrigerants have a high minimum ignition energy and sparks from tools and even some electrical devices is not a competent ignition source for an A2L refrigerant due to their higher minimum ignition energies.''

Response: EPA noted in the proposal and reiterates in this final rule that the information on spark-free tools is included in the ''Further information'' column of the regulatory text and so is not a requirement of the rule. While we believe the use of spark-free tools provides additional risk mitigation for technicians working with flammable refrigerants, it was not proposed as a requirement and in this final rule we maintain the recommendation in the ''Further information'' column.

c. Use Conditions

i. Standards

Comment: Daikin supported EPA's reliance on UL Standard 60335–2–40 as a basis for listing as acceptable with a use condition requiring adherence to that standard. NRDC, speaking in part about the UL Standard, stated that ''EPA's approach of reviewing, adjusting as needed, and then adopting these standards' safe use requirements is sound.''

Response: EPA acknowledges Daikin's and NRDC's support for these aspects of the proposed listing. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.B, including the use conditions related to UL 60335–2–40.

Comment: Pointing to ASHRAE 15–2019 and the third edition of UL 60335–2–40, Chemours stated that the ''[a]pplication and product standards for the end-uses referenced in the proposed rule are complete.'' AHRI stated that industry has proposed requirements to reduce risk with A2L refrigerants in UL Standard 60335–2–40, ASHRAE Standard 15, and ASHRAE Standard 15.2. They provided some examples of these including air circulation as well as control of ignition sources and hot surface temperatures. Trane stated EPA's use conditions should be linked to the current and future versions of ASHRAE 15 and ASHRAE 15.2, the latter of which they expected to be published in early 2021. They noted that these standards govern the installation, operation and maintenance of heating, ventilation, and air conditioning (HVAC) systems using A2L refrigerants in commercial and residential occupancies.

Response: EPA understands that other risk mitigation requirements have been proposed by the standards project committee for ASHRAE 15 and ASHRAE 15.2 and may be used by the HVAC industry, just as mitigation requirements have already been

[34] The Air Conditioning, Heating, and Refrigeration News, *An HVAC Technician's Guide to R–32,* November 12, 2020. Available at *https://www.achrnews.com/articles/144053-an-hvac-technicians-guide-to-r-32?oly_enc_id=8731J4776701J6C.*

included in the UL Standard that is adopted as a use condition in these final SNAP listings. Nonetheless, we find that these A2L refrigerants can be used safely provided the use conditions in this rule are followed, including compliance with the requirements of the UL Standard. In certain clauses, the UL Standard requires compliance with ASHRAE 15. We also note that other authorities might impose additional requirements, such as adoption of ASHRAE 15 and 15.2 in building codes, that would provide an additional layer of safety above what EPA is requiring. If in the future EPA were to determine that additional requirements are needed after this rulemaking to ensure safe use of the refrigerants in the residential and light commercial AC and heat pumps end-use, EPA could consider any relevant changes and if any revisions to this final rule should be proposed.

Comment: The Alliance noted that the standard proposed to be incorporated by reference, UL 60335–2–40, 3rd edition, will likely be updated again. Daikin noted the standard is a ''continuous maintenance standard'' supporting reference to the current edition. AHRI also pointed out that ''new and updated standards will become more important as standards sunset in the coming years.'' The Alliance expected the fourth edition ''soon,'' and forecasted that most products manufactured to this standard with the six A2L refrigerants would likely be certified to that fourth edition. They asked that ''the UL 60355–2–40 [sic] standard update to include refrigerants that meet all the requirements listed in the fourth edition as well.'' More generally they asked that ''references to the standards be updated as new editions become available for the products listed in SNAP Rule 23 and other rules.'' Carrier also suggested EPA align with new safety standards ''as new editions and future revisions become available'' and Chemours offered similar suggestions. Sporlan and Trane suggested the use condition reference the latest edition of the UL Standard, such that the reference remains up to date. Sporlan suggested ''this use condition be modified to reference the latest released edition of this same standard, instead of tying Rule 23 exclusively to the 3rd Edition.'' Trane noted that future editions of the UL Standard are already underway and predicted the fourth edition would be complete within two years (*i.e.,* by July 27, 2022). Honeywell also supported referencing a 4th edition and indicated that the process for writing such would start in August 2020 and expected completion in 2021. Honeywell asked EPA to wait until the 4th edition is published before finalizing these listings of the A2L refrigerants and noted that the 3rd edition ''does not cover mitigation measures for external fires caused by refrigerant leaks.'' AHRI also pointed out that there is an ongoing effort to harmonize the relevant safety standards and recommended that EPA update references to requirements for compliance with product safety standards as new editions and revisions become available. Referencing both the third and fourth edition of UL 60335–2–40 as well as ASHRAE 15–2019 and the proposed ASHRAE 15.2, Johnson Controls called for the acceptability listing of these A2L refrigerants to be ''contingent upon the completion and harmonization of the governing UL and ASHRAE standards for the safe design and application of stationary air conditioning.'' Honeywell made a similar point, referencing ASHRAE Standards 15 and 15.2, and suggested that these A2L listings be delayed until this harmonization process was complete.

Response: EPA acknowledges the information on further developments in the UL 60335–2–40 standard and ASHRAE standards processes. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.B. EPA is incorporating by reference the 3rd edition of the UL standard (the existing version of the standard). As addressed below, we conclude, and several commenters agree, that this version adequately addresses the use of these A2L refrigerants in the equipment proposed.

As we noted above, in certain cases the UL Standard refers to ASHRAE 15–2019 for compliance. We are not, however, providing a use condition based on one or more future editions of this standard, nor do we feel it necessary or appropriate to rely on future standards and harmonization efforts. Not only does EPA not know exactly what these future standards may entail, those commenting on the proposed rule have not had the opportunity to review those updates, as they have not yet been finalized. Similarly, we do not find it necessary or appropriate to wait for such actions to be finalized before taking this action. The third edition of the UL Standard included extensive revisions specifically to address flammability risks of A2L refrigerants and reach industry-wide consensus. We further note that Chemours' comments on the 2020 NPRM called finalization of this rule ''critical'' and ''timely'' and stated that with this final rule, the HVAC ''industry is now well prepared to take this important step forward'' in the use of lower-GWP—and lower overall risk to human health and the environment—refrigerants in this end-use. If and when a 4th edition of the UL Standard is released, EPA can consider any relevant changes and if any revisions to this final rule should be proposed.

Further, as mentioned by AHRI and Daikin, the UL standards are under continuous maintenance—as are ASHRAE Standards 15 and 15.2—and hence may change again even after the mentioned editions are published. Nonetheless, most commenters supported moving forward with the rule using the third edition of the UL Standard. Daikin, for instance, ''endorses EPA's determination that this consensus safety standard adequately protects against the reasonably foreseeable risks associated with the use of R–32 in the applications being considered.'' Chemours added that ''[a]pplication and product standards for the end-uses referenced in the proposed rule are complete'' and that ''these updated standards sufficiently address the risks associated with the use of A2L solutions.'' EPA concludes that reliance on the current UL Standard and our other use conditions allows applicable products to be used safely.

Regarding Honeywell's comment on external fires, we note that a leak, even of a flammable refrigerant, does not ''cause'' a fire. It would require an ignition source and a concentration of the refrigerant higher than the lower flammability limit and below the higher flammability limit. Requirements in the UL Standard mitigate the risk of the equipment serving as an ignition source. As noted above, AHRI pointed out that ''[f]or almost all applications air circulation will be sufficient to dilute the refrigerant concentration in the event of a catastrophic leak to below 25% of the LFL. Only in [a] rare case will ventilation be used to introduce outside air.'' Further, the industry is actively studying the behavior of A2L refrigerants (presuming a leak does occur) in a structural fire. Should the results of this research or other information lead in the future EPA to determine that additional requirements are needed after this rulemaking to ensure safe use of the refrigerants in the residential and light commercial AC and heat pumps end-use, EPA could consider any relevant changes and if any revisions to this final rule should be proposed.

We understand that the Alliance is asking EPA to modify the use condition so that it requires adherence to the fourth edition once the fourth edition

publishes, similar to suggestions from other commenters, and to also consider revising the listing beyond the six refrigerants in this rulemaking to others. If in the future an updated standard is published, or the harmonization with other standards is completed, EPA could consider any relevant changes and if any revisions to this final rule should be proposed. In a similar manner, and through the normal SNAP submission review, we can consider taking future action to list, or propose to list with use conditions, other refrigerants if we were to determine we had enough information to do so.

Comment: Honeywell predicted that ASHRAE Standard 15.2 would be published in late 2021 or early 2022 and then adopted into model building codes in 2024. They asked EPA to delay finalization of this rule listing of A2L refrigerants until these actions occurred. They stated that ''[c]urrent model mechanical and fire codes prohibit mildly flammable refrigerants to be used in direct HVAC systems.''

Response: EPA has not participated in the revisions to the model codes discussed by Honeywell, and we find that these SNAP listings can be finalized before Honeywell's prediction that a proposed standard would be adopted into such codes, consistent with how we have proceeded with other listings in past SNAP actions that could be affected by anticipated revisions to building codes. As noted both in the proposal and above in this final rule, however, information listed in the ''Further information'' column of the listings might refer to ''sound operating practices that have already been identified in existing industry and/or building codes or standards.'' (85 FR 35885, June 12, 2020). The listings in this final rule find certain refrigerants acceptable and establishes EPA's use conditions, and do not require any particular entity to use these refrigerants. Should other requirements or standards also apply, such as building codes as Honeywell states, other authorities would be responsible for ensuring such requirements are addressed and enforced. We also note that some states are in the process of updating their building code requirements to allow for refrigerants with lower flammability (*e.g.,* 2Ls), which will address Honeywell's concern that such codes ''prohibit mildly flammable refrigerants.'' Further, we are aware of the safe use of 2L refrigerants in the end-uses covered by this rule in other countries. While other states' building codes might currently prohibit use of these refrigerants, the adoption by some states and the safe use demonstrated gives support to listing these now. Further, we note that regardless of the status of building codes, alternative means and measures exist under which interested parties may present to the Authority Having Jurisdiction (AHJ) evidence to demonstrate a similar level of safety as provided under the existing building codes and receive an exception to use an A2L refrigerant. For these reasons, the Agency determines it is appropriate to finalize this final rule now. If and when building codes are updated as indicated by the comment, EPA can consider any relevant changes and if any revisions to this final rule should be proposed.

Comment: Rheem asked EPA to ''[p]rovide revised guidance for charge limits for R–32 refrigerant, currently defined in SNAP Notice 25 and based on unit capacity, to be governed by the safety standards.''

Response: We believe Rheem is referring to SNAP Rule 19 (80 FR 19454, April 10, 2015) wherein EPA found HFC–32 acceptable, subject to use conditions, for self-contained room air conditioners. One use condition referenced parts of the August 3rd, 2012 version of UL Standard 484, Edition 8 and another set charge size limits based on the type of equipment (window unit, portable room AC, etc.) and cooling capacity. In the proposal for this final rule we noted that we were not proposing to revisit or modify the existing requirements from SNAP Rule 19, and consistent with that proposal, we are not finalizing changes to these requirements. EPA understands that the standard we relied on in Rule 19 might ''sunset'' in the future. Therefore, we will continue to evaluate the market for the equipment addressed in that rule, including HFC–32 in self-contained room air conditioners, and whether to establish new or revised use conditions that reference UL 60335–2–40. If in the future we wish to revise the existing requirements for HFC–32 self-contained room air conditioners, EPA could consider any relevant changes and if any revisions to this final rule, or SNAP Rule 19, should be proposed.

ii. New Equipment

Comment: AHRI, Carrier, Daikin, EIA, Honeywell, Johnson Controls and Lennox strongly support the proposed use condition that these A2L refrigerants may only be used in new equipment and not retrofits. AHRI noted that ''refrigerants from a higher ASHRAE flammability classification'' should not be used to retrofit existing equipment; *i.e.,* these A2L lower flammability refrigerants should not be used to retrofit systems using A1 (''no flame propagation'') refrigerants, such as R–410A. Carrier added that such a use condition continues EPA's precedent from similar listings of flammable refrigerants that were only listed for new equipment.

Response: EPA acknowledges these commenters' support of our proposed use condition that finds these refrigerants acceptable for new equipment and not for retrofits. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.B., including that use condition.

Comment: AHRI, Carrier, Chemours, Daikin, Johnson Controls, and Rheem sought clarification on footnote 33 in the proposed rule, which sought to distinguish a ''new'' system from a ''retrofitted'' system. AHRI noted that since the inception of the International Building Codes in the 1990s, nail strips have been required to be used to support existing piping within 1.5 inches of a wall when a new system is installed. AHRI also indicated that any ''[e]xisting external piping must be pressure-tested, leak-checked and vacuum-checked per the safety standards during the installation process,'' a point also noted by Johnson Controls. Daikin pointed to provisions in UL Standard 60335–2–40 that address situations where ''partial units'' (as defined in the Standard) are installed without new refrigerant tubing between indoor and outdoor components. They also noted that clause DD.3.1DV.2 of the UL Standard provides mandatory requirements, including strength test, leak tightness checks, and compliance with national and local codes, for field-installed refrigerant tubing and as such tubing meeting those conditions may be reused. Carrier stated that ''[l]ine sets, however, have been safely re-used in the HVACR field for decades'' and noted that equipment manufacturer installation instructions and standards, such as UL 60335–2–40 and ASHRAE 15, allow for reuse of line sets provided they meet requirements including ''line sizing, as well as pressure and vacuum testing of the line sets to ensure they are free of leaks.'' Chemours offered similar observations. Rheem asked that ''external field-erected line sets'' be excluded from the definition of a new unit, observing that replacement of these should be left to the AHJ such as a building code inspector. Carrier and Chemours offered alternative language for the footnote and suggested providing such guidance in appendix W of the proposed regulatory text where the listing is provided. On the other hand,

Honeywell states that the definition of ''new system'' should require the installation of new refrigerant piping, tubing or linesets and later stated that ''the tubing must be replaced, or at least inspected and reinforced to meet proposed requirements under ASHRAE 15.2.'' They said that existing tubing was not likely to meet minimum safety regulations. Trane said ''[b]asing the proposed use conditions on ASHRAE 15 and ASHRAE 15.2 incorporates appropriate piping guidance and avoids the potential of unnecessary and costly restrictions.''

Response: After consideration of these comments, EPA concludes that the use of existing piping that is consistent with the use conditions finalized—such as adherence to the UL 60335–2–40 Standard and the inclusion of markings and labels as required—and the safety protocols mentioned should not pose additional risk. We have clarified this in section II.B.5.a and likewise in the text of the corresponding footnote in section II.B.1.b of this final rule by not including ''refrigerant tubing'' in the description of new equipment in this final action. As such, existing piping does not need to be replaced for the equipment to be considered ''new'' while a new compressor, evaporator, and condenser are all required to be considered ''new.'' We believe this preamble text sufficiently indicates our intention and so have not included additional discussion in the regulatory text.

As noted by other comments, discussed elsewhere in this final rule, the UL Standard 60335–2–40, which is incorporated by reference through this rule, addresses the situations where existing tubing might be used when installing a new system using a refrigerant in this rule. Consistent with the use conditions established in this rule, EPA finds that this standard provides appropriate criteria by which an installer would decide when exiting tubing may be used or needs to be replaced. Accordingly, EPA concludes it is not necessary or appropriate to define a ''new'' system to require installation of new refrigerant piping, tubing or linesets. If the existing tubing and linesets do not meet existing regulations separate from the UL Standard and our other use conditions, *e.g.* applicable building codes, other regulations or other authorities may require installation of new refrigerant piping, tubing or linesets. EPA also does not find it appropriate to adopt ''proposed requirements,'' including those proposed in October for ASHRAE 15.2, as those have not been finalized and neither commenters nor EPA can know the future content of a standard for certain until it is finalized.

Comment: Carrier brought up the possibility that an outdoor condensing unit using a non-flammable refrigerant (*e.g.,* HCFC–22 or R–410A) might illegally be replaced with one of the six refrigerants in the listings in this final rule. Carrier urged EPA to work with the industry concerning the replacement of all components, *e.g.* including the indoor unit, as these instances will exhibit ''inspection and enforcement challenges.''

Response: EPA notes that the final listings of these six refrigerants require they be used in a new system, including the replacement of the indoor unit of an existing HCFC–22 or R–410A system when the corresponding outdoor unit is replaced. We support education and training across the industry to improve awareness of and compliance with the requirements of this final rule. EPA intends to continue to work with industry towards these goals.

Comment: Carrier and Chemours sought clarification where EPA stated in footnote 33 that the use condition for ''new equipment'' meant a ''completely new circuit.'' Chemours noted that a literal translation of that might be to require that an entire system be replaced, even if in the future a repair was being conducted on a system using one of the six A2L refrigerants in this final rule.

Response: EPA acknowledges Carrier's and Chemours' comments pointing out this potential misinterpretation of the use condition. Under the use conditions finalized in this rule, EPA intends that once systems using these A2L refrigerants are installed, technicians, using proper safety procedures, may service the equipment similarly to servicing current day equipment using A1 refrigerants. This intention to allow servicing and not strand equipment prematurely is consistent with prior SNAP decisions, as well as with approaches that we have taken under other provisions of Title VI of the CAA to achieve a smooth phaseout and transition to safer alternatives. Such service would include replacing components including the condensing unit, and other adjustments. In those cases where one of the heat exchangers needs replacing, EPA recommends that outdoor units and indoor units be properly matched, including for instance replacing a functioning indoor A2L evaporator unit if warranted when the original A2L outdoor unit is replaced with a higher-efficiency outdoor unit using that same A2L refrigerant.

iii. Labels

Comment: AHRI, the Alliance, Carrier, Chemours, Daikin, Johnson Controls, Lennox, and Rheem suggested that EPA rely on the labeling requirements found in UL 60335–2–40, including the font size requirement in the standard. Carrier held that the ⅛-inch font size specified in the standard is ''easily readable'' and further noted that ''visual icons and flammability symbols'' are required by the standard. Lennox felt this size, which is half the size required in other EPA listings (*e.g.,* 80 FR 19454, April 10, 2015), was justified given the refrigerants proposed have lower flammability (A2L) whereas the referenced listings were for higher flammability refrigerants (A3). Chemours stated that using a larger font ''disproportionally emphasizes flammability versus other safety aspects including electrical or pressure requirements.'' Rheem said that diverging from the UL Standard ''adds unnecessary complexity'' and Johnson Controls held that ''[t]he introduction of new, unique requirements could lead to confusion in the field and thus increase safety risks.'' EIA, on the other hand, ''strongly supports the labelling requirements . . . outlined on the proposed rulemaking.''

Response: As in other regulations promulgated under CAA section 612, EPA concludes that the proposed labeling requirement to use ¼-inch fonts provides for an easier-to-read label than the ⅛-inch fonts in the standard; hence, the large font size provides an extra layer of risk mitigation for technicians, consumers, retail store owners, building owners and operators, first responders, and those disposing of the equipment to readily understand the possibility that the equipment contains a flammable refrigerant. Accordingly, EPA is finalizing the larger text size as proposed.

The only differences to the actual text of the label between UL 60335–2–40 and the requirement proposed and finalized in this rule are to the label(s) on the indoor unit, where for instance the minimum installation height in meters (m) and feet (ft) is to be referred to in the format ''X m (Y ft)'' rather than ''X m and Y ft'' as in the UL Standard, with X and Y calculated per the standard (85 FR 35881, June 12, 2020). EPA believes the format is appropriate and would help avoid possible confusion if an installer were to interpret the label as called for in the UL Standard to mean X meters *plus* Y feet (*i.e.,* 4.28 times Y feet or 1.305 times X meters). Likewise, we proposed and are finalizing the same change in text

format for the minimum room area label.

Comment: AHRI and Daikin indicated EPA could in the future submit a proposed change to UL to modify the labeling requirements. AHRI also pointed out that there is an ongoing effort to harmonize the relevant safety standards and recommended that EPA update references to requirements for compliance with product safety standards as new editions and revisions become available. They also suggested EPA consider incorporating application standards such as ASHRAE 15 when this harmonization process is complete.

Response: As explained above, EPA finds that these A2L refrigerants can be used safely provided the use conditions in this final rule are followed, including compliance with the current (3rd edition) UL 60335–2–40. Accordingly, EPA is taking final action on the proposal without waiting for the harmonization process to be completed. EPA understands that it could submit a change proposal to UL and if in the future EPA were to determine that additional use conditions are needed after this rulemaking to ensure safe use of the refrigerants in the residential and light commercial AC and heat pumps end-use, EPA could consider any relevant changes and if any revisions to this final rule should be proposed, for instance by proposing to reference a revised standard and specific application standards. Given the time required to propose, discuss, and finalize any change to the UL Standard, EPA understands that such a revised UL standard would not have been finalized for this final rule, nor did we expect the harmonization effort to be complete. If and when a 4th edition of the UL Standard is released, EPA can consider any relevant changes and if any revisions to this final rule should be proposed.

Comment: Carrier stated that ''[t]he consensus safety standard CSA/UL 60335–2–89 committee included representatives from fire service which concluded that the proposed label requirements replicated from UL/CSA 60335–2–40 in addition to label requirements for buildings in building codes were sufficient from their perspective.'' Lennox made the same point, saying the committee that developed the CSA/UL 60335–2–89 standard ''included representatives from fire services which concluded that the UL label requirements were sufficient.''

Response: EPA appreciates learning that fire service personnel were part of the consensus process for the 60335–2–89 standard but notes that this is a different UL standard from the one addressed in this rule. Thus, any conclusions about the adequacy of the label requirements for that standard are not the same as a conclusion that the label requirements for the UL standard addressed in this final rule is sufficient, including the font size. For example, as the 60335–2–89 standard covers commercial refrigeration equipment, it is reasonable to assume that the fire service personnel were only evaluating the label requirements for the types of appliances covered by that standard, and not necessarily agreeing to the adequacy of those requirements for the equipment covered in this final rule, considering that much of the equipment in the residential and light commercial AC and heat pumps end-use has higher refrigerant charge sizes than the appliances covered in the 60335–2–89 standard. As described elsewhere in this action, we are concluding that the larger font size is appropriate under SNAP to reduce risks to technicians, consumers, retail store owners, building owners and operators, first responders, and those disposing the appliance, consistent with EPA's approach in other prior SNAP rules.

Comment: Daikin stated that the UL Standard was drafted under a consensus process and requested that EPA's proposed use conditions regarding labels be removed, allowing the standard to address any such requirements.

Response: EPA understands that this UL standard was drafted following consensus practices, as were standards referenced in past EPA listings of flammable refrigerants (*e.g.,* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015). In those cases, as in this action, we find that the extra level of safety provided by EPA's labeling requirement is appropriate under SNAP and that the larger font size will reduce risks to technicians, consumers, retail store owners, building owners and operators, first responders, and those disposing the appliance. Accordingly, EPA is finalizing the use conditions regarding labels as proposed.

iv. Red Markings

Comment: Chemours indicates that using the same use condition for red markings for these A2L refrigerants as was used for A3 refrigerants previously listed acceptable amounts to a ''one size fits all'' approach. They disagreed that this should be done and specifically drew attention to the UL 60335–2–40 standard, which provides different requirements for equipment with A2L refrigerants compared to equipment with A3 refrigerants. They indicated that ''treating A2 [sic] and A3 refrigerants the same is likely to cause confusion to end-users, especially technicians responsible for installation and maintenance of systems.'' Daikin, Lennox, and Rheem commented that the UL Standard was adequate and as such the proposed requirement for red markings was not warranted. EIA, on the other hand, ''strongly supports . . . the required red markings on piping and hoses outlined on the proposed rulemaking.''

Response: EPA is finalizing the proposed requirement for red markings. Consistent with other rules promulgated under CAA section 612, EPA's requirements of red markings add an extra layer of safety on top of the labels required under the UL standards, and EPA concludes this extra protection is appropriate for this listing under SNAP. As noted above, these types of red markings would signal to the technician that the refrigeration circuit that she/he was about to access contained a flammable refrigerant, even if all warning labels were somehow removed or were illegible or not understood (*e.g.,* for non-English speakers), and would provide similar notification to consumers, retail store owners, building owners and operators, first responders, and those disposing the appliance. We understand that UL 60335–2–40 treats A2L and A3 refrigerants differently; however, our proposal and this final rule do not cover the A3 refrigerants. EPA relied on different standards when we previously listed A3 refrigerants as acceptable subject to use conditions and hence we are not treating these two classes of refrigerants the same. For this SNAP listing, as in our past listings for A3 (and also A2L) refrigerants, EPA concluded that it is most important to warn technicians that there is a flammable refrigerant present, not whether it is specifically an A2L, A2, or A3 refrigerant. Once warned, we would expect the technician then seek to know which refrigerant is used and to proceed accordingly. While we see that the flammability risk can be considered ''lower'' when using A2L refrigerants compared to A3 refrigerants, a risk does exist and we find that the red markings will provide an additional warning to technicians, consumers, retail store owners, building owners and operators, first responders, and those disposing the appliance. We also note that the use of red markings is already required for HFC–32 as well as A3 refrigerants in self-contained room air conditioners based on previous regulations (80 FR 19454, April 10, 2015), and we are not aware that the marking requirements have led to any confusion.

Comment: AHRI read the proposal to be proposing all tubing be red, but thought the intent was to only require such markings for service ports.

Response: EPA did not intend to propose that all tubing in equipment using A2L refrigerants be red and we are not finalizing such a requirement in this final rule. We are finalizing this use condition as proposed and clarifying in section II.B.1.d that where the red markings would be applied depends primarily on the equipment design. The intent in the proposed rule and finalized in this rule is for the red marking to be present at all service ports for equipment that includes such service ports, and for the marking to extend one inch from those ports. Likewise, if connections need to be made in the field as opposed to at a factory, the one-inch red marking is required at those connection points. If, however, equipment is provided without such service ports, the one-inch red marking would be required at the point in the equipment where any service involving the refrigerant, including the evacuation of the refrigerant prior to equipment disposal, would occur. On smaller appliances, we have noted in the past that a process tube is often provided for such service, and that the red marking would be required there. As we have also noted previously, the manufacturer must decide the method of providing the red marking, for instance via paint, plastic sleeve, shrink wrap, tape, etc.

Comment: AHRI described the labeling requirements of the UL standard for service ports and indicated that ''use of red markings and the use of red hoses may cause some confusion.'' The reason the commenter provided was that typical gage sets currently use red housing for the higher-pressure side, a comment echoed by Carrier.

Response: EPA does not agree that the similarity of color between the gage set and the servicing port would lead to confusion. Given that connections in the gage set also exist for the low-pressure side, we feel that technicians would understand that a red marking of a service port does not mean that only the red hose of a gage set must be connected there. Other EPA requirements, such as the venting prohibition under section 608(c) of the CAA and technician training requirements, have existed since the early 1990s, and thus EPA believes technicians will be able to use gage sets without confusion. Further, training on flammable refrigerants which several commenters have pointed to would reinforce the understanding of red service ports and the use of gage sets. Finally, EPA notes that a similar red coloring requirement use condition exists for flammable refrigerants, including HFC–32, in other end-uses, and we are not aware that such coloring has led to any confusion.

Comment: Chemours stated that the requirement of red markings would be difficult to implement in certain types of residential and light commercial air conditioning equipment. As an example, they indicated that quick-release Schrader valves ''may be impossible to get in red color.''

Response: EPA does not see evidence that the construction of red-colored Schrader valves is impossible. In fact, Chemours' comments may point to the reason why they say such valves are not available. Chemours pointed out that the equipment types where flammable refrigerants are currently acceptable subject to use conditions were self-contained equipment generally using process tubes rather than Schrader valves. Thus, there may have been no reason to develop them in the past. However, that does not mean that such valves will not become available if there is demand for such valves in the future. Although we cannot confirm that such valves do not exist at all, it is important to note that other means of applying the red marking may be used. The regulatory text proposed and finalized in this rule states the red ''color must be applied at all service ports;'' hence, items such as a red plastic sleeve or shrink wrap at both sides of the port, rather than the entire port itself, would be acceptable means of meeting this use condition.

d. SNAP Criteria

i. Flammability Risks and Safety

Comment: AHRI and Lennox pointed to an approximately $7 million research effort with the U.S. Department of Energy (DOE), the California Air Resources Board (CARB) and other stakeholders on the behavior and safe use of next generation refrigerants, including the lower toxicity, lower flammability (A2L) refrigerants in the proposed rule. Lennox emphasized that such research was used to develop the safety standards and develop training. Sporlan said this research on 2L refrigerants is ''of mature enough nature that they will be able to be safely applied in new systems designed for 2L flammable refrigerants.'' AHRI detailed the extensive use of A2L refrigerants in the United States and other countries and noted that ''it has yet to find incidents related to A2L refrigerants.''

Response: The Agency acknowledges AHRI's and Lennox's support for this proposed listing. EPA acknowledges AHRI and Lennox for providing this information and note Sporlan's comment, which supports EPA's finding that the flammability risk of A2L refrigerants can be safely addressed. After considering all the public comments on this proposal, we are finalizing this listing, as described in section II.B.

Comment: HARDI indicated that the industry is supporting updates to the building, mechanical, and fire codes as well as transportation regulations to allow new equipment to use new refrigerants, including the A2L ones listed in the proposed rule. HARDI is working with the industry ''to ensure a smooth and safe transition takes place.''

Response: EPA acknowledges HARDI's information on their efforts to support the safe use of these refrigerants in residential and light commercial equipment as well as other types of equipment not covered by this final rule.

Comment: Honeywell commented that EPA should update the Risk Screens for R–32 and R–454B included in supporting documents for the proposed rule. They suggested that because ASHRAE Standard 15 mandates use of a refrigerant concentration limit (RCL), and ASHRAE Standard 34 sets the RCL to be 25% of the LFL, EPA should use that amount rather than the 100% of LFL.

Response: EPA has consistently evaluated alternatives through a risk screen process that begins with a highly conservative worst-case scenario, such as where the entire refrigerant charge of a specific equipment type leaks out rapidly in a specific room size. If a substitute's concentrations remain below 100% of the LFL and relevant toxicity limits in the worst-case scenario with highly conservative assumptions, we do no further assessment. If the substitute's concentrations exceed the LFL or a relevant toxicity limit in the worst-case scenario, then we consider more typical scenarios based on less conservative assumptions. EPA's risk screens indicate that none of the types of equipment in this rule with these refrigerants came close to 100% of the LFL, although they did exceed the 25% mark under the most conservative scenarios analyzed.

To the extent ASHRAE 15 is incorporated into building codes—as Honeywell indicates—that requirement to adhere to the ASHRAE RCL would provide an additional layer of safety above the use conditions set in this final rule. More generally, the use of risk screens was developed in the original SNAP Rule issued in 1994 and was not meant to incorporate every possible risk factor. In fact, in that rule we stated

''[w]henever the initial risk screen indicated a potential risk, the substitute was evaluated further to ascertain whether the potential risk was accurately estimated and if management controls could reduce any risk to acceptable levels.'' In this case, in the worst-case scenario where the 25% RCL was exceeded, we concluded that the additional risk mitigation offered by the UL Standard and our other use conditions adequately addressed any such risk.

ii. Toxicity and PFAS

Comment: EIA indicated there are ''concerns regarding potential risks to human health and the environment due to toxicity of trifluoroacetic acid ('TFA') and other by-products of breakdown of HFO–1234yf, which is a component of the five refrigerant blends.'' They pointed to scientific literature that finds HFO–1234yf has a 100% conversion rate into TFA. They noted that increased use of alternative refrigerants including HFOs has increased ecosystem levels of anthropogenic TFA. EIA advised EPA to lead with caution but did not, however, recommend that additional restrictions be placed on these refrigerant blends based on TFA concerns. NRDC noted that ''EPA's risk analyses do not evaluate the potential human health and environmental impacts of approving additional uses for substances known to degrade into [TFA].'' NRDC pointed to the previous analyses EPA performed on TFA and requested that EPA revise those studies to include the potential use of the five blends in the air-conditioning sector.

Response: EPA does not agree that increased controls on HFOs or other refrigerants is warranted to address generation of TFA. EPA studied the potential generation of TFA when we first listed neat (*i.e.,* 100%, not in blends) HFO–1234yf as acceptable subject to use conditions in motor vehicle air conditioners. The myriad studies we referenced all concluded that the additional TFA from HFO–1234yf did not pose a significant additional risk, even if it were assumed to be used as the only refrigerant in all refrigeration and air conditioning equipment (76 FR 17492–17493, March 29, 2011). More recently, the World Meteorological Organization (WMO) concluded that ''[t]here is increased confidence that [TFA] produced from degradation of HFCs, HCFCs, and HFOs will not harm the environment over the next few decades'' while also calling for periodic reevaluation of this conclusion.[35] EPA likewise finds that the data on TFA is not sufficient to propose or establish additional restrictions under SNAP at this time. We further note that the venting prohibition under section 608(c) of the CAA, codified at 40 CFR 82.154(a), and accompanying refrigerant management requirements reduce emissions of these refrigerants. EPA intends to continue reviewing the research on potential impacts from TFA in the future.

Comment: NRDC asked EPA to revise the Agency's analysis of the substances included in this rulemaking that are polyfluoroalkyl or perfluoroalkyl substances (PFAS), citing two recent papers on the subject.[36] [37]

Response: EPA acknowledges these references. Upon review of these papers, EPA does not conclude that any revisions to the evaluation of overall risk to human health and the environment of the refrigerants addressed in this final rule is necessary at this time. While the papers NRDC referenced indicate there are potential health effects due to accumulation of PFAS in the environment, they do not provide information concerning the incremental effect that adoption of the five refrigerants listed in this rule for the residential and light commercial air conditioning end-use would have or how those effects would compare to effects from other available substitutes in this end-use.

Both papers reference decision IV/25 by parties to the *Montreal Protocol on Substances that Deplete the Ozone Layer.* That decision concerns applying specific criteria and procedures in assessing an essential use for the purposes of the control measures in Article 2 of the Protocol and therefore is not directly relevant to the SNAP program. Cousins *et al.* reviewed several examples of PFAS uses to assess whether they would consider those uses to be ''essential,'' and those uses did not include the refrigerants considered in this final rule. Kwiatkowski *et al.* likewise did not provide an overview of refrigerants to indicate any additional restrictions that they would consider warranted.

EPA intends to continue monitoring the scientific research on PFAS in the future and consider whether this information is relevant for the SNAP program.

e. Training

Comment: ACCA argues that training and certification of technicians on the handling of A2L refrigerants is necessary for safety and consumer peace of mind. ACCA indicated it and others were developing training and guidelines on A2L refrigerants and provided a list of several aspects that they are addressing. Carrier noted that industry has developed an exam for flammable refrigerants under the North American Technician Excellence (NATE) certification organization. Chemours also pointed to NATE and ACCA training as well as that by the Refrigeration Service Engineers Society (RSES), AHRI, and that provided by refrigerant producers and equipment manufacturers. Daikin also noted that AHRI is developing guidelines for A2L refrigerants and that equipment manufacturers are providing training to their service personnel. Chemours stated that ''[t]echnician training, guidelines, informational brochures, and certifications for flammable refrigerants have been or are currently being developed by a number of industry organizations'' and that ''recovery machines, leak detectors, service cylinders and fittings are also available to the industry.'' HARDI indicated the industry is supporting ''the development of training to allow contractors to install newly designed equipment.'' ACCA asked EPA to work with them and other industry stakeholders ''to develop and implement training standards for the handling of flammable refrigerants.'' Carrier similarly encouraged industry stakeholder engagement and Chemours stated that given the number of programs that already exist, EPA should collect a wide range of comments and move forward with a separate rule on training that incorporates stakeholder feedback. Rheem agreed that EPA should not undertake the creation of new training requirements in this rule and went further to say they were not in favor of a separate rulemaking, believing industry should create any new training requirements.

Response: EPA acknowledges the commenters' information related to their work to educate and train technicians on the proper and safe use of flammable refrigerants, including the A2L refrigerants in this final rule. In the

[35] World Meteorological Organization (WMO), Executive Summary: Scientific Assessment of Ozone Depletion: 2018, World Meteorological Organization, Global Ozone Research and Monitoring Project—Report No. 58, 67 pp., Geneva, Switzerland, 2018. Available at *https://ozone.unep.org/sites/default/files/2019-04/SAP-2018-Assessment-report-ES-rev%20%281%29.pdf.*

[36] Cousins, Ian T, *et al. The concept of essential use for determining when uses of PFASs can be phased out.* Environmental Science: Processes & Impacts. The Royal Society of Chemistry. May 28, 2019. *https://pubs.rsc.org/en/content/articlelanding/2019/em/c9em00163h#!divAbstract.*

[37] Kwiatkowski, Carol F. *et al. Scientific Basis for Managing PFAS as a Chemical Class.* Environmental Science & Technology Letters. June 30, 2020. *https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255.*

proposed rule (85 FR 35886, June 12, 2020), EPA indicated it would take advance comments on the possibility of proposing, in a separate rule, training and service requirements, and we thank the industry for their advance comments. We will take these comments into consideration to determine whether we should propose such a rule on training or undertake other future action. We note that certain safety requirements for refrigerant recovery and/or recycling equipment are already included in 40 CFR part 82, subpart F, under EPA's Refrigerant Management Program. We also indicated in our proposal, as we did in previous rules finding flammable refrigerants acceptable subject to use conditions (*e.g.* 76 FR 78832, December 20, 2011; 80 FR 19454, April 10, 2015), that industry may be better suited than EPA to develop appropriate training, and we see that this development has already started across multiple fronts.

Comment: AHRI ''strongly supports incorporation of new refrigerant and requirements regarding A2L refrigerants into existing certification requirements.'' The Alliance likewise supported this position asking EPA to update the training and certification framework. Rheem ''encourages EPA to incorporate group A2L and group A3 refrigerants into any requirements for training and certification that *currently exist* for group A1 refrigerants.'' (emphasis in original). EIA recommended that ''EPA mandate training and servicing requirements for all flammable refrigerants'' holding that ''[i]n addition to putting consumers at risk, not mandating such training would create confusion for contractors if EPA has different rules and standards for different refrigerants.''

Response: Although AHRI and Rheem did not indicate which existing training and certification requirements to which they were referring, we believe it would include the existing technician certification required under regulations implementing section 608 of the Clean Air Act. EPA has incorporated information on flammable refrigerants into the question bank for tests for such certification, which is required to service equipment that contains the refrigerants covered by this rulemaking, and has standards in place for refrigerant recovery and/or recycling equipment used with such refrigerants. As we consider these advance comments, we note that EPA's 608 test bank already includes questions concerning A2L refrigerants and the appliances covered by this rule, and EPA continues to review the test bank and can consider adding additional questions in the future if appropriate. As noted above, EPA will consider these advance comments as we determine what, if any, additional actions we might take, including considering issuing a proposed rulemaking addressing the possibility of mandating certain additional training requirements.

Comment: In their support of a separate rulemaking to update training and certification requirements for A2L refrigerants, Carrier suggested that a rulemaking provide ''training and service requirements for anyone purchasing A2L refrigerants or servicing equipment containing A2L refrigerants,'' noting that Australia and Japan have credited such requirements in their successful adoption of such refrigerants. Johnson Controls recommended a licensing system, delivered by trade schools and accredited by established contractor trade organizations, for handling A2L refrigerants. They emphasized the need for hands-on training, including ''demonstration of skills as it relates to the brazing, evacuating, charging, handling, storage, transportation, etc. of mildly flammable, A2L refrigerants.''

Response: EPA acknowledges the suggestion of undertaking a rulemaking to provide training and service requirements for technicians and the suggestion that it cover those purchasing A2L refrigerants and servicing equipment containing them. Likewise, we acknowledge Johnson Controls' recommendations of hands-on training and the topics suggested to be included in a licensing training curriculum. As noted above, EPA is taking these advance comments into consideration for possible future industry engagement and possible rulemaking or other future action.

Comment: EIA commented that industry has ''an aging and diminishing workforce that need to be retrained.'' In addition to flammability, they opined the training needs to cover other safety aspects including health and environmental aspects of venting and accidental release. They also stated that ''[t]here is significant confusion and lack of clarity when it comes to applicability of the venting prohibition itself, which still applies to the maintenance, service, repair, and disposal of equipment containing HFCs.'' They noted that ''the workforce needs to be provided basic awareness and education of refrigerant lifecycle and impacts at different stages'' while also noting that such education and training already exists. EIA offered suggestions on how the training program they support could be managed, such as allowing ''a certain grace period for servicing companies to bring technicians into compliance before such training becomes mandatory.'' They noted EPA could partner with the Department of Labor to ''support the transition to low-GWP alternatives, particularly to small businesses and women or minority owned companies,'' possibly complementary to apprenticeship programs under the Workforce Opportunity and Innovation Act.

Response: EPA appreciates EIA's concern with respect to technicians' handling of refrigerants. We further note that EPA's current CAA section 608 technician certification test bank includes questions concerning topics such as environmental impacts, laws and regulations (including the venting prohibition and its applicability), safety, flammable refrigerants, and safe disposal. Under the current regulations, EPA can make changes to the test bank.

EPA observes that while our proposed rulemaking took advance comment on the possibility of proposing training and service requirements for certain flammable refrigerants through a separate rulemaking, we neither proposed to create a complementary technician training and certification program in the current rulemaking, nor did we propose to modify our existing CAA 608 technician certification program in the current rulemaking. We appreciate EIA's suggestions and as noted above we will take these comments into consideration in determining whether to propose a rule or undertake other future action on such training or service requirements.

Comment: Honeywell stated that ''[a]ny transition to A2L refrigerants should also be accompanied by a comprehensive training program'' covering the installation and maintenance of equipment containing A2L refrigerants. They held that such a training program should be established, through rulemaking, by EPA before finalization of this rule. Others, including manufacturers intending to use these A2L refrigerants in their equipment, disagreed. For instance, Carrier said they see no reason to delay this rulemaking in order to initiate a separate rulemaking on training and certification for A2L refrigerants. Daikin also supported EPA's approach of not proposing specific training or service practices at this time, stating that manufacturers using A2L refrigerants provide training to their service personnel.

Response: After considering these comments, we agree with the comments that it is not necessary to delay this rulemaking to undertake separate action

on training, certification, or service practices for A2L refrigerants. As noted by comments, training is already being provided by some manufacturers and several organizations have developed or are in the process of developing training. In past rulemakings listing flammable refrigerants, we stated our conclusion that training is best left to the industry, and we find no reason to change that conclusion in this action. We are not aware of any safety issues that have arisen with the equipment covered by those rules and our current understanding based on comments to this rule is that action is already being taken to adequately train service technicians. While we will nonetheless consider these advance comments as we determine what, if any, additional actions we might take, including considering issuing a proposed rulemaking addressing the possibility of mandating certain additional training requirements, our current understanding based on comments to this rule is that the industry in general and interested manufacturers in particular are already preparing for an adequate level of training. As noted above, many additional sources are available, and more are under development, to provide training on the A2L refrigerants in this final rule and on flammable refrigerants in general.

C. Total Flooding: Removal of Powdered Aerosol E From the List of Substitutes Acceptable Subject to Use Conditions

Powdered Aerosol E, also marketed under the trade names of FirePro, FirePro Xtinguish, and FireBan, is generated in an automated manufacturing process during which the chemicals, in powder form, are mixed and then supplied to end users as a solid contained within a fire extinguisher. In the presence of heat, the solid converts to an aerosol consisting mainly of potassium salts. EPA listed Powdered Aerosol E as acceptable, subject to use conditions, as a total flooding agent (71 FR 56359, September 27, 2006). The use conditions required that Powdered Aerosol E be used only in areas that are normally unoccupied, because the Agency did not have sufficient information at that time supporting its safe use in areas that are normally occupied. Based on a review of additional information from the submitter to support the safe use of Powdered Aerosol E in normally occupied spaces, EPA subsequently determined that Powdered Aerosol E is also acceptable for use in total flooding systems for normally occupied spaces (83 FR 50026, October 4, 2018). The listing provides that Powdered Aerosol E is acceptable for total flooding uses, which includes both unoccupied and occupied spaces. In the October 2018 listing action, EPA noted that in a subsequent rulemaking, the Agency would remove the previous listing of Powdered Aerosol E as acceptable, subject to use conditions since the use condition is no longer applicable. We received no comments on the proposal for this listing. Therefore, in this final rule, as proposed, EPA is taking the ministerial action of removing that listing for Powdered Aerosol E.

III. How is EPA responding to other public comments?

EPA received other comments beyond the scope of this final action and addresses them below.

Comment: EIA stated ''that ODS are still undergoing replacement in the residential and light commercial AC and heat pump end-use and are subject to EPA's authority under the SNAP Program. EIA urges EPA to promulgate additional SNAP Program regulations listing high-GWP substitutes that pose a considerably higher comparable risk to the five refrigerant blends, as unacceptable for this end-use, including R–410A, R–404A, R–134a, and R–434A.''

Response: This final rule lists additional substitutes as acceptable, subject to use conditions, in the residential and light commercial air conditioning end-use. The proposed rule did not discuss finding other substitutes unacceptable in this end-use and such listings are out of scope for this action. Accordingly, this comment requires no further response.

Comment: EIA noted EPA's ''Ongoing Responsibility to Protect Global Ozone'' as it relates to methylene chloride (CH_2Cl_2). The commenter stated that the atmospheric concentrations of very short-lived substances (VSLS) including methylene chloride are increasing and that they are ''increasingly seen as a threat to the progress made by the Montreal Protocol . . . to protect the ozone layer.'' In order to address this threat, EIA asks that the agency consider listing methylene chloride and other similar VSLS as unacceptable in some end-uses.

Response: We appreciate EIA's comments on VSLS and note that EPA has taken domestic action on methylene chloride under the Toxic Substances Control Act (TSCA) due to its toxicity (84 FR 11420, March 27, 2019). The proposed rule did not discuss listing VSLS as unacceptable and such listings are out of scope for this final action. Accordingly, this comment requires no further response.

Comment: Trane commented that HFC–32, R–452B, and R–454B should also be approved for scroll chillers. AHRI requested EPA to find HFC–32 and R–454B acceptable for positive displacement chillers, and Rheem similarly asked that SNAP list group A2L refrigerants in such equipment. Johnson Controls suggested listing HFC–32 and all five blends acceptable for positive displacement chillers, to include reciprocating, screw and scroll chillers. The Alliance, Carrier, and Chemours agreed and encouraged listing HFC–32 and the five A2L blends acceptable in chillers in general. Carrier pointed out that for chillers, requirements for machine rooms would be needed and held that the ASHRAE 15 standard could serve this purpose.

Response: EPA notes that five of these six refrigerants (HFC–32, R–452B, R–454A, R–454B, and R–454C) have been submitted to the SNAP program for use in chillers and EPA is evaluating them for the chiller end-use, encompassing both the centrifugal chiller and positive displacement chiller end-uses. The other refrigerant, R–457A, has been submitted but not for the chiller end-uses. The proposed rule addressed listings for certain end-use categories, which did not include the chiller end-use. The proposed rule did not discuss finding these substitutes acceptable in other end uses, and such listings are out of scope for this action. Accordingly, this comment requires no further response.

Comment: Rheem sought clarification as to which SNAP end-use Heat Pump Pool Heaters (HPPH) and Heat Pump Water Heaters (HPWH) belong in and for clarification as to whether an end use category currently exists for these types of equipment.

Response: The classification of HPPHs and HPWHs is beyond the scope of this final rule. Accordingly, this comment requires no further response. Nonetheless, EPA is now aware of this clarification request and we invite Rheem and other manufacturers of such equipment to further pursue this issue separately with EPA and the SNAP program.

IV. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is not a significant regulatory action and was therefore not submitted to the Office of Management and Budget (OMB) for review.

B. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations and has assigned OMB control number 2060–0226. The approved Information Collection Request includes five types of respondent reporting and recordkeeping activities pursuant to SNAP regulations: Submission of a SNAP petition, filing a TSCA/SNAP Addendum, notification for test marketing activity, recordkeeping for substitutes acceptable subject to use restrictions, and recordkeeping for small volume uses. This rule contains no new requirements for reporting or recordkeeping.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden or otherwise has a positive economic effect on the small entities subject to the rule. This action allows the additional options under SNAP of using R–32, R–448A, R–449A, R–449B, R–452B, R–454A, R–454B, R–454C, and R–457A in the specified end-uses, but does not mandate such use. Users who choose to avail themselves of this flexibility for R–448A, R–449A, and R–449B must make a reasonable effort to ascertain that other substitutes or alternatives are not technically feasible and must document and keep records of the results of such investigations. Because equipment for R–452B, R–454A, R–454B, R–454C, and R–457A is not manufactured yet in the U.S. for the residential and light commercial air conditioning and heat pumps end-use, no change in business practice is required to meet the use conditions, resulting in no adverse impact compared to the absence of this rule. Equipment for R–32 already being manufactured has been subject to similar use conditions, resulting in no adverse impact compared to the absence of this rule. Thus, this final rule would not impose new costs on small entities. We have therefore concluded that this action will not impose a significant adverse regulatory burden for all directly regulated small entities.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the National Government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. It will not have substantial direct effects on tribal governments, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes, as specified in Executive Order 13175.

Thus, Executive Order 13175 does not apply to this action. EPA periodically updates tribal officials on air regulations through the monthly meetings of the National Tribal Air Association and will share information on this rulemaking through this and other fora.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866 and because EPA does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. EPA has not conducted a separate analysis of risks to infants and children associated with this rule. Any risks to children are not different than the risks to the general population. This action's health and risk assessments are contained in the comparisons of toxicity for the various substitutes, as well as in the risk screens for the substitutes that are listed in this final rule. The risk screens are in the docket for this rulemaking.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act

This action involves technical standards. EPA uses and incorporates by reference portions of the 2019 UL Standard 60335–2–40, which establishes requirements for the evaluation of residential air conditioning equipment and safe use of flammable refrigerants, among other things. The standard is discussed in greater detail in section II.B.5 of this preamble.

The 2019 UL Standard 60335–2–40 is available at *https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=36463,* and may be purchased by mail at: Comm 2000, 151 Eastern Avenue, Bensenville, IL 60106; Email: *orders@shopulstandards.com;* Telephone: 1–888–853–3503 in the U.S. or Canada (other countries dial 1–415–352–2178); internet address: *https://www.shopulstandards.com.* The cost of the 2019 UL Standard 60335–2–40 is $440 for an electronic copy and $550 for hardcopy. UL also offers a subscription service to the Standards Certification Customer Library that allows unlimited access to their standards and related documents. The cost of obtaining this standard is not a significant financial burden for equipment manufacturers and purchase is not necessary for those selling, installing, and servicing the equipment. Therefore, EPA concludes that the UL standard incorporated by reference is reasonably available.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Population

EPA believes that it is not feasible to quantify any disproportionately high and adverse human health or environmental effects from this action on minority populations, low-income populations and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629, February 16, 1994) because for all affected populations there is no requirement to use any of the alternatives listed in this action.

K. Congressional Review Act (CRA)

This action is subject to the CRA, and EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2).

V. References

Unless specified otherwise, all documents are available electronically through the Federal Docket Management System, Docket number EPA–HQ–OAR–2019–0698.

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ICF, 2020a. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–448A.

ICF, 2020b. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–449A.

ICF, 2020c. Risk Screen on Substitutes in Retail Food Refrigeration (Medium-temperature Stand-alone Units) (New Equipment); Substitute: R–449B.

ICF, 2020d. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: HFC–32.

ICF, 2020e. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–452B.

ICF, 2020f. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454A.

ICF, 2020g. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454B.

ICF, 2020h. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–454C.

ICF, 2020i. Risk Screen on Substitutes in Residential and Light Commercial Air-Conditioning and Heat Pumps (New Equipment); Substitute: R–457A.

IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M., and Miller, H.L. (eds.). Cambridge University Press. Cambridge, United Kingdom and New York, NY, USA. Available online at: *www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html.*

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UL 60335–2–40, 2019. Standard for Safety for Household And Similar Electrical Appliances—Safety—Part 2–40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers. Third Edition. November 1, 2019.

List of Subjects in 40 CFR Part 82

Environmental protection, Administrative practice and procedure, Air pollution control, Incorporation by reference, Reporting and recordkeeping requirements, Stratospheric ozone layer.

Michael S. Regan,

Administrator.

For the reasons set forth in the preamble, EPA amends 40 CFR part 82 as follows:

PART 82—PROTECTION OF STRATOSPHERIC OZONE

■ 1. The authority citation for part 82 continues to read as follows:

Authority: 42 U.S.C. 7414, 7601, 7671–7671q.

Subpart G—Significant New Alternatives Policy Program

Appendix O to Subpart G of Part 82 [Amended]

■ 2. Appendix O to subpart G of part 82 is amended by removing the entry ''Total flooding; Powdered Aerosol E (FirePro®)''.

■ 3. Add appendix W to subpart G of part 82 to read as follows:

Appendix W to Subpart G of Part 82—Substitutes Listed in the May 6, 2021 Final Rule—Effective June 7, 2021

REFRIGERANTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Narrowed use limits	Further information
Retail food refrigeration— medium-temperature stand-alone units (new only).	R–448A, R–449A, R–449B.	Acceptable Subject to Narrowed Use Limits.	Acceptable only for use in new medium-temperature stand-alone units where reasonable efforts have been made to ascertain that other alternatives are not technically feasible. Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information shall include descriptions of: • Process or product in which the substitute is needed; • Substitutes examined and rejected; • Reason for rejection of other alternatives, *e.g.,* performance, technical or safety standards; and • Anticipated date other substitutes will be available and projected time for switching.	A possible reason for rejection of one or more other alternative(s) could be based on ADA requirements.

REFRIGERANTS—SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS

End-use	Substitute	Decision	Use conditions	Further information
Residential and light commercial air conditioning and heat pumps (new only).	R–452B, R–454A, R–454B, R–454C and R–457A.	Acceptable Subject to Use Conditions.	These refrigerants may be used only in new equipment specifically designed and clearly identified for the refrigerants (*i.e.,* none of these substitutes may be used as a conversion or ''retrofit'' refrigerant for existing equipment designed for other refrigerants). These substitutes may only be used in air conditioning equipment that meets all requirements in the 3rd edition of UL 60335–2–40.[1 2 3] In cases where this appendix includes requirements more stringent than those of UL 60335–2–40, the appliance must meet the requirements of this appendix in place of the requirements in the UL Standard. The charge size for the equipment must not exceed the maximum refrigerant mass determined according to UL 60335–2–40 for the room size where the air conditioner is used. The following markings must be attached at the locations provided and must be permanent: (a) On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.'' (b) On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.'' (c) On the inside of the air conditioning equipment near the compressor: ''WARNING—Risk of Fire. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed.'' (d) For any equipment pre-charged at the factory, on the equipment packaging: ''WARNING—Risk of Fire due to Flammable Refrigerant Used. Follow Handling Instructions Carefully in Compliance with National Regulations.'' (e) On the indoor unit near the nameplate: a. At the top of the marking: ''Minimum Installation height, X m (W ft)''. This marking is only required if required by UL 60335–2–40. The terms ''X'' and ''W'' shall be replaced by the numeric height as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the height in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis. b. Immediately below (a) above or at the top of the marking if (a) is not required: ''Minimum room area (operating or storage), Y m^2 (Z ft^2)''. The terms ''Y'' and ''Z'' shall be replaced by the numeric area as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the area in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis.	Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.94 (ventilation) and 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), and 1910.1000 (toxic and hazardous substances). Proper ventilation should be maintained at all times during the manufacture and storage of equipment containing flammable refrigerants through adherence to good manufacturing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-fourth of the lower flammability limit, the space should be evacuated and reentry should occur only after the space has been properly ventilated. Technicians and equipment manufacturers should wear appropriate personal protective equipment, including chemical goggles and protective gloves, when handling flammable refrigerants. Special care should be taken to avoid contact with the skin which, like many refrigerants, can cause freeze burns on the skin. A class B dry powder type fire extinguisher should be kept nearby. Technicians should only use spark-proof tools when working on air conditioning equipment with flammable refrigerants. Any recovery equipment used should be designed for flammable refrigerants. Only technicians specifically trained in handling flammable refrigerants should service refrigeration equipment containing these refrigerants. Technicians should gain an understanding of minimizing the risk of fire and the steps to use flammable refrigerants safely. Room occupants should evacuate the space immediately following the accidental release of this refrigerant. Personnel commissioning, maintaining, repairing, decommissioning and disposing of appliances with these refrigerants should obtain training and follow practices consistent with Annex HH of UL 60335–2–40, 3rd edition.[1 2 3] CAA section 608(c)(2) prohibits knowingly venting or otherwise knowingly releasing or disposing of substitute refrigerants in the course of maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration. Department of Transportation requirements for transport of flammable gases must be followed. Flammable refrigerants being recovered or otherwise disposed of from residential and light commercial air conditioning appliances are likely to be hazardous waste under the Resource Conservation and Recovery Act (RCRA) (see 40 CFR parts 260–270).

REFRIGERANTS—SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS—Continued

End-use	Substitute	Decision	Use conditions	Further information
			(f) For non-fixed equipment, including portable air conditioners, window air conditioners, packaged terminal air conditioners and packaged terminal heat pumps, on the outside of the product: ''WARNING—Risk of Fire or Explosion—Store in a well ventilated room without continuously operating flames or other potential ignition.'' (g) For fixed equipment, including rooftop units and split air conditioners, ''WARNING—Risk of Fire—Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.'' (h) All of these markings must be in letters no less than 6.4 mm (¼ inch) high. The equipment must have red Pantone Matching System (PMS) #185 or RAL 3020 marked service ports, pipes, hoses, or other devices through which the refrigerant passes, to indicate the use of a flammable refrigerant. This color must be applied at all service ports and other parts of the system where service puncturing or other actions creating an opening from the refrigerant circuit to the atmosphere might be expected and must extend a minimum of one (1) inch (25mm) in both directions from such locations and shall be replaced if removed.	
Residential and light commercial air conditioning and heat pumps (new only), excluding self-contained room air conditioners.	R–32	Acceptable Subject to Use Conditions.	These refrigerants may be used only in new equipment specifically designed and clearly identified for the refrigerants (*i.e.,* none of these substitutes may be used as a conversion or ''retrofit'' refrigerant for existing equipment designed for other refrigerants). These substitutes may only be used in air conditioning equipment that meets all requirements in the 3rd edition of UL 60335–2–40.[1 2 3] In cases where this appendix includes requirements more stringent than those of UL 60335–2–40, the appliance must meet the requirements of this appendix in place of the requirements in the UL Standard. The charge size for the equipment must not exceed the maximum refrigerant mass determined according to UL 60335–2–40 for the room size where the air conditioner is used. The following markings must be attached at the locations provided and must be permanent: (a) On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.'' (b) On the outside of the air conditioning equipment: ''WARNING—Risk of Fire. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.'' (c) On the inside of the air conditioning equipment near the compressor: ''WARNING—Risk of Fire. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed.'' (d) For any equipment pre-charged at the factory, on the equipment packaging: ''WARNING—Risk of Fire due to Flammable Refrigerant Used. Follow Handling Instructions Carefully in Compliance with National Regulations'' (e) On the indoor unit near the nameplate: a. At the top of the marking: ''Minimum Installation height, X m (W ft)''. This marking is only required if required by UL 60335–2–40. The terms ''X'' and ''W'' shall be replaced by the numeric height as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the height in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis. b. Immediately below (a) above or at the top of the marking if (a) is not required: ''Minimum room area (operating or storage), Y m^2 (Z ft^2)''. The terms ''Y'' and ''Z'' shall be replaced by the numeric area as calculated per the UL Standard. Note that the formatting here is slightly different than the UL Standard; specifically, the area in Inch-Pound units is placed in parentheses and the word ''and'' has been replaced by the opening parenthesis. (f) For fixed equipment, including rooftop units and split air conditioners, ''WARNING—Risk of Fire—Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.'' (g) All of these markings must be in letters no less than 6.4 mm (¼ inch) high.	Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.94 (ventilation) and 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), and 1910.1000 (toxic and hazardous substances). Proper ventilation should be maintained at all times during the manufacture and storage of equipment containing flammable refrigerants through adherence to good manufacturing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-fourth of the lower flammability limit, the space should be evacuated and reentry should occur only after the space has been properly ventilated. Technicians and equipment manufacturers should wear appropriate personal protective equipment, including chemical goggles and protective gloves, when handling flammable refrigerants. Special care should be taken to avoid contact with the skin which, like many refrigerants, can cause freeze burns on the skin. A class B dry powder type fire extinguisher should be kept nearby. Technicians should only use spark-proof tools when working on air conditioning equipment with flammable refrigerants. Any recovery equipment used should be designed for flammable refrigerants. Only technicians specifically trained in handling flammable refrigerants should service refrigeration equipment containing this refrigerant. Technicians should gain an understanding of minimizing the risk of fire and the steps to use flammable refrigerants safely. Room occupants should evacuate the space immediately following the accidental release of this refrigerant. Personnel commissioning, maintaining, repairing, decommissioning and disposing of appliances with this refrigerant should obtain training and follow practices consistent with Annex HH of UL 60335–2–40, 3rd edition.[1 2 3] CAA section 608(c)(2) prohibits knowingly venting or otherwise knowingly releasing or disposing of substitute refrigerants in the course of maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration. Department of Transportation requirements for transport of flammable gases must be followed. Flammable refrigerants being recovered or otherwise disposed of from residential and light commercial air conditioning appliances are likely to be hazardous waste under the Resource Conservation and Recovery Act (RCRA) (see 40 CFR parts 260–270).

REFRIGERANTS—SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS—Continued

End-use	Substitute	Decision	Use conditions	Further information
			The equipment must have red Pantone Matching System (PMS) #185 or RAL 3020 marked service ports, pipes, hoses, or other devices through which the refrigerant passes, to indicate the use of a flammable refrigerant. This color must be applied at all service ports and other parts of the system where service puncturing or other actions creating an opening from the refrigerant circuit to the atmosphere might be expected and must extend a minimum of one (1) inch (25mm) in both directions from such locations and shall be replaced if removed.	

[1] UL 60335–2–40, Standard for Safety for Household And Similar Electrical Appliances—Safety—Part 2–40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, Third edition, Dated November 1, 2019.

[2] You may purchase the material from UL by mail: Comm 2000; 151 Eastern Avenue; Bensenville, IL 60106; email: *orders@shopulstandards.com;* phone: 1–888–853–3503 in the U.S. or Canada (other countries dial +1–415–352–2168); or web: *www.shopulstandards.com.*

[3] The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at U.S. EPA's Air and Radiation Docket; EPA West Building, Room 3334, 1301 Constitution Ave. NW, Washington, DC, 202–566–1742 and is available from Underwriters Laboratories Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062, 877.854.3577, *www.ul.com.* It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.*

[FR Doc. 2021–08968 Filed 5–5–21; 8:45 am]

BILLING CODE 6560–50–P