Subpart G—Significant New Alternatives Policy Program

Appendix U to Subpart G of Part 82—Unacceptable Substitutes and Substitutes Subject to Use Restrictions Listed in the July 20, 2015 Final Rule, Effective August 19, 2015

AEROSOLS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Propellants	HFC-125	Unacceptable as of January 1, 2016	HFC-125 has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 354-33-6 and it is also known by the name 1,1,1,2,2-pentafluoropropane. HFC-125 has a GWP of 3,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
			Products using this propellant that are manufactured prior to January 1, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HFC-134a	Unacceptable as of July 20, 2016, except uses listed as acceptable, subject to use conditions	HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-134a has a GWP of 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
			Products using this propellant that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HFC-227ea and blends of HFC-134a and HFC-227ea	Unacceptable as of July 20, 2016, except uses listed as acceptable, subject to use conditions	HFC-227ea has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 431-89-0 and it is also known by the name 1,1,1,2,3,3,3-heptafluoropropane. HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-227ea and HFC-134a have GWPs of 3,220 and 1,430, respectively. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

			Products using these propellants that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HCFC-22 and HCFC-142b	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 and HCFC-142b for aerosols is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. These propellants have ozone depletion potentials of 0.055 and 0.065, respectively.
Solvents	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-141b for aerosols is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. HCFC-141b has an ozone depletion potential of 0.11.

SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS

End-use	Substitute	Decision	Use conditions	Further information
Propellants	HFC-134a	Acceptable subject to use conditions	The classes of products listed below are acceptable for use from July 20, 2016 through December 31, 2017 and are unacceptable thereafter • products for functional testing of smoke detectors • products for which new formulations require governmental review, including: EPA pesticide registration, approval for conformance with military or space agency specifications, or FDA approval (other than MDIs) The classes of products listed below are acceptable for use and other uses are	HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-134a has a GWP of 1,430. Use is allowed for the specified uses because of the technical and safety demands in these applications. Aerosol products using this propellant that are manufactured prior to July 20, 2016, may be sold, imported, exported, distributed and used after that date.

			unacceptable as of July 20, 2016: • metered dose inhalers approved by the U.S. Food and Drug Administration for medical purposes • cleaning products for removal of grease, flux and other soils from electrical equipment or electronics • refrigerant flushes • products for sensitivity testing of smoke detectors • lubricants and freeze sprays for electrical equipment or electronics	
			• sprays for aircraft maintenance. • sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment. • pesticides for use near electrical wires or in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants. • mold release agents and mold cleaners. • lubricants and cleaners for spinnerettes for synthetic fabrics. • duster sprays specifically for removal of dust from	

			photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment. • adhesives and sealants in large canisters. • document preservation sprays. • wound care sprays. • topical coolant sprays for pain relief. • products for removing bandage adhesives from skin.	
Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a	Acceptable subject to use conditions	Acceptable for use in metered dose inhalers approved by the U.S. Food and Drug Administration for medical purposes and unacceptable for all other uses as of July 20, 2016	HFC-227ea has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 431-89-0 and it is also known by the name 1,1,1,2,3,3,3-heptafluoropropane. HFC-227ea has a GWP of 3,220.
				Aerosol products using this propellant that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.

REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Retail food refrigeration (supermarket systems) (new)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	Unacceptable as of January 1, 2017	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

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

capacity below 2,200 Btu/hr and containing a flooded evaporator) (new)	417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03		human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32 °F (0 °C).
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity equal to or greater than 2,200 Btu/hr) (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	Unacceptable as of January 1, 2020	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32 °F (0 °C).
Retail food refrigeration (stand-alone low-temperature units) (new)	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	Unacceptable as of January 1, 2020	These refrigerants have GWPs ranging from approximately 1,800 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Low-temperature" refers to equipment that maintains food or beverages at temperatures at or below 32 °F (0 °C).
Retail food refrigeration (stand-alone units only) (retrofit)	R-404A, R-507A	Unacceptable as of July 20, 2016	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

Vending machines (new only)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	Unacceptable as of January 1, 2019	These refrigerants have GWPs ranging from approximately 1,100 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Vending machines (retrofit only)	R-404A, R-507A.	Unacceptable as of July 20, 2016	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS

End-use	Substitute	Decision	Narrowed use limits	Further information
Rigid Polyurethane: Appliance	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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

			applications, may be used after those dates	standards; and/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should

			not technically feasible due to performance or safety requirements	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/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane: Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2019, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will

				be available and projected time for switching.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.
Rigid Polyurethane: Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: • Process or product

			Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	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.
Polystyrene: Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.

Polystyrene: Extruded Boardstock and Billet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2021, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa,	Acceptable Subject to	Acceptable from January 1, 2017, until January 1, 2022, in military	Users are required to document and retain the results of their

	HFC-365mfc, and blends thereof	Narrowed Use Limits	applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	technical investigation of alternatives for the purpose of demonstrating compliance. Information should 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/or • Anticipated date other substitutes will be available and projected time for switching.

UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
All Foam Blowing End-uses	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015. Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	HCFC-141b has an ozone depletion potential of 0.11 under the Montreal Protocol. EPA previously found HCFC-141b unacceptable in all foam blowing end-uses (appendix M to subpart G of 40 CFR part 82). HCFC-141b has an ozone depletion potential (ODP) of 0.11.
All Foam Blowing end-uses	HCFC-22, HCFC-142b, and blends thereof	Unacceptable effective September 18, 2015. Closed cell foam products and products containing	Use or introduction into interstate commerce of virgin HCFC-22 and HCFC-142b for foam blowing is prohibited

		closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	after January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A unless used, recovered, and recycled. These compounds have ODPs of 0.055 and 0.065, respectively.
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit	These foam blowing agents have global warming potentials (GWPs) ranging from 725 to 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polystyrene: Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from 725 to 4,470. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the

			environment by the status change date.
Rigid Polyurethane: Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2019, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2019, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from 725 to 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane: Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020 except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020 except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

		January 1, 2020, may be used after that date	
Rigid Polyurethane: Appliance	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polystyrene: Extruded Boardstock and Billet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6	Unacceptable as of January 1, 2021, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2021, may be used after that date	These foam blowing agents have GWPs ranging from higher than 140 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

FIRE SUPPRESSION AND EXPLOSION PROTECTION AGENTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Total Flooding	HCFC-22	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 for total flooding fire suppression and explosion protection is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A.

			This chemical has an ozone depletion potential of 0.055.

STERILANTS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Sterilants	Blends containing HCFC-22	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 for sterilants is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.055.

ADHESIVES, COATINGS AND INKS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Adhesives, coatings and inks	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-141b for adhesives, coatings and inks is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.11.

[80 FR 42953, July 20, 2015, as amended at 81 FR 86885, Dec. 1, 2016]