



Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning

Ozone Protection Hotline (800) 296-1996

February 2, 1999

Changes from the February 25, 1998 version: changed name of Free Zone manufacturer.

Background

Scientists worldwide have concluded that CFC-12 and other chlorofluorocarbons deplete the ozone layer. As a result, over 150 countries have signed a treaty to protect the earth's ozone layer called the Montreal Protocol. In the US, the Protocol is implemented by the Clean Air Act, and regulations issued under the Act ended the production of CFC-12 for air conditioning and refrigeration uses on December 31, 1995.

CFC-12 (also known by the trade name Freon) was widely used in air conditioners for automobiles and trucks for over 30 years. While new vehicles no longer use CFC-12, most vehicles built before 1994 still require its use for servicing. As a result, 30 million cars or more may need conversions to use an alternative refrigerant should the air conditioning develop a leak after CFC-12 is no longer available.

Note: there are several [other relevant fact sheets](#) available online and through our hotline.

Significant New Alternatives Policy (SNAP)

In 1994, EPA established the SNAP Program to review alternatives to ozone-depleting substances like CFC-12. Under the authority of the 1990 Clean Air Act (CAA), EPA examines new substitutes for their ozone-depleting, global warming, flammability, and toxicity characteristics. EPA has determined that several refrigerants are acceptable for use as CFC-12 replacements in motor vehicle air conditioning systems, subject to certain use conditions. This fact sheet lists the use conditions in detail and provides information about the current crop of refrigerants.

It is important to understand the meaning of "acceptable subject to use conditions." EPA believes such refrigerants, when used in accordance with the conditions, are safer for human health and the environment than CFC-12. This designation does not mean that the refrigerant will work in any specific system, nor does it mean that the refrigerant is perfectly safe regardless of how it is used. Finally, note that EPA does not approve or endorse any one refrigerant that is acceptable subject to use conditions over others also in that category.

Note also that EPA does not test refrigerants. Rather, we review information submitted to us by manufacturers and various independent testing laboratories. Therefore, it is important to discuss any new refrigerant with your vehicle dealer and shop technician before deciding to use it, and in particular to determine what effect using a new refrigerant will have on your warranty. Before choosing a new refrigerant, you should also consider whether it is readily and widely available, and your technician should consider the cost of buying recovery equipment for blends or recovery/recycling equipment for HFC-134a. Additional considerations about purchasing CFC-12

substitutes can be found in EPA's fact sheet titled "[Questions to Ask Before You Purchase an Alternative Refrigerant.](#)"

Definition of "Motor Vehicle Air Conditioning"

Under the SNAP program, the motor vehicle air conditioning (MVAC) end-use includes all forms of air conditioning that provide cooling to the passenger compartments in moving vehicles. This definition includes both MVACs, defined under the section 609 regulations at [40 CFR 82.32](#), and MVAC-like equipment, defined under the section 608 regulations at [40 CFR 82.152](#). EPA regulations issued under sections 608 and 609 of the Clean Air Act distinguish between MVACs and MVAC-like equipment for purposes of refrigerant recycling and handling. EPA includes both in the SNAP MVAC end-use and has relied on this definition since the original SNAP rule of March 18, 1994 (59 FR 13044). All use conditions, unacceptability findings, and other regulatory actions for this end-use apply equally to on-road vehicles, such as automobiles and trucks, and to off-road vehicles, such as tractors, combines, construction, mining equipment, boats, planes, and trains.

Misleading Use of "Drop-in" to Describe Refrigerants

Many companies use the term "drop-in" to mean that a substitute refrigerant will perform identically to CFC-12, that no modifications need to be made to the system, and that the alternative can be used alone or mixed with CFC-12. However, EPA believes the term confuses and obscures several important regulatory and technical points. First, charging one refrigerant into a system before extracting the old refrigerant is a violation of the SNAP use conditions and is, therefore, illegal. Second, certain components may be required by law, such as hoses and compressor shutoff switches. If these components are not present, they must be installed. See the section below on use conditions for more information on these points. Third, it is impossible to test a refrigerant in the thousands of air conditioning systems in existence to demonstrate identical performance. In addition, system performance is strongly affected by outside temperature, humidity, driving conditions, etc., and it is impossible to ensure equal performance under all of these conditions. Finally, it is very difficult to demonstrate that system components will last as long as they would have if CFC-12 were used. For all of these reasons, EPA does not use the term "drop-in" to describe any alternative refrigerant.

Use Conditions

Under the SNAP rule, each new refrigerant must be used in accordance with the [conditions](#) listed below. If you choose to use an alternative, make sure the service shop meets these requirements and that it has dedicated recovery equipment for blends or recovery/recycling equipment for HFC-134a.

UNIQUE FITTINGS:

Each new refrigerant must be used with a unique set of fittings to prevent the accidental mixing of different refrigerants. These fittings are attachment points on the car itself, on all recovery and recycling equipment, on can taps and other charging equipment, and on all refrigerant containers. If the car is being retrofitted, any service fittings not converted to the new refrigerant must be permanently disabled. Unique fittings help protect the consumer by

ensuring that only one type of refrigerant is used in each car. They also help protect the purity of the recycled supply of CFC-12, which means it will last longer, so fewer retrofits will be necessary nationwide. The list of fittings is available in an EPA fact sheet titled "[Fitting Sizes and Label Colors for Motor Vehicle Refrigerants](#)."

Applicability to Manifold Gauges and Refrigerant Identifiers Manifold gauges allow technicians to diagnose system problems and to charge, recover, and/or recycle refrigerant. A standard fitting may be used at the end of the hoses attached to the manifold gauges, but unique fittings must be permanently attached at the ends of the hoses that attach to vehicle air conditioning systems and recovery or recycling equipment. Similarly, refrigerant identifiers may be used with multiple refrigerants. The connection between the identifier or similar service equipment and the service hose may be standardized and work with multiple hoses. For each refrigerant, however, the user must attach a hose to the identifier that has a fitting unique to that refrigerant permanently attached to the end going to the vehicle. Adapters for one refrigerant may not be attached to end 2 and then removed and replaced with the fitting for a different refrigerant. The guiding principle is that once attached to a hose, the fitting is permanent and is not removed.

LABELS:

Whether a car is originally designed to use a new refrigerant or is retrofitted, the technician must apply a detailed label giving specific information about the alternative. The label's background color is chosen by the manufacturer to be unique, and the label colors for each refrigerant are listed in an EPA fact sheet titled "[Fitting Sizes and Label Colors for Motor Vehicle Refrigerants](#)." The label shows:

- the name and address of the technician and the company performing the retrofit;
- the date of the retrofit;
- the trade name, charge amount, and, when applicable, the ASHRAE numerical designation of the refrigerant;
- the type, manufacturer, and amount of lubricant used; and
- if the refrigerant is or contains an ozone-depleting substance, the phrase "ozone depleter"

This label covers up information about the old refrigerant, and provides valuable details on the alternative and how it was used. It also tells the owner who performed the retrofit.

REMOVE ORIGINAL REFRIGERANT:

The original CFC-12 must be removed from the system prior to charging with the new refrigerant. This procedure will prevent the contamination of one refrigerant with another. Refrigerants mixed within a system probably won't work and could damage the system. As mentioned above, this requirement means that no alternative can be used as a "drop-in."

BARRIER HOSES:

HCFC-22, a component in some blends, can seep out through traditional hoses. Therefore, when using these blends, the technician must ensure that new, less permeable "barrier" hoses are used. These hoses must be installed if the system currently uses old, non-barrier hoses. The table of refrigerants below notes this additional requirement where appropriate.

COMPRESSOR SHUTOFF SWITCH:

Some systems have a device that automatically releases refrigerant to the atmosphere to prevent extremely high pressures. When retrofitting any system with such a device to use a new refrigerant, the technician must also install a high-pressure shutoff switch. This switch will prevent the compressor from increasing the pressure to the point where the refrigerant is vented.

Alternative Refrigerants

The table below summarizes the following information about refrigerants reviewed under EPA's SNAP program for use in motor vehicle air conditioning systems. Note that "air conditioning" means cooling vehicle passenger compartments, not cargo areas, so refrigeration units on trucks and rail cars are not considered air conditioners.

If your browser cannot display tables, please call our Hotline at **800-296-1996** to receive a free copy of this fact sheet in the mail or by fax. The title is "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning".

- Name: Many refrigerants are sold under various names. All known trade names are listed, separated by slashes.
- Status:
 - *acceptable subject to use conditions*: May be used in any car or truck air conditioning system, provided the technician meets the conditions described above. Note that EPA cannot guarantee that any refrigerant will work in a specific system.
 - *unacceptable*: Illegal to use as a substitute for CFC-12 in motor vehicle air conditioners.
 - *proposed acceptable subject to use conditions*: May be used legally. EPA will accept public comment on these refrigerants and then make a final ruling. There is no formal EPA position until then, and it is inappropriate for advertising to imply that EPA has found the product acceptable.
 - *not submitted*: Illegal to use **or sell** as a substitute for CFC-12 in motor vehicle air conditioning systems.
- Date of ruling: The date either a final rule or a proposed listing was published in the [Federal Register](#). Note that proposed listings are not final and may change because of public comment.
- Manufacturer name and contact phone number: Call for more information on testing, performance, system compatibility, etc.
- Composition: Every refrigerant other than HFC-134a is a blend of several components.

For More Information

EPA's Stratospheric Ozone Protection Hotline, at 800-296-1996, distributes numerous fact sheets and brochures. The following fact sheets discuss various issues related to motor vehicle air conditioning and ozone depletion.

- [Fitting Sizes and Label Colors for Motor Vehicle Refrigerants](#)
- [Questions to Ask Before You Purchase an Alternative Refrigerant](#)
- [The Facts Behind the Phaseout](#) (ozone depletion science)
- [Qs & As on HC-12a, OZ-12, and Other Flammable Refrigerants](#)
- [Qs & As on Ozone-Depleting Refrigerants and Their Alternatives](#)

**Motor Vehicle Air Conditioning Substitutes for CFC-12
Reviewed Under EPA's SNAP Program as of June 3, 1997**

Name (1)	Status (2)	Date	Manufacturer	Components / Reason Unacceptable						
				HCFC-22	HCFC-124	HCFC-142b	HFC-134a	Butane (R-600) (3)	Isobutane (R-600a) (3)	HFC-227ea
HFC-134a	ASU	3/18/94	Several	-	-	-	100	-	-	-
FRIGC FR-12	ASU	6/13/95	Intermagnetics General 800-555-1442	-	39	-	59	2	-	-
Free Zone/ RB-276 (4)	ASU	5/22/96	Refrigerant Management Services of Georgia 800-347-5872	-	-	19	79	-	-	-
R-406A/ GHG(5)	ASU	10/16/96	People's Welding 800-382-9006	55	-	41	-	-	4	-
GHG-X4/ Autofrost/ Chill-It (5)	ASU	10/16/96	People's Welding 800-382-9006	51	28.5	16.5	-	-	4	-
Hot Shot/ Kar Kool (5)	ASU	10/16/96	ICOR 800-357-4062	50	39	9.5	-	-	1.5	-
Freeze 12	ASU	10/16/96	Technical Chemical 800-527-0885	-	-	20	80	-	-	-
GHG-X5 (5)	ASU	6/3/97	People's Welding 800-382-9006	41	-	15	-	-	4	40
GHG-HP (5)	ASU	10/16/96	People's Welding 800-382-9006	65	-	31	-	-	4	-
Ikon-12	ASU	5/22/96	Ikon Corp. 601-868-0755	Composition claimed as confidential business information						
OZ-12®	UNA	3/18/94	OZ Technology	Flammable blend of hydrocarbons; insufficient data to demonstrate safety						
R-176	UNA	3/18/94	Arctic Chill	Contains CFC-12, which is inappropriate in a CFC-12 substitute						
HC-12a®	UNA	6/13/95	OZ Technology	Flammable blend of hydrocarbons; insufficient data to demonstrate safety						
Duracool 12a	UNA	6/13/95	Duracool Limited	This blend is identical to HC-12a® in composition but is manufactured by a different company						
R-405A	UNA	6/13/95	Greencool	Contains a perfluorocarbon, which has extremely high global warming potential and lifetime						

(1) R-401A (made by DuPont), R-401B (DuPont), R-409A (Elf Atochem), Care 30 (Calor Gas), Adak-29/Adak-12 (TACIP Int'l), MT-31 (Millenia Tech), and ES-12R (Intervest) have not been submitted for review in motor vehicle air conditioning, and it is therefore illegal to use these refrigerants in such systems.

(2) See text for details on legality of use according to status

ASU = acceptable subject to fittings, labeling, no drop-in, and compressor shutoff switch use conditions

UNA = unacceptable; illegal for use as a CFC-12 substitute in motor vehicle air conditioners

(3) Although some blends contain hydrocarbons, all blends that are ASU are nonflammable as blended

(4) Freezone contains 2% of a lubricant

(5) HCFC-22 content results in an additional use condition: must be used with barrier hoses

● [Other Fact Sheets Related to Alternative Refrigerants](#)

● [Other Fact Sheets Related to Motor Vehicle Air Conditioning](#)



Written by EPA's [Stratospheric Protection Division](#)

Last updated on October 14, 1999.
<http://www.epa.gov/ozone/title6/snap/macssubs.html>



Ozone Protection Regulations: Substitutes for Ozone-Depleting Substances



[EPA's SNAP Program](#)

[SNAP application form available online](#)

Help us write our [new foams fact sheet!](#)

Under section [612](#) of the Clean Air Act, EPA established the Significant New Alternatives Policy (SNAP) Program. SNAP's mandate is to identify alternatives to [ozone-depleting substances](#) and to publish [lists of acceptable and unacceptable substitutes](#). Several [rules](#) and [notices](#) have expanded these lists, and they are available for online reading or for downloading. In addition, [fact sheets](#) cover more fully the eight industrial use sectors included within SNAP. Finally, information about [enforcement actions](#) is available. Call the ozone protection hotline at 1-800-296-1996 for more information.

Fact sheets

Each of these fact sheets is also available from the EPA Stratospheric Ozone Hotline at 1-800-296-1996.

General Information

- [● SNAP Final Rule Summary](#)
- [● SNAP Chronology](#)
- [● Substitutes and Vendor Lists](#)
- [● Generic Substitute Names](#)
- [● SNAP Glossary](#)
- [● Enforcement Actions](#)

[● List of Ozone-Depleting Substances, including their ODPs and GWPs](#)

[● List of GWPs for Many Non-Ozone-Depleting Substances](#)

Fact Sheets About Specific Sectors

● Refrigerants

[● General Questions and Answers](#)

[● Use of MT-31 and MT-31-1 Prohibited Under EPA's SNAP Program](#)(also available as a [PDF](#) document [7K])

[● Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning](#)

[● Fitting Sizes and Label Colors for Motor Vehicle Refrigerants](#)

[● Ten Questions to Ask Before You Purchase An Alternative Refrigerant](#)

[● Qs & As about Motor Vehicle Air Conditioning](#)

[● Refrigerant Advertising Guidance Letter](#)

[● Recycling of Blend Refrigerants Used in Motor Vehicles](#)

[● Legal Status of HC-12a®, DURACOOOL 12a®, and OZ-12®](#)

[● Guidance on Retrofitting to HFC-134a](#)

[● Programs that Provide Training on HFC-134a Retrofit](#)

[● What You Should Know about Refrigerants When Purchasing or Repairing a Residential A/C System or Heat Pump](#)

[● ASHRAE Journal Article about Refrigerant Safety](#)

[● ARTI Refrigerant Information Database](#)

[● Compositions of Refrigerant Blends](#)

[● Foam Blowing](#)

[● Solvent Cleaning](#)

[● EPA/ICEL Solvent Reduction Manuals](#)

[● Fire Suppression and Explosion Protection](#)

[● Aerosols](#)

[● Sterilants](#)

[● Tobacco Expansion](#)

[● Adhesives, Coatings, and Inks](#)

[● Pesticides](#)



Ten Questions to Ask Before You Purchase An Alternative Refrigerant

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

Many new alternative refrigerants marketed for use in the motor vehicle and stationary/commercial sectors are being touted by their manufacturers and distributors. Whether you're a nationwide distribution chain or a one-man service shop, you should take the time to determine how well an alternative will work and whether it may pose any problems for your customers or liability for you. Consider asking your supplier, whether it is the refrigerant manufacturer or a distributor, the following questions.

1. Is the refrigerant on the Environmental Protection Agency's SNAP (Significant New Alternatives Policy) Program list of acceptable substitutes, and therefore legal to use as a substitute for a CFC refrigerant? If so, are there any restrictions on how the refrigerant can be used?
2. How much will the alternative refrigerant cost?
3. What does the system manufacturer have to say about this refrigerant and whether it is compatible with system components? Will using a particular refrigerant void any warranties on the system the refrigerant is used in?
4. What recycling and/or reclamation standards apply to the refrigerant? Can the refrigerant be recycled or reclaimed to those standards?
5. What equipment must be used with the alternative refrigerant?
6. Has the alternative refrigerant been evaluated by ARI (the Air-Conditioning and Refrigeration Institute)? If an alternative is to be reclaimed, will it be reclaimed to ARI's 700 standard? If not, then how will the purity of the reclaimed alternative refrigerant be assured?
7. Is the alternative refrigerant flammable?
8. Is the refrigerant readily and widely available?
9. What is my liability if I sell an alternative not yet listed as acceptable by EPA or if I put it in a customer's system?
10. Are any alternative refrigerants more environmentally beneficial than others?

1.

Is the refrigerant on the Environmental Protection Agency's SNAP (Significant New Alternatives Policy) Program list of acceptable substitutes, and therefore legal to use as a substitute for a CFC refrigerant? If so, are there any restrictions on how the refrigerant can be used? EPA's SNAP program determines what risks alternatives to CFC or HCFC refrigerants pose to human health and the environment. EPA evaluates the

alternative refrigerant's ozone-depleting potential, global warming potential, flammability, and toxicity. The SNAP evaluation, however, does not determine whether the alternative will provide adequate performance or will be compatible with the components of an A/C or refrigeration system. Call the Hotline number listed above for the SNAP fact sheet on alternative refrigerants and for lists of refrigerants accepted under SNAP, or [download](#) a version of the current list.

EPA may place conditions or restrictions on how an alternative can be used. For example, using a motor vehicle A/C refrigerant accepted under SNAP as a CFC-12 substitute requires, among other things, the use of a new label and new fittings unique to the alternative, and the CFC-12 must first be removed from the system. Note that there is no do-it-yourself (DIY) exemption from SNAP requirements. Both service technicians and DIYers who use alternatives found unacceptable under SNAP or ignore use conditions have violated the Clean Air Act. A [fact sheet](#) explains the current status of all refrigerants reviewed so far for motor vehicle air conditioning.

2.

How much will the alternative refrigerant cost? Many manufacturers and distributors of alternative refrigerants may point out how much less expensive their product is than the refrigerant it is substituting for. Potential purchasers, however, should compare the cost of the product with the cost of other substitutes. For example, if you are considering purchasing a blend refrigerant that substitutes for CFC-12, consider its cost relative to the cost of HFC-134a, which is generally considerably less expensive than blend refrigerants.

3.

What does the system manufacturer have to say about this refrigerant and whether it is compatible with system components? Will using a particular refrigerant void any warranties on the system the refrigerant is used in? Because of the wide range in equipment types and designs, EPA does not issue retrofit procedures. The best source of information on how a given substitute will perform in a system is the manufacturer of the system and its components. Note that lab data have indicated that HCFC-22 refrigerant is not compatible with XH-5 or XH-7 desiccant, and that HCFC-22 can also damage NBR nitrile and HNBR rubber hoses and O-rings. If you are considering using a blend refrigerant that includes HCFC-22 as a major component, then you should ask about these issues before you purchase the refrigerant.

In addition to questions about the alternative's performance in a particular end use, you should determine whether charging a system with a new refrigerant will void any warranty. Many component manufacturers have stated that their warranties will be voided if any refrigerant other than R-12 or R-134a is charged into the system.

4.

What recycling and/or reclamation standards apply to the refrigerant? Can the refrigerant be recycled or reclaimed to those standards? The Clean Air Act requires that EPA establish standards for the [recovery](#), on-site [recycling](#) and off-site [reclamation](#) of refrigerants, including alternatives accepted under SNAP. The Agency's standards for recovering and recycling refrigerants in motor vehicles are generally based on Society of

Automotive Engineers (SAE) standards. EPA's standards for reclaiming refrigerants from motor vehicles and from stationary/commercial A/C and refrigeration systems are generally based on ARI (Air-Conditioning and Refrigeration Institute) standards. If these standards have not been published by EPA for a particular alternative, then they may be under development by EPA, SAE or ARI. Check to make sure that the refrigerant manufacturer intends to work with these organizations to develop uniform methods for extraction, recycling and reclamation. You can call the Hotline number listed above to determine the status of EPA standards and requirements. Note that currently, there is no way to recycle blend refrigerants on-site at an automotive facility, so that used blend refrigerants must be sent off-site for reclamation or incineration.

5. **What equipment must be used with the alternative refrigerant?** Equipment that is used by a facility to service R-12 or R-134a A/C systems may not be used to charge, recover or recharge a blend refrigerant. Technicians must therefore dedicate newly purchased equipment to that blend. Alternatively, a shop may convert a piece of R-12 or R-134a equipment for permanent use with the blend refrigerant. For more information on equipment requirements, see the EPA document "[Just the Facts for MVACs.](#)"
6. **Has the alternative refrigerant been evaluated by ARI (the Air-Conditioning and Refrigeration Institute)? If an alternative is to be reclaimed, will it be reclaimed to ARI's 700 standard? If not, then how will the purity of the reclaimed alternative refrigerant be assured?** ARI, an A/C and refrigeration manufacturers' trade association, develops standards for the industry. ARI's 700 standard specifies acceptable levels of refrigerant purity for fluorocarbon refrigerants including R-12, R-22, R-134a, R-500, and R-502 and for certain refrigerant blends. The purpose of the 700 standard is to enable users to evaluate and accept or reject refrigerants, whether virgin, reclaimed or repackaged. Reclamation of these refrigerants in both the motor vehicle and stationary/commercial sectors must follow the 700 standard.
7. **Is the alternative refrigerant flammable?** Both ASHRAE (the American Society of Heating, Refrigerating and Air-Conditioning Engineers) and EPA evaluate refrigerant flammability. As part of its SNAP review, EPA requires that a new refrigerant be tested according to the American Society of Testing Materials (ASTM) E-681 testing method. E-681 is used to determine the concentrations in air at which a substance is flammable, at normal atmospheric pressure. In addition to testing the refrigerant itself, if a blend contains a flammable component, EPA requires leak testing to ensure that the composition does not change and become flammable. EPA prohibits the use of any flammable CFC-12 substitutes in motor vehicle A/Cs.

If a substitute is flammable, EPA requires a comprehensive risk assessment for each proposed end-use. This risk assessment estimates the likelihood of fire and the potential results if a fire were to occur, in addition to suggesting measures to mitigate this risk. State governments, fire marshals, building code organizations, and other local authorities may have issued prohibitions or other regulations related to flammable refrigerants. Check with

them before buying, selling, or using a flammable refrigerant.

8.

Is the refrigerant readily and widely available? If an automotive service technician charges a system with an alternative refrigerant that later becomes unavailable, or that is not available nationwide, then at the next servicing, the system may have to be retrofitted to another appropriate substitute. The customer may be unwilling to pay for the retrofit, or may be unhappy that his vehicle cannot be otherwise serviced at the facility he chooses.

9.

What is my liability if I sell an alternative not yet listed as acceptable by EPA or if I put it in a customer's system? Under EPA regulations, a refrigerant manufacturer must submit information on a new refrigerant for SNAP review at least 90 days before marketing the product. This 90-day period is required by Section 612 of the Clean Air Act, but the Act did not prohibit sale and use of that refrigerant after the 90-day period. Thus, if the Agency is still engaged in its review when the 90 days elapses, the product can be sold and used, even though it is not "EPA acceptable." However, EPA may later determine that the product is unacceptable under SNAP. It makes sense, then, to determine whether SNAP review is complete -- if not, it may be only temporarily legal to use the alternative refrigerant. If you purchased the refrigerant during the SNAP review, and EPA later determines that it is unacceptable, you may be stuck with a large inventory of refrigerant no one can legally use!

The Clean Air Act only granted EPA the authority to regulate the *use* of alternative refrigerants, not the *sale* of them. Even if EPA determines that an alternative is unacceptable, it is still legal to sell it. However, putting it in a customer's A/C or refrigeration system is considered use, not sale, so a service technician who charges a system with an unacceptable refrigerant may be subject to a \$25,000 fine and up to five years' jail time.

10.

Are any alternative refrigerants more environmentally beneficial than others? HFC-134a does not contain chlorine and therefore does not contribute to ozone depletion, although like other HFCs, it contributes to global warming. HCFC-22 and all other HCFCs contribute to both ozone depletion and global warming. All blend refrigerants listed as acceptable for motor vehicle use contain HCFCs.

Related Fact Sheets

- [Alternative Refrigerants](#)
 - [Motor Vehicle Air Conditioning](#)
 - [Stationary Refrigeration and Air Conditioning](#)
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Ozone Science: The Facts Behind the Phaseout

The Earth's ozone layer protects all life from the sun's harmful radiation, but human activities have damaged this shield. Less protection from ultraviolet light will, over time, lead to higher skin cancer and cataract rates and crop damage. The U.S., in cooperation with over 140 other countries, is phasing out the production of ozone-depleting substances in an effort to safeguard the ozone layer.

I. The Ozone Layer

The Earth's atmosphere is divided into several layers. The lowest region, the troposphere, extends from the Earth's surface up to about 10 kilometers (km) in altitude. Virtually all human activities occur in the troposphere. Mt. Everest, the tallest mountain on the planet, is only about 9 km high. The next layer, the stratosphere, continues from 10 km to about 50 km. Most commercial airline traffic occurs in the lower part of the stratosphere.

Most atmospheric ozone is concentrated in a layer in the stratosphere, about 15-30 kilometers above the Earth's surface. Ozone is a molecule containing three oxygen atoms. It is blue in color and has a strong odor. Normal oxygen, which we breathe, has two oxygen atoms and is colorless and odorless. Ozone is much less common than normal oxygen. Out of each 10 million air molecules, about 2 million are normal oxygen, but only 3 are ozone.

However, even the small amount of ozone plays a key role in the atmosphere. The ozone layer absorbs a portion of the radiation from the sun, preventing it from reaching the planet's surface. Most importantly, it absorbs the portion of ultraviolet light called UVB. UVB has been linked to many harmful effects, including various types of skin cancer, cataracts, and harm to some crops, certain materials, and some forms of marine life.

At any given time, ozone molecules are constantly formed and destroyed in the stratosphere. The total amount, however, remains relatively stable. The concentration of the ozone layer can be thought of as a stream's depth at a particular location. Although water is constantly flowing in and out, the depth remains constant.

While ozone concentrations vary naturally with sunspots, the seasons, and latitude, these processes are well understood and predictable. Scientists have established records spanning several decades that detail normal ozone levels during these natural cycles. Each natural reduction in ozone levels has been followed by a recovery. Recently, however, convincing scientific evidence has shown that the ozone shield is being depleted well beyond changes due to natural processes.

II. Ozone Depletion

For over 50 years, chlorofluorocarbons (CFCs) were thought of as miracle substances. They are stable, nonflammable, low in toxicity, and inexpensive to produce. Over time, CFCs found

uses as refrigerants, solvents, foam blowing agents, and in other smaller applications. Other chlorine-containing compounds include [methyl chloroform](#), a solvent, and [carbon tetrachloride](#), an industrial chemical. [Halons](#), extremely effective fire extinguishing agents, and [methyl bromide](#), an effective produce and soil fumigant, contain bromine. All of these compounds have atmospheric lifetimes long enough to allow them to be transported by winds into the stratosphere. Because they release chlorine or bromine when they break down, they damage the protective ozone layer. The discussion of the ozone depletion process below focuses on CFCs, but the basic concepts apply to all of the ozone-depleting substances (ODS).

In the early 1970s, researchers began to investigate the effects of various chemicals on the ozone layer, particularly CFCs, which contain chlorine. They also examined the potential impacts of other chlorine sources. Chlorine from swimming pools, industrial plants, sea salt, and volcanoes does not reach the stratosphere. Chlorine compounds from these sources readily combine with water and repeated measurements show that they rain out of the troposphere very quickly. In contrast, CFCs are very stable and do not dissolve in rain. Thus, there are no natural processes that remove the CFCs from the lower atmosphere. Over time, winds drive the CFCs into the stratosphere.

The CFCs are so stable that only [exposure to strong UV radiation](#) breaks them down. When that happens, the CFC molecule releases atomic chlorine. One chlorine atom can destroy over 100,000 ozone molecules. The net effect is to destroy ozone faster than it is naturally created. To return to the analogy comparing ozone levels to a stream's depth, CFCs act as a siphon, removing water faster than normal and reducing the depth of the stream.

Large fires and certain types of marine life produce one stable form of chlorine that does reach the stratosphere. However, numerous experiments have shown that CFCs and other widely-used chemicals produce roughly 85% of the chlorine in the stratosphere, while natural sources contribute only 15%.

Large volcanic eruptions can have an indirect effect on ozone levels. Although Mt. Pinatubo's 1991 eruption did not increase stratospheric chlorine concentrations, it did produce [large amounts of tiny particles called aerosols](#) (different from consumer products also known as aerosols). These aerosols increase chlorine's effectiveness at destroying ozone. The aerosols only increased depletion because of the presence of CFC-based chlorine. In effect, the aerosols increased the efficiency of the CFC siphon, lowering ozone levels even more than would have otherwise occurred. Unlike long-term ozone depletion, however, this effect is short-lived. The aerosols from Mt. Pinatubo have already disappeared, but satellite, ground-based, and balloon data still show ozone depletion occurring closer to the historic trend.

One example of ozone depletion is the [annual ozone "hole" over Antarctica](#) that has occurred during the Antarctic Spring since the early 1980s. Rather than being a literal hole through the layer, the ozone hole is a large area of the stratosphere with extremely low amounts of ozone. Ozone levels fall by over 60% during the worst years.

In addition, research has shown that ozone depletion occurs over the latitudes that include [North America](#), [Europe](#), Asia, and much of Africa, Australia, and South America. Over the U.S., ozone levels have fallen 5-10%, depending on the season. Thus, ozone depletion is a [global issue](#) and not just a problem at the South Pole.

Reductions in ozone levels will lead to higher levels of **UVB** reaching the Earth's surface. The sun's output of UVB does not change; rather, less ozone means less protection, and hence more UVB reaches the Earth. Studies have shown that in the Antarctic, the amount of UVB measured at the surface can double during the annual ozone hole. Another study confirmed the relationship between reduced ozone and increased UVB levels in Canada during the past several years.

Laboratory and epidemiological studies demonstrate that UVB causes nonmelanoma skin cancer and plays a major role in malignant melanoma development. In addition, UVB has been linked to cataracts. All sunlight contains some UVB, even with normal ozone levels. It is always important to limit exposure to the sun. However, ozone depletion will increase the amount of UVB, which will then increase the risk of health effects. Furthermore, UVB harms some crops, plastics and other materials, and certain types of marine life.

III. The World's Reaction

The initial concern about the ozone layer in the 1970's led to a ban on the use of CFCs as aerosol propellants in several countries, including the U.S. However, production of CFCs and other ozone-depleting substances grew rapidly afterward as new uses were discovered.

Through the 1980s, **other uses expanded** and the world's nations became increasingly concerned that these chemicals would further harm the ozone layer. In 1985, the Vienna Convention was adopted to formalize international cooperation on this issue. Additional efforts resulted in the signing of the Montreal Protocol in 1987. The original protocol would have reduced the production of CFCs by half by 1998.

After the original Protocol was signed, new measurements showed worse damage to the ozone layer than was originally expected. In 1992, reacting to the latest scientific assessment of ozone layer, the Parties decided to completely end production of halons by the beginning of 1994 and of CFCs by the beginning of 1996 in developed countries.

Because of measures taken under the Protocol, emissions of ozone-depleting substances are already falling. Assuming continued compliance, stratospheric chlorine levels will peak in a few years and then slowly return to normal. The good news is that the natural ozone production process will heal the ozone layer in about 50 years.

IV. The EPA Stratospheric Protection Program

In addition to regulating **the end of production of the ozone-depleting substances**, the U.S. Environmental Protection Agency (EPA) implements **several other programs** to protect the ozone layer under Title VI of the Clean Air Act. These programs include refrigerant recycling, product labeling, banning nonessential uses of certain compounds, and reviewing substitutes.

EPA's Stratospheric Ozone Protection Hotline responds to inquiries and distributes information about ozone depletion and EPA's programs to protect the ozone layer. Call 1-800-296-1996 between 10 am and 4 pm Eastern Standard Time to ask questions or to order free copies of the following documents:

● [Reports to the Nation: Our Ozone Shield](#) 

Written by the National Oceanic and Atmospheric Administration (NOAA), this booklet describes the history and science of ozone depletion.

● [Executive Summary to Scientific Assessment of Ozone Depletion: 1994](#)

EXITING EPA →

This Assessment represents the consensus conclusions of nearly 300 atmospheric researchers worldwide. The Executive Summary includes answers to common questions about ozone depletion. (Note: an Adobe Acrobat ([PDF](#)) version of the Executive Summary of the 1998 Assessment is available from [NOAA's web site](#).)



Written by EPA's [Stratospheric Protection Division](#)

Last updated on December 24, 1997.
http://www.epa.gov/ozone/science/sc_fact.html



Legal Status of HC-12a®, DURACOOL 12a®, and OZ-12®

Ozone Protection Hotline toll-free (800) 296-1996 direct dial (301) 614-3396

1. [What are HC-12a® and OZ-12®?](#)
2. [What is DURACOOL 12a®? Is there a difference between HC-12a® and DURACOOL 12a®?](#)
3. [What is the legal status of hydrocarbon refrigerants such as HC-12a® and DURACOOL 12a®?](#)
4. [May hydrocarbon refrigerants be used to replace CFC-12, commonly referred to as "Freon®," in cars?](#)
5. [Why is it legal to use hydrocarbon refrigerants as CFC-12 substitutes in industrial process refrigeration, but not elsewhere?](#)
6. [Is the sale of hydrocarbon refrigerants legal?](#)
7. [May hydrocarbon refrigerants be vented?](#)
8. [What other regulations restrict the use and handling of hydrocarbon refrigerants?](#)
9. [Are there other refrigerants that can replace CFC-12?](#)
10. [Is it legal to replace HFC-134a in a motor vehicle with hydrocarbon refrigerants such as DURACOOL 12a® and HC-12a®?](#)

[Detailed Questions About HC-12a®, OZ-12®, DURACOOL 12a® EC-12a, and other Flammable Hydrocarbon Refrigerants](#)

1. **What are HC-12a® and OZ-12®?**

HC-12a® and OZ-12® brand hydrocarbon refrigerant blends are flammable refrigerants. Their primary components are hydrocarbons, which are flammable substances such as propane and butane. HC-12a® and OZ-12® are registered trademarks of OZ Technology, Inc. HC-12a® has been marketed since 1994. OZ-12® was a similar blend marketed until the introduction of HC-12a®. Both products have been reviewed by EPA under the [Significant New Alternatives Policy](#) (SNAP) program. More information about the SNAP program is available from the hotline listed at the top of this page.

Note that EPA refers to the chemical composition of HC-12a® as Hydrocarbon Blend B. EPA considers any substance with that chemical composition, no matter what its trade name is, to be Hydrocarbon Blend B and to have the same legal status that HC-12a® has.

In order to meet Department of Transportation requirements for shipping HC-12a® in six-ounce cans (DOT refers to these cans as DOT 2Q containers), OZ Technology reduced

the vapor pressure of HC-12a® in June, 1998. In order to reduce the vapor pressure, OZ Technology changed the composition of HC-12a®. EPA does not consider this reformulated HC-12a® to be the same as Hydrocarbon Blend B. The reformulated HC-12a® has not been submitted for SNAP review, and thus cannot be marketed or used as a substitute for ozone-depleting substances.

2. What is DURACOOL 12a®? Is there a difference between HC-12a® and DURACOOL 12a®?

DURACOOL 12a® has the same chemical composition as the HC-12a® formulation that was submitted for SNAP review as Hydrocarbon Blend B. Both HC-12a® and DURACOOL 12a® are different than the new formulation of HC-12a® in six-ounce cans. DURACOOL 12a® is the registered trademark of Duracool Limited, the Canadian company that has manufactured DURACOOL 12a® since 1997. Duracool Limited and OZ Technology, the manufacturer of HC-12a®, are separate, unrelated companies with their own manufacturing facilities and distribution mechanisms.

3. What is the legal status of hydrocarbon refrigerants such as HC-12a® and DURACOOL®?

It has been illegal since July 13, 1995 to replace CFC-12 with the HC-12a® formulation that was submitted for SNAP review in any refrigeration or A/C application other than industrial process refrigeration. The same prohibition for OZ-12® took effect on April 18, 1994. Because DURACOOL 12a® has the same chemical composition as the HC-12a® formulation that was submitted for SNAP review (i.e., Hydrocarbon Blend B), DURACOOL 12a® is also subject to the same restrictions.

HC-12a®, as reformulated to meet DOT requirements, is not the same as Hydrocarbon Blend B and has not been submitted for SNAP review. OZ Technology is therefore prohibited from *marketing* this blend as a substitute for any ozone-depleting substance. In addition, any *use* of this blend as a substitute for CFC-12 or any other ozone-depleting chemical, in industrial process refrigeration or any other refrigeration or A/C end use, is prohibited under the Clean Air Act.

Since HC-12a® as submitted for SNAP review, is chemically different from HC-12a®, as reformulated to meet DOT requirements, and since it has a different legal status under the Clean Air Act, users of any substance marketed as HC-12a® should be aware of which HC-12a® they have purchased.

Note that the Clean Air Act does not regulate the use of any of these hydrocarbon refrigerants when they are used as replacements for non-ozone-depleting chemicals such as HFC-134a. However, many states prohibit using flammable refrigerants in motor vehicles, regardless of which original refrigerant was used in the vehicle.

4. May hydrocarbon refrigerants be used to replace CFC-12, commonly referred to as "Freon®," in cars?

No. It is illegal to use hydrocarbon refrigerants like HC-12a® and DURACOOL 12a® as substitutes for CFC-12 in automobile or truck air conditioning under any circumstances.

5. Why is it legal to use hydrocarbon refrigerants as CFC-12 substitutes in industrial process refrigeration, but not elsewhere?

EPA has not yet received data that adequately address the safety issues of hydrocarbon refrigerants in applications other than industrial process refrigeration. Flammability risks

depend on the type of refrigeration or air-conditioning system. Industrial process refrigeration, for instance, does not include air conditioning, which pipes refrigerated air directly into occupied areas. Industrial process refrigeration generally refers to complex customized appliances used in the chemical, pharmaceutical, petrochemical and manufacturing industries. Direct risk to human health is reduced in industrial process refrigeration; for example, access to areas near the system is typically restricted. In addition, other regulations exist to protect the safety of industrial workers.

EPA will review any additional material that is submitted under SNAP regarding the safety considerations of using hydrocarbon refrigerants in systems other than industrial process refrigeration.

6. Is sale of hydrocarbon refrigerants legal?

Sale of substitute refrigerants listed under the SNAP program is not regulated under SNAP. However, statutes and regulations issued by other federal, state, or local agencies may control the sale of these products, including illegal advertising.

7. May hydrocarbon refrigerants be vented?

No. Since November 15, 1995, the [Clean Air Act](#) has prohibited the venting of any refrigerant during the service, maintenance, repair, or disposal of air conditioning and refrigeration systems. When working on a system containing a hydrocarbon refrigerant such as HC-12a® or DURACOOL 12a®, the technician must recover the refrigerant into a suitable container and safely dispose of it.

8. What other regulations restrict the use and handling of hydrocarbon refrigerants?

In addition to the prohibition on use described above, and the federal law banning the venting of all refrigerants, there are also state and local statutes and regulations that relate to certain uses of hydrocarbons. As of the printing date of this fact sheet, EPA is aware that the following states prohibit the use of flammable refrigerants in automobile air conditioners: Arkansas, Arizona, Connecticut, Florida, Idaho, Iowa, Indiana, Kansas, Louisiana, Maryland, North Dakota, Oklahoma, Texas, Utah, Virginia, Washington, Wisconsin, and the District of Columbia.

Local fire codes also often restrict the storage of flammable materials. In addition, other federal, state, and local regulatory agencies may have regulations related to flammable refrigerants. Check with these authorities for more information.

9. Are there other refrigerants that can replace CFC-12?

Yes. Numerous other refrigerants have been found acceptable, subject to certain conditions on their use. EPA's fact sheet titled "[Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning](#)" lists these refrigerants and discusses the conditions. [Lists of alternatives](#) in other sectors are available online and from our hotline at 800-296-1996.

10. Is it legal to replace HFC-134a in a motor vehicle with hydrocarbon refrigerants such as DURACOOL 12a® and HC-12a®?

In certain circumstances, the replacement of HFC-134a in a motor vehicle with hydrocarbon refrigerants might be permitted. At a minimum, in order to avoid violating the Clean Air Act, the motor vehicle A/C system must have either been originally designed for use with HFC-134a refrigerant, or must have been previously retrofitted from CFC-12 to HFC-134a refrigerant, AND no sham retrofit must have occurred to convert the system to the hydrocarbon refrigerant. In order to avoid violating other laws, the replacement of the

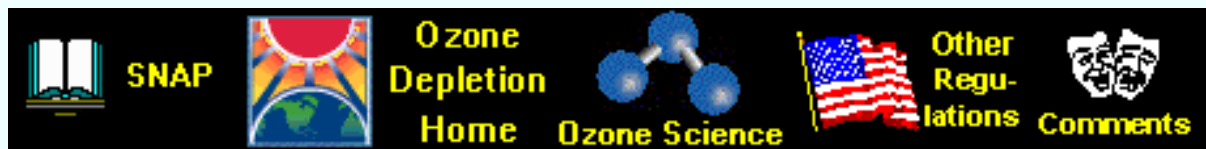
refrigerant must not violate any state or local prohibition on the use of flammable refrigerants in motor vehicle A/C systems.

The following 18 states ban the use of flammable refrigerants such as HC-12a® and DURACOOL 12a® in motor vehicle air conditioning, regardless of the original refrigerant: Arkansas, Arizona, Connecticut, Florida, Idaho, Indiana, Iowa, Kansas, Louisiana, Maryland, North Dakota, Oklahoma, Texas, Utah, Virginia, Wisconsin, Washington, and the District of Columbia.

EPA and hotline staff will not, based solely on facts given in a phone call or letter, determine the legality under the SNAP program of using a hydrocarbon refrigerant in a motor vehicle retrofitted to use HFC-134a, because the determination depends on many factors, including the nature of the retrofit from CFC-12 to HFC-134a, the reason for the retrofit, and the exact procedure and timing involved.

If you plan to change a car from HFC-134a to a hydrocarbon refrigerant such as HC-12a® and DURACOOL 12a®, you should consider that auto manufacturers have stated that changing the refrigerant in new vehicles designed for use with HFC-134a will void the warranty and may damage the system. If the air conditioner on a new car or truck is not working, consult a qualified mechanic or your dealer.

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- [Other Fact Sheets Related to Alternative Refrigerants](#)
 - [Other Fact Sheets Related to Motor Vehicle Air Conditioning](#)
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Written by EPA's [Stratospheric Protection Division](#)

Last updated on August 3, 1998.
<http://www.epa.gov/ozone/title6/snap/hc-12a.html>



Questions and Answers on Alternative Refrigerants

These are commonly asked questions about substitute refrigerants. [Lists](#) are available in several formats. If you have questions beyond those in this fact sheet, or would like paper copies of the lists, please call the Stratospheric Ozone Protection Hotline:

Ozone Protection Hotline toll-free (800) 296-1996

Ozone Protection Hotline direct dial (301) 614-3396

You can also read more about EPA's [Significant New Alternatives Policy \(SNAP\) Program](#), which evaluates alternatives for [ozone-depleting substances](#). Finally, [numerous fact sheets](#) discuss motor vehicle air conditioning and substitutes for CFC-12 in this end-use.

[Lists of Substitutes](#)

General Questions

1. [What refrigerants are used now? What is Freon?](#)
2. [How do I know what I'm allowed to use?](#)
3. [What alternative refrigerants are currently available?](#)
4. [Who do I contact for information about substitutes?](#)
5. [What should I ask about new refrigerants?](#)
6. [What are use conditions? Do I have to meet them?](#)
7. [Will EPA recommend the best substitute for my equipment?](#)
8. [I don't see any substitutes listed for my equipment. How do I find out what's available?](#)
9. [Are there any safety considerations for new refrigerants in chillers?](#)
10. [Is HCFC-123 safe?](#)
11. [Are flammable refrigerants automatically unacceptable?](#)
12. [What are my choices for replacing CFC-12 in my car?](#)
13. [What is evaporative cooling?](#)
14. [How does EPA define the drop-in, retrofit, and new use categories?](#)

Questions from Manufacturers

15. [When should I let EPA know I'm selling a new substitute?](#)

16. [What information should I send EPA about a new substitute?](#)
17. [How are SNAP-reviewed refrigerants described in the SNAP updates?](#)

1. What refrigerants are used now? What is Freon?

"Freon" is a trade name for [CFC](#) and [HCFC](#) refrigerants sold by DuPont. Other trade names include AlliedSignal's "Genetron" and ICI's "Arcton". Various companies sell the same CFCs, HCFCs, [HFCs](#), and other products under different names. The most common [ozone-depleting refrigerants](#) are CFC-12, R-502, and HCFC-22. R-502 is a blend of 48.8% HCFC-22 and 51.2% CFC-115.

[Return to the questions list.](#)

2. How do I know what I'm allowed to use?

[Lists of acceptable and unacceptable substitutes](#) are published regularly in the [Federal Register](#). In addition, you may call the Ozone Protection Hotline at (800) 296-1996. If the Hotline cannot answer your question, it will refer you to the appropriate SNAP analyst for more information.

[Return to the questions list.](#)

3. What alternative refrigerants are currently available?

Several new alternatives are already on the market. The EPA hotline distributes the [latest list](#) of acceptable refrigerants, according to end-use. Another [table](#) lists the compositions of many blends, what they are intended to replace, their ASHRAE designations, and the [generic names](#), if any, used when describing them in the [Federal Register](#).

[Return to the questions list.](#)

4. Who do I contact for information about substitutes?

Substitute refrigerants are made by many manufacturers. Contact information, along with a listing of which refrigerants they make, is available from the hotline at 800-296-1996 or on this [web site](#). A separate fact sheet is also available that lists manufacturers of [motor vehicle air conditioning refrigerants](#).

[Return to the questions list.](#)

5. What should I ask about new refrigerants?

EPA has issued a fact sheet that sums up the important points. Titled "[Questions to Ask Before You Purchase An Alternative Refrigerant](#)", it is available from the hotline at 800-296-1996.

[Return to the questions list.](#)

6. What are use conditions? Do I have to meet them?

In some cases, EPA believes that substitutes must be deemed unacceptable, unless the user meets specific conditions on [how](#) the substitute is used. Such substitutes will be listed as acceptable subject to use conditions. For example, EPA may require the use of a detector to warn users of leakage. Users must meet such conditions, or they will be in violation of the SNAP rule. Several use conditions are imposed on all automotive refrigerants, as explained in a [fact sheet](#) about motor vehicle air conditioning.

[Return to the questions list.](#)

7. Will EPA recommend the best substitute for my equipment?

No, EPA only determines what substitutes are acceptable from an environmental and health perspective. **EPA does not test refrigerants for their effectiveness in any equipment.** EPA firmly believes that the market should determine which of the acceptable alternatives will work the best and gain the largest market share.

[Return to the questions list.](#)

8. I don't see any substitutes listed for my equipment. How do I find out what's available?

The SNAP program has identified [eight major industrial use sectors](#), and several [end-uses](#) within each sector. The SNAP rule only applies to those end-uses included in the [lists of substitutes](#). However, EPA is interested in receiving information about significant end-uses not included in the lists. For definitions of the end-uses within a sector or to report information on a potential new end-use, read the SNAP rule or call the Ozone Protection Hotline at 800-296-1996. If the Hotline cannot answer your question, it will refer you to the appropriate SNAP analyst.

[Return to the questions list.](#)

9. Are there any safety considerations for new refrigerants in chillers?

EPA strongly believes that adherence to standard 15 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) will ensure the safety of technicians and building occupants. This standard applies to the use of all alternative refrigerants. In addition, systems designed and operated in accordance with ASHRAE Guideline 3 will leak minimal amounts of refrigerant, thereby reducing ozone depletion and global warming impacts.

[Return to the questions list.](#)

10. I keep hearing that [HCFC-123](#) isn't safe to use in centrifugal chillers and that it causes cancer in rats. Why is EPA listing it as acceptable?

Toxicity in general is a complex issue. The two types of toxicity, chronic and acute, pose completely different sets of hazards. Chronic toxicity relates to long-term exposures over a lifetime of experience with refrigeration equipment. Acute toxicity, in contrast, relates to the dangers posed by short-term exposure to very high concentrations of refrigerant, especially catastrophic releases.

Short-term exposure levels measure several types of risk. Cardiotoxicity indicates the concentration at which a worker's heart becomes sensitized to adrenalin; thus, in an emergency, exposure to this level may result in a heart attack. The asphyxiation level indicates when the amount of oxygen in the area is reduced to the point that a worker may become unconscious and therefore unable to escape.

All refrigerants pose each type of toxicity. HCFC-123 actually poses less acute risk than CFC-11. In other words, in the event of a major leak, you're safer with HCFC-123 than with CFC-11.

As for chronic toxicity, it is true that HCFC-123 caused tumors in several organs in rats, including the testes. However, the critical facts are that, in all cases: a) the tumors were benign, b) they only appeared after long exposures to very high concentrations, c) the tumors were never life-threatening, and d) the exposed rats actually lived longer at these higher concentrations.



Just the Facts for MVACs: EPA Regulatory Requirements for Servicing of Motor Vehicle Air Conditioners

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

Our Threatened Ozone Layer

The ozone layer acts as a blanket in the stratosphere that protects us from harmful ultraviolet (UV) radiation. Scientists worldwide believe that man-made chemicals such as CFC-12 (also known by the trade name Freon) are rapidly destroying this layer of gas 10 to 30 miles above the earth's surface. Strong UV radiation breaks the CFC-12 molecules apart, releasing chlorine. A single chlorine atom can destroy over one hundred thousand ozone molecules. Ozone loss in the atmosphere is likely to lead to an increase in cataracts and skin cancer, which is now one of the fastest growing forms of cancer, and could weaken the human immune system. In the U.S., one person dies of skin cancer every hour. Agriculture, as well as plant and animal life, may also be dramatically affected.

Remember that ozone is "good up high, bad nearby": even though it protects us when it is in the stratosphere, ozone at ground level can be harmful to breathe and is a prime ingredient in smog. Many man-made sources such as tailpipe emissions from cars contribute to ground-level ozone.

Global Action to Protect the Ozone Layer

The United States has joined over 160 countries as a Party to the international treaty known as the Montreal Protocol. All developed countries agreed to phase out production of most ozone-depleting substances, including CFCs, by the end of 1995. The 1990 Clean Air Act Amendments (the Act) incorporated this production ban date and directed EPA to develop regulations to maximize recycling, ban nonessential uses, develop labeling requirements and examine safe alternatives for ozone-depleting substances.

Impact of Motor Vehicle Air Conditioners

One of the largest uses of CFC-12 in the U.S. is as a refrigerant in motor vehicle air conditioners (MVACs). Section 609 of the Act gives EPA the authority to establish requirements to prevent the release of refrigerants during the servicing of MVACs and to require recycling of refrigerants. Widespread refrigerant recycling reduces the demand for virgin CFC-12 and thus extends the time that it will be available. The following sections describe the requirements of the

law and its potential impact on the service industry.

Recycling vs. Reclamation

In the discussion below, recycling means the use of a machine to remove impurities and oil and then recharge the refrigerant into either the same car or a different car. Recycled refrigerant is not as pure as reclaimed refrigerant. Recycling occurs in the service shop.

Reclamation means the removal of all oil and impurities beyond that provided by on-site recycling equipment, and reclaimed refrigerant is essentially identical to new, unused refrigerant. Reclamation cannot be performed in the service shop. Rather, the shop generally sends refrigerant either back to the manufacturer or directly to a reclamation facility.

Handling CFC-12

Venting CFC-12

Another section of the Clean Air Act, [section 608](#), prohibits releasing CFC-12 into the atmosphere. The [prohibition on venting CFC-12](#) has been in effect since 1992.

Section 609 Regulatory History

The [original regulation](#) promulgated under section 609 was published in July 1992. That regulation established standards for equipment that [recovers](#) and [recycles](#) CFC-12 refrigerant from motor vehicle air conditioners, rules for training and testing technicians to handle this equipment, and record-keeping requirements for service facilities and for refrigerant retailers. A [supplemental final rule](#) published in May 1995 established a standard for equipment that recovers but does not recycle CFC-12, and training and testing technicians to handle this equipment.

Approved Equipment

Technicians repairing or servicing CFC-12 MVACs must use either [recover/recycle](#) or recover-only equipment approved by EPA. Recover/ recycle equipment cleans the refrigerant so that oil, air and moisture contaminants reach acceptably low levels. A list of approved recover/recycle and recover-only equipment is available from the Hotline.

Technician Training and Certification

Technicians who repair or service CFC-12 motor vehicle air conditioners must be trained and certified by an [EPA-approved organization](#). Training programs must include information on the proper use of equipment, the regulatory requirements, the importance of refrigerant recovery, and the effects of ozone depletion. To be certified, technicians must pass a test demonstrating their knowledge in these areas. A list of approved testing programs is available from the Hotline and the web site listed above.

Recordkeeping Requirements

Service shops must certify to EPA that they own approved CFC-12 equipment. If refrigerant is recovered and sent to a reclamation facility, the name and address of that

facility must be kept on file.

Sales Restrictions

Section 609 has long prohibited the sale of small cans of ozone-depleting refrigerants to anyone other than a certified technician. The sale of **any** size container of CFC-12 to anyone other than certified technicians was prohibited under section 608 of the Act beginning on November 14, 1994. This provision is intended to discourage "do-it-yourselfers" who recharge their own air conditioners. Such individuals often release refrigerant because they typically do not have access to recovery/recycling equipment. The Agency encourages "do-it-yourselfers" to bring their cars to certified technicians who can properly fix air conditioners using approved equipment. This avoids damage to A/C equipment by improper charging and helps to protect the environment.

Handling HFC-134a

Venting HFC-134a Refrigerant

Section 608 of the Clean Air Act prohibits releasing HFC-134a into the atmosphere. The [prohibition on venting HFC-134a](#) has been in effect since November 1995.

Section 609 Regulatory History

In [March, 1996](#), EPA proposed a rule to require recycling of HFC-134a. The rule proposed standards for recover-only and recover/recycle equipment and rules for training and testing technicians to handle this equipment. EPA requested comments from the public about this proposed rule, and, after reviewing the comments, published a final rule on December 30, 1997. This final rule will become effective on January 29, 1998. For more information about this rule, see the fact sheet "[Summary of Final Rule Governing Substitutes for CFC-12 Refrigerant in Motor Vehicle Air Conditioners](#)" available through the Hotline and the web site.

Approved Equipment

Technicians who repair or service HFC-134a MVACs must recover the refrigerant and either recycle it on-site, or send it off-site to a reclamation facility so that it may be purified according to ARI Standard 700. Technicians must use [EPA-approved equipment](#) to perform the refrigerant recovery and recycling. Recover/ recycle equipment cleans the refrigerant so that oil, air and moisture contaminants reach acceptably low levels. A list of approved recover/recycle and recover-only equipment is available from the Hotline and the web site listed above. Note that certain EPA-approved models can recycle both CFC-12 and HFC-134a refrigerants.

Converting CFC-12 Equipment for Use with HFC-134a

EPA regulations prohibit technicians from changing fittings on the same unit back and forth so that the unit is used for CFC-12 in the morning, HFC-134a in the afternoon, then back to CFC-12 again, etc.

EPA regulations specify that when equipment is converted for use with a new refrigerant, the converted unit must be able to meet the applicable equipment standard set forth in the regulations. CFC-12 equipment may be permanently converted for use with

HFC-134a under certain conditions. EPA intends to issue regulations placing certain restrictions on these retrofits in the future. Those restrictions may require that the manufacturer's service representative rather than the automotive service technician perform the retrofit, that a unit may only be retrofitted if retrofit procedures have been certified by an independent testing laboratory such as Underwriters Laboratories, and that an appropriate label is affixed to the unit. In addition, the retrofitted unit must meet the technical specifications of SAE standard J2210 and must have the capacity to purify used refrigerant to SAE standard J2099 for safe and direct return to the air conditioner following repairs.

Currently, however, in the absence of any EPA regulations, a service facility may perform such a retrofit, or may have the equipment manufacturer's service representative perform the retrofit, as long as the fittings are changed in accordance with EPA's Significant New Alternative Policy (SNAP) program regulations. The Agency cautions technicians, however, that even though recovering a given refrigerant using permanently converted equipment is legal, it may not be technically desirable. The equipment is designed to be compatible with specific refrigerants, and incompatible materials may cause short circuits, damage to seals, and compressor failure. Technicians should check with the recovery equipment manufacturer for recommendations about the recovery of refrigerants other than the refrigerant the equipment was originally intended to recover. Conversion of recovery equipment for use with other refrigerants may also invalidate any warranties offered by the equipment manufacturer.

Technician Training and Certification

Technicians who repair or service HFC-134a MVACs must be trained and certified by an [EPA-approved organization](#). If a technician is already trained and certified to handle CFC-12, he does not need to be recertified to handle HFC-134a.

Recordkeeping Requirements

Service shops must certify to EPA that they own approved HFC-134a equipment. Note that this certification is a one-time requirement, so that if a shop purchased a piece of CFC-12 recycling equipment in the past, and sent the certification to EPA, the shop does not need to send a second certification to EPA when it purchases a second piece of equipment, no matter what refrigerant that equipment is designed to handle. If refrigerant is recovered and sent to a reclamation facility, the shop must retain the name and address of that reclaimer.

Sales Restrictions

Right now, there is no restriction on the sale of HFC-134a, so anyone may purchase it. This year, EPA will issue a proposed rule under section 608 of the Act that will include a proposal to restrict the sale of HFC-134a so that only technicians certified under sections 608 and 609 may purchase it. After the proposed rule is published, EPA will review comments from the public on the proposal and will then publish a final rule sometime in 1998 or 1999.

Handling Other Refrigerants that Substitute for CFC-12

Venting Substitute Refrigerants

Other than HFC-134a, [all EPA-accepted refrigerants](#) that substitute for CFC-12 in motor vehicles, and that are currently on the market, are blends that contain ozone-depleting [HCFCs](#) such as R-22, R-142b and R-124. Section 608 of the Clean Air Act prohibits venting any of these new blend substitutes into the atmosphere. The prohibition on venting these ozone-depleting blends has been in effect since 1992.

Section 609 Regulatory History

The December, 1997 final rule established a standard for equipment that is designed to recover, but not recycle, any single, specific blend substitute refrigerant.

Using Older Equipment to Recover Blends

Technicians have a number of choices in recovering blend refrigerants. One option is that a technician may permanently dedicate an older piece of equipment he owns to recovering one or more blend refrigerants. The technician may also use this equipment to recover contaminated CFC-12 and HFC-134a and other "mystery mixtures." This equipment, however, may no longer be used to recover uncontaminated CFC-12 or HFC-134a. Refrigerant recovered using this kind of "junk" tank must then be shipped off-site for reclamation or destruction.

Using New Equipment to Recover Blends

Another option for recovering a blend refrigerant is to use a new piece of EPA-approved equipment designed to recover, but not recycle, any single, specific blend refrigerant. The EPA regulation published in December, 1997, includes an appendix that describes the standards that this new equipment must meet.

In addition, EPA is currently working with independent testing laboratories and equipment manufacturers to devise a standard for new equipment that can recover, but not recycle, both multiple blend refrigerants and contaminated CFC-12 and HFC-134a. EPA will finalize a standard for this type of equipment by the end of 1998. This equipment may be commercially available by the 1998 A/C season. EPA expects to grandfather any equipment purchased in 1998 before the EPA standard becomes finalized.

Recycling Blends

As of June 1, 1998, EPA allows recycling of refrigerant blends used in motor vehicle air conditioning systems (MVACs), provided that a) recycling equipment meets a new Underwriters Laboratories (UL) standard (Standard 2964) and b) refrigerant is returned to the vehicle from which it was removed. The only exception to item b) is for fleets of vehicles with a common owner; recycled blend refrigerant may be moved among vehicles within such a fleet. EPA detailed this policy in a [June 1, 1998 open letter to the industry](#). Certified recycling equipment may be commercially available during the 1998 A/C season. EPA plans to adopt this new UL standard into EPA's regulations and to grandfather any equipment that (1) meets the UL standard and (2) is purchased before the date on which EPA publishes a proposed rule to adopt the UL standard.

Converting CFC-12 or HFC-134a Recover/Recycle Equipment for Use with Blend Substitutes

EPA currently prohibits the conversion of existing CFC-12 or HFC-134a recycling equipment for either temporary or permanent use with a blend refrigerant, unless the equipment is used only to recover, but not to recycle, the refrigerant. In the future, EPA may issue regulations allowing these conversions but placing certain restrictions on who performs the conversions, what models may be converted, etc.

Technician Training and Certification

Technicians who repair or service MVACs that use blend refrigerants must be trained and certified by an EPA-approved organization. If a technician is already trained and certified to handle CFC-12 or HFC-134a, he does not need to be recertified to handle a blend refrigerant.

Recordkeeping Requirements

Service facilities that work on vehicles that use blend substitutes must certify to EPA that they own approved equipment designed to service these refrigerants. Note that this certification is a one-time requirement, so that if a shop purchased a piece of CFC-12 or HFC-134a recycling equipment in the past, and sent the certification to EPA, the shop does not need to send a second certification to EPA when it purchases a second piece of equipment, no matter what refrigerant that equipment is designed to handle. If refrigerant is recovered and sent to a reclamation facility, the shop must retain the name and address of that reclaimer.

Sales Restrictions

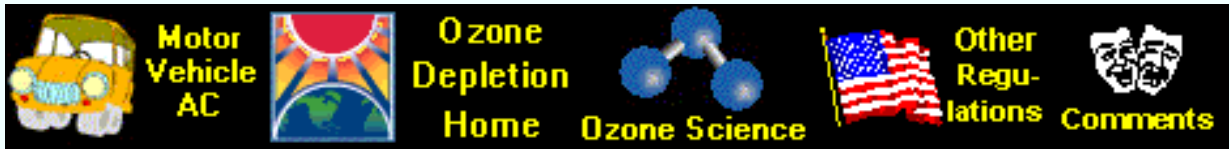
Section 608 regulations prohibit the sale of any size container of any blend refrigerant to anyone other than a certified technician. This prohibition began in November, 1994.

Retrofitting Vehicles to Alternative Refrigerants

Although section **609** of the Act does not govern retrofitting, section **612** of the Act, which describes the Agency's Significant New Alternatives Policy (**SNAP**) program, does require that when retrofitting a CFC-12 vehicle for use with another refrigerant, the technician must first extract the CFC-12, must cover the CFC-12 label with a label that indicates the new refrigerant in the system and other information, and must affix new fittings unique to that refrigerant. In addition, if a technician is retrofitting a vehicle to a refrigerant that contains R-22, the technician must ensure that only barrier hoses are used in the A/C system. Finally, if the system includes a pressure relief device, the technician must install a high-pressure compressor shutoff switch to prevent the compressor from increasing pressure until the refrigerant is vented.

Much more information about the SNAP program and about retrofitting procedures is available in a fact sheet called "**Choosing and Using Alternative Refrigerants**" through the EPA Hotline.

Other Fact Sheets Related to Motor Vehicle Air Conditioning



Written by EPA's [Stratospheric Protection Division](#)

Last updated on June 17, 1998.
<http://www.epa.gov/ozone/title6/609/justfax.html>

The Acceptable Exposure Limit (AEL) set by the HCFC-123 manufacturers is 30 ppm. This represents the concentration to which a worker could be exposed 8 hours/day for a working lifetime without effects. In other words, the AEL is a chronic exposure limit. EPA conducted a study to determine the typical exposure level found in actual equipment rooms. The study concluded that if appropriate measures are taken (for instance, complying with ASHRAE 15), the concentration of HCFC-123 can be kept below 1 ppm.

EPA believes that HCFC-123 is a necessary transition refrigerant as the world phases out the CFCs, and SNAP lists it as acceptable for use in chillers. It is safe to use in the long-term, and is actually safer in emergencies than CFC-11.

[Return to the questions list.](#)

11. Are flammable refrigerants automatically unacceptable?

EPA considers flammability as one factor in the SNAP risk screen. Rather than serving to disqualify a substitute, flammability may necessitate additional testing and assessment of risk. The risks from using a flammable refrigerant are extremely dependent on the conditions and type of equipment. EPA believes that it may well be possible to safely use flammable refrigerants, and encourages manufacturers to contact SNAP to discuss the information needed to support such a submission. To date, hydrocarbons have only been found acceptable in industrial process refrigeration. **It is illegal to use hydrocarbon refrigerants as CFC or HCFC substitutes in any form of air conditioning, and all forms of refrigeration other than industrial process refrigeration. A [fact sheet](#) provides information about HC-12a®, OZ-12®, and Duracool 12a, found unacceptable outside industrial process refrigeration.**

[Return to the questions list.](#)

12. What are my choices for mobile air conditioning? How much will it cost me to replace my car's system?

EPA has deemed several refrigerants acceptable for use in motor vehicle air conditioning, subject to several conditions on their use, as explained in a detailed [fact sheet](#). In addition, several [other fact sheets](#) provide information about specific aspects of this type of system. CFC-12 may still be used as the refrigerant, but when a vehicle is retrofitted to use a new refrigerant, the conditions mentioned above apply.

[Return to the questions list.](#)

13. What is evaporative cooling?

Evaporative cooling is an alternative technology to classic vapor compression and absorption cycle equipment. It uses the evaporation of water to effect cooling. It is currently available in systems designed to cool homes, office buildings, and transit buses. Recent advancements in technology have expanded its applicability nationwide.

[Return to the questions list.](#)

14. How does EPA define the drop-in, retrofit, and new use categories?

Although EPA does not recognize any refrigerants as being "drop-in" substitutes, in general usage the term means that the refrigerant provides exactly the same cooling, efficiency, durability, and other performance factors as the original refrigerant, with no changes to existing equipment. For purposes of SNAP determinations, EPA does not distinguish between drop-in and retrofit substitutes. The retrofit designation identifies substitutes that may be used in systems retaining at least some of the original equipment.

Retrofits will generally be less expensive than new systems, meaning total replacements. Many substitutes will be acceptable in both categories. Alternative technologies will usually be deemed acceptable only in new equipment, since they cannot utilize parts of existing systems.

[Return to the questions list.](#)

15. When should I let EPA know I'm selling a new substitute?

You must notify EPA at least 90 days prior to sale of a new substitute. This time period allows SNAP staff to review the health and environmental implications of use of your alternative.

[Return to the questions list.](#)

16. What information should I send EPA about a new substitute?

All data to be reviewed by EPA must be included in the SNAP submission. The details are listed on the SNAP Form, available from the SNAP Coordinator at (202) 564-9410, who can also give you contact information for the sector analyst.

[Return to the questions list.](#)

17. How are SNAP-reviewed refrigerants described in the SNAP updates?

Wherever possible, EPA will use ASHRAE designations for refrigerants. In cases when refrigerant compositions are confidential, EPA will use trade names. If it is not possible to list trade names in the Federal Register, a list will be available that [connects generic names to trade names](#).

[Return to the questions list.](#)

For More Information:

Ozone Protection Hotline toll-free (800) 296-1996

Ozone Protection Hotline direct dial (202) 775-6677



Written by EPA's [Stratospheric Protection Division](#)

Last updated on June 12, 1998.

<http://www.epa.gov/ozone/title6/snap/ref.html>



Lists of Substitutes for Ozone-Depleting Substances

Substitutes are reviewed on the basis of ozone depletion potential, global warming potential, toxicity, flammability, and exposure potential as described in the final SNAP rule ([59 FR 13044](#); file size is 967K). Lists of acceptable and unacceptable substitutes are updated several times each year. A [chronological list of SNAP updates](#) is available from the hotline.

The SNAP program makes decisions on a particular substitute in a particular [end-use](#) within a larger [sector](#). For example, within the refrigeration and air conditioning sector, HFC-134a is acceptable as a substitute for CFC-12 in new and retrofitted household refrigerators. Acceptable substitutes are listed by end-use. These lists include substitutes that are either [acceptable](#), [acceptable subject to narrowed use limits](#), or [acceptable subject to use conditions](#). Because the number of [unacceptable](#) substitutes is very small, they are listed by sector.

Tables by sector are also available in Adobe Acrobat format. To use these files, you must [download](#) a free copy of the Adobe Acrobat Reader program or install the Acrobat plug-in for your browser. In some sectors, there is both a comprehensive list of all substitutes, and a shorter, more useful list of acceptable substitutes.

If you cannot use these tables, please call our hotline at **800-296-1996** to ask for free copies.

Note: Originally, EPA used generic names instead of trade names. A [list](#) links generic and trade names. Since the May 1996 Final Rule, however, all lists have used trade names.

Refrigeration & Air Conditioning	Foam Blowing	Solvent Cleaning	Fire Suppression and Explosion Protection
Aerosols	Sterilants	Adhesives, Coatings, and Inks	Tobacco Expansion

● Refrigeration and Air Conditioning

● Substitutes for CFCs ([class I ODS](#)) and HCFCs ([class II ODS](#))

(Includes [acceptable](#), [acceptable subject to narrowed use limits](#), and [acceptable subject to use conditions](#))

Centrifugal Chillers Using:

[CFC-11](#)

[CFC-114](#)

[Other Refrigerants](#)

[Reciprocating and Screw Chillers](#)

[Industrial Process Refrigeration](#)

[Industrial Process Air Conditioning](#)

[Ice Skating Rinks](#)

[Very Low Temperature Refrigeration](#)

[Heat Transfer Systems](#)

[Cold Storage Warehouses](#)

[Refrigerated Transport](#)

[Retail Food Refrigeration](#)

[Commercial Ice Machines](#)

[Vending Machines](#)

[Water Coolers](#)

[Motor Vehicle Air Conditioning](#)


[Household Refrigerators and Freezers](#)

[Residential Dehumidifiers](#)

[Household & Light Commercial Air Conditioning](#)

 [Composition of Refrigerant Blends](#)

 [Unacceptable Substitutes](#)

 Adobe Acrobat (PDF) Files

 [Acceptable and Unacceptable Substitutes & Contact Information for Manufacturers \(213K\)](#)

 **Foam Blowing**

 Acceptable Substitutes for CFCs ([class I ODS](#)) and HCFCs ([class II ODS](#))

[Rigid Polyurethane: Appliance](#)

[Rigid Polyurethane: Spray, Commercial Refrigeration, and Sandwich Panels](#)

[Flexible Polyurethane](#)

[Integral Skin Polyurethane](#)

[Polyurethane: Extruded Sheet](#)

[Polyolefin](#)


[Rigid Polyurethane: Slabstock and Other](#)

[Polystyrene: Extruded Boardstock & Billet](#)

[Rigid Polyurethane & Polyisocyanurate Laminated Boardstock](#)


[Phenolic Insulation Board & Bunstock](#)

 [Unacceptable Substitutes](#)

 Adobe Acrobat (PDF) Files

 [Acceptable and Unacceptable Substitutes \(20K\)](#)

 **Solvent Cleaning**

 Substitutes for CFC-113, Methyl Chloroform ([class I ODS](#)), and HCFCs ([class II ODS](#)) (Includes [acceptable](#), [acceptable subject to narrowed use limits](#), and [acceptable subject to use conditions](#))

[Metals Cleaning](#)

[Electronics Cleaning](#)

[Precision Cleaning](#)

 [Unacceptable Substitutes](#)

 Adobe Acrobat (PDF) Files

 [Acceptable and Unacceptable Substitutes \(21K\)](#)

 [Vendors List - Electronics Cleaning \(244K\)](#)

 [Vendors List - Metals Cleaning \(268K\)](#)

● [Vendors List - Precision Cleaning \(239K\)](#)

● [EPA/ICEL Manuals on Reducing Solvent Use](#)

● **Fire Suppression and Explosion Protection**

● [Substitutes for Halons \(class I ODS\)](#)

(Includes [acceptable](#), [acceptable subject to narrowed use limits](#), and [acceptable subject to use conditions](#))

[Streaming Agents](#)

[Total Flooding Agents](#)

● [Halon Substitute Manufacturers](#)

● [Unacceptable Substitutes](#)

● Adobe Acrobat (PDF) Files

● [Comprehensive Acceptable and Unacceptable Substitutes \(43K\)](#)

● **Aerosols**

● [Substitutes for CFC-11, CFC-113, Methyl Chloroform \(class I ODS\), and HCFCs \(class II ODS\)](#)

(Includes [acceptable](#), [acceptable subject to narrowed use limits](#), and [acceptable subject to use conditions](#))

[Aerosol Propellants](#)

[Aerosol Solvents](#)

● [Unacceptable Substitutes](#)

● Adobe Acrobat (PDF) Files

● [Acceptable and Unacceptable Substitutes \(15K\)](#)

● **Sterilants**

● [Acceptable Substitutes for the 12/88 Blend of Ethylene Oxide and CFC-12 \(a class I ODS\)](#)

● No unacceptable substitutes

● Adobe Acrobat (PDF) Files

● [Acceptable Substitutes \(8K\)](#)

● **Adhesives, Coatings, and Inks**

● [Acceptable Substitutes for CFC-113 and Methyl Chloroform \(class I ODS\)](#)

(Includes [acceptable](#) and [acceptable subject to use conditions](#))

● [Unacceptable Substitutes](#)

● Adobe Acrobat (PDF) Files

● [Acceptable Substitutes \(10K\)](#)

● **Tobacco Expansion**

● [Acceptable Substitutes for CFC-11 \(a class I ODS\)](#)

● No unacceptable substitutes

● Adobe Acrobat (PDF) Files



Significant New Alternatives Policy (SNAP) Glossary

Acceptable

This designation means that a substitute may be used, without restriction, to replace the relevant ODS within the end-use specified. For example, HCFC-22 is an acceptable substitute for R-502 in industrial process refrigeration. Note that all SNAP determinations apply to the use of a specific product as a substitute for a specific **ODS** in a specific **end-use**.

Acceptable Subject to Use Conditions

This designation means that a substitute would be **unacceptable** unless it is used under certain conditions. An example is the set of use conditions placed on **motor vehicle air conditioning refrigerants**, requiring the use of unique fittings and labels and requiring that the original refrigerant be removed before charging with an alternative. Use of the substitute in the end-use is legal provided the conditions are fully met. Note that all SNAP determinations apply to the use of a specific product as a substitute for a specific **ODS** in a specific **end-use**.

Acceptable Subject to Narrowed Use Limits

This designation indicates means that a substitute would be **unacceptable** unless its use was restricted to specific **applications** within an end-use. This designation is generally used when the specific characteristics of different applications within an end-use result in differences in risk. Use of the substitute in the end-use is legal only in those applications included within the narrowed use limit. Note that all SNAP determinations apply to the use of a specific product as a substitute for a specific **ODS** in a specific **end-use**.

Application

The most specific category of equipment. This description is generally used in **sectors** where the **end-uses** are fairly broad. In order of increasing specificity, a particular system is part of an **industrial use sector**, an end-use, and an application.

End-use

Processes or classes of specific applications within major industrial sectors where a substitute is used to replace an ozone-depleting substance. The specific definition varies by sector, but examples are motor vehicle air conditioning, electronics cleaning, flooding fire extinguishing systems, and polyurethane integral skin foam. Substitutes are listed by end-use in the **SNAP lists**. In order of increasing specificity, a particular system is part of an **industrial use sector**, an end-use, and an **application**.

Industrial Use Sector

A user community that uses an [ozone-depleting substance](#) in similar ways. SNAP reviews substitutes in nine sectors:

- [Refrigerants](#)
- [Foam Blowing](#)
- [Solvent Cleaning](#)
- [Fire and Explosion Protection](#)
- Aerosols
- Sterilants
- Tobacco Expansion
- Adhesives, Coatings, and Inks
- [Pesticides](#)

In order of increasing specificity, a particular system is part of an industrial use sector, an [end-use](#), and an [application](#).

Unacceptable

This designation means that it is illegal to use a product as a substitute for an ODS in a specific end-use. For example, HCFC-141b is an unacceptable substitute for CFC-11 in building chillers. Note that all SNAP determinations apply to the use of a specific product as a substitute for a specific [ODS](#) in a specific [end-use](#).

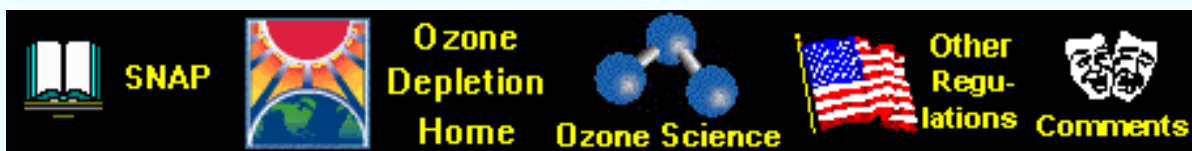
Use Restriction

A general term that includes both [use conditions](#) and [narrowed use limits](#).

For More Information:

Ozone Protection Hotline toll-free (800) 296-1996

Ozone Protection Hotline direct dial (202) 775-6677



Written by EPA's [Stratospheric Protection Division](#)

Last updated on February 4, 1998.

<http://www.epa.gov/ozone/title6/snap/snapdefs.html>



Title VI of the Clean Air Act

SEC. 609: SERVICING OF MOTOR VEHICLE AIR CONDITIONERS

EPA Regulations Related to This Section

(a) REGULATIONS.-Within one year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations in accordance with this section establishing standards and requirements regarding the servicing of motor vehicle air conditioners.

(b) DEFINITIONS.-As used in this section-

(1) The term 'refrigerant' means any class I or class II substance used in a motor vehicle air conditioner. Effective five years after the enactment of the Clean Air Act Amendments of 1990, the term 'refrigerant' shall also include any substitute substance.

(2)(A) The term 'approved refrigerant recycling equipment' means equipment certified by the Administrator (or an independent standards testing organization approved by the Administrator) to meet the standards established by the Administrator and applicable to equipment for the extraction and reclamation of refrigerant from motor vehicle air conditioners. Such standards shall, at a minimum, be at least as stringent as the standards of the Society of Automotive Engineers in effect as of the date of the enactment of the Clean Air Act Amendments of 1990 and applicable to such equipment (SAE standard J-1990).

(B) Equipment purchased before the proposal of regulations under this section shall be considered certified if it is substantially identical to equipment certified as provided in subparagraph (A).

(3) The term 'properly using' means, with respect to approved refrigerant recycling equipment, using such equipment in conformity with standards established by the Administrator and applicable to the use of such equipment. Such standards shall, at a minimum, be at least as stringent as the standards of the Society of Automotive Engineers in effect as of the date of the enactment of the Clean Air Act Amendments of 1990 and applicable to the use of such equipment (SAE standard J-1989).

(4) The term 'properly trained and certified' means training and certification in the proper use of approved

refrigerant recycling equipment for motor vehicle air conditioners in conformity with standards established by the Administrator and applicable to the performance of service on motor vehicle air conditioners. Such standards shall, at a minimum, be at least as stringent as specified, as of the date of the enactment of the Clean Air Act Amendments of 1990, in SAE standard J-1989 under the certification program of the National Institute for Automotive Service Excellence (ASE) or under a similar program such as the training and certification program of the Mobile Air Conditioning Society (MACS).

(c) SERVICING MOTOR VEHICLE AIR CONDITIONERS.-Effective January 1, 1992, no person repairing or servicing motor vehicles for consideration may perform any service on a motor vehicle air conditioner involving the refrigerant for such air conditioner without properly using approved refrigerant recycling equipment and no such person may perform such service unless such person has been properly trained and certified. The requirements of the previous sentence shall not apply until January 1, 1993 in the case of a person repairing or servicing motor vehicles for consideration at an entity which performed service on fewer than 100 motor vehicle air conditioners during calendar year 1990 and if such person so certifies, pursuant to subsection (d)(2), to the Administrator by January 1, 1992.

(d) CERTIFICATION.- (1) Effective two years after the enactment of the Clean Air Act Amendments of 1990, each person performing service on motor vehicle air conditioners for consideration shall certify to the Administrator either-

(A) that such person has acquired, and is properly using, approved refrigerant recycling equipment in service on motor vehicle air conditioners involving refrigerant and that each individual authorized by such person to perform such service is properly trained and certified; or

(B) that such person is performing such service at an entity which serviced fewer than 100 motor vehicle air conditioners in 1991.

(2) Effective January 1, 1993, each person who certified under paragraph (1)(B) shall submit a certification under paragraph (1)(A).

(3) Each certification under this subsection shall contain the name and address of the person certifying under this subsection and the serial number of each unit of approved recycling equipment acquired by such person and shall be signed and attested by the owner or another responsible officer. Certifications under paragraph (1)(A) may be made by submitting the required information to the Administrator on a standard form provided by the manufacturer of certified refrigerant recycling equipment.

(e) SMALL CONTAINERS OF CLASS I OR CLASS II SUBSTANCES.-Effective two years after the date of the enactment of

the Clean Air Act Amendments of 1990, it shall be unlawful for any person to sell or distribute, or offer for sale or distribution, in interstate commerce to any person (other than a person performing service for consideration on motor vehicle air-conditioning systems in compliance with this section) any class I or class II substance that is suitable for use as a refrigerant in a motor vehicle air-conditioning system and that is in a container which contains less than 20 pounds of such refrigerant.

Previous: [Section 608 - National Recycling and Emission Reduction Program](#)

Next: [Section 610 - Nonessential Products Ban](#)



Written by EPA's [Stratospheric Protection Division](#)

Last updated on March 21, 1997.



Ozone Protection Regulations: Motor Vehicle Air Conditioning



[EPA's Motor Vehicle Air Conditioning Program](#)

[1999 Report on the Supply and Demand of CFC-12](#)

For decades, [CFC-12](#) was used as the refrigerant in motor vehicle air conditioning systems. However, scientists have shown that it [damages](#) the ozone layer. In response, the world decided to [end production](#) of ozone-depleting substances. Additionally, to make sure existing CFC-12 is used as much as possible, rather than being wasted and released to the atmosphere, EPA issued [regulations](#) under [section 609](#) of the Clean Air Act to require that shop technicians use special machines to recycle CFC-12.

On December 31, 1995, CFC-12 production essentially ended in the US. It is still legal to use the existing stockpiles of CFC-12, but several companies have also developed [new substitutes](#). These products have been reviewed by EPA's [SNAP](#) program. Since it is illegal to release these substitutes to the atmosphere, EPA has promulgated [standards](#) for machines that recover them from vehicles, and we are working on standards for recycling machines.

Numerous [fact sheets](#) explain the effects of CFC-12 on the ozone layer, the substitutes and how they must be used, and the regulations that govern car motor vehicle conditioning in the US.

[New ODS Management Technologies Database](#)

The U.S. Environmental Protection Agency and the Global Environment & Technology Foundation (a not-for profit corporation) announce the Ozone Protection Technologies Information Clearinghouse System (OPTICS). This web-based database provides information submitted by manufacturers of technologies related to recycling, identification, and destruction of ozone-depleting substances. The system is ready, and now we need help filling it with detailed information.



EPA Enforcement Actions Under Title VI of the Clean Air Act

EPA has issued several [regulations](#) under Title VI of the [Clean Air Act](#) designed to protect the ozone layer and to provide for a smooth transition away from [ozone-depleting substances](#).

EPA is also charged with enforcing these regulations. This section of the web site will feature information about enforcement actions, ranging from civil fines to criminal prosecutions. For each action, a summary will be presented along with a link to more information.

Note that 1) no information is presented here about ongoing investigations, 2) even for completed cases, this page represents only the most major cases, and 3) information comes from a variety of organizations, so it is not always formatted consistently.

If you want to report a violation, please call our hotline at 800-296-1996.

Black Market CFCs and You: A Criminal Combination

● March 3, 2000: [Former Colorado Air Conditioning Businessman Charged with Smuggling CFCs](#)

Kenneth L. McManus of Denver, Colo., was charged on Feb. 24 with violating the Clean Air Act. McManus formerly operated an air conditioning business in Denver and allegedly imported eighty 30-pound cylinders of R-12 refrigerant into the United States without meeting importation requirements.

● March 3, 2000: [EPA Cites Two Detroit Metal Recyclers for Clean-Air Violations](#)

U.S. Environmental Protection Agency (EPA) Region 5 has recently cited two Detroit metal recyclers for alleged violations of Federal clean-air regulations at their scrap yards. They are R&F Metals Co., Inc., 9101 West Fort St., and Consumers Recycling, Inc., 7777 West Chicago Ave. EPA said the companies improperly disposed of appliances containing ozone-depleting refrigerants. In July 1999, EPA inspectors observed both companies disposing of appliances without verifying that the appliances no longer contained ozone-depleting refrigerants.

● January 19, 2000: [EPA Sets Enforcement Records in 1999](#)

The U.S. Environmental Protection Agency today announced record enforcement actions and penalties for Fiscal Year 1999, including \$3.6 billion for environmental cleanup, pollution control equipment, and improved monitoring, an



Handling Contaminated and Unfamiliar Automotive Refrigerants

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

It's clear to most automotive service technicians by now that buying and handling A/C refrigerants is a lot more complicated than it used to be. Even when R-12 was the only refrigerant in town, many A/C techs discovered systems that had been contaminated with air, R-22 or hydrocarbons such as propane and butane. Today, with new vehicles using R-134a refrigerant, and with an abundance of other R-12 substitutes reaching the market, the variety of refrigerants that techs may handle on the job is making A/C service more complicated than ever.

This document is designed to assist techs in determining how to identify, recover, and dispose of any contaminated refrigerants they may encounter. This document will also discuss what a tech should do with a substitute refrigerant that he has chosen not to work with or is unfamiliar to him. EPA intends to update this document whenever the Agency receives new information about potential solutions to the problems relating to contaminated or unfamiliar refrigerants.

A. Identifying refrigerants

EPA requires that when any vehicle is retrofitted from R-12, a label identifying the new refrigerant in the system must be placed under the hood, and new fittings that are unique to that refrigerant must be attached to the high- and low-side service ports of the A/C system. (For a complete discussion of these and other requirements, see the EPA fact sheet "Choosing and Using Alternative Refrigerants.") These EPA requirements obviously don't solve the entire refrigerant identification problem. Your shop could encounter a vehicle that has been retrofitted to another refrigerant but has not been properly relabeled, or a vehicle that has the right label, but highly contaminated refrigerant.

Checking refrigerant pressures does not guarantee that you will recognize that refrigerant is contaminated or is a brand that is unfamiliar to you. Unusual head pressures may tip you off that a system labeled to indicate that it has pure R-12 or R-134a in it actually is highly contaminated or contains another refrigerant altogether. However, you may also encounter a contaminated system, or a system that contains a blend refrigerant, that indicates pressures similar to those of pure R-12 or R-134a.

Purchasing a refrigerant identifier unit can help pinpoint many refrigerant identification problems, and EPA strongly recommends (but does not require) that techs obtain this equipment. You can use the identifier to confirm that the refrigerant your supplier is sending you is exactly what he says it is -- pure and uncontaminated. The equipment you choose will depend on what you plan to do once you discover that refrigerant in a vehicle is not pure R-12 or R-134a. If, for example, you decide to turn the customer with a contaminated system away, then a less-expensive identifier that simply tells you whether refrigerant is pure R-12 or R-134a ("go/no-go") may be sufficient for you.

However, a unit that can help you identify the chemical composition of the refrigerant more specifically can be an important diagnostic tool, so that the extra cost may be well worth it. Some models can identify flammable substances, which require special care and safe handling (see [section B](#) below). Some models can tell you how much air is in recycled refrigerant, so that you can use these models to determine whether the air purge cycle feature on your R-12 or R-134a recycling equipment is functioning properly. Excess air in an A/C system can lead to false readings in electronic low charge indicators in some vehicles; rapid clutch cycling and potential clutch failures; and noisy compressor operation. Finally, using this tool may build your customers' confidence in your diagnostic abilities.

Keep in mind that even the most sophisticated diagnostic units on the market today cannot properly identify all combinations of chemicals used in blend refrigerants. Diagnostic identifiers being sold today may be able to identify potential R-12 and R-134a contaminants such as air, R-22, and hydrocarbons, but many were not designed to identify R-124 and R-142b (chemicals that are components in many of the new substitutes), or to recognize particular chemical combinations as specific patented, marketed blend refrigerants. In the future, equipment manufacturers may develop equipment designed to identify all of the substitute refrigerants that are being marketed today.

Whether you are interested in purchasing a "go/no-go" unit or a diagnostic unit, check that the unit meets the SAE J1771 standard, which is an indication that the unit accurately identifies refrigerants. When claiming to meet this standard, manufacturers of identifier equipment are required to label the unit stating its level of accuracy.

If you are reluctant to invest in another piece of equipment, consider making an arrangement to borrow an identifier from a nearby service facility that has purchased one. That facility may agree to make its identifier available to you for a reasonable fee.

B. Recovering and recycling contaminated or unfamiliar refrigerants

You may not wish to turn away a good customer who comes to the shop with contaminated R-12 or R-134a, or with a substitute refrigerant for which you have no dedicated recovery or recycling equipment. What do you do?

Recovering refrigerant. As a first step, the contaminated or unfamiliar refrigerant must be recovered. EPA prohibits venting any automotive refrigerants (including "unacceptable" refrigerants), no matter what combination of chemicals is in the refrigerant. The best way today that a tech can recover contaminated or unfamiliar refrigerant is to dedicate a recover-only unit to anything that is not pure R-12 or pure R-134a. Some equipment manufacturers may also be marketing new types of recover-only stations specifically designed to remove these refrigerants.

If the refrigerant you extract into a recovery unit contains a high level of flammable substances such as propane and butane, a fire hazard may result if the refrigerant comes into contact with an ignition source within the equipment. Whether you are purchasing a new piece of equipment to handle your contaminated and unfamiliar refrigerants, or you are converting a piece of existing equipment for this purpose, make sure you talk to your sales representative about what features have been incorporated into the equipment to guard against risks of ignition.

Refrigerant should be recovered into the standard DOT-certified, gray-with-yellow-top recovery tank, and if the tank is not equipped with a float valve (which serves as overfill protection), make sure it never gets filled beyond 60% of its gross weighted capacity, as specified in the SAE J1989 and J2211 standards.

If A/C service is not a large percentage of your business, then you may be reluctant to invest in another piece of recovery equipment. If this is the case, consider calling a local A/C specialty shop that may have the equipment necessary to service contaminated refrigerants or refrigerants that are unknown to you.

Recycling refrigerant. Once recovered, refrigerant should not be recycled on-site unless it is uncontaminated R-12 or R-134a. Recovering contaminated R-12 or R-134a refrigerant into recycling equipment may damage the equipment. In addition, EPA regulations currently prohibit technicians from recycling blend substitute refrigerants (contaminated or not). EPA is working with independent testing laboratories and with equipment manufacturers to determine whether it is possible to develop recycling equipment to service these blends that protects both the health or safety of the technician, and the integrity of the A/C system.

C. Storage and disposition of contaminated or unfamiliar refrigerants

Once the refrigerant has been recovered, if you can't recycle it, what do you do with it? The answer, naturally, is that it depends.

Storage. If the refrigerant in your "junk" tank contains significant amounts of flammable substances, it may be considered hazardous and you should make sure you follow any local ordinances that govern the storage of combustible mixtures. In addition, if your shop generates over 100 kilograms (220 pounds) of hazardous wastes per month (including used coolant, paint, rust removers, solvents, degreasers, and battery acids), then your shop must meet certain storage and transportation requirements under the Resource, Conservation and Recovery Act (RCRA). For more details, call the RCRA Hotline at (800) 424-9346 and ask for EPA publication 530-K-95-001, the 1996 update of "Understanding the Hazardous Waste Rules -- A Handbook for Small Businesses." You may also wish to check out the world wide web site of the Coordinating Committee for Automotive Repair at www.ccar-greenlink.org.

Disposition. If the refrigerant in your "junk" recovery tank is a chemical "soup" -- either contaminated R-12 and R-134a, or a mixture of those contaminated refrigerants and some blend refrigerants that you are unfamiliar with -- then the contents should be **reclaimed** or destroyed. You should investigate all your options and pick the one that makes the most economic sense for you.

If you have a contract in place with a waste hauler, contact the hauler to see if they can handle the material. Waste haulers may require that the contents be identified first and may charge you for this identification procedure. They are most likely to send the tank to an incinerator for destruction. You may also want to contact one or more reclaimers, who will send the refrigerant off-site either for destruction, or for reclamation, which involves breaking it up into its chemical components and purifying each of the components.

Some reclaimers can handle tanks sent to them from anywhere in the nation. A reclaimer does not necessarily have to be located in your area.

Due to the expense involved in reclaiming, some reclaimers may not accept less than 500 or 1000 pounds of contaminated or mixed refrigerant. In addition, you should be aware that not all reclaimers have the technology to handle all contaminated or mixed refrigerants. However, if one tells you that he is not interested in receiving your tank, don't necessarily assume that the next reclaimer you call will say the same thing.

Before you enter into any agreement with either your waste hauler or a reclaimer, make sure you understand all of the costs involved; there may be separate charges for identifying the material, transporting it and destroying it. If you are responsible for shipping the tank, make sure that the hauler or reclaimer explains to you how to comply with any applicable DOT, state and local requirements relating to shipping.

EPA maintains a [list of reclaimers](#) that is available through the Hotline at 800/296-1996. EPA will update this fact sheet in the event that the Agency receives more specific information about which reclaimers will accept mystery mixtures of refrigerant.

If you have questions about disposing of specific blend refrigerants, call the refrigerant manufacturer. Most manufacturers of blend refrigerants have made arrangements with specific reclaimers to handle their used refrigerant. For a list of these telephone numbers, see the EPA fact sheet "[Choosing and Using Alternative Refrigerants](#)," available from the Hotline.

[Other Fact Sheets Related to Section 609](#)



Written by EPA's [Stratospheric Protection Division](#)

Last updated on August 4, 1998.
<http://www.epa.gov/ozone/title6/609/contamin.html>



Section 609 Approved Equipment

July, 1998

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

If the tables below are jumbled, see the [text version](#).

Under section 609, EPA reviews refrigerant handling equipment to ensure that it meets published standards.

This equipment falls into two categories:

1. equipment that can both [recover](#) and [recycle](#) refrigerant (**recover/recycle**) and
2. equipment that can recover refrigerant but not recycle it (**recover-only**).

Within each category, equipment that is "substantially identical" to approved equipment may be used as if it were actually approved.

See "[Just the Facts](#)" for more information on requirements relevant to this equipment.

[Table I](#) contains **CFC-12 recover/recycle equipment** approved by Underwriters Laboratory (UL) and ETL Testing Laboratories, Inc.

VERY IMPORTANT NOTE: This list may include dual refrigerant recover/recycle equipment that uses separate circuitry for the recycling of each refrigerant.

[Table II](#) contains **CFC-12 recover/recycle equipment determined to be substantially identical** to equipment approved by UL or ETL.

[Table III](#) contains **CFC-12 recover-only equipment** approved by Underwriters Laboratory (UL) and ETL Testing Laboratories, Inc.

[Table IV](#) contains **CFC-12 recover-only equipment determined to be substantially identical** to equipment approved by UL or ETL. At this time, no CFC-12 recover-only equipment that may qualify to be considered substantially identical has been submitted to the Agency for that determination.

[Table V](#) contains **dual refrigerant recover/recycle equipment that services both CFC-12 and HFC-134a using COMMON circuitry**.

[Table VI](#) contains **HFC-134a recover/recycle equipment** approved by UL or ETL.

VERY IMPORTANT NOTE: This list may include dual refrigerant recover/recycle equipment that uses separate circuitry for the recycling of each refrigerant.

[Table VII](#) contains **HFC-134a recover-only equipment** approved by UL or ETL.

All lists will be updated as equipment is approved. If you believe something is listed in error, or a specific model is not listed that should be, please submit the relevant information using our [feedback page](#).

Table I. CFC-12 Recover/Recycle Equipment

Manufacturer	Model	Remarks (1)
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A. Gramkow	RRC	No longer manufactured
AES NTRON	Retriever 2.2AC and 2.2A	-
Airosol Company, Inc	Chargette RC2000, RC2200	No longer manufactured
American Thermaflo	18000	Dual refrigerant
Applied Ecological Systems	2.2c	-
Assemblies Systems Corp.	NS-2000	No longer manufactured
Atlas Supply Company	EAC-205, -250, -750, -1400, -1500	Multiple Listing
Atlas/SPX - Robinair	EAC-125, EAC-370, 679125, 679137	-
Automotive Diagnostics, Division of SPX Corporation	40-375	Multiple Listing
Bear/SPX - Robinair	40-310, 17352C/17352, 17355C, 40-327, 40-370	-
Belco Controls Inc.	08	No longer manufactured
Carquest Corporation	209990	Multiple Listing
Carrier	12RA001100	No longer manufactured
Caterpillar Inc/ SPX -Robinair	4C8754, 4C8755, 905786, 905787, 905788, 905789, 905790	-
Century Mfg. Co.	MR-1991-A, -R, ME-1991-A, 160-002, -003, -004, -005, -013, -014, -015, -016. Solar 5090, -5100, -5110, 7100, 8100, 85100, 86100.	-
Chrysler/SPX-Robinair	OT-17350, OT-17400, OT-17700	-
Classic Tool Design, Inc.	FBR-11	No longer manufactured
Cornwell/SPX-Robinair	RA-17350C, RA-17400, RA-17500B, RA-17700	-
Diavia/SPX-Robinair	17705	-
D.W. Myers Enterprises, Inc.	AM 6000, MR-1991-A, MR-1991-R, ME-1991-A	No longer manufactured
Dowmar Solvent Recovery Systems, Inc.	DR12R	No longer manufactured
Draf Industries	1400	No longer manufactured
Enspeco, Inc.	RMS-3112, RMS-3012	-

Environmental Products Amalgamated Pty.Ltd	SKYE.EP3, SKYE.EP-4/5, EP-9S	-
Environmental Systems Products, Inc.	FICS 9000	Multiple Listing
Environmental Technologies Corporation	SYSTEM I 102-12	-
Everco/SPX-Robinair	A9990	-
Everco Industries, Inc	A9950	No longer manufactured
Firestone/SPX-Robinair	TE 48-30-960-7	-
FT Industries (formerly Fluoro Tech, Inc.)	Fluoromizer 3000R (FM3000R), FM3000 with RM3 module (Fluoromizer, 3000), FM4000-12	Certified by ETL, Inc. Multiple Listing
Ford Motor Company	158-00001,-00002, 01400900, 02300100	Multiple Listing
Ford-New Holland/SPX-Robinair	FNH00140, FNH00141, FNH00335	-
Four Seasons	59870	Multiple Listing
Four Seasons	59900, 59901	-
General Motors/SPX-Robinair	17250B	-
Honda/SPX-Robinair	J-3810-CH	-
IG-LO, Inc; Subsidiary of Valvoline, Inc	1400, 1500	No longer manufactured
IG-LO, Inc.; Subsidiary of Valvoline, Inc.	1000	No longer manufactured
Infiniti/SPX4-Robinair	J-38100-INF	-
International Carbonics Inc. (now The Youngstown Research and Development Company YRD)	RRR-SS, BH-RRR, RRR-SSA	No longer manufactured
James Kamm Technologies, Inc.	K-3333, K3333-TB, AC-3333	-
John Deere/SPX-Robinair	JTO 2020, JTO 2021, JTO 2052	-

Kent Moore/SPX-Robinair	J-38100-C, J-38100-B, J-38750, J-38550-B, J-39770, 42-17400, 43-40015-HDE, 43-40018-HDE, 42-175250-C, 43-40017-HDE, 42-17350-C, 43-40014-HDE, J-38100-D	-
Kolpak Mfg. Co.	ZRM2000	-
Lexus/SPX-Robinair	00002-01396-02	-
MAC Tools Inc	ACRRC-750, AC650, AC751, AC760 AC600, AC700, AC800, AC750, AC761, AC790	Multiple Listing Multiple listing by ETL, Inc.
MAC Tools, Inc/SPX-Robinair	AC17350C, AC17400, AC17500B, AC17700, AM6000	-
Matco Tools Corp.	ACRM120, ACRM3412	Multiple Listing
MATCO Tools/SPX-Robinair	AC17350, AC17400, AC17500B, AC17700	-
Mastercool, U.S.A. Inc	Supervamp 62000, 65000, 65500	-
Mazda/SPX-Robinair	17401MAZ	-
MDI	1/2 HPCA	-
Mitsubishi/SPX-Robinair	17400MIT, 17401MIT	-
Moog Automotive, Inc	209990	Multiple Listing
Murray Corporation	ATC-1000, -1100, -5000	No longer manufactured
Myers Enterprises	MR-1991-A, MR-1991-R, ME-1991-A	-
NAPA	209990	Multiple Listing
NAPA Temp. Products	ATC1100, -5000	Multiple Listing
Nissan/SPX-Robinair	J-38100-NI, 17400NIS, 42-17250-NI, 17401NIS, 17403NIS	-
OTC/SPX-Robinair	OEM-1380, -1396, -1412, -1420, -48158, -48463	-
Ozone Environmental Industries Inc.	R-6A, OS-1000, OS-4000, OS-2000	No longer manufactured
P&F Technologies	PF-8, Viper	-
Power Manufacturing	R-12a	-
Promax Industries, Inc	Roger-1 (front and back), Roger 1B	Consists of front and back systems

R & D Fountain Industries	AM6000	No longer manufactured
Refrigerant Recovery Systems, Inc	ST100A	-
Refrigerant Recovery Technologies, Inc	Fluoromizer 3000R (FM3000R), FM3000 with RM3 module (Fluoromizer 3000), FM4000-12	Certified by ETL, Inc.
RTI Technologies, Inc. (formerly Refrigerant Technologies, Inc.)	RRC-1000, RRC-750, RRC-750X, RRC-751, TC-700, TX-600, AC-800, TX-200, RRC770, TC2700, AC790, TC670, RRC760, RRC761	Certified by ETL, Inc.
Refrigeration Transfer Systems/Justice Supply and Glass	RFT-2212, RFT-2234	-
Rolo Inc.	91R12	-
Rotunda/Ford (Sun & SPX)	158-00001, 158-00002, 014-00900, 023-00100, 078-00802, 078-00800, 078-00801	-
R.S.I.	Port-O-Zone, Automotive	-
Saturn/SPX-Robinair	42-A7250, 17400ASAT	-
Snap-On Tools Company	ACT2500, ACT3000, ACT3300, ACTR3000, ACTH3400	Multiple Listing
Source World Wide Inc.	R-12a	-
Sun Electric Corporation	MRC-150, -300, -312, -334, -400, -500, MTC-4000, NAPA-1100, -5000, -A9950, ATC-1000, -1100, -5000, -078-00800, -00801, -00802, -00805. ACT-3120, -3340, -4100, Kool Kare EEAC101A-301A.	-
Technical Chemical Company	SERCON -8000 (-M,-A,-MA,-MAH,-MV,-MAV,-H),-9000 (-M,-A,-MA,-MV,-MAH,-MAV,-H),-9220,-9220M,-5000H with -SR4000 or 4000A filter unit, -5000A, -5000AB, -5000MB or -5000MBJ with SR4000, 4000A or -4000H filter unit.	-
Toyota/SPX-Robinair	TOY-01380, TOY-01396, 00002-01396-01, 42-17400, 17400TOYJ, 17401TOYJ, 17404TOYJ	-
Trane Division of American Standard, Inc	RRPC	Multiple Listing
Van Steenburgh Engineering Lab, Inc	JV90-4,-3,-2,-1, LV30-4,-3,-2,-1. CV15-4,-3,-2,-1	-
Watsco Components, Inc.	WC-2	Multiple Listing

White Industries; Division of K-Whit Tools	01050, 01060, 01061, 01080, 01095, 1095XL, 01075,1075XL, 01234a, 01234av, 1234XL	-
Wynn's Climate Systems	90-0001A, -0458A, -1100A, -1300A, -1500A	-
The Youngstown Research and Development Company YRD (formerly International Carbonics)	RRR-SS, BH-RRR	-

Table II. Substantially Identical CFC-12 Recover/Recycle Equipment

Manufacturer	Model
REJUVENATOR ST-100 and ST-1000	Refrigerant Recovery Systems, Inc.
White Industries Model 01050	K-Whit Tools, Inc.
R-12 Recover-Recycle Machine	Justice Glass and Supply Company
NAPA TEMP ATC-1000	Murray/Division of Moog Automotive, Inc
CFC-SAV-R (with Robinair retrofit kit 17217)	LSK, Inc
Everco A9989 (with Robinair retrofit kits 17217 and 17216)	Everco Industries
Robinair 17200 (with retrofit kits 17216 and 17217), 17500, RTB17200, RTB17500.	Robinair Division, SPX Corporation
MODEL K-3330	James Kamm Technologies, Inc.
Space Age Air Products, Inc.	Model 010 (with retrofit kit Robinair 17217)
AES-Ntron Models 2.2 and 2.4	-

Table III. CFC-12 Recover-Only Equipment

Manufacturer	Model	Remarks <u>(1)</u>
AES NTRON	R1.1AC	-
Assemblies Systems Corp.	NS750A	no longer manufactured
CFC Equipment, Inc.	EM2020A	Certified by ETL, Inc.
Clardy Manufacturing Co.	CP4MA	-
C Mar Industries Inc.	CM20-12A	No longer manufactured
DAVECO Recovery Division of DAVECO Industries Inc.	41250, 41250-2	-
Econozone, Inc. (RSB Engineering) (now Refrigerant Management Systems)	Econozone 29A	No longer manufactured

Environmental Products Amalgamated PTY Ltd.	EP10A	-
Environmental Technologies Corp.	The-Pro-A	-
FT Industries (formerly Fluoro Tech, Inc.)	FM3000	Certified by ETL, Inc.
MDI	5150D	-
National Refrigeration Products, Inc.	ULV63	-
Power Manufacturing, Inc.	012B-FRSPORT-01 (Power R1)	-
Promax Amprobe Industries	RG5000A	-
Refrigerant Management Systems Inc. (Formerly Econozone, Inc.)	Econozone 29A	-
Refrigerant Recovery Systems, Inc.	RC-1-A	-
Refrigerant Recovery Technologies, Inc.	FM3000, FM 4000-12	Certified by ETL, Inc.
RTI Technologies, Inc. (formerly Refrigerant Technologies, Inc.)	TX 200	Certified by ETL, Inc.
R.S.I.	Mini-Sucker1 Automotive Recovery System, RSI Part Number 600075	-
SPX Corporation, Robinair Division	17625A	-
Technical Chemical	SR5000MBJ, SR1000MBJ	-
Watsco Components Inc.	WC1S-A	-
White Industries Div. of K-Whit Tools Inc.	01055	-

(None yet approved)

Table IV. Substantially Identical Recover-only Equipment

Table V. Dual Refrigerant Recover/Recycle Equipment that Uses Common Circuitry

Manufacturer	Model	Remarks <u>(1)</u>
Mac Tools, Inc.	AC800	Certified by ETL
Penguin Refrigeration	1100	Certified by ETL
Robinair Division of SPX Corp.	12134A, 12135A, 17800A	Meets SAE J1770
RTI Technologies, Inc.	AC790, AC800, TC2700	Certified by ETL

Table VI. HFC-134a Recover/Recycle Equipment Approved by UL or ETL

Manufacturer	Model	Remarks <u>(1)</u>
Automotive Diagnostics Division of SPX Corp.	40-380, 02300150	-
Century Mfg. Co.	5150/134a, 160-001, -008, -009, -010, -011, -012, 600-134a, 7134, 8134, 85134, 86134	-
Enspero Inc.	RMS-3134, RMS-3034	-
Environmental Technologies Corp.	System I 102-34	-
Four Seasons	59902	-
IG-LO, Inc., subsidiary of Valvoline	2500	No longer manufactured
James Kamm Technologies	K-3334	-
Mac Tools, Inc.	AC610, AC710, AC750, AC760, AC761, AC790	Certified by ETL, Inc.
Mastercool USA Inc.	Supervamp 64000, 67000, 67500	-
Matco Tools Corp.	ACRM134, ACRM3412	-
Ozone Environmental Industries	OS-4134	No longer manufactured
P&F Technologies Ltd.	PF134, Viper, Compact-134	-
Power Manufacturing	R-134a	-
Refrigerant Recovery Systems, Inc.	ST134a	-
Refrigerant Recovery Technologies, Inc.	FM 4000-134	Certified by ETL, Inc.
Robinair Div. of SPX	12134A, 12135A, 13670, 13671, 17534, -GM, -INF, -KM, -MEX, -NI, 17734, 17735, 17454, 17455, 17800A, AC34145, 34400, 34600, 34666, 34700, -701, -702, -703, 34725, 34790	-
RTI Technologies, Inc.	TX600-R134a, TC700-R134a, RRC770-R134a, TC2700, AC790-R134a, TC670-134a, RRC-760, RRC-761, RRC-750	Certified by ETL, Inc.
RTS	RFT2234	-
SKYE USA (Environmental Products Amalgamated Pty. Ltd.)	EP-3N, EP-9N	-
Source World Wide Inc.	R-134a	-

Sun Electric Corp.	MRC-334, -450, MTC-4500, ACT-3340, -4500, 078-00850, Kool Kare EEAC104A, -304A	-
Technical Chemical Co.	SR8134M, SR8134MV, SR9134M, SR9134MV, SR5134M with SR 4134	-
White Industries division of K-Whit Tools, Inc.	1070XL, 01085, 01090, 1090XL, 01234a, 01234av, 1234XL	-
Wynn's Climate Systems Inc.	90-1200A, -1400A, -1500A	-

Table VII. HFC-134a Recover-Only Equipment Approved by UL or ETL

Manufacturer	Model
Skye USA (Environmental Products Amalgamated PTY Ltd.)	EP10N
Promax Amprobe Industries	RG5000AR-134a

(1) A UL Multiple Listing (referred to as private labeling by the industry) is the formal publication of the name of a company that appears on equipment that is basically UL Listed for another company. It would be similar to a private brand except that the basic company name need not appear anywhere on the product. This equipment has been evaluated to determine the minimum purity specifications for recycled CFC-12 for use in mobile automotive air conditioning systems. Such equipment is provided with the auxiliary marking "Design Certified by Underwriters Laboratories for Compliance with * _____(date)" to indicate that the equipment has been investigated for compliance with the applicable SAE requirements.

Other Fact Sheets Related to Motor Vehicle Air Conditioning



Written by EPA's [Stratospheric Protection Division](#)

Last updated on July 7, 1998. <http://www.epa.gov/ozone/title6/609/appequip.html>



Section 609 Technician Certification Programs

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

January 20, 2000

This list will be updated when other technician certification programs are approved. If your program has been approved but you are not listed here, please let us know via our [feedback page](#). Section 609 covers technician certification in the motor vehicle sector only. Becoming certified allows you to: (1) purchase R-12 and ozone-depleting blend substitutes for R-12 (right now, all blends are ozone-depleting); and (2) perform refrigerant servicing of vehicles with R-12, R-134a, or blend refrigerants.

Although you have to be certified to perform refrigerant servicing of vehicles equipped with R-134a, currently, you do not have to be certified to purchase R-134a. EPA, however, issued on June 11, 1998 a [proposed regulation that would restrict the sale of R-134a to certified technicians](#). If you become certified now, your certification will allow you to purchase R-134a if a sales restriction is instituted in the future.

Notes:

- An asterisk (*) indicates that the program offers home study.
- A double asterisk (**) indicates that the program offers training and testing on the Internet.
- Where available, links have been provided to web sites.
- **Note to refrigerant retailers:** Ryder Trucks, Refrigerant Certification Services, Snap-On, Minnesota Dep't of Transportation, Marine Safety Consultants/Tidewater School of Navigation, Rancho Santiago College, Penske Auto Centers (formerly K-Mart) and Geneva Steel formerly offered certification programs. Retailers should continue to accept cards from these organizations.

*[Air Conditioning Contractors of America/Ferris State University](#)

<http://www.acca.org/>
1712 New Hampshire Avenue, NW
Washington, D.C. 20009
(202) 483-9370

*[ASE \(National Institute for Automotive Service Excellence\)](#)

13505 Dulles Technology Drive
Herndon, Virginia 22071-3415
(703) 713-3800

For booklet requests, write to: talktoase@asecert.org

C.F.C. Reclamation and Recycling Service, Inc.
P.O. Box 560
Abilene, Texas 79604
(915) 675-5311

E F Technical Institute, Inc.
1860 Crown Drive
Suite 1400

Dallas, TX 75234
(972) 831-8845

*,** [ESCO Institute](#)

<http://www.escoinst.com/>
1350 West Northwest Highway
Suite 205
Mount Prospect, IL 60056
(800) 726-9696

*The Greater Cleveland Automobile Dealers' Association
6100 Rockside Woods Boulevard, Suite 235
Independence, Ohio 44131
(216) 328-1500 or (888) 740-2886

*,** [International Mobile Air Conditioning Association](#)

<http://www.imaca.org/>
P.O. Box 9000
Fort Worth, TX 76147-2000
(817) 732-4600
email: info@imaca.org

*,** [Mainstream Engineering Corporation](#)

<http://www.epatest.com/>
200 Yellow Place
Rockledge, FL 32955
(407) 631-3550
email: rps@mainstream-engr.com

Mechanic's Education Association
1805 Springfield Avenue
Maplewood, New Jersey 07040-2910
(973) 763-0086

*[Mobile Air Conditioning Society](#)

<http://www.macsw.org/>
P.O. Box 100
East Greenville, PA 18041
(215) 679-2220
email: macs1@macsw.org

New York State Association of Service Stations and Repair Shops, Inc.
Automotive Technician Training Program
8 Elk Street
Albany, New York 12207
(518) 452-4367

New York State Department of Motor Vehicles, Division of Vehicle Safety - Technical Training
Unit
Empire State Plaza
Swan Street Building, Room 111
Albany, New York 12228

(518) 474-4049

Texas Engineering Extension Service
San Antonio Training Division
The Texas A&M University System
9350 South Presa
San Antonio, Texas 78223-4799
(210) 633-1000

*Waco Chemicals, Inc.,
12306 Montague Street
Pacoima, California 91331
(818) 897-3018 or (800) 266-9226

*Universal Technical Institute
3823 North 34th Avenue
Phoenix, AZ 85017
(800) 859-7249

*Vatterott College
www.vatterott-college.com
10265 St. Charles Rock Road
St. Louis, MO 63074
(314) 843-4200

Note: The programs listed below are intended specifically for their employees

Jiffy Lube International
P.O. Box 2967
Houston, Texas 77252-2967
(713) 546-4100

Los Angeles County Metropolitan Transportation Authority (MTA)
900 Lyon Street
Los Angeles, California 90012
(213) 922-5159

Potomac Electric Power Company
8400B Old Marlboro Pike
Upper Marlboro, Maryland 20772
(301) 967-5294

Whayne Supply Company
P.O. Box 35900
Louisville, KY 40323-5900
(502) 774-4441

U.S. Army Ordnance Center and School
Attn: ATSL-DI-TSED-U (Mr. Williams)
Aberdeen Proving Ground
Aberdeen, Maryland 21005-5201
(410) 278-2302 or 278-9774

Yellow Freight System, Inc.
10990 Roe Avenue
P.O. Box 7270
Overland Park, Kansas 66207
(913) 345-3000

[Other Fact Sheets Related to Motor Vehicle Air Conditioning](#)



Written by EPA's [Stratospheric Protection Division](#)
<http://www.epa.gov/ozone/title6/609/609certs.html>



Recordkeeping Requirements for Refrigerant Retailers

OZONE PROTECTION HOTLINE TOLL-FREE (800) 296-1996

The sale of refrigerants is constrained by several EPA regulations. This fact sheet explains the requirements according to the identity of the purchaser and the seller. In all cases, the following guidance applies:

- These rules currently apply to sale of ozone-depleting refrigerants (CFCs, HCFCs, and blends containing these compounds).
- HFC refrigerants (e.g., HFC-134a) are not currently subject to these rules.
- All records related to the sale of refrigerants must be kept for three years.

Please call the hotline at the number above to receive a free copy of a paper version that formats this information into a single table.

Please follow the link for the relevant situation:

Selling a large cylinder to:

[a refrigerant installer](#) or [a refrigerant wholesaler](#)

Selling a small can to:

[a refrigerant installer](#) or [a refrigerant wholesaler](#)

Selling a Large Cylinder (e.g. 30 pounds) to a Refrigerant Installer

In this situation, the seller has two **required** actions:

1. The seller must either see 608 or 609 technician certification card; if the purchaser is uncertified but is purchasing for a shop or other facility, the seller must see evidence that at least one tech at that shop is certified (for example, a letter from the shop stating that Joe Tech is certified plus a copy of Joe Tech's card). The Seller must keep this information on file. The purchasing facility must notify seller when Joe Tech is no longer employed.
2. The seller must get an invoice listing name of purchaser, date of sale, and quantity of refrigerant purchased.

Selling a Large Cylinder (e.g. 30 pounds) to a Refrigerant Wholesaler

In this situation, the seller has one recommended action and one required action:

Recommended: You don't need to see 608 or 609 card. However, it is a good idea to get a written statement certifying that the jugs will be resold, and stating name and business address of purchaser. Why? Because wholesalers are legally responsible for ensuring that people who purchase refrigerant from them are allowed under the Clean Air Act to purchase that refrigerant.

Required: The seller must get an invoice listing name of purchaser, date of sale, quantity of refrigerant purchased.

Selling a Small Can to a Refrigerant Installer

In this situation, the seller has two **required** actions:

1. See the technician's 609 certification card. Small cans may only be sold to a 609 technician. **608-certified technicians may not purchase small cans of ozone-depleting refrigerants.**
2. The seller must get an invoice listing name of purchaser, date of sale, quantity of refrigerant purchased.

Selling a Small Can to a Refrigerant Wholesaler

In this situation, the seller has one recommended action and one required action:

Recommended: The seller must either see 608 or 609 technician certification card; if the purchaser is uncertified but is purchasing for a shop or other facility, the seller must see evidence that at least one tech at that shop is certified (for example, a letter from the shop stating that Joe Tech is certified plus a copy of Joe Tech's card). The Seller must keep this information on file. The purchasing facility must notify seller when Joe Tech is no longer employed.

Required: The seller must get an invoice listing name of purchaser, date of sale, quantity of refrigerant purchased.

[Other Fact Sheets Related to Motor Vehicle Air Conditioning](#)

[Other Fact Sheets Related to Refrigeration and Stationary Air Conditioning](#)



Written by EPA's [Stratospheric Protection Division](#)

Last updated on October 1, 1997.

<http://www.epa.gov/ozone/title6/609/recordkp.html>