



## U.S. Environmental Protection Agency

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## What You Should Know about Refrigerants When Purchasing or Repairing a Residential A/C System or Heat Pump

DISCLAIMER: EPA seeks to promote energy efficiency and the safe use of ozone-friendly substances, and does not endorse any particular company or its products.

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### Background: Ban on Production and Imports of Ozone-Depleting Refrigerants

In 1987 the Montreal Protocol, an international environmental agreement, established requirements that began the worldwide phaseout of ozone-depleting CFCs (chlorofluorocarbons). These requirements were later modified, leading to the phase out in 1996 of CFC production in all developed nations. In addition, a 1992 amendment to the Montreal Protocol established a schedule for the phaseout of HCFCs (hydrochlorofluorocarbons). HCFCs are substantially less damaging to the ozone layer than CFCs, but still contain ozone-destroying chlorine. The Montreal Protocol as amended is carried out in the U.S. through Title VI of the Clean Air Act, which is implemented by EPA.

An HCFC known as R-22 has been the refrigerant of choice for residential heat pump and air-conditioning systems for more than four decades. Unfortunately for the environment, releases of R-22 that result from system leaks contribute to ozone depletion. In addition, the manufacture of R-22 results in a by-product that contributes significantly to global warming. As the manufacture of R-22 is phased out over the coming years as part of the agreement to end production of HCFCs, manufacturers of residential air conditioning systems are beginning to offer equipment that uses ozone-friendly refrigerants. Many homeowners may be misinformed about how much longer R-22 will be available to service their central A/C systems and heat pumps. This fact sheet provides information about the transition away from R-22, the future availability of R-22, and the new refrigerants that are replacing R-22. This document also assists consumers in deciding what to consider when purchasing a new A/C system or heat pump, or when having an existing system repaired.

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### Phaseout Schedule for HCFCs Including R-22

Under the terms of the Montreal Protocol, the U.S. agreed to meet certain obligations by specific dates that will affect the residential heat pump and air-conditioning industry:

January 1, 2004:

In accordance with the terms of the Montreal Protocol, the amount of all HCFCs that can be produced nationwide must be reduced by 35% by 2004. In order to achieve this goal, the U.S. is ceasing production of HCFC-141b, the most ozone-damaging of this class of chemicals, on January 1, 2003. This production ban will greatly reduce nationwide use of HCFCs as a

group, making it likely that the 2004 deadline will have a minimal effect on R-22 supplies.

January 1, 2010:

After 2010, chemical manufacturers may still produce R-22 to service existing equipment, but not for use in new equipment. As a result, heating, ventilation and air-conditioning (HVAC) system manufacturers will only be able to use pre-existing supplies of R-22 to produce new air conditioners and heat pumps. These existing supplies would include R-22 recovered from existing equipment and recycled.

January 1, 2020:

Use of existing refrigerant, including refrigerant that has been recovered and recycled, will be allowed beyond 2020 to service existing systems, but chemical manufacturers will no longer be able to produce R-22 to service existing air conditioners and heat pumps.

For more information about this phaseout, see fact sheets about the [HCFC Phaseout Schedule](#) and [Frequently Asked Questions on the HCFC Phaseout](#).

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## What Does the R-22 Phaseout Mean for Consumers?

### Availability of R-22

The Clean Air Act does not allow any refrigerant to be vented into the atmosphere during installation, service, or retirement of equipment. Therefore, R-22 must be recovered and recycled (for reuse in the same system), reclaimed (reprocessed to the same purity levels as new R-22), or destroyed. After 2020, the servicing of R-22-based systems will rely on recycled refrigerants. It is expected that reclamation and recycling will ensure that existing supplies of R-22 will last longer and be available to service a greater number of systems. As noted above, chemical manufacturers will be able to produce R-22 for use in new A/C equipment until 2010, and they can continue production of R-22 until 2020 for use in servicing that equipment. Given this schedule, the transition away from R-22 to the use of ozone-friendly refrigerants should be smooth. For the next 20 years or more, R-22 should continue to be available for all systems that require R-22 for servicing.

### Cost of R-22

While consumers should be aware that prices of R-22 may increase as supplies dwindle over the next 20 or 30 years, EPA believes that consumers are not likely to be subjected to major price increases within a short time period. Although there is no guarantee that service costs of R-22 will not increase, the lengthy phaseout period for R-22 means that market conditions should not be greatly affected by the volatility and resulting refrigerant price hikes that have characterized the phaseout of R-12, the refrigerant used in automotive air-conditioning systems.

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## Alternatives to R-22 in Residential Air Conditioning

As R-22 is gradually phased out, non-ozone-depleting alternative refrigerants are being introduced. Under the Clean Air Act, EPA reviews alternatives to ozone-depleting substances like R-22 in order to evaluate their effects on human health and the environment. EPA has reviewed several of these alternatives to R-22 and has compiled a [list of substitutes](#) that EPA has determined are acceptable. One of these substitutes is R-410A, a blend of hydrofluorocarbons (HFCs), substances that do not contribute to depletion of the ozone layer, but, like R-22, contribute to global warming. R-410A is manufactured and sold under various trade names,

including GENETRON AZ-20®, SUVA 410A®, and Puron®. Additional refrigerants on the list of acceptable substitutes include R-134a and R-407C. These two refrigerants are not yet available for residential applications in the U.S., but are commonly found in residential A/C systems and heat pumps in Europe. EPA will continue to review new non-ozone-depleting refrigerants as they are developed.

### **Servicing existing units**

Existing units using R-22 can continue to be serviced with R-22. There is no EPA requirement to change or convert R-22 units for use with a non-ozone-depleting substitute refrigerant. In addition, the new substitute refrigerants cannot be used without making some changes to system components. As a result, service technicians who repair leaks to the system will continue to charge R-22 into the system as part of that repair.

### **Installing new units**

The transition away from ozone-depleting R-22 to systems that rely on replacement refrigerants like R-410A has required redesign of heat pump and air conditioning systems. New systems incorporate compressors and other components specifically designed for use with specific replacement refrigerants. With these significant product and production process changes, testing and training must also change. Consumers should be aware that dealers of systems that use substitute refrigerants should be schooled in installation and service techniques required for use of that substitute refrigerant.

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## **A Common Sense Approach To Servicing Your System**

Along with prohibiting the production of ozone-depleting refrigerants, the Clean Air Act also mandates the use of common sense in handling refrigerants. By containing and using refrigerants responsibly -- that is, by recovering, recycling, and reclaiming, and by reducing leaks -- their ozone depletion and global warming consequences are minimized. The Clean Air Act outlines specific refrigerant containment and management practices for HVAC manufacturers, distributors, dealers and technicians. Properly installed home comfort systems rarely develop refrigerant leaks, and with proper servicing, a system using R-22, R-410A or another refrigerant will minimize its impact on the environment. While EPA does not mandate repairing or replacing small systems because of leaks, system leaks can not only harm the environment, but also result in increased maintenance costs.

One important thing a homeowner can do for the environment, regardless of the refrigerant used, is to select a reputable dealer that employs service technicians who are EPA-certified to handle refrigerants. Technicians often call this certification "Section 608 certification," referring to the part of the Clean Air Act that requires minimizing releases of ozone-depleting chemicals from HVAC equipment.

## **A Common Sense Approach To Purchasing New Systems**

Another important thing a homeowner can do for the environment is to purchase a highly energy-efficient system. Energy-efficient systems result in cost savings for the homeowner. Today's best air conditioners use much less energy to produce the same amount of cooling as air conditioners made in the mid-1970s. Even if your air conditioner is only 10 years old, you may save significantly on your cooling energy costs by replacing it with a newer, more efficient model. Products

with EPA's Energy Star® label can save homeowners 10% to 40% on their heating and cooling bills every year. These products are made by most major manufacturers and have the same features as standard products but also incorporate energy saving technology. Both R-22 and R-410A systems may have the Energy Star® label. Equipment that displays the Energy Star® label must have a minimum seasonal energy efficiency ratio (SEER). The higher the SEER specification, the more efficient the equipment.

You should consider energy efficiency, along with performance, reliability and cost, in making your decision. And don't forget that when purchasing a new system, you can also speed the transition away from ozone-depleting R-22 by choosing a system that uses ozone-friendly refrigerants.

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## Related Fact Sheets

- [Information on EPA's Energy Star program for heating and cooling equipment](#)
- [Home Improvement Toolbox with Energy Star](#)
- [Information on financing the purchase of an A/C system or a heat pump](#)
- [Information from DOE on energy-efficient air conditioning](#) EXIT Disclaimer
- [Energy Solutions for Heating and Cooling your Home](#)

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Remind me ... why have the U.S. and other countries agreed to stop the production of CFC and HCFC refrigerants?

- CFCs and HCFCs deplete the ozone layer, which acts as a blanket in the stratosphere that protects us from harmful UV radiation.
- This radiation has been linked to skin cancer, which is now one of the fastest growing forms of cancer. In the U.S., one person dies of skin cancer every hour.
- 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.

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