Responsible Use Principles for
Refrigerant Recovery, Recycling and Reclamation

A key element of the responsible use and stewardship of fluorocarbon refrigerants is the recovery, recycling and reclamation of used refrigerants so that they can be reprocessed for further commercial use or destroyed. Hydrofluorocarbons (HFCs) can be recovered, recycled and reclaimed from many applications, including mobile air conditioning, stationary air conditioning and refrigeration.

There are many environmental and economic benefits gained from recovery, recycling and reclamation efforts worldwide. The major benefits include:

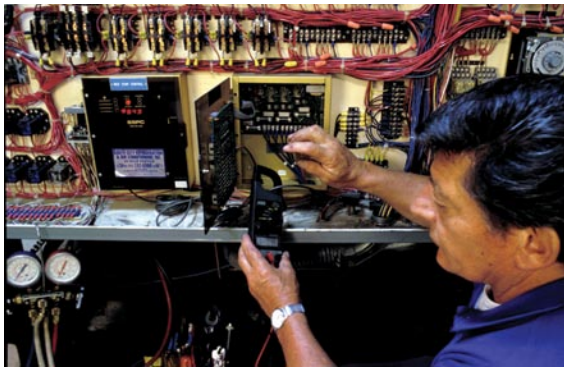
- Minimized atmospheric emissions and reduced environmental impact;
- Expanded market opportunity for used refrigerant;
- Reduced environmental compliance costs;
- Reduced need for new refrigerant; and
- Increased lifetime of refrigeration equipment due to contaminant removal;

The following describes the specific differences between refrigerant recovery, recycling and reclamation:

Refrigerant RECOVERY involves the removal of a refrigerant from a system and the placement of that refrigerant into a container. The recovery process:

- Is conducted whenever technicians need to open or dispose of air conditioning or refrigeration equipment.
- Includes removal of refrigerant vapor (heels) to established evacuation levels to maximize the amount of refrigerant captured and minimize releases. Examples of recovery/recycling machine design safety are included in Underwriters Laboratories (UL) 1963, and performance specifications are included in Air Conditioning and Refrigeration Institute (ARI) 740.
- Involves service technicians, equipment operators, appliance disposal facilities, equipment and refrigerant manufacturers.

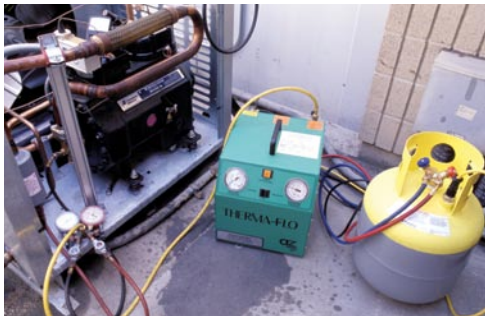
Refrigerant RECYCLING involves processing used refrigerants to reduce contaminants, then reusing the refrigerant in the same system or returning the refrigerant to the system.



- Recycling is permitted only when recharging to the same owner's equipment.
- Recycling involves reducing the levels of contaminants prior to reuse. Contaminants can result in early system failure. Contaminants include oil, moisture, acid, chlorides, particulates, and non-condensable gases.
- The Industry Recycling Guide (IRG-2) published by ARI describes maximum recommended levels of impurities for recycled refrigerants.
- International Organization for Standards (ISO) 11650, Society of Automotive Engineers (SAE) J1990 or ARI 740 standards may be used to measure recovery recycling equipment performance.

Refrigerant RECLAMATION involves purifying used refrigerant to meet industry product specifications for newly manufactured refrigerant.

- Reclamation requires initial chemical (laboratory) analysis of the used refrigerant in order to identify bad or mixed refrigerants which could result in equipment damage or leakage. Chemical analysis also is required to verify specification values to meet or exceed product standards. (e.g. ISO 12810, ARI 700).
- Reclamation may include filtering, separation, distillation, dilution, or reformulation of the recovered refrigerant.
- Reclamation requires final chemical analysis to verify that processed refrigerant meets or exceeds product specifications for newly manufactured refrigerant.
- Reclamation is recommended when used refrigerants will be charged into equipment other than the equipment it was removed from, and required if charged into equipment owned by a different company.
- The U.S. Environmental Protection Agency (EPA) requires that reclaimed refrigerant must attain and be tested to verify that it has attained ARI 700 or ISO 12810, or equivalent specification prior to resale.
- Reclamation facilities and processes should be designed to minimize emissions.
- Non-reclaimable refrigerants must be disposed of in an environmentally acceptable manner, and in accordance with applicable regulations.
- Reclamation facilities in the U.S. are required to be certified by the U.S. EPA.



Specific Recovery, Recycling and Reclamation options and methods depend on the application and refrigeration equipment size. Recovery and recycling of refrigerants used in mobile air conditioning normally occurs in licensed vehicle maintenance facilities where the used refrigerant is removed and replaced with a recycled product. For stationary air conditioning systems or small refrigeration equipment, HVAC professionals can remove and recover used refrigerants, which can then be shipped to a reclamation facility. For large refrigeration equipment, used refrigerant can be recovered by an HVAC professional and either reclaimed or recycled onsite for reuse or shipped to a reclamation facility. Regardless of which method is used, all personnel must be properly trained to handle refrigerants.

The United Nations Environment Programme (UNEP), various governments worldwide, and many companies can provide more information. Contact the Alliance for Responsible Atmospheric Policy. The Alliance recommends that refrigerants not be released to the atmosphere, and where feasible, recovery/recycling standards for all refrigerants be strengthened. Recovery, recycling and reclamation will maximize refrigerant reuse and thereby minimize release to the atmosphere.

The Alliance for Responsible Atmospheric Policy is a leading industry voice which coordinates industry participation in the development of reasonable international and U.S. Government policies regarding ozone protection and global climate change.

The Alliance
for Responsible Atmospheric Policy

The Alliance for Responsible Atmospheric Policy
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