Understanding refrigerant recovery

Contents

Understanding refrigerant recovery

Part 1: Refrigerant recovery cylinders

Refrigeration technicians are required to know how to safely recover refrigerant from old equipment to ensure it is not released into the environment. This series is designed to give you a clear and practical understanding of recovery cylinder types, safe handling, and compliance in refrigerant recovery.

Here, in Part 1, we outline the key requirements for holding a Refrigerant Trading Authorisation (RTA) and explain the different types of recovery cylinders, and their role in the recovery process.

One of the conditions for holding an RTA is that the holder has and maintains at least one of each of the following pieces of equipment:

- Leak detector
- Vacuum pump
- Recovery unit

Refrigerant recovery is the process of safely removing refrigerant from a system (such as an air conditioner or refrigerator) and storing it in a separate cylinder for reuse, recycling, or disposal. Therefore, using the appropriate tools and equipment is vital as fluorocarbon refrigerants **must not** be released into the atmosphere.

Appropriately licensed ARCtick technicians currently use 2 different types of recovery cylinders, Reclaim and Pump-down cylinders, each used for a specific purpose. These cylinders can either be purchased or rented from suppliers of stationary and automotive refrigeration and air conditioning equipment.

Reclaim cylinders are for returning used and/or contaminated refrigerant for disposal. These cylinders are often not clean. After recovering the refrigerant, they are to be returned to a wholesaler. It is important to record the amount of refrigerant returned in your quarterly reports.	**Pump-down cylinders**, on the other hand, are guaranteed clean and suitable for temporarily storing refrigerant during servicing, which can then be transferred and reused in a system. This aligns with industry standards and the 2025 Refrigerant Handling Code of Practice

It is crucially important that you only recover flammable refrigerants, such as R32, into a Reclaim or Pump-down cylinder suitably designed and labelled for use with flammable refrigerants with the following Class label.

Further information on recovery cylinders can also be found in the Australian and New Zealand Refrigerant Handling Code of Practice 2025, Parts 1 and 2, under sections Refrigerant recovery, recycling, reclamation and disposal together with Handling and storage of refrigerants.

Correct use of recovery cylinders reduces the chance of cross contamination and refrigerant emissions, protecting the environment. In Part 2, we will discuss: ‘How much refrigerant can be safely stored in a recovery cylinder?

Understanding refrigerant recovery

Part 2: How much refrigerant can be safely stored in a recovery cylinder?

In this part, we delve into the key information needed to safely fill a recovery cylinder with refrigerant. Any overfilling of the cylinder presents danger to you and the environment. It is therefore critically important all Refrigerant Handling Licence holders fully understand the following information to know how refrigerant can be safely stored in a cylinder.

Safe fill capacity (**SFC**) is the weight of liquid refrigerant that can be safely added to a cylinder without causing undue stress (as per Standard AS2030.5). Recovered and recycled refrigerant may contain contaminants like oil or water, which can affect safety. Therefore, for recovered and recycled refrigerants, a minimum ullage (empty space) of 20% must be maintained for safety. This means cylinders should only be filled to 80% of the capacity. Using the below formula from the **Code of Practice**, you can calculate the maximum amount of refrigerant that can be safely stored in a recovery cylinder.

Safe Fill Capacity (SFC) = 0.80 × Fill Ratio (FR) × Water Capacity (WC)

- **Fill Ratio (FR)** is the ratio of the weight of refrigerant to the weight of water at 57°C that is permitted to be filled into a gas cylinder. Fill Ratios are available in **Australian and New Zealand Refrigerant Handling Code of Practice 2025, Parts 1 and 2**, and AS 2030.5 Gas cylinders - Filling, inspection and testing of refillable cylinders.
- **Water Capacity (WC)** needs to be carefully checked. It is the maximum weight of water that the cylinder can hold, which is stamped on every cylinder.

It is important to ensure that the cylinder has enough remaining capacity to safely accommodate the planned recovery activity by:

- determining the weight of the recovery cylinder when it is at its Safe Fill Capacity
- weighing the recovery cylinder as the refrigerant is recovered and stopping the recovery when its weight reaches the Safe Fill Capacity.

Additional information and breakdown of the requirements for refrigerant recovery can also be found in the **Australian and New Zealand Refrigerant Handling Code of Practice 2025, Parts 1 and 2**, under the following sections:

- Refrigerant recovery, recycling, reclamation and disposal
- Handling and storage of refrigerants.

All ARCtick refrigerant handling licence holders must adhere to these requirements when recovering regulated refrigerant.

The correct handling of recovery cylinders reduces refrigerant emissions and protects the environment. In Part 3, we will discuss: ‘Are your recovery cylinders to standard?’.

Understanding refrigerant recovery

Part 3: Are your recovery cylinders to standard?

As the number of high-pressure refrigerants in the market grows, it is crucial for technicians to ensure each piece of their equipment, including recovery cylinders, meets the appropriate safety standards.

Using out of date, untested or unsafe cylinders is a breach of Refrigerant Trading Authorisation (RTA) conditions under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995. Cylinders must meet Australian Standards **AS 2030.1-2009** and **AS 2030.5-2009**, which outline the requirements for the verification, inspection, and maintenance of cylinders.

Here are some key rules from the standards:

1. Cylinders can't be refilled without the owner's permission and confirmation of previous contents.
   This is to ensure it is only filled with an appropriate refrigerant type, flammability and toxicity class and purity.
2. The cylinder and valve must suit the type of refrigerant.
   For low pressure refrigerants, their minimum pressure rating is 5.2MPa, but for high pressure refrigerants, the required pressure rating is at least 6.0 MPa. Flammable refrigerants must be stored in cylinders rated and labelled for flammable refrigerant.
3. The intended filling pressure must not exceed the cylinder's test pressure.
   The designed maximum safe working pressure of a refrigerant cylinder is determined in accordance with AS 2030.5 must not be exceeded in any filling operation, no matter how temporary. If this occurs, the cylinder's pressure relief will open, releasing refrigerant into the atmosphere.
4. Safety devices and valves must be free of corrosion or damage.
   Corrosion or damage to pressure relief devices and valves can result in them not operating correctly when required.
5. Cylinders must not show signs of irregular treatment, mechanical and/or fire damage, or contamination beyond allowed limits.
   Damage to the cylinder can weaken it and reduce the pressure it can safely handle.
6. Cylinders must carry a current test date stamp mark and be retested and stamped by a certified test station every 10 years.
   This ensures the cylinder and valves are not damaged and can still safely meet its pressure rating.
7. The safety classification of the refrigerant matches the label on cylinder (flammable or non-flammable).
   Flammable refrigerant must be stored in cylinders rated and labelled for flammable refrigerant. Flammable refrigerant cylinder valves have a left-handed thread outlet.

For more details, see **ARC Fact Sheet No. 2: Are you taking care of your gas cylinders?**

Ensuring your cylinders are to standard is not just about safety; it also protects you and the environment. Therefore, only use approved equipment by checking the pressure rating and ensure the cylinder complies with Australian Standards.

In Part 4, we will answer: 'When must cylinders must be retested?'.

Understanding refrigerant recovery

Part 4: When must cylinders be retested?

This final part of our series explores the critical process of retesting all refrigerant cylinders and that includes recovery cylinders. Retesting ensures that cylinders are in safe working condition and comply with industry and Australian standards.

Cylinders must be retested and receive a certification stamp from a certified test station every 10 years, as outlined in AS 2030.5-2009.

While it is legal to use refrigerants from cylinders that have a test date stamp more than 10 years old, until they are empty, it is illegal to recover into a cylinder that has a test date stamp more than 10 years old (or that lacks a date stamp). Cylinders with test date stamps more than 10 years old are out of date.

If you have an out-of-date cylinder that was rented from a gas wholesaler, simply take the cylinder back to the wholesaler, where it will either be re-tested or you will be issued with a new cylinder. If you own the cylinder, once emptied, you will need to get the cylinder re-tested at an appropriate testing station.

By adhering to the retesting requirements and, in doing so, complying with industry standards, you are helping ensure safety and environmental protection. For more information regarding recovery, please always check with your refrigerant supplier.

We hope this series has provided valuable insights into refrigerant recovery best practices.