

## Refrigerant handling regulations — Part 3

This month's skills workshop will conclude our three-part examination of the Australia / New Zealand Refrigerant Handling Code of Practice 2007, by looking at the code's provisions for retrofitting, decommissioning and refrigerant handling.

### One more reminder: how it works

As discussed in the previous two articles, the *Australia / New Zealand Refrigerant Handling Code of Practice 2007* (which we'll again, for the sake of simplicity, refer to from now on as "the code") is divided into two parts.

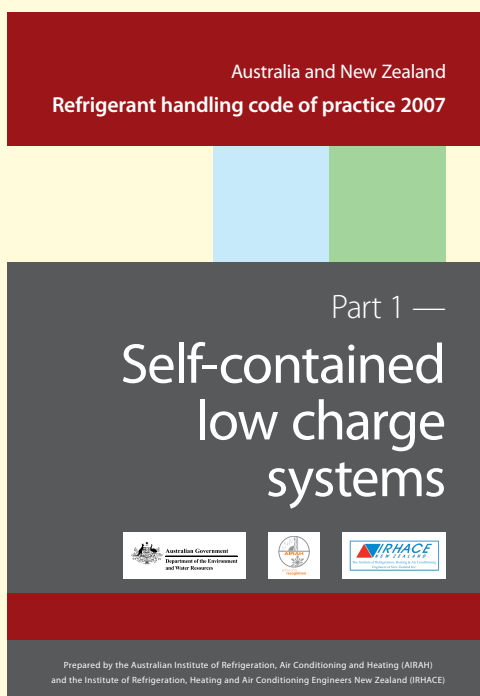
Part one covers "self-contained low-charge systems: those that don't require any work on the refrigeration system to install (ie: are self-contained) and contain less than two kilograms of refrigerant.

Part two, covers all other stationary and transport refrigeration systems (ie: all other systems that contain fluorocarbon refrigerants, except for automotive air conditioners – which are subject to a different code prepared by the automotive industry).

The aim of both parts of the code is to minimise the emission of fluorocarbon refrigerants to the atmosphere and the entire system life cycle is covered: from design, through manufacture, shipping, installation, commissioning and servicing, to decommissioning and refrigerant recovery.

The code has replaced the HB40 series of good practice guides in Table 135 of the *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995*. This means that compliance with them is mandatory for everyone in Australia that holds a refrigerant handling licence or trading authorisation as of January 1, 2008.

You can download the documents free from [www.arctick.org](http://www.arctick.org) and [www.airah.org.au](http://www.airah.org.au)



Also, as discussed in previous issues, the code includes two types of provisions – some are mandatory, while others are only recommended.

Mandatory clauses all contain the word "must" and are identified by colour coding in the code documents. You have to comply with these items to keep your licence.

Recommended clauses contain the word "should" or "recommended" and are also identified by colour coding. Compliance with these items is not mandatory, but it is recommended as industry best practice.

### The rest of the codes

As discussed in the previous two articles (we're saying that a lot, aren't we!), the final sections of both codes are effectively the same. They cover the following areas, and will be the subject of our final article:

- Retrofitting
- Decommissioning
- Recovery, recycling and disposal of refrigerants
- Handling and storage of refrigerants

#### Retrofitting

The retrofitting section (Section 11 in part 1, and Section 12 in part 2) of the codes is fairly straightforward.

When retrofitting a system with a refrigerant other than the one for which it was designed, any procedures recommended by the system manufacturer (or its distributor) must be followed.

Written advice from the equipment and/or component manufacturers is required when retrofitting an alternative refrigerant (remembering that, in this case, "alternative refrigerant" means any refrigerant, fluorocarbon or otherwise, other than the one the system was originally designed for), and this advice must be followed.

Where the manufacturer cannot be contacted and written advice from them is not available (the company may no longer be in existence, for example), written advice from a suitably qualified refrigeration or air conditioning engineer must be obtained and followed.

Clause 12.4 states that high pressure, flammable or toxic refrigerants must not be used in systems where they will pose a safety risk.

### Definition of an "alternative" refrigerant

The term "alternative" refrigerant has become interchangeable with "natural" refrigerant in a lot of circles within our industry.

This is not necessarily the meaning the term has in the *Australia / New Zealand Refrigerant Handling Code of Practice 2007*!

The code defines an alternative refrigerant as 'a refrigerant other than that for which a system was designed' (page 6 of either code). So while in many cases the term "alternative refrigerant" will encompass natural refrigerants, it isn't restricted to them.

If a system was designed for R22, for example, then R410A is as much an 'alternative refrigerant' in that system as ammonia or isobutane would be.

The code also recommends that, where it is technically and economically feasible, an alternative refrigerant with a lower ozone depletion potential (ODP) and lower global warming potential (GWP) than the original refrigerant is used.

The code also requires the person carrying out the retrofit to ensure that the alternative refrigerant being used is compatible with all parts of the system, that the correct lubricants are used, and that the systems labelling, colour coding and name plates are revised (in a permanent manner) to ensure that anyone working on the system in the future will be aware of the refrigerant it contains.

## Decommissioning

The decommissioning section of both codes is fairly simple – in fact, it's only one clause, which is reproduced here in full:

All refrigerant must be reclaimed from all parts of the system at the time of decommissioning, unless the system is being decommissioned for service or immediate recommissioning.

Again, the clause is fairly straightforward. It means, for example, that it is not permissible to just pump the refrigerant down into the outdoor unit of a split system upon decommissioning, and then leave it there. The refrigerant must be fully reclaimed, as if the outdoor unit is damaged at any point in the future, the refrigerant charge may be lost to atmosphere.

## Recovery and recycling

Section 14 of the code (Section 13 in part 1) begins by stating that the maximum safe working pressure of a refrigerant cylinder must not be exceeded in any filling operation.

**Refrigerant must be measured accurately when charging – make sure you account for temperature as well!**

Safe working pressure is defined in Australian Standard (AS) 2030.1:1999 *The verification, filling, inspection, testing and maintenance of cylinders for storage and transport of compressed gases – cylinders for compressed gases other than acetylene.*



Plasma arc machine – used by RRA to destroy refrigerants at the end of their useful life

If you don't have a copy of the standard in your business, you'll need to get one to ensure compliance.

Recovery of refrigerant into a flexible bag (a practice common in domestic applications in the past) is also banned by the code.

Valves on refrigerant cylinders must not be tampered with, and cylinders must conform to AS 4484:2004, AS2030:1999 and AS/NZS 1200:2000 Appendix G.

Refrigerant recovery units must be appropriately rated for the refrigerant that is being recovered – if you're in any doubt as to the suitability of a particular recovery unit for the refrigerant you're working with, make sure you consult with the manufacturer or supplier. Manufacturer's instructions should always be followed when using the equipment.

Clause 14.1.12 (13.1.12 in Part 1) states that the hoses, fittings and procedures used when servicing, installing and decommissioning must be those which minimise the loss of refrigerant.

If recovered refrigerant is suspected to be contaminated, or if it is to be re-used in a system other than the one from which it was recovered, it must be tested to ensure it complies with the provisions of ARI standard 700-2004. Otherwise, the refrigerant must be sent for destruction.

Recovery and recycling equipment must conform with AS 4211.3:1996, and refrigerant vapour as well as liquid must be recovered when a system is repaired.

## Disposal

The disposal section of the codes highlights again that fluorocarbon refrigerant must not be discharged to atmosphere – it must instead be returned to a supplier or collection agent for disposal. In Australia, the refrigerant is returned to the supplier, who then passes it on to Refrigerant Reclaim Australia for destruction.

This section of the code also contains some advice on the use of disposable refrigerant containers for the benefit of New Zealand readers. As the importation and use of fluorocarbon refrigerant in disposable containers is prohibited by law in Australia, HVAC&R Nation® readers can probably skip over the relevant clauses.

The code does, however, require locks on refrigerator and freezer cabinets to be removed or rendered inoperable when they are removed from service, and doors, drawers and lids to be removed or otherwise rendered safe and inaccessible if the cabinet is being removed from service and stored anywhere where children may have access.



Pump down cylinders

## Handling and storage

When transferring refrigerant from one vessel to another, the code states that the refrigerant cylinder must not be directly heated using flame, radiant heat or uncontrolled direct heat. Warming of the cylinder using other controlled means to increase the rate of discharge is allowed, however, the control system for any indirect form of heating must be designed to be fail safe.

Refrigerant cannot be left in the outdoor unit of a split system (or any other system) on decommissioning: it must be reclaimed and disposed of.

The amount of refrigerant vapour vented to the atmosphere must be minimised when transferring refrigerant to a charging station.

Clause 15.1.6 (14.1.6 in Part 1) requires refrigerant to be stored securely with appropriate signage, to provide ready identification by emergency teams if required. Local legislation on the amounts of refrigerant that can be stored also need to be referenced.

Cylinder valves must be handled carefully to avoid damage, and when the cylinder is not in use its valve must be closed, the valve outlet sealing cap must be put in place and the valve must be protected.

## Charging

Unless you're working on an assembly line at a manufacturing facility, the pipework connecting the refrigerant cylinder to the system must be leak tested every time you use it, before the cylinder valve is fully opened. Partial opening and then re-closing of the valve is allowed to pressurise the pipework and facilitate the leak test.

Refrigerant must be accurately measured when transferring, with due reference to temperature as per AS 4211.3:1996. Charging lines must also be as short as possible, and have fittings to minimise losses during disconnection at the end of the transfer.

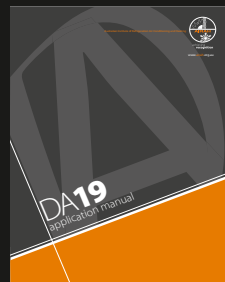
Cylinders must not be connected to a system at a higher pressure, or a hydraulic leg, to avoid backflow of refrigerant into the cylinder. For similar reasons, the code requires that cylinders must not be connected to systems or other cylinders at a high temperature.



The cylinders you use must be up to the task at hand. If you're in any doubt, check with the cylinder supplier. It may need to be retired, like the ones shown above.

## Discount extended!

### DA19 – HVAC&R Maintenance



Section 11 requires any system covered by part two of the code to be regularly inspected in accordance with AIRAH's DA19 –

HVAC&R Maintenance manual.

DA19 sets out maintenance schedules for a wide range of systems. As a special offer to HVAC&R Nation readers, AIRAH is offering 20% off the price of DA19 until the end of May 2008 for anyone who orders a copy and cites this article.

To order your copy, contact the AIRAH office on 03 8623 3000.

## Further reading

The front section of the code includes a list of other documents, standards, regulations, acts and codes that are referenced inside the code. Depending on the kind of work you do, different ones will apply.

While the following list isn't exhaustive (see Section III – Referenced Documents of the code for a full list), below are some of the standards referred to in the code which technicians should become familiar with:

AS/NZS 1677.2:1998 *Refrigerating systems part 2 – safety requirements for fixed applications*

AS 2030.1:1999 *The verification, filling, inspection, testing and maintenance of cylinders for storage and transport of compressed gases – cylinders for compressed gases other than acetylene*

AS 4211.3:1996 *Gas recovery on combined recovery and recycling equipment part 3 – fluorocarbon refrigerants from commercial/ domestic refrigeration and air conditioning systems*

AIRAH manual DA19 – HVAC&R Maintenance

Australian Standards are available from SAI Global ([www.saiglobal.com](http://www.saiglobal.com)). See other sidebar for details on AIRAH manuals.

## Important note!

This article is intended as an overview only! We've done our best to cover the major points, but what you've read here is by no means exhaustive. Please make sure you download and read both parts of the code in full before applying what you've read here. They're free and available 24 hours a day – visit [www.arctick.org](http://www.arctick.org) or [www.airah.org.au](http://www.airah.org.au)