# Refrigerant flammability classifications

**The ARC represents licence holders on a number of committees and groups who look at ways to improve safety, good practice, ease of use and cost efficiencies for technicians.**

We assisted the Australian Standards in its review of the refrigerant flammability classification and provide an outline below of the 2016 changes.

### The previous classifications

The previous AS/NZS 1677.1: 1998 Refrigeration systems Part 1: Refrigerant Classification, covered the refrigerant classification according to its physical properties. Table 2.1 below only lists five groups, that is – A1, A2, A3, B1 and B2.

**TABLE 2.1**

**SAFETY GROUP CLASSIFICATION OF REFRIGERANTS AS DETERMINED BY FLAMMABILITY AND TOXICITY**

| Flammability group | Toxicity group | |
|---|---|---|
| | A | B |
| | $LC_{50} \geq 10{,}000$ ppm | $LC_{50} < 10{,}000$ ppm |
| 1 (Non-flammable) | A1 | B1 |
| 2 (LEL ≥ 3.5% volume) | A2 | B2 |
| 3 (LEL < 3.5% volume) | A3 | |

NOTES:

1 Toxicity group classification is based on an acute health effect measured by the $LC_{50}$ value of the refrigerant. Information on chronic health effects measured by TWA exposure standards of refrigerants is given in Table 3.1. Practical limits for Group B refrigerants are based on the $LC_{50}$ value where available.

2 Information on the classification of particular refigerants is given in Section 3.

3 This classification system does not include toxic products of refrigerant combustion.

The previous AS/NZS 1677.2:1998 Refrigerating systems – Safety requirements for fixed applications, details the minimum safety requirements for fixed applications of all refrigeration systems.

### Review

Both of these standards were released in 1998 and were replaced in October 2016 by the latest equivalent International Standards (ISO) with the appropriate minor changes to suit Australian and New Zealand requirements. The applicable new standards are as follows:

- **AS/NZS ISO 817:2016 Refrigerants** – Designation and safety classification
- **AS/NZS 5149:2016: Refrigerating systems and heat pumps** – Safety and environmental requirements is published in 4 parts as follows:
- AS/NZS 5149-1:2016 Refrigerating systems and heat pumps – Safety and environmental requirements – Part 1: Definitions, classification and selection criteria

- AS/NZS 5149-2:2016 Refrigerating systems and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation
- AS/NZS 5149-3:2016 Refrigerating systems and heat pumps – Safety and environmental requirements – Part 3: Installation site
- AS/NZS 5149-4:2016 Refrigerating systems and heat pumps – Safety and environmental requirements – Part 4: Operation, maintenance, repair and recovery

**The changes**

AS/NZS ISO 817 replaced Part 1 of AS/NZS1677 and AS/NZS 5149 replaced part 2 of AS/NZS1677.

AS/NZS ISO 817 has eight separate safety classifications (A1, A2L, A2, A3, B1, B2L, B2 and B3) for refrigerants as per Table 2.2 below, instead of the five listed in Table 2.1 from AS/NZS1667.1.

| TABLE 2.2 | SAFETY GROUP | |
|---|---|---|
| Higher Flammability | A3 | B3 |
| Flammable | A2 | B2 |
| Lower Flammability | A2L | B2L |
| No Flame Propagation | A1 | B1 |
| | Lower Toxicity | Higher Toxicity |

A1 group refrigerants include R22, R404A. R410A and R744

B1 group refrigerants include R123

A2L group refrigerants include R1234yf and R32.

B2L group refrigerants include R717 (Ammonia).

A3 group refrigerants include R290 and R600

Refer to AS/NZS ISO 817 for the full list of refrigerants, their classification and properties