

FACT SHEET 1

Index and fluid naming conventions for refrigerants

These Fact Sheets provide background material for the UNEP Workshop on **HFC Management: Technical Issues**. The Fact Sheets provide delegates with an overview of available factual information and have been structured to support the workshop agenda.

Fact Sheet 2 provides an analysis of the current market sectors using HFCs. It highlights the HFC demand in key market sectors and introduces opportunities to use lower GWP alternatives.

Fact Sheets 3 to 14 address the main end use sectors. Each uses a standard template to highlight the issues in each sector. The market sectors are split into sub-sectors – these are important as the technical issues vary considerably across these sub-sectors.

Fact Sheet 15 provides a glossary of terms and definitions used in other Fact Sheets.

| Workshop Session | Fact Sheet | Topic | Sub-sectors / systems |
|---|------------|--|---|
| | 1 | Index of Fact Sheets | |
| Plenary | 2 | Overview of HFC market sectors | |
| Session I: Refrigeration | 3 | Domestic refrigeration | Refrigerators and freezers |
| | 4 | Commercial refrigeration | Small stand-alone equipment Condensing units Large central pack systems |
| | 5 | Industrial refrigeration | Small / medium sized systems Large distributed systems Large secondary chiller systems |
| | 6 | Transport refrigeration | Road vehicles (vans, trucks, trailers) Intermodal containers; Ships |
| Session II: Stationary Air Conditioning and Heat Pumps | 7 | Small self-contained air-conditioning | Portable systems, window units, through-the-wall units, packaged terminal units |
| | 8 | Small split air-conditioning | Single splits <12 kW |
| | 9 | Larger split air-conditioning and other types of air-to-air system | Larger single splits and multi-splits VRF systems Ducted and packaged roof-top systems |
| | 10 | Chiller systems | Small and medium sized chillers Large chillers |
| | 11 | Heating only heat pumps | Space heating: domestic / commercial Water heating: domestic / commercial Large space heating systems |
| Session III: MAC | 12 | Mobile air-conditioning (MAC) | Cars Larger vehicles (bus, trains etc.) |
| Session IV: Foam | 13 | Insulating Foam | Flexibly faced panels; Steel faced panels Appliance insulation; Spray foam Block foam; Pipe insulation; Integral skin |
| Side event: Aerosols | 14 | Aerosols | Metered dose inhalers (MDIs) Non-medical aerosols |
| | 15 | Glossary of terms and technical definitions | |

Fluid naming conventions for refrigerants

There are many fluids referred to in these Fact Sheets. This includes some fluids that have already been phased out under the Montreal Protocol (such as CFCs), the HFCs that are the main subject of the workshop and the various lower GWP alternatives that are under consideration.

The following naming conventions have been used in the Fact Sheets:

- 1) Pure organic fluids use the relevant “fluid family” name e.g. HFC or HC
- 2) Blends of more than one fluid are referred to using an “R-number” e.g. R-404A
- 3) Non-organic fluids are referred to using an R-number e.g. R-717 for ammonia

R-numbers are a naming system used for refrigerants. Each R-number is issued by ASHRAE (American Society of Heating, Refrigeration and Air-conditioning Engineers).

The fluid family name has been used where possible as this provides the reader with more useful information about the type of fluid being referred to. All the family names are listed in the table below.

Because blends often include components from more than one fluid family, it is simpler to use an R-number for all blends.

| Fluid Family | Family name | Examples | Comments |
|--------------------------------|--------------------|---|--|
| HFC | Hydrofluorocarbon | HFC-134a HFC-125 HFC-32 | HFCs were introduced in the 1990s as alternatives to CFCs and HCFCs. |
| HC | Hydrocarbon | HC-290 (propane) HC-600a (iso-butane) | HCs are being used as low GWP alternatives in various markets including RACHP ¹ , foams and aerosols. |
| HFO | Hydrofluoroolefin | HFO-1234ze HFO-1234yf | HFOs are recently developed chemicals being used as low GWP alternatives in various markets including RACHP, foams and aerosols. HFOs are also referred to as unsaturated HFCs (u-HFCs). The term HFO has become more widely used by users and suppliers. |
| CFC | Chlorofluorocarbon | CFC-11 CFC-12 | CFCs are phased out under the Montreal Protocol |
| HCFC | Hydrofluorocarbon | HCFC-22 HCFC-123 | HCFCs are in the process of being phased out under the Montreal Protocol |
| Blends of 2 or more components | | R-404A R-410A R-507A | Blends are widely used in RACHP. The 400-series are non-azeotropic blends. The 500 series are azeotropic blends. |
| Non-organic fluids | | R-717 (ammonia) R-744 (CO ₂) | R-717 and R-744 are low GWP alternatives used mainly in RACHP applications. |

¹ RACHP: refrigeration, air-conditioning and heat pumps