Fluorocarbons / FCs

Since 1995, fluorocarbons (FCs) have succeeded CFCs or HCFCs as refrigerants, propellants and solvents. FCs are man-made substances that are stable, non-flammable, odourless and tasteless. Fluorocarbons are hydrocarbons whose hydrogen atoms have been partially (HFCs) or completely (PFCs) replaced with fluorine. FCs are included in the Kyoto Protocol. The European Union is already preparing initial restrictions on high-consumption applications such as car air-conditioning, with further restrictions on the use of FCs expected to follow. In use are per-fluorocarbons (PFCs) and partially halogenated fluorocarbons.

PFCs:

Per-fluorocarbons (PFCs) have no ozone depletion potential (ODP = 0), but because their hydrogen atoms have been completely replaced with fluorine, they have a very high direct greenhouse effect (GWP = 5,820-12,010) and an extremely long life cycle (3,200-50,000 years). The European F-Gas Directive and the Kyoto Protocol seek to radically reduce the use of PFCs.
Examples: R 14, R 116, R 218

Characteristics:

ODP	0
GWP	12,010
Molecular weight	138 g/mol
Boiling point (1.013 bar)	-78.2 °C
Melting point	-101 °C
Critical temperature	19.8 °C
Density of the saturated vapour at the boiling point (1.013 bar) (air (20 °C, 1 bar) = 1.188 kg/m^3)	9.08 kg/m^3
Density of the boiling liquid (water (20 °C) = 998.21 kg/m3)	1,604 kg/m^3
Vapour pressure at -20 °C	10.44 bar