

A collection of short
pointed topical papers.

Cold W.A.R.

Whether it's **A**ir Conditioning or **R**efrigeration



IUPAC

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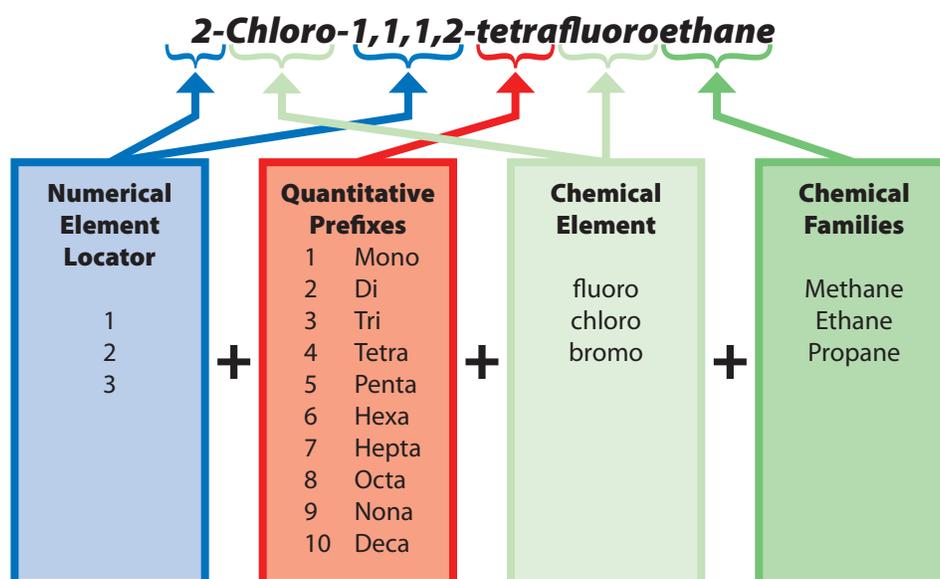
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International Union of Pure and Applied Chemistry (IUPAC)

1,1,1,2 - Tetrafluoroethane is what refrigerant ?

At one time organic compounds were given their names by the people who first prepared or discovered them. However, the number of new organic compounds grew rapidly and an efficient system of naming them had to be found. The International Union of Pure and Applied Chemistry (IUPAC) devised such a system at a meeting in Paris in 1957. The IUPAC system gives specific rules for naming organic compounds like refrigerants.



Answer: R-134a

Interpretation of IUPAC Nomenclatures

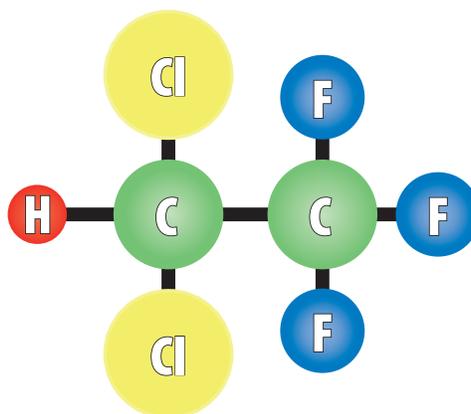
2,2-Dichloro-1,1,1-trifluoroethane

1. When determining the chemical formula from an IUPAC name, always read and work from **RIGHT** to **LEFT**.
2. First determine the hydrocarbon family that is being expressed, write it down, is it *methane*, *ethane* or *propane*.
3. Secondly, determine what chemical element is attached to this family, are they *fluoro* or *chloro*.
4. Thirdly, with the hydrocarbon family and chemical elements determined, now read the prefix that tells you how many of those elements there are *di*, *tri*, *tetra* etc.
5. The *Arabic* numbers will now tell you to which carbon these elements are *attached*. In this example there are three (3) F, and all three (3) F are on the first carbon, reading *right to left*.
6. Repeat steps 3, 4 and 5 while continuing to work *right to left* until the complete chemical name has been interpreted. In this example there are two (2) Cl on the second carbon.
7. The balance of elements that are NOT expressed in the IUPAC chemical name will be hydrogen (H).

ANSI / ASHRAE designation: R-123

Chemical formula: $\text{CHCl}_2\text{-CF}_3$

Chemical structural name: 2,2-Dichloro-1,1,1-trifluoroethane

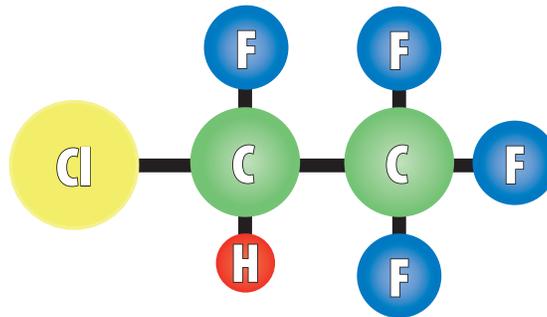


R-123

Determining the IUPAC Nomenclatures

ANSI / ASHRAE designation: R-124

Chemical formula: CHClF-CF₃



R-124

1. When determining the IUPAC nomenclature from a structural formula, always read and work from **RIGHT** to **LEFT**.
2. First determine the hydrocarbon family that is being expressed, and write it down, is it *methane*, *ethane* or *propane*.
3. Secondly, determine the number of Fluorine (F) that are attached to this family.
4. Thirdly, with the hydrocarbon family and quantity of fluorine (F) elements determined, now select the prefix that reflects this quantity, is it *di*, *tri*, *tetra*, etc.
5. Using Arabic numbers you can now indicate to which carbon these elements are attached. In this example there are four (4) F. One (1) is attached to the second carbon and three (3) F attached to the first carbon. Total four (4) F.
6. Repeat steps 3, 4 and 5 to determine the quantity and locations of chlorine (Cl). Work *right* to *left* until the complete IUPAC nomenclature has been determined. In this example there is one (1) Cl on the second carbon.
7. Hydrogen (H) elements are NOT expressed in the IUPAC nomenclature.

IUPAC nomenclature would be 2-Chloro-1,1,1,2-tetrafluoroethane