

METROPOLITAN NY CHAPTER Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry
"Better Service Through Knowledge"

November 2012

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Refrigerant Numbering System

There are many different types of refrigerant used in our industry today. These refrigerants are produced by several different manufacturers and have numerous ways of identification.

One proper method of identification is referring to a refrigerant by its ANSI/ASHRAE designation. This is a standardized numbering system which was first developed by E.I. DuPont and released for general use in 1956. Since then it has been adopted by ANSI/ASHRAE as part of their Standard 34 (*Number Designation and Safety Classification of Refrigerants*).

This numbering system allows a technician or engineer to easily identify the chemical composition of a refrigerant. Each digit of the numbering system has its own significance in identifying the compounds which make up a refrigerant.

The basic structure of the numbering system is the "chemical group" of refrigerant followed by a dash (-) and a series of numbers and letters. For example, HFC-134a is represented by "HFC" its chemical group and "134a" which identifies the chemical composition of the refrigerant. In years past "R" was used instead of the refrigerant's "chemical group". HFC-134a would have been referred to as R-134a.

Below is a brief explanation of the number system used after the dash (-):

The rightmost digit equals the number of fluorine atoms per molecule.

The second digit from the right (tens digit) equals one plus the number of hydrogen atoms per molecule.

The third digit from the right (hundreds digit) equals the number of carbon atoms minus one. If zero, it is not normally written, but assumed. For example HCFC-22 has one carbon atom.

The fourth digit (thousands digit) equals the number of double bonds in the molecule. This is omitted when zero and in practice is rarely used.

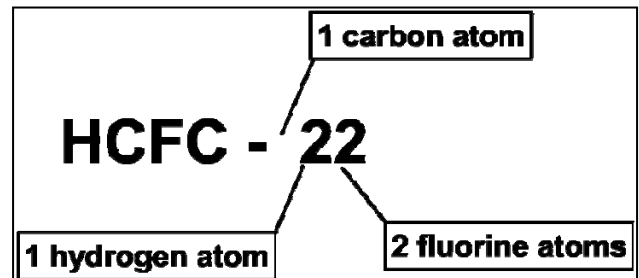
A suffix with a capital B and a number indicates the number of bromine atoms, when used.

A suffix of an upper-case (A, B, C, etc.) indicates different percentages of refrigerant which are blended

together. For example R-402A and R-402B are made up of the same refrigerants, but with different percentages of each refrigerant.

A suffix of a lower-case letter (a, b, c, etc.) indicates an isomer. Isomers are chemical compounds that have the same atomic compounds and molecular weight, but different molecular structures and properties.

For example HCFC-22 is made up of 1 carbon atom, 1 hydrogen atom and 2 fluorine atoms. (It also contains 1 chlorine atom, but it is not identified in the numbering system)



This numbering system also allows refrigerants to be grouped into series. Below is an explanation of the various refrigerant groups:

- -000 series: Methane-based compounds
- -100 series: Ethane-based compounds
- -200 series: Propane-based compounds
- -300 series: Cyclic organic compounds
- -400 series: Zeotropes
- -500 series: Azeotropes
- -600 series: Organic compounds
- -700 series: Inorganic compounds
- -1000 series: Unsaturated organic compounds

For example HCFC-22 is in the "000 series" of refrigerants meaning it is a methane-based compound.

R-134a is in the "100 series" of refrigerants meaning it is an ethane-based compound.





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*Dates Tentative – Subject to Change

Time: 6:00 PM – 10:00 PM

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Long Island City, NY 11106

Cost for Course 1, 2 or 3:

\$849.00 for RSES members
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FOR ADDITIONAL INFORMATION VISIT:

<http://www.metronyrses.org>

or Email: school@metronyrses.org

or Phone Stan Hollander: 718 232-6679

by Mail: Metro NY Chapter RSES

Attn: Stan Hollander, 1837 61st Street, Brooklyn, NY 11204

–Checks and Charges Welcome –

Please make checks payable to "Metro NY RSES"



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<http://metronyrses.org/ti1.html>

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Beginning with tools-of-the-trade this course covers refrigeration system accessories, desiccants and driers, defrosting methods, refrigeration system controls and piping. It also includes instruction on compressor replacement and system evacuation, electric motors in refrigeration systems, motor capacitors and protectors, thermostats, relays, contactors and starters, test equipment and troubleshooting, pressure and enthalpy diagrams, psychrometrics, heat transfer and estimating heat loads, residential air conditioning, humidification and a review of safety codes. Detailed information on lessons and content for Course 2 can be found at:

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Begins with comprehensive introduction to heat pump theory, including water-source heat pumps. Topics covered include computer-room environmental control, economizers, fans and blowers, air filtration and distribution evaporative condensers and cooling towers, water treatment, multiple-rack systems, hydronics, troubleshooting, controls and controls components, pneumatic relays, typical control applications, and control maintenance. Detailed information on lessons and content for Course 3 can be found at:

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