

CLASSIFICATION OF REFRIGERANTS

1. Primary refrigerants

2. Secondary refrigerants

Primary refrigerants are those working mediums or heat carries which directly take part in the refrigeration system and cool the substance by the absorption of latent heat e.g., Ammonia, Carbondioride, Sulphur dioxide, Methyl chloride, Methylene chloride, Ethyl chloride and Freon group etc.

Secondary refrigerants are those circulating substances which are first cooled with the help of The primary refrigerants and are then employed for cooling purposes, e.g., ice, carbondioxide etc. These refrigerants cool substances by absorption of their sensible heat.

PRIMARY REFRIGERANTS

1. Halocarbon compounds
2. Azeotropes
3. Hydrocarbons
4. Inorganic compounds
5. Unsaturated organic compounds

Halocarbon Compounds refrigerants which contain one or more of three halogens, chlorine and bromine .

They are sold in the market under the names as Freon, Genetron, Isotron and Areton. Since the refrigerants belonging to this group have outstanding merits over the group's refrigerants, therefore they find wide field of application in domestic, commercial and industrial purposes.

<i>Refrigerant number</i>	<i>Chemical name</i>	<i>Chemical formula</i>
R-11	Trichloromonofluoromethane	CCl_3F
R-12	Dichlorodifluoromethane	CCl_2F_2
R-13	Monochlorotrifluoromethane	CClF_3
R-14	Carbontetrafluoride	CF_4
R-21	Dichloromonofluoromethane	CHCl_2F
R-22	Monochlorodifluoromethane	CHClF_2
R-30	Methylene chloride	CH_2Cl_2
R-40	Methyl chloride	CH_3Cl
R-100	Ethyl chloride	$\text{C}_2\text{H}_5\text{Cl}$
R-113	Trichlorotrifluoroethane	$\text{CCl}_2\text{FCClF}_2$
R-114	Dichlorotetrafluoroethane	$\text{CClF}_2\text{CClF}_2$
R-115	Monochloropentafluoroethane	CClF_2CF_3
R-152	Difluoroethane	$\text{C}_2\text{F}_4\text{Cl}_2$

Azeotropes

The refrigerants are mixtures of different substances. These substances cannot be separated into components by distillation. They possess fixed thermodynamic properties and do not undergo any separation with changes in temperature and pressure. An azeotrope behaves like a simple substance.

<i>Refrigerant number</i>	<i>Azeotropic mixing refrigerants</i>	<i>Chemical formula</i>
R-500	73.8% R-12 and 26.2% R-152	$\text{CCl}_2\text{F}_2/\text{CH}_3\text{CHF}_2$
R-502	48.8% R-22 and 51.2% R-115	$\text{CHClF}_2/\text{CClF}_2\text{CF}_3$
R-503	40.1% R-23 and 59.9% R-13	$\text{CHF}_3/\text{CClF}_3$
R-504	48.2% R-32 and 51.8% R-115	$\text{CH}_2\text{F}_2/\text{CClF}_2\text{CF}_3$

Hydrocarbons

Most of the refrigerants of this group are organic compounds. Several hydrocarbons are used successfully in commercial and industrial installations. Most of them possess satisfactory thermodynamic properties but are highly inflammable

<i>Refrigerant number</i>	<i>Chemical name</i>	<i>Chemical formula</i>
R-50	Methane	CH_4
R-170	Ethane	C_2H_6
R-290	Propane	C_2H_8
R-600	Butane	C_4H_{10}
R-601	Isobutane	$[\text{CH}(\text{CH}_3)_3]$

Inorganic Compounds

Before the introduction of hydrocarbon group these refrigerants were most commonly used for all purposes.

<i>Refrigerant number</i>	<i>Chemical name</i>	<i>Chemical formula</i>
R-717	Ammonia	NH_3
R-718	Water	H_2O
R-729	Air	Mixturer of $\text{O}_2, \text{N}_2, \text{CO}_2$ etc.
R-744	Carbon dioxide	CO_2
R-764	Sulphur dioxide	SO_2

Unsaturated Organic Compounds

The refrigerants belonging to this group possess ethylene or propylene as their constituents.

<i>Refrigerant name</i>	<i>Chemical name</i>
R-1120	Trichloroethylene
R-1130	Dichloroethylene
R-1150	Ethylene
R-1270	Propylene