

Table 22 Swelling of Plastics in Liquid Refrigerants at Room Temperature^{1a}

Plastic	Linear Swell, Percent					
	Refrigerant					
	11	12	21	30	113	114a
Phenol Formaldehyde Resin	0	0	0	0	-0.2	-0.2
Cellulose Acetate	0.4	0	*	*	0	-0.1
Cellulose Nitrate	0.6	0	*	*	0	-0.1
Nylon	0	0	0	0	0	-0.2
Methyl methacrylate Resin	0	-0.1	*	*	-0.2	-0.2
Polyethylene	6.7	0.4	4.5	4.6	2.3	0.6
Polystyrene	*	-0.1	*	*	-0.2	-0.2
Polyvinyl Alcohol	0.3	-0.7	12.9	9.1	-0.1	0.2
Polyvinyl Chloride	0	0	15.1	*	0	0.1
Polyvinylidene Chloride	-0.2	0	1.0	2.4	-0.1	0
Polytetrafluoroethylene	0	-0.7	0.1	0	0	-0.3

* Sample completely disintegrated.

any form. A highly flammable gas is formed and the explosion hazard is great.

Ammonia should never be used with copper, brass, or other alloys containing copper.

When water is present in sulfur dioxide systems, sulfurous acid is formed and may rapidly attack iron and steel, and other metals at a slower rate.

Elastomers

The linear swelling of some elastomers in the liquid phase of various refrigerants is shown in Table 21. Swelling data can be used to a limited extent in comparing the effect of refrigerants on elastomers. However, other factors such as the amount of extraction, the tensile strength, and the degree of hardness of the exposed elastomer must be considered in a particular application. When other fluids will be present in addition to the refrigerant, the combined effect on elastomers should be determined. In some instances, somewhat higher swelling of elastomers has been found in mixtures of Refrigerant 22 and lubricating oil than in either fluid alone.

Plastics

The effect of a refrigerant on a plastic material should be thoroughly examined under the conditions of intended use.

Plastics are often mixtures of two or more basic types and it is difficult to predict the effect of the refrigerant. The linear swelling of some plastic materials in refrigerants is shown in Table 22. The swelling data can be used as a guide but, as with elastomers, the effect on the properties of the plastic should also be examined. Comparable data for Refrigerant 22 are not available. The effect of Refrigerant 22 on plastics is generally somewhat more severe than that of Refrigerant 12, but not as severe as that of Refrigerant 21. The effect of Refrigerant 114 is very similar to that of Refrigerant 114a.

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The general responsibility for this chapter is assigned to TC 1.9, Refrigerants and Brines, and to the Task Group for Refrigerant Tables.