Chemical resistance of RTV silicone rubber

In answer to questions regarding the effects of solvents and industrial chemicals on RTV silicone rubber, the following data have been compiled.

Silicones are, in general, chemically inert and are attacked by only a very few common materials; among them are concentrated sulphuric acid, hydrofluoric acid and, under long-term exposure, high-pressure steam.

Like any elastomer, RTV has a tendency to physically absorb those materials with a solubility parameter near its own. This absorption may cause the rubber to swell and soften slightly. In a few applications, this volume increase is advantageous. For example, a silicone rubber gasket exposed to certain solvents will swell to form a tighter seal.

The change undergone by silicone rubber in contact with an absorbed solvent is primarily physical. After the solvent has completely evaporated, the RTV will return to its original physical and electrical properties. To assure complete evaporation a bake-out at elevated temperature may be necessary.

The following table shows RTVs resistance to various common materials. It indicates the volume change which may be expected from RTV submerged in a chemical or solvent for one week at room temperature. The following definitions for resistance were arbitrarily assigned.

Material	Rating
Acids	
Citric	Excellent
Hydrochloric, 3 per cent	Excellent
Hydrochloric, concentrated	Excellent
Hydrofluoric	Disintegrates
Phosphoric, dilute	Excellent
Sulphuric, 10 per cent	Excellent
Sulphuric, concentrated	Disintegrates
Tannic	Excellent
Nitric, concentrated	Good-Excellent
Nitric, 7 per cent	Excellent
Acetic, concentrated	Excellent
Acetic, 5 per cent	Excellent
Bases	
Ammonium hydroxide 10 per cent	Excellent
Ammonium hydroxide, concentrated	Excellent
Potassium hydroxide	Excellent
Sodium hydroxide 1 per cent	Excellent
Sodium hydroxide 20 per cent	Excellent
Sodium hydroxide 50 per cent	Excellent
Inorganic chemicals	
Anhydrous ammonia	Excellent
Sodium chloride, 10 per cent	Excellent
Hydrogen peroxide, 3 per cent	Excellent
Sodium carbonate, 2 per cent	Excellent
Sodium carbonate, 20 per cent	Excellent
Water	Excellent
Water (70 hours at 212°F)	Excellent
Organic chemicals	
Detergents	Excellent
Freon 12	Good
Freon 114	fair
Methyl chloride	fair
Tricresyl phosphate	Excellent

Material	Rating
Hydraulic fluids	
Hollingshead H-2	Excellent
Hollingshead H-2, 70 hours at 212°F	Good
MIL-L-7808 (diester fluid), 70 hours at 300°F	Fair-Good
Skydrol 500	Fair
Skydrol 8000	Excellent
Skydrol 8000 (70 hours at 212°F)	Excellent
Silicate base	Fair
Oils	
ASTM No. 10.1 (aliphatic). 70 hours at 300°F	Excellent
ASTM No. 30.1 (aromatic), 70 hours at 300°F	Fair
Castor 0.1	Excellent
Pyranol 1476	Excellent
Pyranol 1476 (70 hours at 350°F)	Good
Diester oils	Good
Diester oils (70 hours at 350°F)	Fair
Linseed oil	Excellent
Mineral oil	Excellent
Silicone, SF 96 (100)	Fair
Silicone, SF 96 (100), 70 hours at 300°F	Fair
Viscasil 60000 CSKS	Good-Excellent
10,000-100,000, 60000 CSTKS (70 hours at 300°F)	Good
Solvents	
Acetone	Fair
Butyl alcohol	Good
Carbon tetrachloride	Poor
Diacetone alcohol	Excellent
Ethyl alcohol	Excellent
Gasoline	Poor
Jet fuel, JP4	Fair
Mineral spirits	Poor
Toluene	Poor

Less than 10 per cent volume change	Excellent
10-25 per cent volume change	Good
25-75 per cent volume change	Fair
Greater than 75 per cent volume change	Poor

INFORMATION