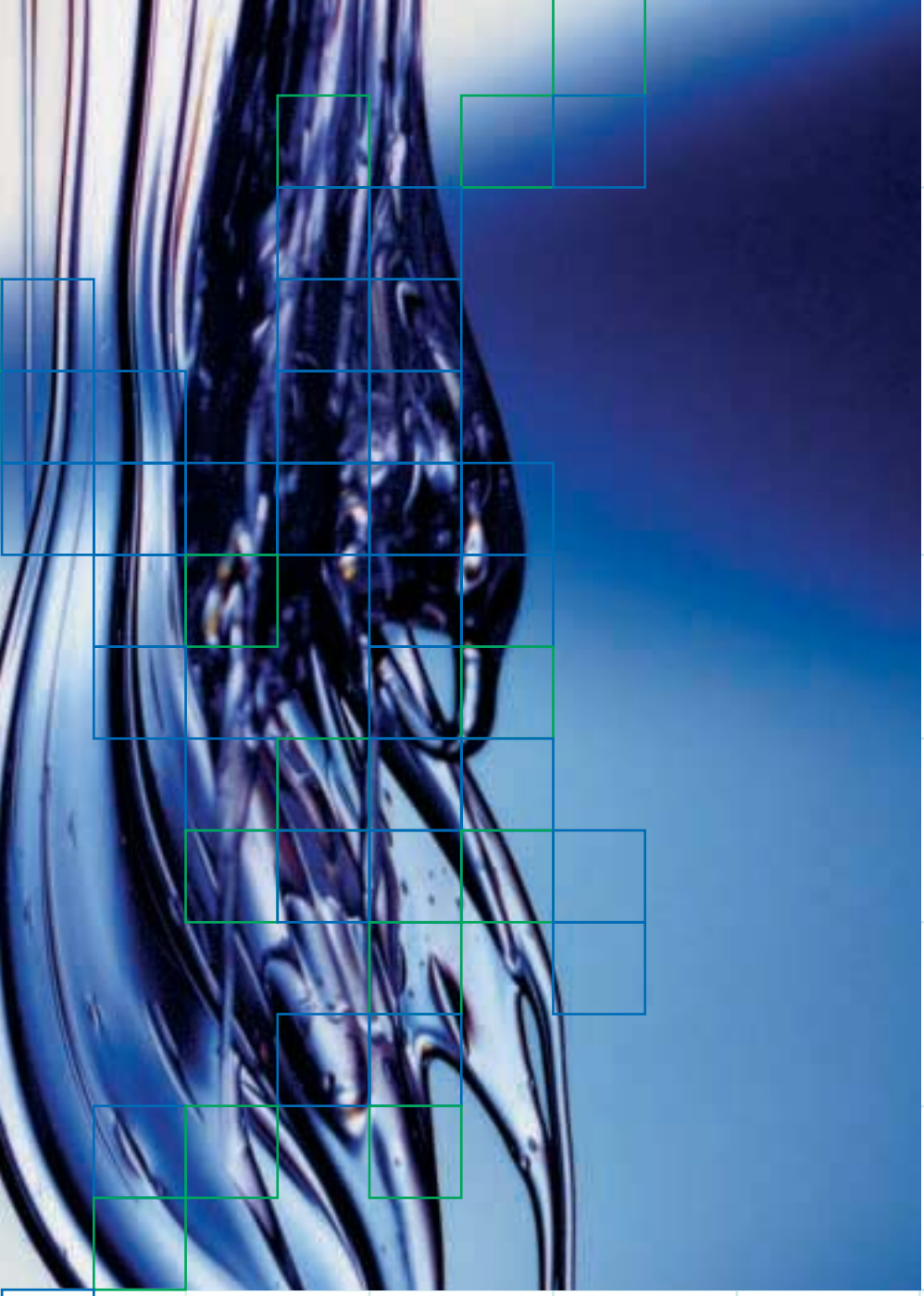


AV03384

SILASTIC® brand Silicone Rubber: Fluid Resistance Guide

Rubber Fabrication Solutions

DOW CORNING

Contents

Introduction

This guide is intended to give you an idea of the performance profile of various classes of silicone rubbers when immersed in different fluids. It's our hope that the information will save you the time and cost of preliminary screening and feasibility tests. We recommend that you test specific materials prior to use. Keep in mind that service conditions are usually less severe than immersion tests. For instance, in actual service the rubber is often only partly exposed or is subjected only to spills or splashing. This means that a rubber that shows only fair results in a prolonged total immersion test will often perform quite adequately under actual conditions.

Types of *Silastic*® brand Silicone Rubber

Immersion test results refer to types of *Silastic*® Silicone Rubber by their ASTM designation. The polymer classification described in ASTM D 1418 is based on the organic group side chains attached to the silicon-oxygen chain. If other groups are present, their initials are listed prior to the MQ designation: MQ indicates methyl groups, V indicates phenyl groups. Where several types of rubber have been tested for resistance to one fluid, they are listed in this order in the tables:

MQ, VMQ } General purpose stocks

PMQ, PVMQ } Extremely low-temperature stocks

FVMQ } Fuel-, oil-and solvent-resistant stocks

Effects of Immersion

If a fluid affects a silicone rubber at all, after prolonged immersion and usually at elevated temperatures, the changes are evidenced as increases or decreases of several physical properties: hardness, tensile strength, elongation, and volume. The values that appear in the tables have been calculated as prescribed in ASTM D 471. The figures have been rounded and represent typical values.

The effects that have been tabulated often go hand in hand, but there is no quantitative correlation. For example, a silicone rubber in one fluid may swell 10 percent and lose 15 percent in tensile strength, whereas in another fluid the same rubber may also swell 10 percent but lose 30 percent in tensile strength.

The effects of solvent or fuel immersion often proceed until they reach a limit and then increase no more. This limit corresponds to the maximum amount of solvent or fuel that the rubber structure can absorb at the test temperature. While a fluid may produce little effect at room temperature, it may cause a noticeable change at 204°C (400°F).

Swelling caused by fluid penetration of rubber is usually the most obvious effect. However, this swelling does not necessarily indicate permanent deterioration. The rubber often regains most of its original properties after the fluid has evaporated.
Hardness changes are tabulated in durometer points on the Shore A-2 scale. Changes in tensile strength and elongation are expressed as percentages of the original values. These changes are usually losses that appear as negative values. Volume changes due to penetration of fluids between silicone polymer chains appear as positive values, that is, swelling. Negative volume changes indicate chemical degradation, such as the tables show for 20 percent sulfuric acid at 83˚C (180˚F) for seven days.

Service Considerations

Duration of exposure may be very important in some applications. In the case of silicone rubber used as electrical insulation, this may mean that no permanent harm will result from short exposures to washing or rinsing, even with powerful solvents. After prolonged periods at high temperatures, hydrocarbon oils may slowly decompose. The breakdown products may have an entirely different solvent effect than that of the original oil. On the other hand, heating may sometimes have the favourable result of driving off volatile components of oils. Contamination in service may also produce changes in lubricating oils and their effect as immersion media. Swelling may be a limiting factor in service, even though a small amount may be desirable for certain applications. For example, o-rings often work better if they swell slightly in the fluid they seal; but if they swell too much, they may push themselves out of position and lose effectiveness. Also, swelling may produce tears in tightly restricted parts.

Selection Recommendations

1. *Silastic*® brand fluorosilicone rubber shows superior resistance to many fluids; however, other types of *Silastic*® rubber offer better resistance to acetone, certain other ketones, and some esters. The fluorosilicone polymer can be blended with other silicone polymers to obtain resistance intermediate between the two types.

2. The higher the aromatic or phenyl content of oils and fuels, the greater is their effect on most types of silicone rubber except fluorosilicone rubber. The stocks most affected are usually the types with ASTM designations including P (phenyl groups). This follows the common principle of organic to solvents that "like dissolves like".

3. For high-temperature applications, parts should generally be cured at temperatures higher than anticipated service temperatures, no matter whether the parts will contact liquid or air. Property changes are usually less for fully cured parts than for as-vulcanized or partially cured parts.

Test Conditions

The immersion tests tabulated were conducted according to ASTM D 471. Specimens were cut from slabs that were molded and oven-cured in accordance with recommended procedures for the individual stocks.

Many fluids were tested only for their effects on volume and hardness because these values are usually the most critical.

In regard to the limited correlation between test conditions and service conditions, the most widely used test, ASTM D 471, states:

"Owing to the wide variations often present in service conditions, no direct correlation between this accelerated test and service performance may be given or implied. However, the method yields comparative data on which to base judgement (as to service quality and is especially useful in research and development work."

Test results refer to types of *Silastic*® silicone rubber products by ASTM designation. Because tests were conducted over a period of several years, the specific products used may no longer be available. Test results, therefore, can be used to project general performance only. If more specific information is required, refer to individual data sheets or conduct new tests.

Fluids Index

Classification of Immersion Media

Fluids for testing have often been submitted with only a trade name for identification. It has been difficult to classify some of these fluids for the tabular sections of this guide. The overall classification has been designed for easy reference by users in different industries.

ASTM and IRM Oils, Fuels and Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
ASTM No. 1 Oil	VMQ PVMQ	3 days/25°C (77°F)	nil -5	- -	- -	nil 5
	MQ VMQ PVMQ	3 days/100°C (212°F)	-5 -5 -10	-5 -10 -10	-5 -5 -10	5 5 10
	MQ VMQ PVMQ	1 day/150°C (302°F)	-10 -5 -10	-10 -10 -15	5 -10 -10	5 10 10
	MQ VMQ PVMQ FVMQ	3 days/150°C (302°F)	-10 -10 -10 -5	-10 -5 -20 nil	nil -5 -15 -5	5 10 10 nil
	MQ VMQ PVMQ	7 days/150°C (302°F)	-10 -10 -10	-10 -10 -20	-10 -10 -10	10 10 10
	VMQ	30 days/150°C (302°F)	-10	-35	-25	10
	MQ VMQ PVMQ	3 days/177°C (350°F)	-10 -5 -15	-10 -10 -20	-10 -10 -10	5 10 10
	VMQ	7 days/177°C (350°F) 14 days/177°C (350°F)	-20 -20	-50 -50	-30 -30	10 10
ASTM No. 2 Oil	VMQ FVMQ	70 hr/150°C(302°F)	-6 nil	4 nil	-2 -14	1 1
	VMQ FVMQ	7 days/150°C (302°F)	-6 -2	8 1	nil -13	8 1
ASTM No. 3 Oil	MQ PVMQ	3 days/24°C (75°F)	-5 -10	- -	- -	15 25
	MQ PVMQ	3 days/100°C (212°F)	-10 -15	- -	- -	20 35
	PVMQ FVMQ	7 days/110°C(230°F)	-30 -5	-75 -5	-60 -5	60 5
	MQ VMQ PVMQ FVMQ	1 day/150°C (302°F)	-20 -15 -25 -5	-50 -35 -40 -10	-20 -20 -20 10	50 45 50 5
	MQ VMQ PVMQ PVMQ FVMQ	3 days/150°C (302°F)	-25 -20 -35 -25 -5	-50 -45 -50 - -25	-25 -25 -30 - -10	35 35 55 85 5
	VMQ FVMQ	7 days/150°C (302°F)	-25 -5	-45 -17	nil -15	40 5
	FVMQ	14 days/150°C (302°F) 21 days/150°C (302°F) 28 days/150°C (302°F)	-5 -10 -10	-25 -60 -85	5 5 -20	5 5 5

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

ASTM and IRM Oils, Fuels and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
ASTM No. 3 Oil (cont.)	VMQ	4 hr/177°C (350°F)	-25	-35	-25	45
	MQ VMQ PVMQ FVMQ	3 days/177°C (350°F)	-35 -40 -40 -10	-85 -60 -65 -25	-25 -15 5 5	55 60 70 5
	VMQ FVMQ	7 days/177°C (350°F)	-50 -10	-80 -40	-30 5	70 5
	VMQ	3 days/200°C (392°F)	-15	-45	nil	5
	FVMQ	14 days/200°C (392°F)	-25	-40	-10	nil
IRM-902 Oil	VMQ PVMQ FVMQ	3 days/23°C (73°F)	-5 -8 -6	-12 -12 -7	-14 -12 -1	5 7 1
	VMQ PVMQ FVMQ	3 days at 150°C (302°F)	-6 -16 0	-7 -7 -7	-17 -21 -8	10 19 1
IRM-903 Oil	VMQ PVMQ FVMQ	3 days/23°C (73°F)	-12 -21 -4	-7 -31 -7	-11 -23 -3	18 33 1
	VMQ PVMQ FVMQ	3 days/150°C (302°F)	-26 -33 -2	-23 -68 -11	-28 -62 -15	40 84 2
	FVMQ (70 Durometer)	70 hours/150°C (302°F) 7 days/150°C (302°F)	-4 -3	-8 -9	4 6	2 2
ASTM Test Fluid 101 **Di** (2-Ethylhexyl) **Sebacate** **+0.5% Phenothiozine** **Di** (2-Ethylhexyl) **Sebacate** (Plexol-201)	FVMQ MQ VMQ	7 days/135°C (275°F) 48 hr/150°C (302°F) 7 days/100°C (212°F)	-4 -10 -15 -10	-7 -25 - -	-11 -25 - -	5 10 20 20
	FVMQ	4 days/232°C (450°F)	DT	DT	DT	DT
ASTM Reference Fuel A - **Isooctane** (also TTS-735 Type I)	VMQ PMQ PVMQ	5 min/-54°C (-65°F)	- - -	- - -	- - -	10 10 10
	VMQ PMQ PVMQ	10 min/-54°C (-65°F)	- - -	- - -	- - -	20 20 15
	VMQ PMQ PVMQ	30 min/-54°C (-65°F)	- - -	- - -	- - -	30 35 30
	VMQ PMQ PVMQ	5 min/24°C (75°F)	- - -	- - -	- - -	25 30 25
	VMQ PMQ PVMQ	10 min/24°C (75°F)	- - -	- - -	- - -	35 50 40
	VMQ PMQ PVMQ	30 min/24°C (75°F)	- - -	- - -	- - -	90 85 75
	FVMQ	7 days/24°C (75°F) 3 days/150°C (302°F)	-5 -20	-40 -60	-30 -30	15 25

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

ASTM and IRM Oils, Fuels and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
ASTM Reference Fuel B (70% Isooctane, 30% Toluence by Volume) (also TTS-735 Type III)	FVMQ	1 day/-54°C (-65°F) 3 days/24°C (75°F) 7 days/24°C (75°F) 14 days/24°C (75°F)	-5 -5 -5 -10	-20 -55 -40 nil	-20 -35 -30 -30	10 20 20 15
	VMQ FVMQ	3 days/65°C (150°F)	 -5	 -50	 -40	215 15
	FVMQ	3 days/150°C (302°F) 3 days/232°C (450°F)	-20 DT	-60 DT	-35 DT	30 DT

MIL Specification Oils, Fuels and Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
ASTM Reference Fuel C (M0)	FVMQ (60 Durometer)	1 day/23°C (73°F) 1 week/23°C (73°F) 3 months/23°C (73°F) 1 year/23°C (73°F) 1 day/60°C (140°F) 1 week/60°C (140°F) 3 months/60°C (140 F) 6 months/60°C (140°F)	-15 -14 -14 -13 -14 -14 -17 -14	-25 -20 -23 -22 -30 -36 -37 -33	-23 -19 -20 -18 -15 -32 -28 -35	18 19 19 19 21 21 22 21
85% ASTM Reference Fuel C 15% Methanol (M15)	FVMQ (60 Durometer)	1 day/23°C (73°F) 1 week/23°C (73°F) 3 months/23°C (73°F) 1 year/23°C (73°F) 1 day/60°C (140°F) 1 week/60°C (140°F) 3 months/60°C (140°F)	-24 -18 -18 -14 -21 -21 -24	-52 -56 -50 -53 -57 -64 -64	-29 -42 -38 -38 -41 -48 -45	26 24 25 24 29 31 31
75% ASTM Reference Fuel C 25% Methanol (M25)	FVMQ (60 Durometer)	1 day/23°C (73°F) 1 week/23°C (73°F) 3 months/23°C (73°F) 1 year/23°C (73°F) 1 day/60°C (140°F) 1 week/60°C (140°F) 3 months/60°C (140°F) 6 months/60°C (140°F)	-19 -19 -18 -13 -20 -23 -26 -27	-53 -54 -50 -51 -63 -62 -68 -64	-43 -40 -39 -36 -51 -48 -48 -45	26 25 25 24 32 33 33 28
50% ASTM Reference Fuel C 50% Methanol (M50)	FVMQ (60 Durometer)	1 day/23°C (73°F) 1 week/23°C (73°F) 3 months/23°C (73°F) 1 year/23°C (73°F) 1 day/60°C (140°F) 1 week/60°C (140°F) 3 months/60°C (140°F)	-18 -18 -19 -17 -21 -22 -24	-52 -48 -49 -50 -60 -59 -64	-41 -37 -39 -33 -47 -46 -43	25 24 23 22 29 30 28
15% ASTM Reference Fuel C 85% Methanol (M85)	FVMQ (60 Durometer)	1 day/23°C (73°F) 1 week 23°C (73°F) 3 months/23°C (73°F) 1 year/23°C (73°F) 1 day/60°C (140°F) 1 week/60°C (140°F) 3 months/60°C (140°F) 6 months/60° C (140°F)	-15 -14 -11 -11 -17 -18 -17 -15	-36 -37 -32 -38 -38 -42 -49 -50	-27 -19 -21 -20 -24 -20 -25 -31	14 13 11 11 15 14 12 8
60% ASTM Reference Fuel C 40% Methanol. by Volume (M40)**.**	FVMQ (75 Durometer)	24 hours/110°C (230°F)	-30	-66	-50	46

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

MIL Specification Oils, Fuels and Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
TTS-735 Type VII (30% Toluene,10% Isooctane, 59% Cyclohexane, 1.0%n-Butyl Disulfide)	FVMQ	3 days/24°C (75°F) 3 days/100°C (212°F)	-10 -10	-40 -40	-25 -35	20 20
MIL-H-5606 Oil (Exxon Univis J-43)	VMQ PVMQ	14 days/24°C (75°F)	- -	- -	- -	65 95
	MQ PMQ FVMQ	1 day/71°C (160°F)	-20 -30 -5	-75 -65 -30	-60 -55 -10	160 120 5
	FVMQ	3 days/71°C (160°F)	-10	-30	-15	5
	VMQ PVMQ	14 days/71°C (160°F)	- -	- -	- -	80 110
	FVMQ	19 days/121°C (250°F) 3 days/150°C (302°F) 3 days/177°C(350°F) 7 days/177°C(350°F) 3 days/200°C (392°F)	-10 -10 -20 -20 -35	-10 -35 -50 -55 -85	-15 -10 -10 5 15	5 10 10 10 15
MIL-H-5606 (American Oil PQ 4226)	FVMQ	70 hr/150°C (302°F)	-6	-8	-16	6
MIL-O-6085 Oil	FVMQ	14 days/177°C (350°F)	-20	-70	-15	10
MIL-L-7808D Oil (Exxon Turbo Oil No. 15)	FVMQ	1 day/-54°C (-65°F)	-5	-15	nil	nil
	MQ VMQ PMQ	3 days/24°C (75°F)	-5 -10 -10	-10 -10 -25	nil -5 -15	10 10 20
	PVMQ	3 days/24°C (75°F) 7 days/24°C (75°F)	-15 -25	-10 -55	-5 -40	20 30
	VMQ PMQ	3 days/71°C (160°F)	-15 -15	-10 -45	-10 -40	15 30
	MQ VMQ PMQ PVMQ	7 days/71°C (160°F)	-10 -10 -20 -25	- - - -65	- - - -50	15 15 30 35
	MQ VMQ PMQ	1 day/121°C (250°F)	-10 -10 -10	- - -	- - -	20 20 40
	VMQ FVMQ	3 days/121°C (250°F)	-10 -5	-25 nil	-20 nil	20 5

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

MIL Specification Oils, Fuels and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
MIL-L-7808D Oil (Exxon Turbo Oil No. 15)	MQ VMQ PMQ	1 day/150°C (302°F)	-10 -5 -10	 - -	 - -	15 10 20
	VMQ PVMQ FVMQ	3 days/150°C(302°F)	-15 -25 -5	-40 -45 -15	-10 5 nil	25 40 10
	MQ	1 hr/177°C (350°F)	-10	-	-	10
	FVMQ	1 day/177°C (350°F)	-10	-35	-10	10
	MQ VMQ PMQ PVMQ FVMQ	3 days/177°C (350°F)	-30 -35 -25 -35 -15	-65 - -50 -55 -40	-5 - -15 -15 -10	35 30 45 50 5
	FVMQ	7 days/177°C (350°F) 14 days/177°C (350°F) 1 day/200°C (392°F)	-20 DT -30	-60 DT -70	nil DT -15	10 DT 15
	VMQ FVMQ	3 days/200°C (392°F)	-35 -45	- -95	- -45	30 15
MIL-L-7808E Oil (Brayco 880D)	VMQ FVMQ	70 hr/150°C (302°F)	-20 -5	-35 -80	-10 -60	25 5
	VMQ FVMQ	70 hr/177°C (350°F)	-35 -5	-75 -95	-30 -90	25 -5
MIL-L-7808E, F, and G Oil (StaufferJet I)	VMQ FVMQ	70 hr/150°C (302°F)	-20 -10	-25 -25	-10 -25	25 10
	VMQ FVMQ	70 hr/177°C (350°F)	-35 -15	-65 -60	-10 -35	35 10
MIL-L-7808F Oil (Gulf Synthetic Lube No. 2)	FVMQ	70 hr/150°C (302°F)	-10	-30	-15	15
MIL-L-7808F Oil (Royco 808GF)	FVMQ	70 hr/150°C (302°F) 70 hr/177°C (350°F)	-10 -20	-45 -60	-15 -20	10 15
MIL-L-7808F Oil (Brayco 880G)	FVMQ	70 hr/150°C (302°F)	-15	-30	-20	10
MIL-L-7808G (Amendment 2) PQ8365	VMQ FVMQ	70 hr/150°C (302°F)	-14 -8	-21 -9	-19 -24	25 8
MIL-A-8243 Deicer Fluid	PVMQ	70 hr/71°C (160°F)	-5	-15	-10	nil
MIL-L-23699 Oil (Mobil XRM-139A)	FVMQ	96 hr/177°C (350°F)	-15	-	-	10
StaufferJet II Oil	FVMQ	70 hr/177°C (350°F)	-8	-25	-21	12
	VMQ FVMQ	100 hr/177°C (350°F)	-9 -9	2 -19	42 -36	11 12
	VMQ FVMQ	300 hr/177°C (350°F)	-8 -15	-3 -73	50 -33	7 9

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

ASTM and MIL Specification Oils, Fuels and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Mobil Jet II Oil	VMQ FVMQ	22 hr/25°C (77°F)	- -	- -	- -	4 3
	VMQ FVMQ	70 hr/150°C (302°F)	-10 nil	10 20	15 -35	10 10
	VMQ FVMQ	7 days/1500C(302°F)	-10 nil	10 5	25 -35	10 10
MIL-L-4600 Oil Bis (2-Ethylhexyl) **Sebacate**	PVMQ	3 days/25°C (77°F) 7 days/25°C (77°F)	-14 -14	- -	- -	28 30
MIL-L-7808JJet Engine Oil	75% FVMQ 25% VMQ Blend.	22 hours/24°C (75°F)	-6	-28	-22	4

Automotive Oils and Fluids

Motor Oils

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
SAE No. 10 Oil (Sunoco HD)	FVMQ	3 days/150°C (302°F)	-5	-5	nil	nil
SAE No. 20 Oil (Mobil Oil)	MQ PMQ	1 day/100°C (212°F)	- -	- -	- -	10 20
	MQ PMQ	1 day/121°C (250°F)	- -	- -	- -	15 25
	MQ PMQ	1 day/150°C (302°F)	- -	- -	- -	15 25
10W-30 Motor Oil (Texaco)	FVMQ	15 days/177°C(350°F) 30 days/177°C (350°F)	-4 1	-33 -52	-8 -58	2 1
	50/50 VMQ/FVMQ	15 days/177°C (350°F) 30 days/177°C (350°F)	-16 -9	-35 -76	10 -80	9 3
AMOCO Super Permalube 10W-30	VMQ	250 hr/150°C (302°F)	-18	-21	5	23
Sun 5W-30 SJ Auto Engine Oil	FVMQ (70 Durometer)	70 hours/150°C (302°F) 7 days/150°C (302°F)	-1 1	1 -3	0 -6	0 0
Mobil 5W-30 HP Engine Oil	75% FVMQ 25% VMQ Blend.	3 days/150°C (302°F) 7 days/150°C (302°F)	-9 -9	-21 -26	-15 -22	12 12

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

Automotive Oils and Fluids (Cont.)

Automobile Transmission Fuids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Dynaflow Automatic Transmission Fluid	MQ VMQ PMQ	70 hr/93°C (200°F)	-15 -15 -10	- - -	- - -	15 25 35
GM Hydramatic Fluid (Type A)	VMQ FVMQ	3 days/150°C (302°F)	-35 -5	-40 -10	-5 -5	35 5
Socony Mobil Transmission Fluid (Type A)	MQ PMQ	1 day/121°C (250°F)	-10 -10	- -	- -	35 40
	MQ	7 days/121°C(250°F)	-10	-	-	35
Sun 109 Transmission Fluid	VMQ	100 hr/177°C (350°F)	-25	-40	nil	30
Texamatic A Transmission Fluid (Texaco)	VMQ	70 hr/65°C (150°F)	-10	-	-	10
	VMQ PVMQ FVMQ	70 hr/150°C (302°F)	-20 -30 nil	-30 -85 -25	-10 -65 -15	25 65 nil
	VMQ	70 hr/177°C (350°F)	DT	DT	DT	DT
Texamatic C Transmission Fluid (Texaco)	MQ PMQ	1 day/121°C (250°F)	-10 -10	- -	- -	35 45
	MQ VMQ	7 days/121°C (250°F) 70 hr/150°C (302°F)	-20 -25	- -60	- -25	40 25
Texamatic TL 3528 Transmission Fluid (Texaco)	VMQ	70 hr/121°C (250°F)	-15	5	nil	25

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Automotive Oils and Fluids (Cont.)

Transmission and Differential Lubricants

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Hypoid EP Lubricant	FVMQ	14 days/149°C (300°F)	-20	nil	-10	nil
Mobilube GX-90 General Lubricant	VMQ FVMQ	3 days/149°C(300°F)	DT DT	DT DT	DT DT	DT DT
Swan Finch EP90 Lubricant	FVMQ	3 days/121°C (250°F) 3 days/150°C (302°F)	-10 DT	-70 DT	nil DT	-10 DT
TL 3450 Lubricant	VMQ	3 days/100°C (212°F)	-10	-	-	15
	VMQ FVMQ	3 days/121°C (250°F)	-10 -5	-60 -5	-45 -5	10 5
	VMQ FVMQ	3 days/150°C (302°F)	DT DT	DT DT	DT DT	DT DT

Shock Absorber Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Delco Shock Absorber Fluid	PMQ	3 days/71°C (160°F)	-	-	-	65
Standard Oil Shock Absorber Fluid	MQ VMQ	1 hr/150°C (302°F)	-15 -20	- -	- -	25 35
	MQ VMQ	1 hr/177°C (350°F)	-15 -20	- -	- -	30 45

Brake Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Wagner 21B Brake Fluid	MQ VMQ PVMQ	7 days/24°C (75°F)	-5 0 -5	- - -	- - -	5 5 5
	PVMQ FVMQ	3 days/150°C (302°F)	-5 DT	-90 DT	-85 DT	10 DT
	MQ VMQ PVMQ	7 days/88°C(190°F)	-5 -5 -5	- - -	- - -	5 5 5
Delco Supreme 550 Heavy Duty Brake Fluid	VMQ	70 hr/150°C (302°F)	-4	-25	nil	4

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Fuels

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Diesel Fuel	MQ VMQ PVMQ	7 days/24°C (75°F)	-25 -25 -35	- - -	- - -	85 100 130
	MQ VMQ PVMQ	7 days/54°C (130°F)	-25 -30 -40	- - -	- - -	90 105 140
Gasoline	VMQ PVMQ	5 min/24°C (75°F)	- -	- -	- -	25 20
	VMQ PVMQ	30 min/24°C (75°F)	- -	- -	- -	60 75
	MQ	18 hr/24°C (75°F)	-25	-	-	245
Gasoline -Regular	FVMQ	24 hr/25°C (77°F)	-12	-39	-30	21
Gasoline -Low Lead	FVMQ	24 hr/25°C (77°F)	-12	-41	-30	20
White Gasoline Vapors	PMQ	14 days/24°C (75°F)	-10	-	-	50
	VMQ	7 days/24°C (75°F)	-20	-	-	165
JP-4 Fuel (MIL-J-5624F)	FVMQ	1 day/-54°C (-65°F)	-5	-10	nil	nil
	PVMQ	10 min/24°C (75°F)	-10	-	-	30
	PVMQ FVMQ	1 day/24°C (75°F)	- -5	- -20	- -50	105 10
	FVMQ	3 days/24°C (75°F)	-5	-35	-20	10
	PVMQ FVMQ	7 days/24°C (75°F)	-25 -5	-75 -20	-60 -50	330 10
	FVMQ	14 days/24°C (75°F) 21 days/24°C (75°F) 30 days/24°C (75°F) 3 days/115°C (240°F) 15 days/121°C (250°F) 3 days/177°C(350°F) 3 days/200°C (392°F) 3 days/232°C (450°F)	-5 -5 -5 -5 -20 -25 -35 -45	-20 -30 -30 -55 -65 -65 -80 -90	-50 -55 -55 -40 -40 -20 -10 -20	10 10 10 15 20 25 30 20
JP-5 Fuel (MIL-J-5624F)	FVMQ	7 days/24°C (75°F)	-5	-15	nil	5
JP-5 Fuel Jet Engine Oil	75% FVMQ 25% VMQ Blend.	22 hours/24°C (75°F)	-11	-45	-37	21
JP-8 Fuel	FVMQ	1 day/24°C (75°F) 7 days/24°C (75°F)	-9 -9	-8 -13	0 -6	3.7 4.6
JP-8Jet Engine Fuel	FVMQ (75 Durometer)	7 days/163°C (325°F) 28 days/163°C (325 F)	-11 -18	0 -73	-8 -38	12 14
Manufactured Gas (24% Methane, 3% Ethane, 18% Carbon Monoxide, 55% Hydrogen)	FVMQ	2 mo/121°C (250°F)	GR	GR	GR	GR

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
GR - good resistance

Fuels (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Gasohol 10%; Methanol/ 90%; No Lead Gasoline	FVMQ	1 day/24°C (75°F) 7 days/24°C (75°F) 14 days/24°C (75°F) 28 days/24°C (75°F)	-19 -19 -20 -21	-47 -19 -48 -50	-35 -26 -26 -26	27.5 25.9 26.6 24.4
Gasohol 10%; Ethanol/90%;	FVMQ	1 day/24°C (75°F) 7 days/24°C (75°F)	-18 -16	-37 -37	-19 -16	21.5 21.3
Unsymmetrical Dimethyl Hydrazine	VMQ FVMQ	4 days/24°C (75°F)	nil DT	-25 DT	-50 DT	60 DT

Hydraulic Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Aerosafe 2300 (Stauffer)	VMQ	70 hr/25°C (77°F)	-12	-26	-17	21
	VMQ FVMQ	70 hr/70°C (158°F)	-15 -49	-36 -97	-5 -62	22 18
Exxon WS2406 Fluid	MQ VMQ PMQ	7 days/71°C(160°F)	-15 -10 -20	- - -	- - -	15 20 35
	MQ VMQ PMQ	1 day/121°C (250°F)	-5 -10 -5	- - -	- - -	20 35 45
	MQ VMQ PMQ	1 hr/177°C (350°F)	-10 -10 -15	- - -	- - -	15 20 30
Hydrolube H-2 Fluid	MQ VMQ PVMQ	70 hr/24°C (75°F)	-5 -5 -5	-15 nil -15	10 15 -10	5 5 5
	MQ PMQ	5 days/24°C (75°F)	-5 -10	- -	- -	5 10
	MQ PMQ	14 days/24°C (75°F)	-5 -10	- -	- -	10 15
	MQ PMQ	27 days/24°C (75°F)	-5 -10	- -	- -	10 15
	MQ PMQ	5 days/65°C (150°F)	-10 -10	- -	- -	10 20
	MQ PMQ	24 days/65°C (150°F)	-5 -10	- -	- -	15 20
	MQ VMQ PVMQ	7 days/70°C (158°F)	-10 -10 -5	-10 - -15	20 - -10	5 5 5
Oronite M2V (Chevron)	VMQ FVMQ	7 days/100°C (212°F)	-19 -3	-57 nil	-62 -16	73 2
	VMQ FVMQ	7 days/150°C (302°F)	-24 nil	-70 -22	-63 -12	96 4
	VMQ FVMQ	7 days/177°C (350°F)	-35 -4	-86 -34	-77 -38	130 5

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Hydraulic Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Oronite 8200 Fluid (Chevron)	FVMQ	3 days/177°C(350°F)	-15	-10	-10	5
Oronite 8515 Fluid (Chevron)	FVMQ	1 day/-54°C (-65°F)	nil	5	5	nil
	MQ VMQ PVMQ	3 days/24°C (75°F)	-15 -20 -15	- - -	- - -	40 45 40
	MQ VMQ PVMQ	3 days/130°C (265°F)	-20 -30 -25	- - -	- - -	60 80 115
	FVMQ	3 days/150°C(302°F) 3 days/177°C (350°F) 3 days/200°C (392°F)	-5 -10 -45	-10 -40 -95	-10 -5 -40	5 10 15
Oronite Hyjet (Chevron)	FVMQ VMQ	70 hr/70°C(158°F)	-25 -10	-79 -4	59 9	24 9
Pydraul 60 Fluid	VMQ PVMQ FVMQ	3 days/24°C (75°F)	-5 -10 -5	- - -	- - -	5 5 5
	VMQ PVMQ FVMQ	3 days/121°C (250°F)	-10 -25 -15	- - -	- - -	10 10 5
Pydraul A-200 Fluid	VMQ PVMQ FVMQ	3 days/24°C (75°F)	-5 -10 -5	- - -	- - -	5 5 nil
	VMQ PVMQ FVMQ	3 days/121°C (250°F)	-10 -10 -5	- - -	- - -	10 15 5
	VMQ PVMQ FVMQ	1 day/177°C (350°F)	-5 -10 -5	- - -	- - -	15 120 5
Pydraul F9 Fluid	MQ VMQ PMQ PVMQ	3 days/24°C (75°F)	-5 -5 -10 -10	-15 - - nil	nil - - 5	5 5 10 5
	MQ VMQ PMQ PVMQ FVMQ	3 days/150°C (302°F)	-5 -5 -10 -10 -5	-15 nil - nil -5	-5 10 - -5 5	10 10 15 15 5
	FVMQ	3 days/177°C (350°F)	-10	-60	-15	-10
Pydraul 150	FVMQ	7 days/150°C (302°F)	DT	DT	DT	DT
Skydrol 500B (Monsanto)	VMQ PVMQ	70 hr/70°C (158°F)	-9 -15	-17 -24	3 -11	10 19
Skydrol HT (Monsanto)	VMQ PVMQ	70 hr/70°C (158°F)	-13 -24	-23 -50	-8 -32	20 40

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Hydraulic Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Skydrol LD (Monsanto)	VMQ FVMQ	70 hr/70°C (158°F)	-16 -37	-22 -87	-3 -71	26 108
Skydrol LD-4 (Monsanto)	FVMQ	1 day/24°C (75°F) 1 day/70°C (158°F)	-24 -29	-82 -85	-68 -73	68 87
Skydrol 7000 Fluid (Monsanto)	MQ VMQ PVMQ	3 days/24°C (75°F)	-5 nil -10	-10 -5 -10	-5 -5 -5	5 5 10
	MQ PMQ	14 days/24°C (75°F)	nil -10	- -	- -	5 5
	MQ VMQ PVMQ	3 days/93°C (200°F)	-5 -5 -10	-10 -10 -15	nil -10 -10	5 5 10

Transformer and Instrument Oils

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Askerol Transformer Oil (Monsanto) **- Chlorinated**	VMQ	35 days/24°C (75°F) 44 days/24°C (75°F) 60 days/24°C (75°F) 7 days/70°C (158°F) 14 days/70°C (158°F) 28 days/70°C(158°F) 38 days/70°C (158°F) 1 day/121°C (250°F) 3 days/121°C (250°F) 7 days/121°C (250°F) 14 days/121°C (250°F)	nil -5 -5 -5 -5 -5 -5 -5 -5 -10 -5	-20 -10 -10 -10 -20 -15 -15 -15 -15 -15 -10	-15 -15 -15 -20 -20 -15 -15 -15 -15 -15 -15	10 10 10 10 15 10 15 20 20 15 20
Inerteen Transformer Oil (Westinghouse) **- Chlorinated**	MQ VMQ PVMQ	3 days/24°C (75°F)	-5 -5 -10	-10 -10 -15	-5 -5 -15	10 10 15
	MQ PVMQ FVMQ	3 days/115°C (240°F)	-10 -10 nil	-25 -25 -15	-5 -10 nil	15 15 5
	VMQ	3 days/177°C (350°F)	-15	-25	-15	30
N-43 Fluorocarbon Capacitor Fluid	VMQ PVMQ	3 days/150°C (302°F)	-5 nil	- -	- -	5 5
Pyranol Transformer Oil (General Electric) **- Chlorinated**	PMQ	7 days/100°C (212°F)	-10	-	-	25
RCA-Gulf Instrument Oil A	VMQ PVMQ	3 days/93°C (200°F)	-20 -30	- -	- -	70 5
Univolt 35 Transformer Oil	MQ VMQ PVMQ FVMQ	3 days/150°C(302°F)	-15 -15 -30 nil	-25 -45 -30 -10	-20 -45 -15 nil	40 50 55 5

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

Transformer and Instrument Oils (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Wemco C Transformer Oil	MQ VMQ PVMQ	3 days/24°C (75°F)	-15 -20 -30	- - -	- - -	35 40 45
	VMQ	1 yr/79°C (175°F)	-35	-	-	40
	VMQ FVMQ	3 days/177°C(350°F)	-55 -5	- -20	- 5	140 10
Coolanol 35 (Monsanto)	VMQ FVMQ	3 days/121°C (250°F)	-21 1	-67 1	-68 -10	101 3
Coolanol 45 (Monsanto)	FVMQ	70 hr/177°C(350°F)	-3	-12	-14	4

Speciality Oils, Greases and Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
ANG 15 Industrial Grease (Texaco Regal Starfak Special)	MQ VMQ	3 days/24°C (75°F)	-5 -10	nil nil	nil nil	10 10
	MQ VMQ	3 days/150°C (302°F)	-10 -15	nil nil	nil nil	20 20
ANG 25 Diester Base (Texaco TG-749)	VMQ	3 days/25°C (77°F)	-5	-	-	15
ANG 25 Diester Base (Texaco TG-749)	PMQ	3 days/93°C (200°F) 1 day/150°C (302°F) 7 days/ 150°C (302°F)	-15 -20 TB	- - TB	- - TB	30 40 TB
ANG 25 Glycerol Ester (Texaco)	PMQ	1 day/71°C (160°F)	-10	-	-	10
ANO No. 3 Grade M; Extreme Pressure (GAF Corp.)	MQ PMQ	3 days/177°C (350°F)	- -	- -	- -	45 30
ANO No. 6 Oil (GAF Corp.)	MQ PMQ	1 day/24°C (75°F)	-10 -10	- -	- -	30 45
	MQ PMQ	7 days/24°C (75°F)	-15 -20	- -	- -	35 60
	MQ PMQ	1 day/150°C (302°F)	-25 -25	- -	- -	95 145
ANO No. 9 Oil (GAF Corp.)	MQ PMQ	1 day/121°C (250°F)	-10 -15	- -	- -	35 40
	MQ PMQ	3 days/121°C (250°F)	-15 -20	- -	- -	45 70
	MQ PMQ	7 days/121°C(250°F)	-15 -20	- -	- -	45 65
ANO No. 11 Oil (GAF Corp.)	MQ PMQ	1 day/121°C (250°F)	-5 -15	- -	- -	10 20
	MQ PMQ	3 days/121°C (250°F)	-10 -15	- -	- -	15 25
	MQ PMQ	7 days/121°C (250°F)	-10 -15	- -	- -	15 25
ANO No. 366 Oil (GAF Corp.)	MQ PMQ	3 days/93°C (200°F)	-20 -10	- -	- -	95 140

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
TB - too brittle to test

Speciality Oils, Greases and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Aroclor 1254 (Monsanto)	VMQ	3 days/24°C (75°F) 3 days/150°C(302°F)	-5 -10	10 -5	5 nil	5 10
Cosmoline 2046 (Fritzsche, Dodge & Olcutt)	VMQ	4 days/24°C (75°F)	-35	-	-	55
Crude Oil 7 API	FVMQ	14 days/24°C (75°F)	-	-	-	5
	VMQ	3 days/83°C (180°F)	-10	-	-	25
	FVMQ	14 days/83°C (180°F) 14 days/135°C (275°F)	- -10	- -	- -	5 5
Crude Oil 315 API	VMQ	14 days/24°C (75°F) 3 days/83°C (180°F)	- -20	- -	- -	10 60
	FVMQ	14 days/83°C (180°F) 14 days/135°C (275°F)	- -5	 -70	- -45	5 -2
Delco No. 9	PVMQ	1 day/100°C (212°F)	-15	-15	15	10
	VMQ PVMQ	5 days/100°C (212°F)	-10 -15	- -	- -	10 10
Delco No. 11	MQ VMQ	5 days/100°C (212°F)	-5 -5	- -	- -	5 5
Dowtherm A Heat Transfer Oil (Dow)	VMQ	3 days/24°C (75°F) 3 days/177°C (350°F)	-10 -30	- -	- -	10 40
FC-75 Fluorochemical Fluid (3M)	VMQ PVMQ FVMQ VMQ PVMQ FVMQ	1 day/24°C (75°F) 7 days/65°C (150°F)	-5 -5 5 nil -5 nil	- - - - - -	- - - - - -	nil nil nil 5 5 5
Gas Drip Oil	VMQ PVMQ FVMQ	3 days/24°C (75°F)	-25 -30 -5	- - -	- - -	250 500 20
GE Transil Oil	VMQ	3 days/24°C (75°F) 3 days/93°C (200°F)	-20 -30	- -	- -	35 50
GM 14X Heavy Duty Oil	VMQ	5 days/100°C (212°F)	-5	-	-	5
Mineral Oil	VMQ PVMQ	3 days/24°C (75°F)	-10 -15	-30 -20	-10 -10	25 35
Mineral Oil (Shell No. 5)	VMQ PVMQ	3 days/121°C (250°F)	-20 -35	-55 -55	-35 -20	60 75
	MQ PMQ	1 day/100°C (212°F)	-10 -5	- -	- -	25 40
	MQ PMQ	1 day/121°C (250°F)	-15 -10	- -	- -	25 40
	MQ PMQ	1 day/149°C (300°F)	-15 -10	- -	- -	30 55

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

Speciality Oils, Greases and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Navy Crankcase Oil No. 2135	VMQ	4 days/93°C (200°F)	-15	-	-	10
Navy Crankcase Oil No. 9250	VMQ	4 days/93°C (200°F)	-10	-	-	10
Pacemaker Fluid 100T	VMQ PVMQ	1 day/177°C (350°F)	-25 -35	- -	- -	50 60
	VMQ PVMQ FVMQ	3 days/177°C (350°F)	-30 -40 -5	- - -20	- - -10	55 65 5
PRL 3313 (Rohm and Haas)	MQ VMQ PMQ	1 day/71°C (160°F)	-15 -15 -20	- - -	- - -	15 15 30
	MQ PMQ	3 days/71°C (160°F)	DT DT	DT DT	DT DT	DT DT
	MQ VMQ PMQ	1 day/121°C (250°F)	DT -25 DT	DT - DT	DT - DT	DT 20 DT
SG 4766 Glycol Ester Base Grease (Standard Oil)	MQ PMQ	70 hr/24°C (75°F)	-10 -10	- -	- -	5 10
	MQ PMQ	3 days/24°C (75°F)	-10 -10	- -	- -	10 15
	PMQ	1 day/71°C (160°F) 3 days/71°C (160°F)	-10 -10	- -	- -	10 10
Shell Aircraft Turbine Lubricant A	FVMQ	70 hr/150°C (302°F) 140 hr/150°C(302°F)	-5 -11	-9 -24	-25 -32	8 10
Shell Aircraft Turbine Lubricant B	FVMQ	70 hr/150°C (302°F) 140 hr/150°C (302°F)	-3 -8	-26 -71	-50 -69	6 7
Shell B & B Grease	VMQ	70 hr/74°C (165°F) 912 hr/74°C (165°F)	-15 -16	-34 -9	-10 -20	26 26
	PMQ	70 hr/74°C (165°F) 912 hr/74°C (165°F)	-17 -19	-11 -15	-7 -13	30 30
Socony Mobil RL 147-A No. 7	PMQ	1 day/150°C (302°F) 6days/150°C (302°F)	-15 -20	- -	- -	50 50
Sun Oil No. 8X2513-1 L	PMQ	1 day/150°C (302°F) 6days/150°C (302°F)	-25 -45	- -	- -	70 55
Tectyl 502C Rust Inhibitor	MQ	14 days/24°C (75°F)	-5	5	5	nil
Tectyl 511-M Rust Inhibitor	MQ	14 days/24°C (75°F)	nil	5	-5	nil
Texas 1500 Oil (HD Concentrate)	MQ	10 days/150°C (302°F) 21 days/150°C (302°F)	-15 -20	-20 -30	-20 -10	10 10

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Speciality Oils, Greases and Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Tricresyl Phosphate	MQ VMQ PVMQ	3 days/24°C (75°F)	nil nil nil	nil -5 -5	-5 5 -5	nil nil nil
	MQ VMQ PVMQ	3 days/177°C (350°F)	nil -5 nil	-40 -25 -45	-40 -10 -50	5 5 5
	VMQ	3 days/200°C (392°F)	DT	DT	DT	DT
Turbo Oil No. 35	PVMQ	7 days/24°C (75°F) 7 days/65°C (150°F)	-15 -20	-35 -35	-20 -25	15 15
	VMQ PMQ	3 days/71°C (160°F)	-10 -15	-10 -35	-15 -25	10 15
	VMQ PMQ	3 days/121°C (250°F)	-15 -15	-10 -35	-15 -20	10 15
	FVMQ	3 days/150°C (302°F)	-10	-30	25	10
Ucon Lubricant LB1145 (gear oil) (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	nil nil nil	- - -	- - -	nil nil nil
Ucon Water-Soluble Lubricant 50-HB-55 (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	-5 -5 nil	- - -	- - -	nil nil nil
Ucon Lubricant 50-HB-100 (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	nil -5 nil	- - -	- - -	nil nil nil
Ucon Lubricant 50-HB-260 (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	nil nil nil	- - -	- - -	nil nil nil
Ucon Lubricant 50-HB-280-X (Union Carbide)	MQ VMQ	3 days/150°C (302°F)	-5 -5	- -	- -	nil nil
Ucon Lubricant 50-HB-660 (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	nil nil nil	- - -	- - -	nil nil nil
Ucon Lubricant 50-HB-5100 (Union Carbide)	MQ VMQ PMQ	3 days/150°C (302°F)	nil nil nil	- - -	- - -	nil nil nil

Solvents

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Acetone	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	-10 -10 -10 -20	- - - -85	- - - -75	25 15 20 180
Benzene	VMQ FVMQ	14 days/24°C (75°F)	- -17	- -22	- -15	175 23
	FVMQ	3 days/70°C (158°F)	-10	-50	-40	20

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Solvents (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Butyl Acetate	VMQ PMQ PVMQ	7 days/24°C (75°F)	-30 nil -25	- - -	- - -	150 150 125
Butyl Alcohol (Butanol)	MQ VMQ PMQ PVMQ FVMQ	7 days/24°C (75°F)	-10 -10 -15 -10 nil	- - - - -	- - - - -	20 15 40 35 10
Carbon Tetrachloride	VMQ PVMQ FVMQ	7 days/24°C (75°F)	-20 -10 -5	- - -45	- - -30	165 165 20
	FVMQ	5 days/49°C (120°F)	-10	-	-	20
Chlorobromomethane	FVMQ	7 days/24°C (75°F)	-10	-45	-50	25
	MQ VMQ PVMQ	2 days/67°C(153°F)	-20 -20 -25	- - -	- - -	70 95 235
Chloroform	FVMQ	5 days/24°C (75°F)	-10	nil	nil	30
Chlorothene Solvent (Dow)	FVMQ	1 day/24°C (75°F)	-15	-	-	50
	VMQ	7 days/24°C (75°F)	-	-	-	245
Cyclohexane	FVMQ	2 days/24°C (75°F)	-	-	-	15
	VMQ	7 days/24°C (75°F)	-	-	-	250
Diacetone Alcohol	VMQ	5 days/24°C (75°F)	-5	-	-	5
Dichloroisopropyl Ether	PMQ	7 days/24°C (75°F)	-	-	-	nil
Diethyl Ether	FVMQ	7 days/24°C (75°F)	-10	-40	-45	50
Ethyl Alcohol	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	-5 -5 -10 nil	- - - -30	- - - -15	nil 5 20 5
Ethylenedichloride	FVMQ	3 days/24°C (75°F)	-10	-	-	50
	VMQ	7 days/24°C (75°F)	-	-	-	45
Heptane	FVMQ	7 days/60°C (140°F)	-10	-30	-30	25
Isopropyl Alcohol	PMQ	7 days/24°C (75°F)	-10	-	-	10
Methyl Alcohol	MQ	7 days/24°C (75°F)	nil	nil	nil	nil
Methyl Chloride	FVMQ	14 days/25°C (77°F)	-12	-34	-11	4
	MQ VMQ PVMQ	7 days/24°C (75°F)	NR -15 -15	NR - -	NR - -	NR 150 150
Methylene Chloride	VMQ FVMQ	72 hr/25°C (77°F)	- -	- -	- -	180 70
Mineral Spirits	FVMQ	30 days/24°C (75°F)	nil	nil	nil	nil
Monochlorobenzene	FVMQ	7 days/24°C (75°F)	-5	-45	-40	25

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
NR - not recommended

Solvents (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Naphtha	FVMQ	3 days/24°C (75°F)	-	-	-	10
Nitrocellulose Solvent (Toluene, Ethyl Alcohol, Ethyl Acetate, Methylethylketone, Butyl Acetate)	VMQ PVMQ FVMQ	2 days/24°C (75°F)	-25 -45 -25	- - -	- - -	135 165 65
Ortho-Chloroethylbenzene	FVMQ	7 days/24°C (75°F)	-5	-55	-40	15
Ortho-Chlorotoluene	FVMQ	7 days/24°C (75°F)	-5	-45	-45	20
Oxylene Solvent	FVMQ	1 day/24°C (75°F)	-15	-	-	90
Perchloroethylene	FVMQ	3 days/24°C (75°F)	-10	-	-	10
	PMQ	14 days/24°C (75°F)	-10	-	-	45
	FVMQ	1 day/107°C (225°F)	-15	-	-	20
Propylenedichloride	FVMQ	5 days/49°C (120°F)	-10	-	-	55
Solvatone Solvent (Union Carbide)	VMQ	1 day/24°C (75°F)	-15	-	-	30
Stoddard Solvent	MQ VMQ PVMQ	7 days/24°C (75°F)	NR -20 -15	NR - -	NR - -	NR 160 150
Toluene	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	NR - -20 -10	NR - - -50	NR - - -35	NR 205 150 20
Toluene Vapor	PMQ	14 days/24°C (75°F)	-10	-	-	50
Turpentine	VMQ FVMQ	16 hr/24°C (75°F)	- -	- -	- -	230 15
Xylene (Xylol)	VMQ	15 min/24°C (75°F) 30 min/24°C (75°F) 1 hr/24°C (75°F) 2 hr/24°C (75°F) 5 days/24°C (75°F)	-20 -25 -30 -30 -35	- - - - -	- - - - -	40 45 60 80 135
	FVMQ	3 days/24°C (75°F) 7 days/24°C (75°F)	-10 -10	-45 -55	-35 -40	20 20

Silicone Fluids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
***200*® Fluid, 0.65 centistokes**	FVMQ	3 days/24°C (75°F) 1 day/100°C (212°F) 3 days/150°C (302°F)	-5 -5 -10	-45 - -60	-30 - -30	5 15 25
***200*® Fluid, 3 centistokes**	FVMQ	3 days/24°C (75°F) 3 days/150°C (302°F)	nil -10	-15 -30	-10 -10	nil 10
***200*® Fluid 10 centistokes**	FVMQ (40 Durometer)	3 days/23°C (73°F) 14 days/23°C (73°F) 3 days/100°C (212°F) 14 days/100°C (212°F)	-1 -2 -3 -1	-5 -9 -4 -6	3 0 3 0	0 0 1 1
***200*® Fluid, 100 centistokes**	FVMQ (40 Durometer)	3 days/23°C (73°F) 14 days/23°C (73°F) 3 days/100°C (212°F) 14 days/100°C (212°F)	-3 -4 -4 -3	3 1 6 5	7 5 10 10	0 0 0 0

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
NR - not recommended

Silicone Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Change	Hardness Change points	Tensile Change %	Elongation Change %	Volume %
***200*® Fluid 1000 centistokes.**	FVMQ (40 Durometer)	3 days/23°C (73°F) 14 days /23°C (73°F) 3 days/100°C (212°F) 14 days/100°C (212°F)	-3 -4 -5 -2	3 1 -2 0	4 2 0 5	0 0 1 0
***200*® Fluid, 60000 centistokes**	VMQ PMQ FVMQ	1 day 24°C (75°F)	-5 -5 nil	-10 -10 -10	nil -10 nil	5 5 nil
	PMQ FVMQ	3 days/24°C (75°F)	-5 nil	-15 -10	-5 -15	5 nil
	VMQ PMQ FVMQ	7 days/24°C (75°F)	-5 -10 nil	-10 -5 -5	nil -5 nil	10 10 nil
	VMQ PMQ FVMQ	1 day 150°C (302°F)	-5 -10 -5	-15 -5 -15	-10 nil -5	15 10 nil
	VMQ PMQ FVMQ	3 days/150°C (302°F)	-10 -10 -5	-15 -15 -25	-10 -10 nil	15 10 nil
	VMQ PMQ FVMQ	7 days/150°C (302°F)	-10 -10 -5	-30 nil -25	-20 -25 -15	15 15 nil
***Dow Corning*® 210 Fluid** (other side of rubber exposed to air)	FVMQ	2 mo/121°C (250°F)	NE	NE	NE	NE
***Dow Corning*® 210 H Fluid 1000 centistokes.**	FVMQ	16 hr/260°C (500°F)	-	-	-	-3
***Dow Corning*® 210 H Fluid 6000 centistokes**	75/25 VMQ/FVMQ 50/50 VMQ/FVMQ	70 hr/177°C (350°F) 70 hr/177°C (350° F)	-10 -10	-16 -13	-20 -21	11 8
***Dow Corning*® 220 Fluid**	FVMQ	2 days/150°C (302°F)	nil	-	-	10
***Dow Corning*® 510 Fluid**	MQ VMQ PVMQ	3 days/24°C (75°F)	-15 -15 -20	- - -	- - -	40 35 35
	VMQ	1 day/l50°C (302°F)	-20	-	-	35
	MQ VMQ PVMQ FVMQ	3 days/150°C (302°F)	-20 -25 -30 nil	- - - -10	- - - -15	40 45 50 nil
***Dow Corning*® 550 Fluid**	MQ VMQ PVMQ	3 days/24°C (75°F)	-5 -5 -10	- - -	- - -	5 10 10
	MQ VMQ PVMQ FVMQ	3 days/150°C (302°F)	-10 -10 -10 nil	- - - -3	- - - -15	10 10 10 nil
	VMQ	7 days/150°C (302°F)	-	-	-	10

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
NE - no effect

Silicone Fluids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
***Dow Corning*® 702 Fluid**	VMQ	1 day/150°C (302°F)	-25	-	-	60
***Dow Corning*® 703 Fluid**	VMQ	1 day/150°C (302°F)	-25	-	-	50
***Dow Corning*® 710 Fluid**	FVMQ	3 days/150°C (302°F)	nil	nil	-15	nil
	VMQ	7 days/150°C (302°F) 7 days/150°C (302°F) 7 days/200°C (392°F)	-5 -10 -10	- - -	- - -	5 5 10
***Dow Corning*® 710 Fluid**	MQ VMQ PVMQ	3 days/24°C (75°F)	-5 -5 -5	- - -	- - -	nil 5 5
	MQ VMQ PVMQ	3 days/150°C (302°F)	-10 -5 -10	- - -	- - -	5 5 10
	FVMQ	14 days/200°C (392°F)	-20	-70	10	nil
***Dow Corning*® FS-1265 Fluid**	VMQ FVMQ PVMQ	7 days/150°C (302°F)	nil -20 -5	10 -55 15	-5 -45 -10	nil 80 5

Silicone Compounds and Greases

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
***Dow Corning*® 4 Compound**	PMQ	1 day/24°C (75°F) 3 days/24°C (75°F) 7 days/24°C (75°F)	-5 -5 -5	- - -	- - -	5 10 20
	MQ VMQ PMQ	1 day/150°C (302°F)	-20 -15 -5	- - -	- - -	25 25 15
	VMQ PMQ	3 days/150°C (302°F)	- -10	- -	- -	25 25
	VMQ PMQ	7 days/150°C (302°F)	- -10	- -	- -	30 30
	PMQ	1 day/200°C (392°F) 3 days/200°C (392°F) 7 days/200°C (392°F)	-10 -20 -30	- - -	- - -	20 30 40
***Dow Corning*® 5 Compound**	MQ VMQ	1 day/150°C (302°F)	-20 -15	- -	- -	20 15
***Dow Corning*® 11 Compound**	PMQ	1 day/150°C (302°F) 3 days/150°C (302°F) 1 day/200°C (392°F) 1 day/250°C (482°F)	nil nil nil -25	- - - -	- - - -	10 10 10 nil
***Dow Corning*® 33 Grease**	FVMQ	3 days/25°C (77°F) 3 days/177°C (350°F)	-5 -11	- -	- -	4 9

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

Silicone Compounds and Greases (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
***Dow Corning*® 44L Grease**	VMQ	7 days 150°C (302°F)	-	-	-	15
***Dow Corning*® 55 Pneumatic Grease**	PMQ	3 days/93 °C (200 °F) 3 days /250°C (482°F)	-15 DT	- DT	- DT	60 DT
	VMQ	3 days/177°C (350°F)	DT	DT	DT	DT
	FVMQ	3 days/25°C (77°F) 3 days/177°C (350°F)	-5 -11	- -	- -	4 9
***Dow Corning*® Heat Sink Compound 304**	VMQ	70 hr/150°C (302°F)	-9			11
***Dow Corning*® FS-1281 Compound**	VMQ FVMQ	7 days/70°C (158° F)	-5 -10	-	- -	5 10
***Dow Corning*® FS-1292 Grease**	75/25 VMQ/FVMQ 50/50 VMQ/FVMQ	70 hr/177°C(350°F) 70 hr/177°C (350°F)	-6 -17	-11 1	-28 -6	6 16

Food Products

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Beer	VMQ FVMQ	22 hr/70°C (158°F)	nil -5	-	-	nil nil
Butter (liquid)	VMQ FVMQ	22 hr/70°C(158°F)	-5 -3	- -	- -	nil nil
Coca Cola Syrup	VMQ PVMQ FVMQ	1 day/24°C (75°F)	nil nil 5	nil 10 nil	nil 15 5	nil nil nil
	VMQ PVMQ FVMQ	28 days/24°C (75°F)	nil nil nil	-10 20 nil	-10 20 10	nil nil nil
	VMQ PVMQ FVMQ	60 days/24°C (75°F)	nil nil 5	-10 -5 -5	-10 -5 -5	nil nil nil
Coffee	VMQ	7 days/83°C(180°F) 14 days/83°C (180° F)	-5 -5	-15 -5	nil nil	nil 5
Lard	VMQ (High Strength)	1 day/200°C (392°F) 3 days/200°C (392°F) 7 days/200°C (392°F)	nil -5 BR	-35 -80 BR	-40 -75 BR	5 5 BR
	VMQ	7 days/200°C (392°F) 1 hr/260°C (500°F)	nil -10	-30 -25	-35 -20	nil 5
Mazola Oil	VMQ	7 days/150°C (302°F)	-5	-15	-10	nil
Orange Peel Oil	VMQ	1 day/24°C (75°F)	-	-	-	-100

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
BR - brittle

Food Products (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Orange Syrup	VMQ PVMQ FVMQ	1 day/24°C (75°F)	nil nil nil	nil 5 -15	5 10 5	nil nil 5
	VMQ PVMQ FVMQ	28 days/24°C (75°F)	nil nil -5	-5 15 -15	-5 25 5	nil nil nil
	VMQ PVMQ FVMQ	60 days/24°C (75°F)	nil nil -5	-5 nil -35	-10 5 -15	nil nil 5
Scotch Whisky	VMQ PVMQ FVMQ	1 day/24°C (75°F)	nil nil nil	nil nil -15	-5 5 3	nil nil 5
	VMQ PVMQ FVMQ	28 days/24°C (75°F)	nil nil -5	-5 5 -15	10 20 15	nil nil nil
	VMQ PVMQ FVMQ	60 days/24°C (75°F)	nil nil -5	-10 -10 -35	5 -5 -15	nil 5 3
Spry Shortening	VMQ	7 days/150°C (302°F)	-5	-15	-15	nil
Tab Concentrate	VMQ PVMQ FVMQ	1 day/24°C (75°F)	nil nil nil	nil nil -5	5 3 3	nil nil nil
	VMQ PVMQ FVMQ	28 days/24°C (75°F)	nil nil nil	5 5 nil	30 10 10	nil nil nil
	VMQ PVMQ FVMQ	60 days/24°C (75°F)	nil nil nil	nil -5 -10	-10 -5 -5	nil nil nil
Tia Maria Liquor	VMQ PVMQ FVMQ	1 day/24°C (75°F)	nil nil nil	nil 10 -10	5 10 3	nil nil nil
	VMQ PVMQ FVMQ	28 days/24°C (75° F)	nil nil -5	nil 10 -15	10 10 20	nil nil nil
	VMQ PVMQ FVMQ	60 days/24°C (75°F)	nil nil -5	-5 -5 -25	-5 nil -5	nil nil nil
Vegetable Oil (Kraft)	VMQ (High Strength)	1 day/200°C (392°F) 3 days/200°C (392°F) 7 days/200°C (392°F)	-5 nil -5	-30 -40 -80	-25 -45 -75	5 5 5
Vinegar	VMQ (High Strength)	1 day/24°C (75°F) 7 days/24°C (75°F)	nil nil	-5 -5	nil nil	nil nil

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups

Water and Steam

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Water	MQ VMQ PVMQ	7 days/24°C (75°F)	nil nil nil	-5 - -5	-5 - -10	5 nil nil
	MQ VMQ PVMQ	7 days/70°C (158°F)	-5 nil -5	-5 -5 -10	5 10 -5	5 nil nil
	VMQ PVMQ FVMQ	3 days/100°C (212°F)	-5 -3 nil	-5 -5 -	-15 -5 -	nil nil nil
	MQ VMQ	7 days/100°C (212°F)	-5 nil	-20 -	20 -	nil 5
	VMQ	14 days/100°C (212°F)	nil	-	-	5
	MQ	1 day/121°C (250°F) 3 days/121°C (250°F)	-5 -5	- -	- -	5 5
	FVMQ	70 hr/150°C (302°F)	-5	-	-	nil
	MQ	1 day/177°C (350°F) 3 days/177°C (350°F)	-15 DT	- DT	- DT	15 DT
Steam	MQ VMQ PVMQ	7 days/5 psi	-5 -5 -5	-25 -15 -10	5 5 10	nil 5 nil
	MQ VMQ PVMQ	14 days/5 psi	-5 -5 -5	-35 -30 -3	-10 -15 10	5 3 nil
	MQ VMQ PVMQ	7 days/10 psi	-5 -5 -5	-30 -30 -10	-10 -10 -10	5 5 nil
	MQ VMQ PVMQ	14 days/10 psi	-5 -5 -5	-35 -40 -10	-15 -20 -10	5 5 nil
	MQ VMQ PVMQ	7 days/20 psi	-5 -5 -3	-35 -35 -15	-15 -20 -15	5 3 nil
	MQ VMQ PVMQ	14 days/20 psi	-5 -5 -5	-45 -45 -20	-20 -40 -15	5 5 nil
	VMQ	1 day/50 psi 3 days/50 psi 5 days/50 psi 7 days/50 psi	-5 -5 -5 -5	-25 -30 -40 -65	-10 -5 -25 -30	5 5 5 5

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated

Water and Steam (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Steam	VMQ	1 day/65 psi 3 days/65 psi 7 days/65 psi 1 day/80 psi 3 days/80 psi 7 days/80 psi	-10 -5 -10 -10 -10 -10	-30 -50 -65 -40 -60 -75	-30 -25 -50 -10 -40 -45	5 5 5 5 10 5
	MQ	16 hr/100psi	-10	-30	25	nil
	MQ VMQ* PVMQ FVMQ	1 day/100 psi	-10 3 -5 -5	-40 -11 -25 -20	-10 -2 5 15	5 -2 nil nil
	MQ VMQ PVMQ	3 days/100 psi	-10 4 -10	-60 -25 -35	-20 -10 -5	10 -4 nil
	MQ VMQ PVMQ	7 days/100 psi	-20 6 -20	-30 -35 -75	-25 -26 -75	5 -6 nil

Acids

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Acetic Acid (5%)	VMQ	7 days/24°C (75°F)	-5	-	-	5
Acetic Acid, glacial	MQ VMQ PVMQ	7 days/24°C (75°F)	-5 -5 -5	- - -	- - -	nil 5 5
	FVMQ	2 days/24°C (75°F)	-	-	-	20
Hydrochloric Acid (5% in Perchloroelhylene)	VMQ FVMQ	1 day/100°C (212°F)	-30 -15	- -	- -	100 10
Hydrochloric Acid (10%)	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	nil -5 nil -5	 - - -25	 - - -15	nil nil nil nil
Hydrochloric Acid (18%)	FVMQ	3 days/24°C (75°F) 3 days/65°C (150°F)	nil nil	-20 -35	-10 -10	nil 10
Hydrochloric Acid (36%, concentrated)	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	PR -5 BR -5	PR - BR -45	PR - BR -30	PR 5 BR 10
Hydrofluoric Acid (48%)	PMQ	9 days/27°C (80°F)	DT	DT	DT	DT
Nitric Acid (10%)	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	nil nil nil nil	- - - -10	- - - -3	10 nil nil nil

* Data based on *Silastic*® NCP-80 and NCP-40 Silicone Rubber.

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
PR - poor
BR - brittle

Acids (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Nitric Acid (50%)	FVMQ	3 days/24°C (75°F) 3 days/65°C (150°F)	5 -10	-15 -80	-10 -30	5 5
Nitric Acid (70%, concentrated)	MQ VMQ PVMQ FVMQ	7 days/24°C (75°F)	PR 5 BR nil	PR - BR -40	PR - BR -30	PR -10 BR 5
Phosphoric Acid (10%)	MQ PMQ MQ PMQ	7 days/24°C (75°F) 7 days/100°C (212°F)	UA UA UA UA	UA UA UA UA	UA UA UA UA	UA UA UA UA
Phosphoric Acid (85%, concentrated)	MQ PMQ VMQ FMQ	7 days/24°C (75°F) 7 days/100°C (212°F)	UA UA UA 4	UA UA -39 -8	UA UA nil -9	UA UA -23 -2
Stearic Acid	MQ PMQ	7 days/100°C (212°F)	UA UA	UA UA	UA UA	UA UA
Sulfuric Acid (20%)	MQ	1 day/83°C (180°F) 7 days/83°C (180°F)	nil nil	-10 -25	-5 -15	-5 -10
Sulfuric Acid (30%)	PVMQ	2 hr/93°C (200°F)	nil	-20	-5	nil
Sulfuric Acid (50%)	FVMQ	3 days/24°C (75°F) 3 days/65°C (150°F)	nil 5	-5 -35	-5 -15	nil nil
Sulfuric Acid (95%. concentrated)	MQ VMQ FVMQ PVMQ	7 days/24°C (75°F)	DC DC DC DC	DC DC DC DC	DC DC DC DC	DC DC DC DC

Bases

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Ammonium Hydroxide (saturated)	MQ VMQ PMQ PVMQ FVMQ	7 days/24°C (75°F)	-5 nil UA nil -5	- - UA - -45	- - UA - -5	nil nil UA 0 5
Calcium Oxide (10%, saturated)	VMQ	1 day/150°C (302°F)	5	-15	-10	5
Lithium Hydroxide (2%)	VMQ	1 day/150°C (302°F)	nil	-25	-10	-5
Lithium Hydroxide (5%)	VMQ	1 day/150°C (302°F)	-10	-70	nil	-35
Lithium Hydroxide (10%, saturated)	VMQ	1 day/150°C (302°F)	DT	DT	DT	DT
Potassium Hydroxide (10%)	VMQ	1 day/150°C (302°F)	5	-20	-15	-5
Potassium Hydroxide (25%)	MQ PMQ	7 days/83°C (180°F)	nil -5	- -	- -	5 nil
Potassium Hydroxide (saturated)	VMQ	1 day/150°C (302°F)	-20	-40	-10	-10

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
BR - brittle
PR - poor
UA - unaffected
DC - decompesed

Bases (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Sodium Hydroxide (10%)	MQ VMQ PMQ PVMQ FVMQ	7 days/24°C (75°F)	-5 -5 - -5 -5	- - - - -45	- - - - -10	nil nil 5 nil nil
Sodium Hydroxide (25%)	MQ PMQ	7 days/83°C (180°F)	-5 -5	- -	- -	nil -10
Sodium Hydroxide (50%)	VMQ PMQ FVMQ	7 days/24°C (75°F)	-5 - -5	- - -10	- - 5	nil 10 nil
	PMQ	7 days/100°C (212°F)	-	-	-	15

Salts

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Copper Sulfate (50%)	PMQ	5 days/100°C (212°F)	UA	UA	UA	UA
Ferric Chloride (60%)	MQ PMQ	7 days/100°C (212°F	UA FR	UA FR	UA FR	UA FR
Sodium Carbonate (2%)	MQ VMQ PVMQ	7 days/24°C (75°F)	nil -5 5	- - -	- - -	nil nil nil
Sodium Chloride (10%)	MQ VMQ PVMQ	7 days/24°C (75°F)	nil nil 5	- - -	- - -	nil nil nil

Other Chemicals

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Acetonitrile	VMQ FVMQ	20 hr/24°C(75°F)	- -	- -	- -	nil 5
	VMQ FVMQ	168hr/150°C (302°F)	- DI	- DI	- DI	5 DI
Ammonia	MQ VMQ PVMQ	7 days/24°C (75°F)	nil -10 -5	- - -	- - -	nil nil 5
	VMQ FVMQ	24hr/110°C(230°F) 300 lb. pressure	- DT	260 DT	200 DT	- DT
Aniline	FVMQ	7 days/24°C (75°F)	nil	-30	-15	5
Bromine (liquid)	MQ	7 days/24°C (75°F)	25	-	-	15
Butylene Oxide	MQ PMQ	1 day/24°C (75°F)	- -	- -	- -	20 40
Calcium Silicate (10%. saturated)	VMQ	1 day/150°C (302°F)	nil	nil	nil	5
Caprolactam Monomer	VMQ FVMQ	3 days/24°C (75°F)	nil -5	-20 -20	-10 nil	nil nil

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
UA - unaffected
FR - fair
DI - disintegrated

Other Chemicals (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
1-Chlorodecane	FVMQ	7 days/24°C (75°F)	-5	-20	-20	10
Dimethyl Formamide	FVMQ	1 day 24°C (75°F)	DT	DT	DT	DT
	MQ PMQ	7 days/24°C (75°F)	nil nil	- -	- -	2 2
Dioctyl Phthalale	VMQ	3 days/70°C (158°F) 6days/70°C (158°F) 70 hr/150°C (302°F)	-1 -5 -15	-10 -16 -4	-12 -9 8	10 11 13
	FVMQ	70 hr/150°C (302°F)	-9	-13	-13	7
Dowtherm 209 (Dow) (50/50 Water)	VMQ	14 days/100°C (212°F)	2	-7	-17	nil
Elhylene Glycol	FVMQ	7 days/24°C (75°F)	nil	-10	-10	nil
Elhylene Glycol (60%)	MQ	7 days/135°C (275°F)	-25	-	-	20
Ethylene Glycol (50%)	VMQ FVMQ	7 days/83°C (180°F)	nil nil	nil -5	10 5	nil nil
	VMQ	70 hr/100°C (212°F) 7 days/100°C (212°F) 14 days/100°C (212°F)	-1 -7 -4	-4 -5 -10	nil 2 -12	1 nil 1
	PVMQ	7 days/121 °C (250°F)	-5	-	-	5
Ethylene Glycol Mixture (⅓ Ethylene Glycol; ⅓ EthylAlcohol: ⅓ Water)	VMQ	7 days/100°C (212°F)	-1	-2	2	5
Ethylene Oxide	MQ	3 days/24°C (75°F)	-	-	-	25
	FVMQ	7 days/24°C (75°F)	-15	-75	-60	100
	VMQ	7 days/71°C (160°F)	-30	-70	-65	95
	MQ	14 days/71°C (160°F)	-	-	-	45
	PVMQ	32hr/110°C (230°F)	nil	-25	-30	nil
Freon 11 (DuPont)	VMQ PVMQ FVMQ	3 days/24°C (75°F)	- - -	- - -	- - -	175 260 30
Freon 12 (DuPont)	VMQ PVMQ FVMQ	3 days/24°C (75°F)	- - -	- - -	- - -	150 195 45
Freon 21 (DuPont)	MQ	7 days/-55°C (-67°F) 7 days/24°C (75°F)	-5 -15	- -	- -	225 165
Freon 22 (DuPont)	MQ FVMQ MQ VMQ	7 days/-55°C (-67°F) 3 days/24°C (75°F) 7 days/24°C (75°F)	-10 - -5 -5	- - - -	- - - -	110 205 75 75

MQ - methyl groups only **P - phenyl groups** **DT - deteriorated**
V - vinyl groups **F - fluorine-containing groups**

Other Chemicals (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Freon 113 (DuPont)	MQ	7 days/-55°C (-67°F) 7 days/24°C (75°F)	-5 -5	- -	- -	200 150
Freon 114 (DuPont)	VMQ PVMQ FVMQ	3 days/24°C (75°F)	- - -	- - -	- - -	130 135 25
HMS 20-1083	VMQ PVMQ	3 days/24°C (75°F)	-20 -15	- -	- -	125 100
Hydrazine (Anhydrous)	FVMQ	3 days/24°C (75°F)	ES	ES	ES	ES
Hydrogen Peroxide (3%)	PMQ	7 days/24°C (75°F)	UA	UA	UA	UA
Hydrogen Peroxide (30%)	PMQ	7 days/24°C (75°F)	UA	UA	UA	UA
Hydrogen Peroxide HTP (90%)	FVMQ	7 days/65°C (150°F)	nil	-20	-15	5
Isopropyl Nitrate	FVMQ	7 days/24°C (75°F)	-	-	-	200
Methyl Methacrylate	VMQ FVMQ	4 hr/25°C (77°F)	- -	- -	- -	106 104
Molybdenum Disulfide	VMQ PVMQ FVMQ	3 days/24°C (75°F)	nil nil nil	- - -	- - -	nil nil nil
	VMQ PVMQ FVMQ	3 days/150°C (302°F)	nil nil 5	- - -	- - -	nil nil nil
Monoethanolamine	VMQ	70 hr/24°C (75°F) 70 hr/38°C (100°F)	nil -5	-20 -25	5 5	nil 5
	VMQ FVMQ	70 hr/121°C (250°F|	-25 DT	-80 DT	-5 DT	5 DT
Pentachlorophenol (10% in Ethanol)	PMQ	7 days/24°C (75°F)	-	-	-	5
Phenol (70%)	MQ	7 days/100°C (212°F)	-30	-	-	5
Phenol (85%)	MQ	7 days/24°C (75°F)	-10	-	-	10
Phthalic Acid Anhydride	MQ	7 days/149°C (300°F)	5	-	-	nil
Phthalic Anhydride	MQ VMQ FVMQ	1 day/200°C (392°F)	nil nil nil	- - -	- - -	nil nil nil
	MQ VMQ FVMQ	5 days/200°C (392°F)	-2 nil -2	- - -	- - -	nil nil 7
	MQ VMQ FVMQ	7 days 200°C (392°F)	-2 nil 2	- - -	- - -	2 nil 7

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
UA - unaffected
ES - excessive swell

Other Chemicals (Cont.)

Immersion Medium	ASTM Destination for Type of *Silastic*® brand Rubber	Immersion Conditions	Hardness Change points	Tensile Change %	Elongation Change %	Volume Change %
Polyglycol (Dow 80-6)	VMQ PVMQ	7 days/24°C (75°F)	-5 -5	- -	- -	5 5
	MQ VMQ	7 days/12°C (250T)	-5 -10	- -	- -	5 5
Polystyrene (expandable)	VMQ	7 days/24°C (75°F)	nil	5	10	nil
Propylene Oxide	MQ	7 days/24°C (75°F)	-20	-	-	150
RX-1099 (Vinyl Plastisol)	VMQ FVMQ	7 days/24°C (75°F)	-5 -5	- -	- -	10 5
Salicylanilide (10% in 2 B Ethanol)	PMQ	7 days/24°C (75°F)	-	-	-	5
Santicizer 141 (Monsanto)	VMQ PVMQ FVMQ	70 hr/150°C (302°F)	DT DT DT	DT DT DT	DT DT DT	DT DT DT
Styrene Monomer	PVMQ	1 hr/24°C (75°F) 1 hr/100°C (212°F)	-10 -20	- -	- -	55 115
Sulfur (molten)	PMQ	7 days/121°C (250°F)	UC	UC	UC	UC
	VMQ	4 days/199°C (390°F)	-22	DT	DT	DT
Sulfur Dioxide (dry gas)	MQ VMQ PVMQ	7 days/24°C (75°F)	nil -5 nil	- - -	- - -	nil nil nil
Sulfur Dioxide (liquid)	MQ	7 days/24°C (75°F)	nil	-	-	5
Sulfur Hexafluoride	VMQ FVMQ	1 day/150°C (302°F)	nil nil	- -	- -	nil nil
	VMQ FVMQ	2 days/199°C (390°F)	nil 5	- -	- -	nil nil
	VMQ FVMQ	3 days/199°C (390°F)	nil 5	- -	- -	nil nil
Tar	PMQ	7 days/100°C (212°F)	nil	-	-	10
Tetrahydrofuran (Tetramethylene Oxide)	VMQ FVMQ	1 day/25°C (77°F)	- -	- -	- -	260 170
Trichloroethylene	FVMQ	1 day/24°C (75°F)	-10	-	-	25
	MQ	7 days/24°C (75°F)	-	-	-	250
	FVMQ	5 days/49°C (120°F)	-10	-	-	20
Trifluorochloroethylene	MQ	7 days/-58°C (-65 °F)	-20	-	-	100

MQ - methyl groups only
V - vinyl groups
P - phenyl groups
F - fluorine-containing groups
DT - deteriorated
UC - unchanged

Your Global Connection

Dow Corning has sales offices, manufacturing sites, as well as science and technology laboratories around the globe. Telephone numbers of locations near you are available on the world wide web at **www.dowcorning.com**, or by calling one of our primary locations listed below.

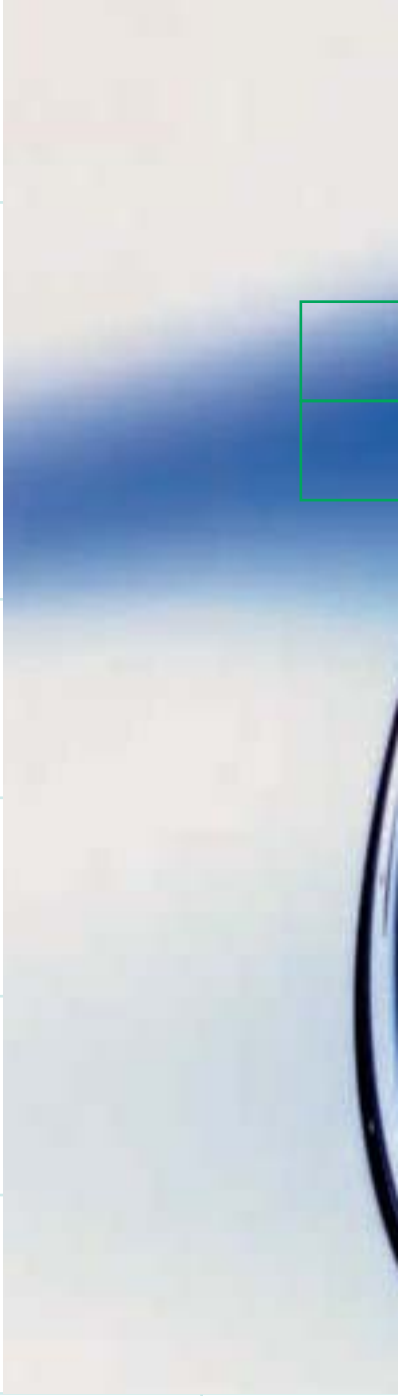
North American and Corporate Headquarters
Dow Corning Corporation
Phone: +1 989 496 4000

Brazil Region
Dow Corning do Brasil Ltda.
Phone: +55 11 3759 4300

Mexico Region
Dow Corning de Mexico S.A. de C.V.
Phone: +525 327 1300

European Area Headquarters
Dow Corning SA
Business & Technology Centre
Phone: +32 64 888 000

Asian Area Headquarters
Dow Corning Toray Silicone Co., Ltd.
Phone: +81 3 3287 1011



Cover photo - AV03384

Form No. 45-0113C-01

DOW CORNING

We help you invent the future.™

www.dowcorning.com