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Elastomer Compatibility of P-80® Temporary Assembly Lubricants At Room Temperature

CONCLUSION: While there are no standard specifications for excessive swell and hardness data, minimal changes are regarded as between -5 to +20% and -5 to +10 points, respectively¹. (Vecchio, 2001) Based on these criteria, P-80 lubricants have acceptable swell and hardness compatibility results after 10 days. Mass compatibility results are favorable compared to the tap water control samples.

Customers are encouraged to conduct their own tests before using P-80 lubricants.

ELASTOMER	PROPERTY	1 Day, %Δ					10 Days, %Δ				
		P-80 EMULSION	P-80 THIX	P-80 GRIP-IT	P-80 REDI-LUBE	Tap Water	P-80 EMULSION	P-80 THIX	P-80 GRIP-IT	P-80 REDI-LUBE	Tap Water
Buna N	%Δ Mass	+0.2	+0.2	+0.2	+0.9	+0.1	+0.9	+0.8	+0.7	+3.5	+0.2
	Δ Hardness, pts	+1.8	+0.2	-1.0	-1.0	+1.2	+0.5	-1.5	-1.2	-3.0	+2.7
	%Δ Swell	0.0	-0.3	+0.9	+0.1	+0.1	-0.2	-0.3	+0.1	+2.2	-0.8
Butyl	%Δ Mass	+0.1	+0.1	0.0	+0.5	0.0	+0.4	+0.5	+0.2	+2.1	+0.1
	Δ Hardness, pts	+0.7	-0.7	-4.3	-2.0	-0.3	-2.1	-1.7	-1.2	-1.7	-0.5
	%Δ Swell	+0.1	+0.5	-0.1	+0.3	+0.2	-0.5	+0.7	-1.1	+2.2	-0.2
ECH	%Δ Mass	+0.4	+0.6	+0.7	+1.1	+0.4	+1.1	+1.2	+2.2	+2.2	+1.4
	Δ Hardness, pts	-0.7	-0.3	-4.0	+0.5	+4.7	-4.0	-4.3	-1.3	-1.0	+4.8
	%Δ Swell	-0.5	-0.3	-0.1	+0.1	+0.3	-0.2	-0.2	+0.6	+0.4	+0.8
EPDM	%Δ Mass	+0.1	+0.1	0.0	+0.7	0.0	0.0	+0.6	+0.2	+2.6	+0.1
	Δ Hardness, pts	-1.8	-2.3	-3.7	-0.8	-1.5	-2.5	-5.3	-4.5	-1.8	-3.3
	%Δ Swell	+0.2	-0.3	+0.4	+0.2	-0.8	+0.2	-0.2	+0.8	+0.9	-0.8
Natural Gum Rubber	%Δ Mass	+0.1	+0.2	+0.4	+0.9	+0.1	+0.8	+1.2	+1.5	+4.4	+0.2
	Δ Hardness, pts	-1.8	-1.2	-2.2	-0.8	+1.3	-1.3	-3.3	-3.0	-3.8	-0.7
	%Δ Swell	-0.1	-0.7	+0.5	+0.7	+0.0	-0.2	-0.6	+0.7	+1.7	+0.1
Neoprene	%Δ Mass	+0.2	+0.3	+0.4	+1.1	+0.1	+1.2	+1.4	+1.5	+4.3	+0.5
	Δ Hardness, pts	-2.2	+0.5	-2.7	-2.3	-1.7	-4.7	-3.7	-4.7	-6.5	-3.5
	%Δ Swell	-0.1	+0.3	+0.8	0.0	+0.1	+0.8	+0.6	+1.1	+2.8	-0.1
SBR	%Δ Mass	+0.2	+0.3	+0.2	+1.1	+0.1	+1.0	+1.2	+0.6	+4.2	+0.2
	Δ Hardness, pts	-2.8	-0.2	-2.2	-2.3	+4.0	-9.0	-2.0	-5.8	-7.8	+1.8
	%Δ Swell	+0.1	+0.3	-0.1	+1.4	+0.1	+1.5	+1.2	+0.5	+5.2	+0.1
Silicone	%Δ Mass	+0.3	+0.2	+0.1	+1.2	0.0	+0.9	+1.0	+0.6	+4.9	0.0
	Δ Hardness, pts	-2.2	+0.2	+1.0	-4.1	+0.7	-1.3	-0.3	+5.3	+4.2	-0.7
	%Δ Swell	-0.1	+0.6	0.0	+0.2	+0.4	+0.7	+0.9	+0.3	+5.0	+0.6
Viton	%Δ Mass	+0.1	+0.1	0.0	+0.1	0.0	+0.2	+0.3	+0.2	+1.1	+0.1
	Δ Hardness, pts	-2.2	-1.3	-1.0	-3.8	+1.3	-2.7	-3.0	-3.5	-1.8	-0.5
	%Δ Swell	-0.1	-0.3	+0.5	-0.5	-0.1	-0.5	0.0	+0.4	+0.8	+0.6

Repeatability Precision

Instrument	Instrument Capability	Typical Average Measurements + Std. Dev	Coefficient of Variation
Micrometer	0.001 mm	1.613 + 0.002	0.1%
Shore A Durometer	1 – 100 A Units	32.3 + 0.6	2.0%
Analytical Balance	0.0001 g	16.9482 + 6.7E-5	4.0E-6%

Modified version of ASTM D471
Coupons were soaked at room temperature for 10 days. Measurements were recorded at the specified time periods.

Vecchio, R.D. (2001). Physical Testing. In K. & Baranwal, *Basic Elastomer Technology* (pp. 218-219). Baltimore: Rubber Division, American Chemical Society.