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## RESEARCH & DEVELOPMENT LABORATORY REPORT

### TITLE

Evaluation of Parker Compound FF400-80

### DATE

May 10, 2013


### REFERENCE

LTR93341

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Research & Development Laboratory Report  
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- TITLE:** Evaluation of Parker Compound FF400-80
- OBJECTIVE:** Provide basic mechanical properties for new compound FF400-80
- METHODS:** The following standard ASTM test methods were used to measure the original physical properties, compression set, chemical compatibility, and TR-10 and glass transition. ASTM D1414, ASTM D395, ASTM D471, ASTM E1356, and ASTM D1329
- DISCUSSION:** Parker compound FF400-80 in the nomenclature described in ASTM D1418 as an FFKM material. The subject compound exhibits very low temperature performance as determined by the TR-10 and the glass transition via differential scanning calorimeter. Additionally, the subject compound has very good compression resistance up to 250 °C. FF400-80 also exhibits good chemical compatibility in the fluids tested. (Table 1)
- CONCLUSIONS:** Parker compound FF400-80 is a new low temperature FFKM developed for demanding applications in aggressive chemical environments that require good to excellent low temperature performance. The steam and ethylene di-amine were chosen as the test media due to their aggressive behavior towards FFKM materials, as seen in the data FF400-80 performs very well in steam and reasonably well in ethylene di-amine. In summary FF400-80 offers excellent low temperature performance and very good compression set resistance up to 250 °C

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Table 1

<u>Original Physical Properties</u>	<u>Test Method</u>	<u>Test Results</u>
Hardness, Shore A, pts.	ASTM D2240	82
Tensile Strength, psi	ASTM D1414	1354
Ultimate Elongation, %	ASTM D1414	188
Modulus at 25% Elongation, psi	ASTM D1414	251
Modulus at 50% Elongation, psi	ASTM D1414	414
Modulus at 75% Elongation, psi	ASTM D1414	620
Modulus at 100% Elongation, psi	ASTM D1414	844
Specific Gravity	ASTM D297	1.85
<b>Compression Set</b>		
<b><u>70 hrs. @ 200°C</u></b>		
Percent of Original Deflection, max	ASTM D395 Method B	25
<b>Compression Set</b>		
<b><u>70 hrs. @ 230°C</u></b>		
Percent of Original Deflection, max	ASTM D395 Method B	27
<b>Compression Set</b>		
<b><u>70 hrs. @ 250°C</u></b>		
Percent of Original Deflection, max	ASTM D395 Method B	29
<b>Fluid Immersion</b>		
<b><u>Steam, 70 hrs @ 121°C</u></b>		
	ASTM D471	
Hardness Change, pts.		+2
Tensile Strength change, psi		+11
Ultimate Elongation change, %		+5
Modulus at 25% Elongation change, psi		+4
Modulus at 50% Elongation change, psi		+8
Modulus at 75% Elongation change, psi		+9
Modulus at 100% Elongation change, psi		+9
Volume Change, %		-0.1
<b>Fluid Immersion</b>		
<b><u>Ethylene Diamine, 70 hrs @ 90°C</u></b>		
	ASTM D471	
Hardness Change, pts.		-10
Tensile Strength change, psi		-47
Ultimate Elongation change, %		+38
Modulus at 25% Elongation change, psi		-44
Modulus at 50% Elongation change, psi		-45
Modulus at 75% Elongation change, psi		-53
Modulus at 100% Elongation change, psi		-58
Volume Change, %		+23
<b>Low Temperature</b>		
TR-10, °C	ASTM D1329	-30
<b>Glass Transition by DSC °C</b>	ASTM E1356	-35

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