

3M Science.
Applied to Life.™

Formulated to help give you a head start.

Starter recipes of 3M™ Dyneon™ Fluoroelastomers

Our starter compound recipes are engineered within
desirable property windows for automotive applications
– to help give you a competitive edge.



**We've started three key formulations –
you can take the wheel and fine-tune them from here.**

Getting fluoroelastomer formulations just right for automotive applications isn't just time-consuming – it also requires a lot of knowledge about cure chemistries, molding and processing techniques, and the interaction of additives and fillers.

That's why we developed starter compound recipes with 3M™ Dyneon™ Fluoroelastomers. With fundamental additives already mixed in, they'll give you a good head start on your next automotive-grade formulations.



High Temp: -15°C to +225°C

Mid Temp: -25°C to 180°C

Low Temp: -29°C to 200°C



Connect with a 3M expert at [3M.com/FKMauto](https://www.3m.com/FKMauto)

**The experts at 3M go the extra mile for you ...
so that you can go the extra mile for your customers.**

These are *starter* compound recipes, but 3M's experienced Application Engineers are with you to the finish. They'll help you refine your formulations to meet demanding OEM requirements. They'll also help you troubleshoot production challenges like material cure and mold release, to help you optimize both the quality of your parts and the efficiency of your processing.



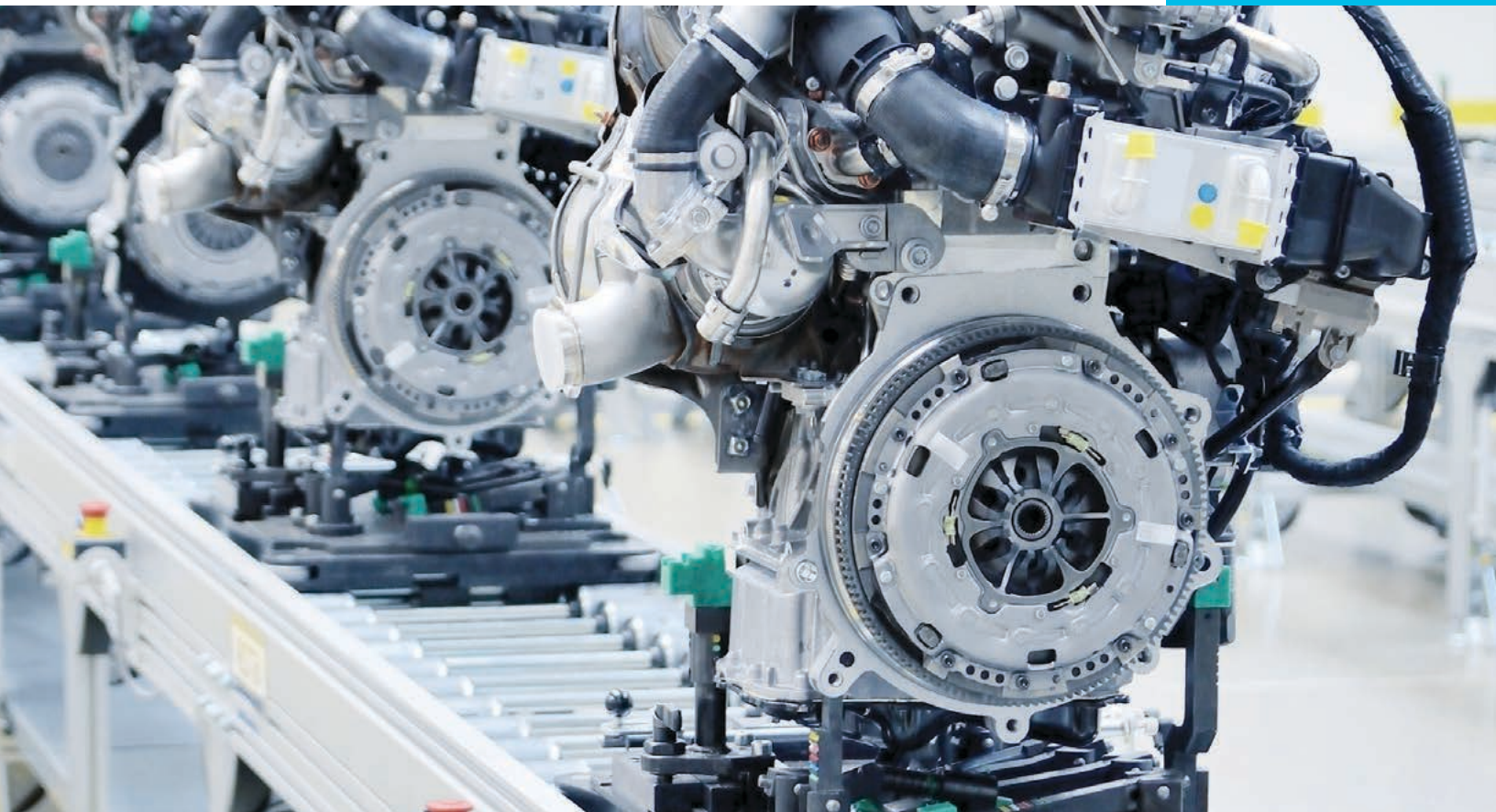
High chemical
resistance



Broad service
temperature range
in 3 grades: low,
medium and
high temp



Versatile processing:
injection and transfer
molding, extrusion,
and calendaring



**Low Temp: -29°C to 200°C**

For sealing applications down to -29°C with oil exposure, i.e. oil pan and strainer seals.

Low-Temperature Compound with 3M™ Dyneon™ LTFE 6320

Press Cure Conditions	ASTM D3183	min/°C	10/177
Post Cure Conditions		min/°C	240/232

Characteristics Measured	Measurement Method	Units	Results
Original Properties			
Hardness	ASTM D2240	Shore A	72
Hardness	ASTM D1415	IRHD	74
Density	ASTM D297	g/cm³	1.76
Tensile	ASTM D412, Die C	MPa	11.0
50% Modulus		MPa	2.9
Elongation		%	190
Cold Resistance	ASTM D1329, TR-10	°C	-30.7
Tear, Die C	ASTM D624, Die C	kN/m	30
Thermal Resistance Behavior			
1008 Hours @200°C	ASTM D573		
Change in Tensile	SAE J2236	%	+24
Change in Elongation			0
1008 Hours @180°C	ASTM D573		
Change in Tensile	SAE J2236	%	N/A
Change in Elongation			N/A
Compression Set			
168 Hours @200°C, Air	ASTM D395, method B, molded Button	%	20
168 Hours @175°C, Air			N/A
Compression Stress Relaxation, in Air, Manual Fixture			
1512 Hours @200°C, 15% Deflection, Air	GMW 17113 and SAE J2979	%RF	14
1512 Hours @180°C, 15% Deflection, Air			N/A
Fluid Resistance Characteristics			
Fuel in Oil	GMW 16678, E-A		
336 Hours @120°C, GMW 16678 E-A			
Change in Tensile	ASTM D412, Die C	%	N/A
Elongation			
Volume Change			
Fuel in Oil	GMW 16678, M-A		
336 Hours @120°C, GMW 16678 M-A			
Change in Tensile	ASTM D412, Die C	%	N/A
Change in Elongation			N/A
Volume Change			N/A
Oil Resistance	ASTM D471		
336 Hours @175°C, SF 105			
Change in Hardness	ASTM D2240	IRHD	+3
Change in Tensile	ASTM D412, Die C	%	-40
Change in Elongation			-39
Volume Change			+1.3
Coolant Resistance	ASTM D471		
336 Hours @180°C, GMW16955 Fluid E			
Change in Tensile	ASTM D412, Die C	%	N/A
Change in Elongation			N/A
Volume Change			N/A

**Mid Temp: -25°C to 180°C**

For sealing applications down to -25°C in coolant systems.

Mid-Temperature Compound with 3M™ Dyneon™ LTFE 6320/FPO 3820

Press Cure Conditions	ASTM D3183	min/°C	10/177
Post Cure Conditions		min/°C	240/232

Characteristics Measured	Measurement Method	Units	Results
Original Properties			
Hardness	ASTM D2240	Shore A	70
Hardness	ASTM D1415	IRHD	73
Density	ASTM D297	g/cm³	1.79
Tensile	ASTM D412, Die C	MPa	13.1
50% Modulus		MPa	2.5
Elongation		%	235
Cold Resistance	ASTM D1329, TR-10	°C	-28.5
Tear, Die C	ASTM D624, Die C	kN/m	30.4
Thermal Resistance Behavior			
1008 Hours @200°C	ASTM D573		
Change in Tensile	SAE J2236	%	+32
Change in Elongation			0
1008 Hours @180°C	ASTM D573		
Change in Tensile	SAE J2236	%	+22
Change in Elongation			-9
Compression Set			
168 Hours @200°C, Air	ASTM D395, method B, molded Button	%	N/A
168 Hours @175°C, Air			12
Compression Stress Relaxation, in Air, Manual Fixture			
1512 Hours @200°C, 15% Deflection, Air	GMW 17113 and SAE J2979	%RF	N/A
1512 Hours @180°C, 15% Deflection, Air			22
Fluid Resistance Characteristics			
Fuel in Oil	GMW 16678, E-A		
336 Hours @120°C, GMW 16678 E-A			
Change in Tensile	ASTM D412, Die C	%	N/A
Elongation			N/A
Volume Change			N/A
Fuel in Oil	GMW 16678, M-A		
336 Hours @120°C, GMW 16678 M-A			
Change in Tensile	ASTM D412, Die C	%	N/A
Elongation			
Volume change			
Oil Resistance	ASTM D471		
336 Hours @175°C, SF 105			
Change in Hardness	ASTM D2240	IRHD	N/A
Change in Tensile	ASTM D412, Die C	%	N/A
Change in Elongation			N/A
Volume Change			N/A
Coolant Resistance	ASTM D471		
336 Hours @180°C; GMW16955 Fluid E			
Change in Tensile	ASTM D412, Die C	%	-59
Change in Elongation			-26
Volume Change			+11

**High Temp: -15°C to +225°C**

For sealing applications up to 225°C in fuel, engine and driveline systems in both gasoline and diesel engines (i.e. valve stem seals, fuel tank and line seals, air intake system seals).

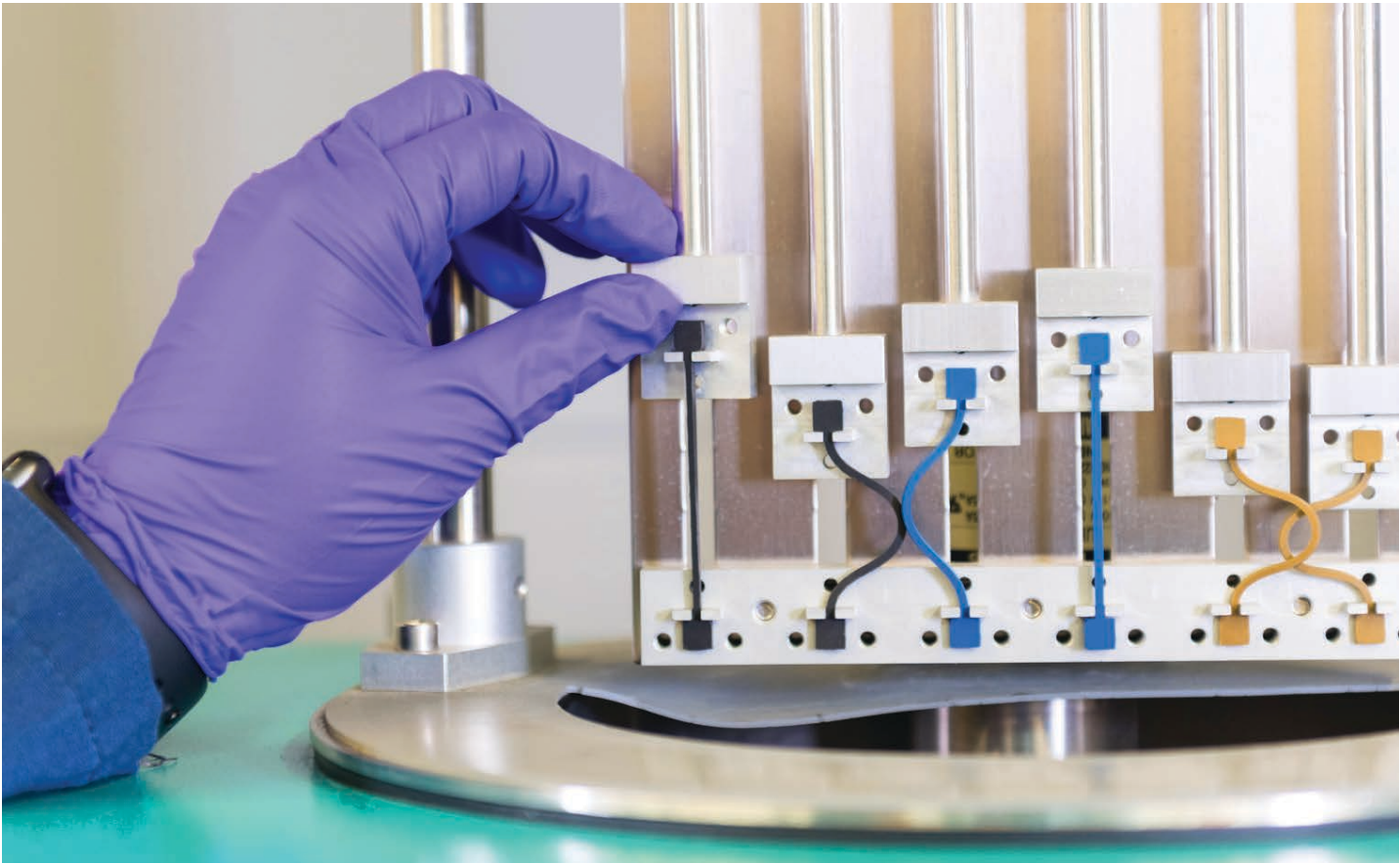
High-Temperature Compound with 3M™ Dyneon™ FPO 3620

Press Cure Conditions	ASTM D3183	min/°C	10/177
Post Cure Conditions		min/°C	240/232

Characteristics Measured	Measurement Method	Units	Results
Original Properties			
Hardness	ASTM D2240	Shore A	70
Hardness	ASTM D1415	IRHD	72
Density	ASTM D297	g/cm³	1.83
Tensile	ASTM D412, Die C	MPa	13.5
50% Modulus		MPa	2.5
Elongation		%	237
Cold Resistance	ASTM D1329, TR-10	°C	-16.4
Tear, Die C	ASTM D624, Die C	kN/m	30.5
Thermal Resistance Behavior			
1008 Hours @200°C	ASTM D573		
Change in Tensile	SAE J2236	%	N/A
Change in Elongation			N/A
1008 Hours @180°C	ASTM D573		
Change in Tensile	SAE J2236	%	N/A
Change in Elongation			N/A
Compression Set			
168 Hours @200°C, Air	ASTM D395, method B, molded Button	%	N/A
168 Hours @175°C, Air			13
Compression Stress Relaxation, in Air, Manual Fixture			
1512 Hours @200°C, 15% Deflection, Air	GMW 17113 and SAE J2979	%RF	N/A
1512 Hours @180°C, 15% Deflection, Air			14
Fluid Resistance Characteristics			
Fuel in Oil	GMW 16678, E-A		
336 Hours @120°C, GMW 16678 E-A			
Change in Tensile	ASTM D412, Die C	%	-24
Elongation			212
Volume Change	ASTM D471		+2.2
Fuel in Oil	GMW 16678, M-A		
336 Hours @120°C, GMW 16678 M-A			
Change in Tensile	ASTM D412, Die C	%	-29
Elongation			206
Volume change	ASTM D471		+2.8
Oil Resistance	ASTM D471		
336 Hours @175°C, SF 105			
Change in Hardness	ASTM D2240	IRHD	+6
Change in Tensile	ASTM D412, Die C	%	-53
Change in Elongation			-57
Volume Change	ASTM D471		+1.8
Coolant Resistance	ASTM D471		
336 Hours @180°C; GMW16955 Fluid E			
Change in Tensile	ASTM D412, Die C	%	N/A
Change in Elongation			N/A
Volume Change	ASTM D471		N/A

Compound Formulations

Material	Compound Formulation (phr)		
	Low Temp	Mid Temp	High Temp
3M™ Dyneon™ FPO 3620	–	–	100
3M™ Dyneon™ FPO 3820	–	20	–
3M™ Dyneon™ LTFE 6320	100	80	–
N990 Carbon Black	30	23	16
Austin Black	18	14	14
ZnO	3	3	3
TAIC DLC-A	3.5	3.5	3.5
DBPH-50	2	2	2
Total:	156.5	145.5	138.5



Stay aligned with your customers ... today and down the road.

The ability for you to meet a customer’s specs – no matter how challenging the application – positions you as a supplier aligned with their success. After all, you’re not just providing high-performance parts: you’re helping deliver the peak automotive experience their brand is recognized for. That means ongoing opportunities for new fluoroelastomer applications.

Whatever your challenge, our application engineering team is always here to help – and to put our expertise to work for you.

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