

3M Advanced Materials Division

3M™ Dyneon™ Fluoroelastomer FPO 3820

Features and Benefits

- High fluorine content
- Low viscosity
- No metal oxides required for cure
- Process targets: injection molding, compression and transfer molding, extrusion, calendaring
- Excellent resistance against chemical fluids
- Good physical properties right out of the press

Typical Applications

- Suitable for hoses, such as fuel line hoses and blow-by gas hoses
- Molded goods

Note: Data in this document are not for specification purposes.

Typical Properties

Property	Units	Value
Color		White to Light Brown
Fluorine Content	%	70.1
Mooney Viscosity	MU	Approximately 24
Solubility		Ketones and Esters
Specific Gravity	%	1.89
Tg	°C(°F)	-6 (21)

Product Description

3M™ Dyneon™ Peroxide Cure Fluoroelastomer FPO 3820 is a terpolymer of vinylidene fluoride, hexafluoropropylene, and tetrafluoroethylene plus cure site monomer.

Processing Guidelines

Dyneon fluoroelastomer FPO 3820 can be compounded using standard water cooled internal mixers or two-roll mills with standard fillers and ingredients utilized in typical fluoroelastomer formulations. The dry ingredients should be blended before adding to the masticated gum. For best results, Dyneon fluoroelastomer FPO 3820 should be banded on the mill several minutes prior to adding the blended dry ingredients. Low mooney and medium mooney grades can be blended to achieve desired viscosity.

Delivered Product Form

FPO 3820 is packaged in crumb form and is available in 25 kg (55 lbs) boxes, comprised of 2 individual polyethylene bags containing 12.5 kg (27.5 lbs) of product. Larger quantities are available in 675 kg (1485 lbs) boxes, comprised of 54 individual polyethylene bags containing 12.5 kg (27.5 lbs) of product. Due to the nature of crumb material, product color may vary within a bag and between bags and lots. It is typical to see variations of opaqueness and color due to product cold flow.

Note: Package size(s) may vary by region.

ISO Registrations

All Dyneon fluoroelastomers are manufactured at ISO 9001 and 14001 registered facilities.

Safety/Toxicology

Follow recommended handling precautions for use of Dyneon fluoroelastomers from 3M. General handling precautions include; (1) Store and use all Dyneon fluoroelastomers only in well-ventilated areas; (2) Do not smoke in areas contaminated with dust from Dyneon fluoroelastomers; (3) Avoid eye contact; (4) After handling Dyneon fluoroelastomers, wash any contacted skin with soap and water.

Potential hazards, including evolution of toxic vapors, do exist during compounding or processing under high-temperature conditions. Before processing Dyneon fluoroelastomers, consult the product Safety Data Sheet (SDS) and follow all label directions and handling precautions. You should also read and follow all directions from other compound ingredient suppliers. Refer to the Dyneon fluoroelastomer safety data sheet for additional safety information.

Typical Properties of Vulcanizate

Compound	Amount (in parts/100) With ZnO	Amount (in parts/100) Without ZnO
3M™ Dyneon™ Fluoroelastomer FPO 3820	100	100
TAIC®-DLCA (72%)	2.5	2.5
Varox® DBPH-50	1.5	1.5
ZnO	3	0
Carbon Black N-990	30	30

Typical Rheological Properties [ASTM D5289]

Moving Die Rheometer (MDR) 100 cpm, 0.5° Arc
12 Minutes @ 177°C (351°F)

Property	Units	With ZnO	Without ZnO
ML, Minimum Torque	dNm (in-lb)	0.8 (0.7)	0.8 (0.7)
MH, Maximum Torque	dNm (in-lb)	27.9 (24.7)	27.6 (24.4)
ts2, Time to 2 Inch-lb Rise from Minimum	Minutes	0.47	0.46
t'50, Time to 50% Cure	Minutes	0.72	0.71
t'90, Time to 90% Cure	Minutes	1.34	1.35

Typical Physical Properties [ASTM D412 Method A, Die D]

Press Cure 10 Minutes @ 177°C (351°F)

Property	Units	With ZnO	Without ZnO
Durometer Type A Hardness [ASTM D2240]	Points	71	70
Tensile	MPa (psi)	18.0 (2614)	17.2 (2497)
Elongation at Break	%	258	248
100% Modulus	MPa (psi)	5.4 (778)	5.0 (721)

Typical Physical Properties [ASTM D412 Method A, Die D]

Press Cure 10 Minutes @ 177°C (351°F)

Post Cure 4 Hours @ 232°C (450°F)

Property	Units	With ZnO	Without ZnO
Durometer Type A Hardness [ASTM D2240]	Points	71	70
Tensile	MPa (psi)	23.5 (3415)	24.3 (3525)
Elongation	%	237	234
100% Modulus	MPa (psi)	6.0 (871)	5.6 (808)

Heat Resistance [ASTM D573]

Press Cure 10 Minutes @ 177°C (351°F)

Post Cure 4 Hours @ 232°C (450°F)

Property	Units	With ZnO	Without ZnO
70 Hours @ 200°C (392°F)			
Change in Hardness	Points	0	1
Change in Tensile Strength	%	1	-1
Change in Ultimate Elongation	%	-1	-6
70 Hours @ 232°C (450°F)			
Change in Hardness	Points	1	0
Change in Tensile Strength	%	0	-16
Change in Ultimate Elongation	%	7	-2

Compression Set Resistance

Press Cure 10 Minutes @ 177°C (351°F)

Post Cure 4 Hours @ 232°C (450°F)

Test Conditions	Sample Tested	Units	With ZnO	Without ZnO
70 Hours @ 200°C (392°F) ASTM D1414	-214 O-ring	%	26	30
22 Hours @ 150°C (302°F) VDA 675 218	15 × 2 mm Disc	%	40	41

Low Temperature [ASTM D1329]

		With ZnO	Without ZnO
TR10	°C (°F)	-	-4.6 (23.7)

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