product information

AFLAS® PM-3000

Semi-commercialized Grade

DESCRIPTION

AFLAS® FFKM Series is a new perfluoroelastomer product line classified as an **FFKM.** AFLAS PM-3000 is a semi-commercialized elastomer having the chemical structure derived from tetrafluoroethylene and perfluoroalkylvinylether. This chemical structure offers outstanding resistance to chemicals, oils, solvents, and more. PM-3000 is a peroxide-curable perfluoroelatomer.

CHARACTERISTICS

- Appearance = translucent white
- Specific gravity = 2.05
- Storage modulus (G') = 480 kPa @ 1Hz frequency via RPA at 100°C
- Mooney viscosity ML1+4 (121°C) = 80

MATERIAL FEATURES

- Outstanding chemical resistance
- Superior oil resistance
- Outstanding solvent resistance
- Excellent heat resistance
- Excellent compression set
- Exceptional mechanical strength
- Excellent processability

END USER BENEFITS

- Highly suitable for extremely harsh and aggressive chemical environments
- Hot service temperature at 250°C, with peak exposure of 270°C
- Can be compounded to be highly resistant to rapid gas decompression (e.g NORSOK)

TYPICAL APPLICATIONS

- O-rings
- Gaskets
- Oilfield parts
- Semiconductor parts
- And more…

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CURE AND CONDITIONS

AFLAS PM-3000 must be optimally formulated, molded and cured to take full advantage of its physical properties. Note that the optimal formulation depends on the intended use. Press cure conditions (temperature and time) should be decided in consideration of various factors, such as the size of parts, required properties and scorch safety.

To achieve the best physical properties, AFLAS PM-3000 also requires a post cure. The recommended standard condition is 250°C for ≥ 4 hours under air. Depending on the size of the part, the cure time must be optimized.

Fully formulated or compounded AFLAS PM-3000 should be used within one (1) day. Co-agent TAIC is easy to bleed. If the full compound is not processed for an extended period of time resulting in bleeding of TAIC, it must be re-milled on the roll. If at any time you have questions or concerns about a specific application, please contact your account manager for assistance.

STANDARD FORMULATION

AFLAS® PM-3000	100
MT-Carbon N990	15
TAIC* WH-60 (60%)	3
Luperox 101**	1
Calcium Stearate	1

* Triallylisocyanurate
** 2,5-dimethyl-2,5-di(t-buthylperoxy)hexane

COMPOUND RPA CURE DATA

150°C, 100CPM, 3° Strain, 12 minutes by RPA-2000

Property	Units	AFLAS PM-3000
Min S'	dNm	11.0
Max S'	dNm	145.0
10% Cure	min	0.8
90% Cure	min	3.1

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COMPOUND PROPERTIES

Property	Units	AFLAS PM-3000
Tensile Strength	MPa	23.1
100% Modulus	MPa	8.7
Tensile Elongation	%	180
Hardness	Shore A	74
Compression Set (ASTM-type 1 button, 70hrs @ 200°C)	%	6.0
Compression Set (O-ring*, 70hrs @ 200°C)	%	14
Compression Set (O-ring*, 70hrs @ 230°C)	%	19
Compression Set (O-ring*, 70hrs @ 250°C)	%	47

Cure Conditions
Press cure: 150°C / 20minutes
Post cure: 250°C / 4 hours

* JIS B 2401 P-26 / AS568-214 / BS1806-214

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HEAT RESISTANCE DATA

Heat Resistance 200°C for 1000 hours	Units	AFLAS PM-3000
Change of Tensile Strength	(%)	- 13
Change of Tensile Elongation	(%)	+ 14
Change in Hardness	(Points)	0
Heat Resistance 230°C for 1000 hours	**Units**	
Change of Tensile Strength	(%)	- 36
Change of Tensile Elongation	(%)	+ 45
Change in Hardness	(Points)	0
Heat Resistance 250°C for 168 hours	**Units**	
Change of Tensile Strength	(%)	- 33
Change of Tensile Elongation	(%)	+ 66
Change in Hardness	(Points)	0

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CHEMICAL COMPATIBILITY DATA

A: Suitable (Volume change < 5 %),
B: Applicable (Volume change < 20 %)
C: Not recommended (Volume change < 50 %),
D: Not applicable (Volume change > 50 %)

Hydrocarbons

Chemical	Temperature	Change after 168hr (%)	Outcome	Change after 500hr (%)	Outcome
Hexane	40℃	4.6	A	5.5	B
Cyclohexane		2.1	A	3.6	A
Isooctane		2.1	A	3.7	A
Benzene		3.4	A	4.3	A
Toluene		2.5	A	3.6	A
Xylene		1.6	A	2.6	A
Chloroform		5.9	B	6.3	B
Carbon tetrachloride		5.9	B	8.2	B
Trichloroethylene		5.6	B	5.9	B
Tetrachloroethylene		3.6	A	5.0	B
dichloromethane	25℃	2.1	A	3.3	A

Nitrogenous substance, Oils

Chemical	Temperature	Change after 168hr (%)	Outcome	Change after 500hr (%)	Outcome
Ethylene diamine	40℃	1.2	A	2.6	A
Dimethyl acetamide		0.6	A	0.9	A
N-Methyl-2-pyrrolidone		0.3	A	0.4	A
Aniline		0.2	A	0.4	A
Dimethyl formamide		0.6	A	1.0	A
ASTM Oil No.1	175℃	0.5	A	0.9	A
IRM 903 Oil		2.4	A	2.9	A
Engine oil		0.9	A	1.2	A
Gear Oil		0.6	A	0.9	A
ATF		1.5	A	1.7	A
Steam	170℃	2.1	A	3.2	A

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Acids and alkalis

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Hydrochloric acid 35%	40℃	0.8	A	0.8	A
Sulfuric acid 96%		0.2	A	0.2	A
Nitric acid 60%		1.0	A	1.4	A
Formic acid 88%		1.1	A	2.0	A
Acetic anhydride		2.5	A	3.5	A
Sodium hydroxide 48%		0.1	A	0.1	A
Sodium hypochlorite 5%		0.3	A	0.4	A
Aqueous ammonia 28%		0.8	A	1.4	A

Furans, Aldehyde, Alcohols

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Tetrahydrofuran	40℃	3.7	A	4.9	A
2-Methyltetrahydrofuran		3.2	A	4.7	A
Acetaldehyde	25℃	1.7	A	2.6	A
Acetophenone	40℃	0.4	A	0.8	A
Formalin 35%		0.3	A	0.4	A
Methanol		1.0	A	1.6	A
Ethanol		0.5	A	1.1	A
Diethylene glycol		0.0	A	0.0	A
Ethylene glycol		0.1	A	0.1	A

Ketones, Ester, Ether

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Acetone	40℃	2.5	A	3.3	A
Methyl ethyl ketone		2.2	A	3.2	A
Isophorone		0.1	A	0.5	A
Ethyl acetate		3.1	A	3.8	A
Dioxane		1.2	A	2.0	A
Methyl isobuthyl ketone		1.2	A	2.0	A
Buthyl acetate		1.5	A	2.5	A
Diethyl ether	25℃	2.6	A	4.3	A

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HANDLING PRECAUTIONS

AFLAS PM-3000 will turn pink when exposed to direct sunlight or UV and the curability will be inhibited. Take precaution to keep the polymer stored in its aluminum packaging and compounding should be completed within a few hours.

The shelf life of AFLAS FFKM Series can be guaranteed by AGC Chemicals for 6 months after date of delivery for unopened packages. Storage and handling facilities should be designed to minimize exposure to extreme temperatures and dusty environments.

AFLAS FFKM Series are stable at normal conditions and are not regulated by the U.S Department of Transportation. Avoid temperatures above 400ºC. FFKMs can react with molten alkali metals and finely divided magnesium and aluminum at temperatures above 425ºC. Thermal decomposition of this product at temperatures above 400ºC will generate hydrogen fluoride, which is corrosive. No polymerization will occur under normal processing conditions.

Wear protective gear and avoid tobacco use at all times when handling fluoroelastomers. Consult your Material Safety Data Sheet for safe handling details or contact your AGC Chemicals Technical Representative for clarification.

NOTE: The data listed here represents typical values for the stated grades of AFLAS® fluoroelastomers. This information should be used as a guide only and not to establish specification limits or design criteria. AGC Chemicals Americas assumes no obligation or liability for any advice furnished by us or for results obtained with respect to this product. All such advice is provided free of charge and the buyer assumes sole responsibility for results obtained in reliance thereon.

For more information and samples contact

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