



## AFLAS® CP-4000 (R&D)

### DESCRIPTION

AFLAS® FFKM Series is a new perfluoroelastomer product line classified as an **FFKM**. AFLAS CP-4000 is an elastomer having the chemical structure derived from tetrafluoroethylene and perfluoroalkylvinylether. This chemical structure offers outstanding resistance to chemicals, oils, solvents, and more. CP-4000 is a peroxide-curable perfluoroelastomer pre-compound. It is required to add the appropriate peroxide to cure it. CP-4000 has incorporated a cross-link co-agent to support the peroxide reaction.

### CHARACTERISTICS

- Appearance = White
- Specific gravity = 2.05
- Storage modulus (G') = 350 kPa @ 1Hz frequency via RPA at 100°C
- Mooney viscosity ML1+4 (121°C) = 85

### MATERIAL FEATURES

- Outstanding chemical resistance
- Superior oil resistance
- Outstanding solvent resistance
- Ultra-high 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 280°C, with peak exposure of 300°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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AGC Chemicals Americas, Inc.  
Business & Technical Center  
55 E. Uwchlan Ave, Suite 201  
Exton, PA 19341  
Phone: 610.423.4300  
Fax: 610.423.4301  
<http://www.agcchem.com>



## product information

### STANDARD FORMULATION

<b>AFLAS CP-4000</b>	100
<b>MT-Carbon N990</b>	10
<b>Zinc Oxide</b>	1.5
<b>Luperox 101*</b>	1
<b>Calcium Stearate</b>	1

\* 2,5-dimethyl-2,5-di(t-butylperoxy)hexane

### COMPOUND RPA CURE DATA

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

Property	Units	AFLAS CP-4000
<b>Min S'</b>	dNm	10.0
<b>Max S'</b>	dNm	154.0
<b>10% Cure</b>	min	0.7
<b>90% Cure</b>	min	4.3

### COMPOUND PROPERTIES

Property	Units	AFLAS CP-4000
<b>Tensile Strength</b>	MPa	21.7
<b>100% Modulus</b>	MPa	9.3
<b>Tensile Elongation</b>	%	170
<b>Hardness</b>	Shore A	74

#### Cure Conditions

Press cure: 150°C / 20minutes

Post cure: 300°C / 9 hours in inert.

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

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## *product information*

# AFLAS® CB-046 (R&D)

Ultra-high temperature compound solution

### DESCRIPTION

AFLAS® FFKM Series is a new perfluoroelastomer product line classified as an **FFKM**. AFLAS CB-046 is a full compound of FFKM having the chemical structure derived from tetrafluoroethylene and perfluoroalkylvinylether. This chemical structure offers outstanding resistance to chemicals, oils, solvents, and more. CB-046 is a peroxide-curable FFKM full compound. It is not required to add any filler, however the product can be tweaked for optimal performance depending on application.

### CHARACTERISTICS

- Appearance = Black
- Specific gravity = 2.02

### MATERIAL FEATURES

- Outstanding chemical resistance
- Superior oil resistance
- Outstanding solvent resistance
- Ultra-high 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 280°C, with peak exposure of 300°C

### TYPICAL APPLICATIONS

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

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# AGC

AGC Chemicals Americas, Inc.  
Business & Technical Center  
55 E. Uwchlan Ave, Suite 201  
Exton, PA 19341  
Phone: 610.423.4300  
Fax: 610.423.4301  
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## product information

### CURE AND CONDITIONS

AFLAS CB-046 must be optimally molded and cured to take full advantage of its physical properties. Note that the optimal molding and post-curing condition 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 CB-046 also requires a post cure. The recommended standard condition is 300°C for  $\geq 9$  hours under Nitrogen or inert gas. It is recommended to raise temperature gradually up to 300°C. Depending on the size of the part, the cure time must be optimized.

It is recommended to refresh CB-046 by 2 roll milling before use, and it should be used within one (1) day. If the full compound is not processed for an extended period of time resulting in bleeding of curatives, 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.

### COMPOUND RPA CURE DATA

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

Property	Units	AFLAS CB-046
Min S'	dNm	10.0
Max S'	dNm	120.0
10% Cure	min	0.7
90% Cure	min	4.4

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## *product information*

### COMPOUND PROPERTIES

Property	Units	AFLAS CB-046
Tensile Strength	MPa	21.5
100% Modulus	MPa	12.3
Tensile Elongation	%	157
Hardness	Shore A	72
Compression Set (ASTM-type 1 button, 70hrs @ 280°C)	%	12
Compression Set (ASTM-type 1 button, 70hrs @ 300°C)	%	21
Compression Set (O-ring*, 70hrs @ 280°C)	%	38
Compression Set (O-ring*, 70hrs @ 300°C)	%	51

#### Cure Conditions

Press cure: 150°C / 20minutes

Post cure: 300°C / 9 hours in inert.

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## CHEMICAL COMPATIBILITY DATA OF CP-4000 STANDARD FORMULATION

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°C	4.0	A	4.9	A
Cyclohexane		1.4	A	2.5	A
Isooctane		1.5	A	2.6	A
Toluene		2.0	A	3.3	A
Xylene		1.2	A	2.2	A
Chloroform		5.6	B	6.4	B
Carbon tetrachloride		4.5	A	7.3	B
Trichloroethylene		5.3	B	5.8	B
Tetrachloroethylene		2.7	A	4.4	A
dichloromethane	25°C	1.7	A	2.9	A

### Nitrogenous substance, Oils

Chemical	Temperature	Change after 168hr (%)	Outcome	Change after 500hr (%)	Outcome
Ethylene diamine	40°C	0.3	A	1.3	A
N-Methyl-2-pyrrolidone		0.1	A	0.8	A
Aniline		-0.2	A	0.3	A
Dimethyl formamide		0.0	A	0.7	A
ASTM Oil No.1	175°C	-0.1	A	0.0	A
ASTM Oil No.3		1.4	A	1.6	A
Engine oil (SJ class)		0.2	A	0.3	A
Gear Oil		0.1	A	0.3	A
ATF	170°C	0.5	A	0.8	A
Steam		1.7	A	1.9	A

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**AGC**

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### Acids and alkalis

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Hydrochloric acid 35%	40°C	2.5	A	3.9	A
Sulfuric acid 96%		0.0	A	-0.2	A
Nitric acid 60%		1.8	A	2.8	A
Formic acid 88%		1.1	A	2.0	A
Acetic anhydride		2.7	A	4.7	A
Sodium hydroxide 48%		0.0	A	0.2	A
Sodium hypochlorite 5%		0.0	A	0.2	A
Aqueous ammonia 28%		0.3	A	0.6	A

### Furans, Aldehyde, Alcohols

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Tetrahydrofuran	40°C	3.6	A	5.2	A
Acetaldehyde	25°C	3.1	A	10.1	A
Formalin 35%	40°C	0.0	A	-0.1	A
Methanol		0.8	A	1.2	A
Ethanol		0.4	A	0.6	A
Diethylene glycol		-0.2	A	-0.3	A

### Ketones, Ester, Ether

Chemical	Temperature	Change after 168hr	Outcome	Change after 500hr	Outcome
Acetone	40°C	2.8	A	3.3	A
Methyl ethyl ketone		2.2	A	3.1	A
Ethyl acetate		3.4	A	4.1	A
Methyl isobutyl ketone		1.1	A	1.6	A
Acetylacetone		4.6	A	6.3	B
Butyl acetate		1.6	A	2.6	A
Diethyl ether	25°C	2.1	A	3.6	A



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### HANDLING PRECAUTIONS

AFLAS CP-4000 will discolor 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. Pre-compound and compound should be kept refrigerated.

The shelf life of AFLAS FFKM Series can be guaranteed by AGC Chemicals for 2 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 400°C. FFKMs can react with molten alkali metals and finely divided magnesium and aluminum at temperatures above 425°C. Thermal decomposition of this product at temperatures above 400°C 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

**AGC Chemicals Americas, Inc.**  
55 E. Uwchlan Avenue, Suite 201  
Exton, PA 19341

**Phone:** (800) 424-7833

**Fax:** (610) 423-4301

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