



product information

AFLAS[®] 600X

Semi-commercialized Grade

DESCRIPTION

AFLAS[®] Fluoroelastomers are copolymers of tetrafluoroethylene and propylene. This combination gives AFLAS Fluoroelastomers unique properties over conventional FKM-type fluoroelastomers in demanding applications found in the oil & gas, chemical process, industrial equipment, food handling, pharmaceutical, heavy duty diesel and automotive industries. AFLAS 600X (R&D: JAQXX02) has been developed with new cure technology, which delivers “rapid cure” and “higher crosslink density” features contributing to excellent compression set and improved mold release. AFLAS Fluoroelastomers display outstanding resistance to heat, acids and strong bases, many solvents, ozone, and steam. Classified by ASTM D 1418-01 as FEPM.

MATERIAL FEATURES

- Rapid cure
- Outstanding compression set
- Improved mold release for better process and yield
- Colorable
- Excellent base and amine resistance unmatched by FKM-type fluoroelastomers
- High heat resistance
- Outstanding steam resistance

END USER BENEFITS

- Preferred material for high pressure and high temperature (HPHT) in oil & gas applications
- Long service use (> 25 years) in harsh environments
- Can be compounded to be highly resistant to rapid gas decompression (e.g NORSOK)
- Chemical durability (e.g. oil exploration and production fluids)

TYPICAL APPLICATIONS

- O-rings
- Gaskets
- Oilfield parts
- Heavy duty seals
- And more...

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CURE AND CONDITIONS

AFLAS 600X must be optimally formulated to take full advantage of its physical properties. Note that the optimal formulation depends on the intended use. AFLAS 600X is peroxide-curable. The best performing peroxide is Perkadox[®] P-14Sfl or Vul-Cup[®] 40KE. TAIC* is the recommended co-agent and is required for the cure. Press cure is accomplished at 170°C for 10 minutes. Press cure conditions (temperature and time) should be decided in consideration of various factors, such as the size of parts, required properties, scorch safety and mold release.

To achieve the best physical properties, AFLAS 600X also requires a post cure. The recommended standard condition is 200°C for ≥ 4 hours. The strength can be further enhanced by adjusting the condition to 230°C for ≥ 4 hours. Depending on the size of the part, the cure time must be optimized.

* Triallylisocyanurate

If at any time you have questions or concerns about a specific application, please contact your account manager for assistance.

Perkadox[®] is a registered trademark of Akzo Nobel Chemicals, B.V.

Vul-Cup[®] is a registered trademark of Arkema, Inc.

AFLAS 600X RPA (CURE) COMPOUND DATA

177°C, 100CPM, 3° Strain, 12 minutes

Property	Units	AFLAS 600X	Conventional AFLAS 100S
Min S'	dNm	11.8	11.2
Max S'	dNm	80.5	60.0
50% Cure	min	0.9	1.6
90% Cure	min	2.1	5.5

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AFLAS 600X COMPOUND COMPARATIVE PROPERTIES

Property	Units	AFLAS 600X
Tg (Glass transition temperature)	°C	-3
TR-10	°C	+3
Brittle Point	°C	-40
Compression Set (70hrs @ 200°C)	%	14
Tensile Strength, Yield	MPa/psi	23 / 3335
M100	MPa/psi	6 / 870
Elongation	%	220
Fluorine Content	%	57
G' Storage Modulus (nominal) of Raw Gum	kPa	350
Mooney Viscosity of standard compound (121°C)	ML(1+4) ML(1+10)	98 96

Formulation(PHR):

AFLAS 600X	100
MT 990 Carbon	30
TAIC*	3
Peroxide**	1
Calcium Stearate	1

* Triallylisocyanurate

** 1,3-bis(t-butylperoxy)-diisopropylbenzene

Cure Conditions:

Press cure: 170°C / 10 minutes

Post cure: 200°C / 4 hours

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.

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AFLAS 600X COMPRESSION SET DATA

Property	Units	AFLAS 600X	Conventional AFLAS 100S
Compression Set (Button*, 22 hours @ 200°C)	%	9	20
Compression Set (Button, 70 hours @ 200°C)	%	14	29
Compression Set (Button, 168 hours @ 200°C)	%	19	-
Compression Set (Button, 1000 hours @ 200°C)	%	37	-

* ASTM D-395 Type-1 specimen, Method B, 25% compression

Property	Units	AFLAS 600X	Conventional AFLAS 100S
Compression Set (O-ring*, 22 hours @ 200°C)	%	18	33
Compression Set (O-ring, 70 hours @ 200°C)	%	29	46
Compression Set (O-ring, 168 hours @ 200°C)	%	39	-
Compression Set (O-ring, 1000 hours @ 200°C)	%	75	-

* JIS B 2401 P-26 / AS568-214 / BS1806-214, 25% compression

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AFLAS 600X CHEMICAL COMPATIBILITY DATA

Heat Resistance 200°C for 720 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+11
Change of Tensile Elongation	(%)	+1
Change in Hardness	(Points)	0
Heat Resistance 230°C for 720 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-12
Change of Tensile Elongation	(%)	+11
Change in Hardness	(Points)	-3
Steam Resistance 170°C for 720 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-7
Change of Tensile Elongation	(%)	-7
Change in Hardness	(Points)	-1
Volume Change	(%)	+2
Hydro Chloric Acid 20% aq 70°C for 720 h	Units	AFLAS 600X
Volume Change	(%)	+3.1
Caustic Soda (NaOH) 48% aq 70°C for 720 h	Units	AFLAS 600X
Volume Change	(%)	+0.4
Ethylene diamine resistance 25°C for 720 h	Units	AFLAS 600X
Volume Change	(%)	+1.5
Aqueous Ammonium 28% 70°C for 720 h	Units	AFLAS 600X
Volume Change	(%)	+2.7

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Standard Oil

IRM903 Resistance 150°C for 70 hours	Units	AFLAS 600X
Volume Change	(%)	11.8
IRM903 Resistance 150°C for 168 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-1
Change of Tensile Elongation	(%)	-8
Change in Hardness	(Points)	-7
IRM903 Oil Resistance 150°C for 336 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+3
Change of Tensile Elongation	(%)	-6
Change in Hardness	(Points)	-9
IRM903 Oil Resistance 150°C for 1008 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+22
Change of Tensile Elongation	(%)	-8
Change in Hardness	(Points)	-5

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Service Fluid

SF105 Resistance 150°C for 70 hours	Units	AFLAS 600X
Volume Change	(%)	3.3
SF105 Resistance 150°C for 168 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+18
Change of Tensile Elongation	(%)	+4
Change in Hardness	(Points)	-7
SF105 Oil Resistance 150°C for 336 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+19
Change of Tensile Elongation	(%)	-7
Change in Hardness	(Points)	-6
SF105 Oil Resistance 150°C for 1008 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	+22
Change of Tensile Elongation	(%)	-8
Change in Hardness	(Points)	-5

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Automatic Transmission Fluid

ATF (Dexron VI) Resistance 150°C for 70 hours	Units	AFLAS 600X
Volume Change	(%)	5.5
ATF (Dexron VI) Resistance 150°C for 168 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-6
Change of Tensile Elongation	(%)	-6
Change in Hardness	(Points)	-7
ATF (Dexron VI) Resistance 150°C for 336 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-1
Change of Tensile Elongation	(%)	-7
Change in Hardness	(Points)	-5
ATF (Dexron VI) Resistance 150°C for 1008 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-2
Change of Tensile Elongation	(%)	-2
Change in Hardness	(Points)	-4

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Diesel Fuel

Diesel fuel #2 Resistance 150°C for 70 hours	Units	AFLAS 600X
Volume Change	(%)	27.3
Diesel fuel #2 Resistance 150°C for 168 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	18
Change of Tensile Elongation	(%)	17
Change in Hardness	(Points)	-16
Diesel fuel #2 Resistance 150°C for 336 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-21
Change of Tensile Elongation	(%)	-18
Change in Hardness	(Points)	-16
Diesel fuel #2 Resistance 150°C for 1008 hours	Units	AFLAS 600X
Change of Tensile Strength	(%)	-29
Change of Tensile Elongation	(%)	-22
Change in Hardness	(Points)	-20

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HANDLING PRECAUTIONS

AFLAS Fluoroelastomers are stable at normal conditions and are not regulated by the U.S Department of Transportation. Avoid temperatures above 400°C. Fluoroelastomers 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.

The shelf life of AFLAS Fluoroelastomers can be guaranteed by AGC Chemicals for 6 months after date of delivery for unopened packages. However the properties are not impacted by storage time. Storage and handling facilities should be designed to minimize exposure to extreme temperatures and dusty environments.

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.

For more information and samples contact

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