



Lamination to other Elastomers for Automotive Hose Applications



AGC

Your Dreams, Our Challenge

AFLAS® Fluoroelastomers for Automotive Hose Applications

AGC has developed AFLAS® FEPM grades designed for a new lamination technology for multi-layer hose constructions. This multi-layer technology using AFLAS® grades 400E and 600X is ideal for use in high-pressure, high-temperature areas around the engine where hoses are exposed to NO_x, SO_x, engine oils or other aggressive automotive fluids.

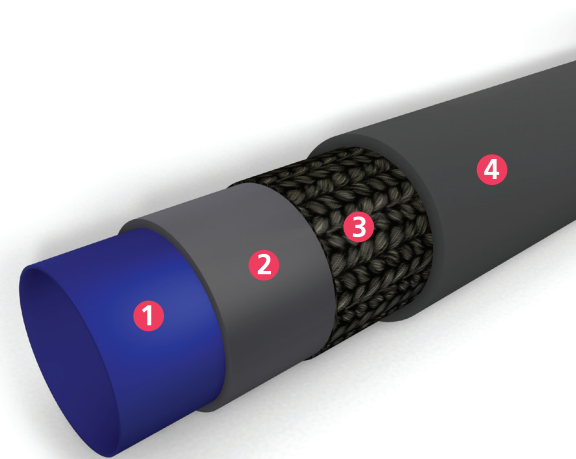
Trends, including engine and turbo efficiency improvement, fuel consumption improvement and environmental regulation changes, are requiring better equipment and new technology over existing constructions of layered materials such as acrylic rubber (ACM, AEM), silicone rubber (VQM) and FKM.

Benefits of AFLAS® 400E and 600X

- Heat, oil, acid and base resistance
- Can be laminated directly to dissimilar elastomers
- Excellent amine and steam resistance
- Continuous use temperatures of 200°C or higher
- Improved compression set (600X) compared to current AFLAS® grades
- Peel strength of >7N/25mm at 150°C
- Colourable
- Faster cure and easier processing, compared to current AFLAS® grades

AFLAS® Multi-Layer Hose Technology

- 1 Inner layer: AFLAS®
- 2 Intermediate layer: AEM, ACM, VKM or FKM
- 3 Textile reinforcement
- 4 Outer cover

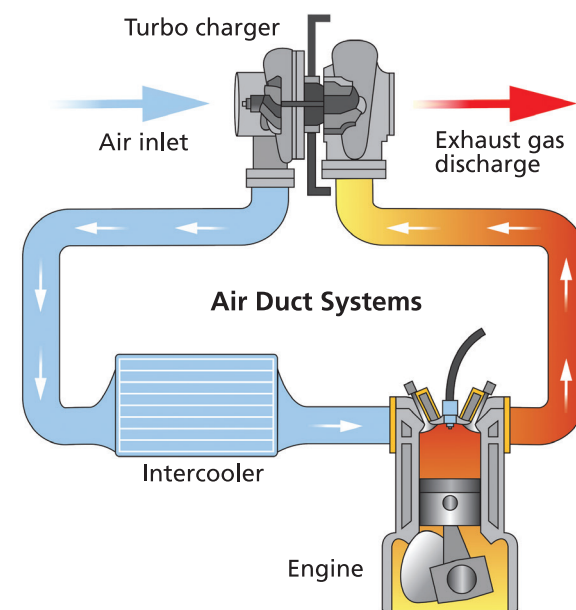


Common Conditions

- High pressure
- High temperature
- Blow-by gas
- NO_x, SO_x (organic acid)
- Oil mist of engine oils
- Coolant, ATF
- Steam, hot water

Applications

- Intercooler hose
- Oil cooler hose
- Oil return hose
- Blow-by hose
- PCV hose
- EGR hose
- Turbo charger hose
- Turbo water cooling hose
- CAC hose
- ATF hose
- Coolant hose

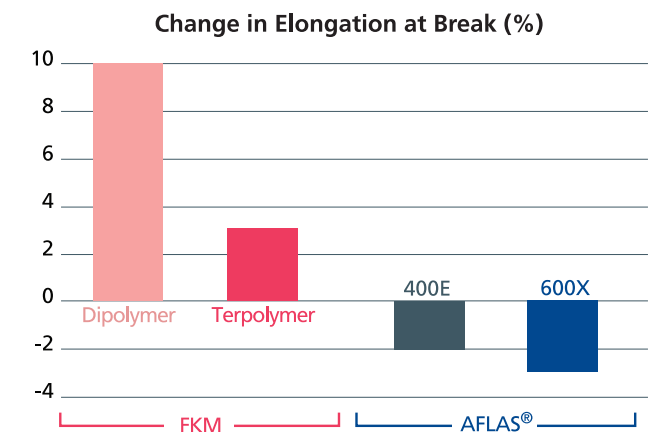
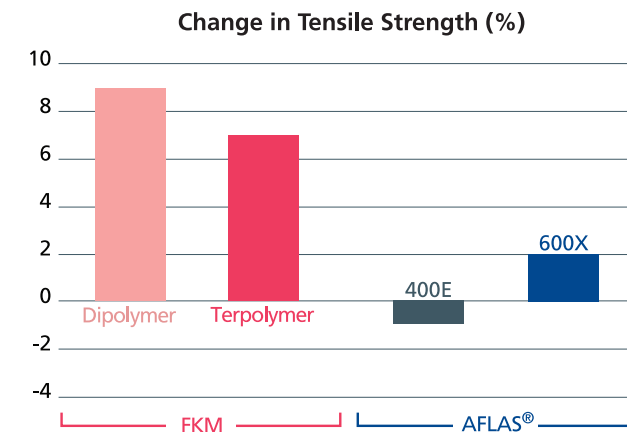


Benefits of AFLAS® vs. FKM

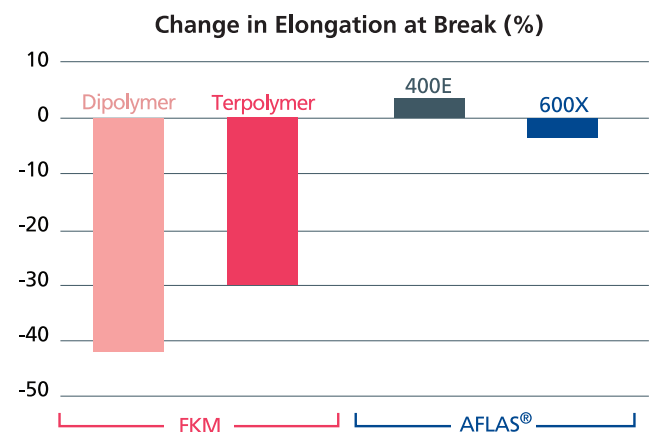
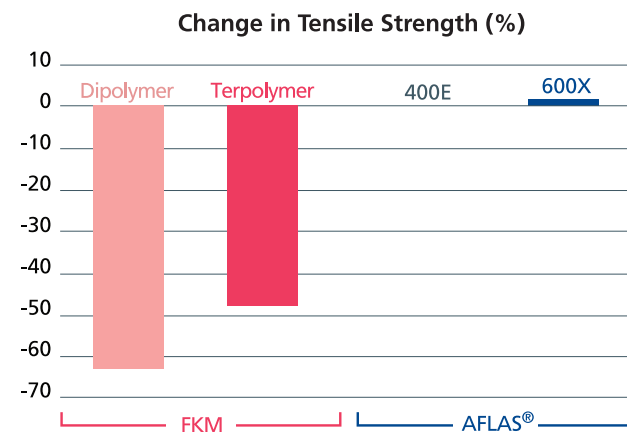
Engine oils resistance tested to GM's standard GMW 15408:

- Used to test turbo charger hoses with high temperature resistance
- First, engine oils aged for 72h at 175°C
- Then, hoses tested by immersion in aged engine oils for 168h at 175°C

0W20 (Oil Reference)



10W60 (Oil Reference)



- Notable changes in tensile strength and elongation observed with the FKM due to chain scission caused by substances attacking the polymer
- AFLAS® has much higher durability compared to FKM

AFLAS® Performance in Engine Oil, Fluids and Steam

Product Name	Temp (°C)	FKM	AFLAS®
Engine oils	150	Not recommended	Excellent
Aged engine oils	175	Failed	Excellent
AT fluids	160	Not recommended	Excellent
Gear oils	135	Failed	Excellent
Brake fluid	135	Good	Good
Coolants 50% LLC	160	Not recommended	Excellent
Hot steam	180	Failed	Excellent

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It is the responsibility of the purchaser to check that the specification is appropriate for any individual application. Particular care is required for special applications such as pharmaceutical, medical devices or food. It is advisable to contact the AGC Chemicals sales office for the latest position. Users of AFLAS® are advised to consult the relevant health and safety literature which is available from the AGC Chemicals sales office.