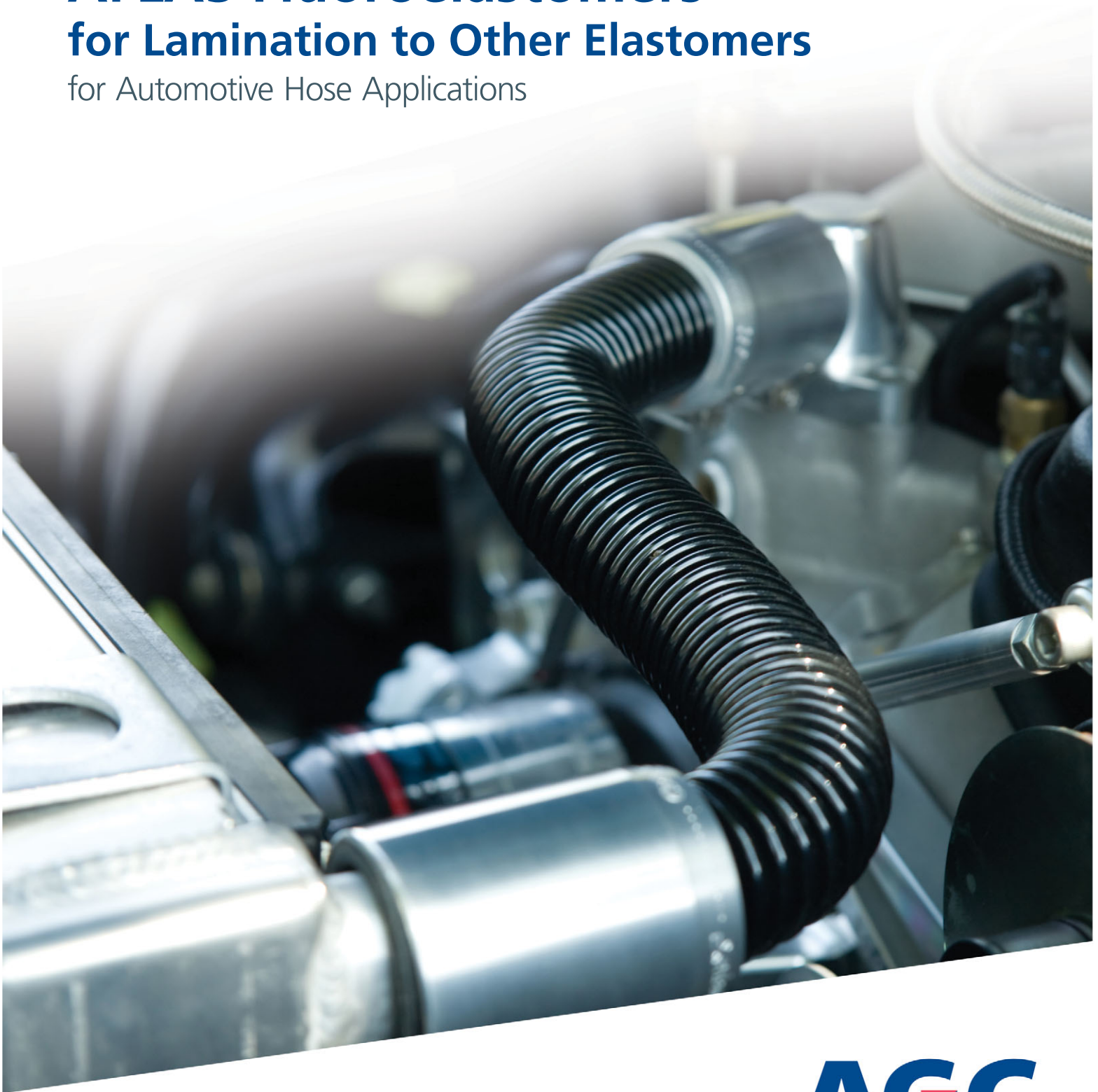


AFLAS Fluoroelastomers for Lamination to Other Elastomers

for Automotive Hose Applications



AGC

Your Dreams, Our Challenge

AGC



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 NOx, SOx, engine oils or other aggressive automotive fluids.

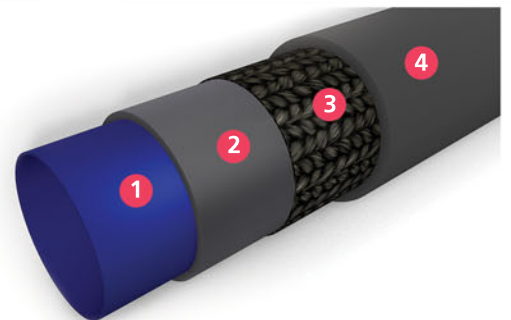
Trends including engine and turbo efficiency improvement, fuel consumption improvement and environmental regulation changes are requiring better equipment and new technology over existing constructions of layered materials such as acrylic rubber (ACM, AEM), silicone rubber (VQM) and FKM.

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)
- Peel strength of > 7 N/inch at 150 °C
- Rapid cure, colorable, easier processing

AFLAS multi-layer hose technology

- 1 Inner: AFLAS
- 2 Intermediate: AEM, ACM, VMQ, EPDM, or FKM
- 3 Textile reinforcement
- 4 Outer cover

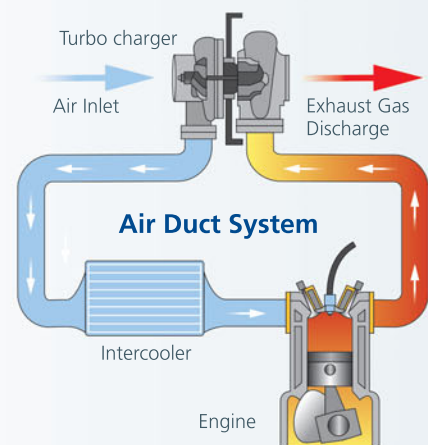


Common Conditions

- High pressure
- High temperature
- Blow-by gas
- NOx, SOx (Organic acid)
- Oil mist of engine oils
- Coolant, ATF
- Hot steam

Applications

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



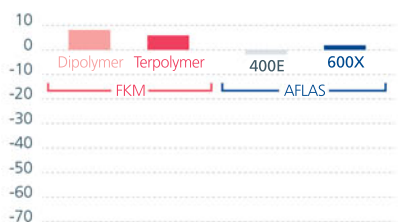
Benefits of AFLAS vs. FKM

Engine oils resistance test in actual conditions and applied GM's standard for testing GMW 15408:

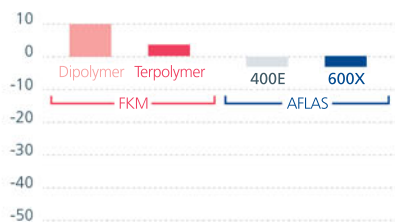
- Turbo charger hoses with high temperature resistance
- Aged engine oils preparation for 72h at 175 °C
- Oils resistance test by immersion in aged engine oils for 168h at 175 °C

0W20

Change in Tensile Strength (%)



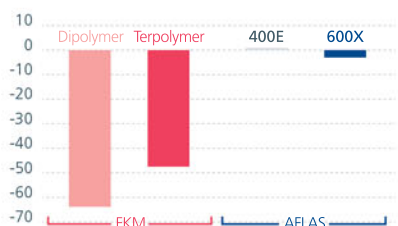
Change in Elongation at Break (%)



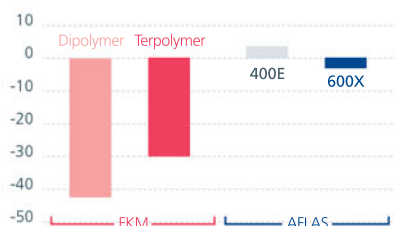
- Notable changes occur with tensile strength and elongation observed with the FKM due to scission substances attacking the polymer
- AFLAS has much higher durability compared to FKM

10W60

Change in Tensile Strength (%)



Change in Elongation at Break (%)



AFLAS Performance in Engine Oil, Fluids and Hot Steam

Product Name	Temp. °C	FKM	AFLAS
Engine Oils	150	Caution	Suitable
Aged Engine Oils	175	Not Applicable	Suitable
AT Fluids	160	Caution	Suitable
Gear Oils	135	Not Applicable	Suitable
Brake Fluids	135	Applicable	Applicable
Coolants 50% LLC	160	Caution	Suitable
Hot Steam	180	Not Applicable	Suitable
Sulfuric Acid	100	Suitable	Not Applicable



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