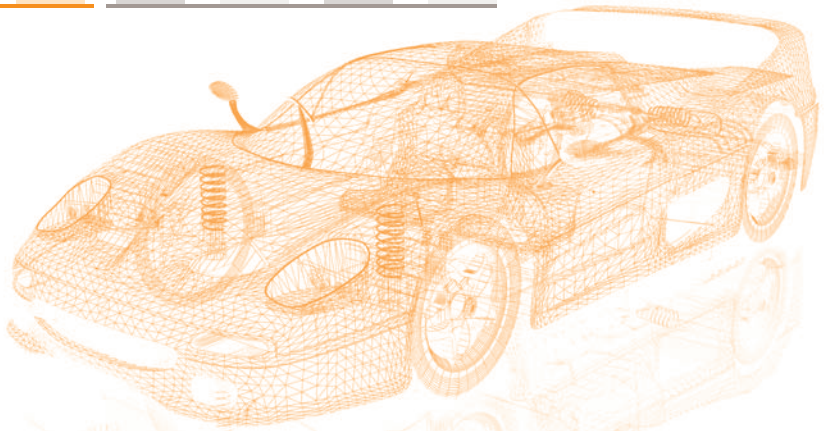
Functions & applications

BLUESIL™ PASTES & GREASES

		Paste	Greases			
		Paste 408	Tap Grease	Grease 33	Grease 44	Grease 55
PROTECTION	Corrosion	❖	❖	❖	❖	❖
LUBRICATION	Metal / plastics mechanisms, power door (lock systems, power windows)	❖	❖			
	Gear boxes, Starters units			❖		
	Transmission parts				❖	
	Piston, O ring					❖



CAF®

		ONE COMPONENT							BI COMPONENT		
		Formed in place Gasket (FiPG)						Injected gasket	Cured in place Gasket (CiPG)		Injected gasket
		CAF® 33	CAF® 44	CAF® 5661	CAF® 5662	CAF® 50	CAF® 510	CAF® 5552 S	CAF® 5761	CAF® 5621 AXAD	CAF® 5651 AXAD	CAF® 5751 AXAD
DRIVE TRAIN GASKETS	Cylinder head cover	❖	❖	❖	❖	❖		❖			❖	
	Bed plate	❖	❖	❖	❖	❖		❖			❖	
	Oil sump	❖	❖	❖	❖	❖		❖			❖	
	Engine front cover					❖					❖	
	Gear Box	❖	❖	❖	❖	❖		❖				
	Water pump	❖		❖	❖	❖		❖			❖	
	Oil pump					❖		❖			❖	
	Intake manifold					❖	❖	❖			❖	
	Oil filter					❖	❖	❖			❖	
BONDING	Headlamps					❖						
	Bonding of plastic parts					❖	❖	❖				
	Bonding of metal parts	❖	❖	❖	❖	❖	❖	❖	❖			
BODYWORK CHASSIS	Sun-roof seals	❖				❖		❖				
	Molded gasket											❖
	Anti-vibration assembly									❖	❖	

❖ *Acetoxy products* - ❖ *Alcoxy products* - ❖ *Oxime Low MEKO products* - ❖ *Activated acetoxy products*

Processing

CAF®, Bluesil™ & CAF® AXAD can be applied by a variety of methods ranging from manual dispensing to automatic dispensing units for cartridge, pail or drum packages. We have strong relationships with automatic dispensing equipment suppliers.

Technical service

Our technical service laboratory carries out analyses and tests to assess the performance of its silicones in a given application. We participate in the design of the parts in order to optimize the performances of our products. We also offer our customers the possibility of producing prototype series with our dispensing equipment or in close cooperation with a specialist dispensing equipment supplier. Technical support for mass production is provided by teams of specialized technicians with both silicones materials and gasketing functions competencies.

Bluestar Silicones France SAS
21, avenue Georges Pompidou
F-69486 Lyon Cedex 03 - France
Tel: +33 (0)4 72 13 19 00 - Fax: +33 (0)4 72 13 19 88
www.bluestarsilicones.com

SIL 12 001 3-1GL PEMACO - Photos: Bluestar Silicones - Thomasz Pietryszek

Silicones Solutions
for Gasketing & Lubricating

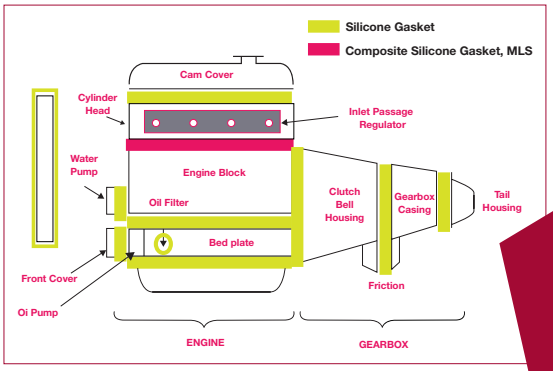
Power-train sealing

Automotive Power-train requires numerous gaskets for fluids as lubricating oils (oil pump, rocker cover, or gear box casing), cooling liquids (water pump) and air (air filter). The thermal and chemical stability of silicone elastomers makes them unique candidates to ensure durability of these gaskets.

Bluestar Silicones has developed a unique range of materials for the following technologies:

- Cured in Place Gaskets (CiPG) with CAF® AXAD, activated RTV-2 range
- Formed in Place Gaskets (FiPG) with CAF®, RTV-1 range

Our expertise in this field covers material performances, recommendation on the parts design and the partnership with dispensing equipment manufacturers for implementation on industrial lines.



Sealing & Bonding other applications

- Sun-roof sealing
- Head lamps, lightening systems bonding
- Air conditioning and ventilation
- Heating devices
- Lubrication
- Alternators and starters
- Differentiel
- Power window and power door lock mechanism

BENEFITS Bluesil™,CAF®, Axad

- **Outstanding resistance to most engine and gearbox lubricant oils**
- **High adhesion, sealing performance and reliability**
- **Fully adapted to robotic dispensing equipments**
- **No gasket handling and no gasket positioning problems**
- **Reduction on inventory - one silicone, several gaskets**
- **Fast on-line quality control**

Bluestar Silicones. Delivering Your Potential.

BLUESTAR SILICONES

Gasketing

CAF®

		ONE COMP			
		Formed in place			
		CAF® 33	CAF® 44	CAF® 5661	CAF® 5662
	Product category	Thixotropic, adhesive	High extrusion	Thixotropic, adhesive	Thixotropic, adhesive
	Main characteristics	High heat stability, fluids resistance	High mechanical properties, oil resistance	High mechanical properties, oil resistance	High mechanical properties, oil resistance
	Color	White-trans-black	Grey	Ivory	Black
PROPERTIES BEFORE CURING	Cure-type	Acetoxy	Acetoxy	Acetoxy	Acetoxy
	Specific gravity at 25°C (1)	1.04	1.03	1.14	1.12
	Viscosity (mPa.s) (2)	-	-	-	-
	Extrusion (g/min) (3)	50	170	100	120
	Flowability (4)	<2 mm	1 mm	<5 mm	<5 mm
CURED COMPOUND	Skin formation time (min) (5)	4	7	6	6
	Cured thickness after 24 h (mm) (5)	5	4	4	4
MECHANICAL PROPERTIES AFTER CURING (7 DAYS)	Shore A hardness for 6 mm thick section (points) (6)	25	38	57	55
	Secant modulus for 100 % elongation (MPa) (7)	0.6	1.9	3.3	2.5
	Tensile strength (MPa) (7)	2.5	2.9	5.8	5
	Elongation at break (%) (7)	500	280	200	220
	Lap shear strength (MPa) (8) *	1.4	1.1	2.5	2.2
	Type of failure CF / AF *	CF	AF	CF	CF
	Oil resistance	+++	+++	++++	++++
PHYSICAL PROPERTIES AFTER CURING	Lower service temperature (°C)	-65	-60	-65	-60
	Maximum continuous service temperature, 1000 h (°C)	250	200	250	250
	Maximum peak service temperature, 72 h (°C)	300 (Black)	250	300	300
STORAGE	Shelf life from the production date (months)	24	24	18	18

** 14 days*
(1) ISO R 1183, DIN 53479, NM 703
(2) Brookfield NF T 76105, ASTM D 445
(3) NM 495 A 3 mm / 3 bars

Formed in Place Gasket (FiPG): CAF®

- The bead is applied to one of the parts to be assembled.
- In the few minutes following application and before skin formation, the part with the bead is brought together with the other part. Adhesion increases as the CAF® bead cures, thus ensuring sealing.
- Dismantling does not damage the parts and a new bead must be laid when reassembling after repair (this operation can be carried out manually).

Cured in Place Ga CAF® Axad

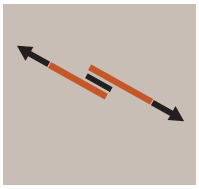
ONENT				BI COMPONENT		
Gasket (FIPG)			Injected gasket	Cured in place gasket (CiPG)		Injected gasket
CAF® 50	CAF® 510	CAF® 5552S	CAF® 5761	CAF® 5621 AXAD	CAF® 5651 AXAD	CAF® 5751 AXAD
Thixotropic, self-adhesive, neutral	Thixotropic, self-adhesive, neutral	Thixotropic, self-adhesive, neutral	Flowing	Thixotropic, self-adhesive	Thixotropic, self-adhesive	Flowing, adhesive
Good adhesion on plastic parts, oil resistance	Adhesion on plastic parts, high elongation	Good adhesion on plastic parts, oil resistance	High Shore A Hardness	Fast cure, good elongation, low modulus	Fast cure, mechanical properties, fluid resistance	Fast cure, mechanical properties, injectable
Black	White-black-grey	Black	Ivory	Grey	Grey	Ivory
Alcoxy	Alcoxy	Oxime Low Meko	Acetoxy	Activated acetoxy	Activated acetoxy	Activated acetoxy
1.25	1.38	1.33	1.3	1.02 / 1.43	1.13 / 1.43	1.3 / 1.17
-	-	-	100 000	-	-	100 000 / thixo
140	30	120	-	80 / 180	100 / 180	-
1 mm	<3mm	<5mm	2 min	<1 mm / <5 mm	<5 mm / <5 mm	fluid / <5 mm
15	10	4	7	-	-	-
2.5	3	3.8	4	-	-	-
33	24	40	57	17	53	53
0.7	0.5	1	6.5	0.3	2.5	3.1
2.1	1.4	1.5	-	1.4	4.4	4.4
350	600	300	180	500	200	180
1.7	0.6	0.85	1.3	1.4	2.7	2.2
CF	CF	CF	AF	CF	CF	CF
++++	++	++	++	+	++++	++
-60	-60	-70	-65	-50	-70	-65
185	180	200	250	200	220	225
220	200	250	300	225	275	250
6	12	12	18	18	18	18

(4) Thixo : BOEING S 7502, flowing : MIL S 880 2 D, NM 459
(5) Temp 23°C, relative humidity 50%
(6) ISO R 868, DIN 53505, ASTM D 2240, BS 903 (A7), NF T 46003, NM 471
(7) ISO 37 (H2), DIN 53504, ASTM D 412, BS 903 (A2), NF T 46002 (H2), NM 470
(8) Aluminium AG3 specimen, without primer, 1mm thick joint, NM 748
CF = Cohesive Failure
AF = Adhesive Failure

SKET (CIPG):

- The bead of product is laid by a robot on one of the parts to be assembled.
- The bead of CAF® AXAD cures quickly with or without heating, the adhesion strength on metal can be modulated as required.
- The complete curing for CAF® AXAD needs 30 minutes at 25°C and only 5 minutes at 60/80°C.
- Compression and cohesion of the gasket provide a gas-tight seal. The mechanical properties and the outstanding resistance to hot fluids and gases enable successive dismantling and assembly without deterioration of the gasket.

FLEXIBLE BONDING: CAF®



- After curing, CAF® products are transformed in a flexible bonding which absorbs significant differential dilatation between 2 substrates.
- Outstanding weatherability (UV, thermal, chemical resistance).
- High bonding performances on various substrates.

Lubricating

BLUESIL™ PASTES & GREASES		Paste	Greases			
		Paste 408	Tap Grease	Grease 33	Grease 44	Grease 55
	Main characteristics	Corrosion, water repellency	Lubrication	Lubrication cold temperature	Lubrication hot temperature	Rubber swelling
	Color	Tranluscent to whitish	Tranluscent to whitish	Brown	Brown	Brown
PHYSICAL PROPERTIES	Specific gravity at 25°C	1.01	1.00	1.03	1.05	1.00
	Worked penetration (mm/10) (1)	280	<260	280	260	280
	Rested penetration (mm/10) (1)	270	200	250	250	270
THERMAL PROPERTIES	Exudation (%) (2)	<0.5	<8	<4 at 150°C	<2 at 150°C	<5 at 100°C
STORAGE	Evaporation (%) (2)	<3	<3	<3 at 150°C	<4 at 150°C	<2.5 at 100°C
	Drip point (°C) (3)	-	-	210	205	205
	Service temperatures (°C)	-40 to +200	-40 to +200	-70 to +180	-40 to +200	-65 to +175
	Thermal conductivity at 25°C (W/mK)	0.19	-	-	-	-
	Shelf life from the production date (months)	36	36	18	18	18

(1) NF T 6012, ASTM D 217, DIN 51804
(2) after 24 h at 2000°C
(3) ASTM D 566

PROTECTION & LUBRICATION BLUESIL™ PASTES & GREASES

- Lubricating devices and vehicles parts exposed to cold and hot conditions as well as harsh conditions moisture, corrosive environment: greases used for gearboxes, starter units, etc…
- Lubricating various mechanisms: power windows, power door lock mechanisms, assemblies of mechanisms (plastic/plastic, plastic/metal): plastics gears, pins used in the vehicle.

Good Lubricating power in a wide range of temperatures, improving resistance to oxidation and corrosion, good wash-out resistance and very high drip point makes Silicones Greases unique for automotive applications.