STRUB Antifreeze BMC

Si-OAT technology with phosphate

Art.-No. 33811

Description

STRUB Antifreeze BMC is a versatile and multifunctional coolant for internal combustion engines and battery-powered electric vehicles that offers unique hard water and oxidation stability. As an ethylene glycol based coolant, STRUB Antifreeze BMC contains a state-of-the-art silicate inhibitor technology with phosphate supported by a robust organic backbone (OAT - Organic Additive Technology).

STRUB Antifreeze BMC completely replaces the following products and meets their requirements:

- STRUB Antifreeze AFC
- STRUB Antifreeze QFC
- STRUB Antifreeze QRC
- STRUB Antifreeze XLC

BASF description: G30, G40, G48, G60

*For a complete list, see the page 4. Colors and dilution on request.

Application

STRUB Antifreeze BMC can be used in a wide range of powertrains. It has been specifically developed for use in modern internal combustion engines (ICE), hybrids and indirect cooling systems of battery electric vehicles (BEV). STRUB Antifreeze BMC provides year-round freeze and corrosion protection. It is recommended to use at least 35% by volume of antifreeze in the final coolant solution. Concentrations greater than 70% by volume are not recommended.

Antifreeze	Concentrate	Water
-18°C	33 vol.%	67 vol.%
-38°C	50 vol.%	50 vol.%
-41°C	55 vol.%	45 vol.%

Features and advantages

- Replaces earlier Si-OAT generation coolants
- Replaces previous Si-OAT generation hybrid coolants containing borate, molybdate and nitrate
- Thermal oxidation stability
- Compatibility with fluxes for controlled atmosphere brazing (CAB).
- State-of-the-art silicate stabilization
- Excellent aluminum passivation
- Excellent hard water stability
- Less waste due to long emptying intervals and less material replacement
- Free from nitrites, borates, amines and 2-ethylhexanoic acid
- Compatible with widely and frequently used construction materials such as metals, alloys, rubber and engineering (thermo)plastics
- Compatible with other coolants, such as previous generations of Si-OAT

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Meets the following standards:

- ASTM D3306
- JIS K2234:2018
- FVV R 530:2005
- BS 6580:2010*
- Ö-Norm * [1]
- GB 29743:2013* (PC)
- AFNOR 15-601

[1]with the exception of RA
*modified

Meets the requirements of the following specifications:

- VW G11, G12+, G12++, G13 compatible
- BMW LC 87, LC 97, LC 18
- Alfa Romeo, Fiat, Lancia 9.55523
- Chrysler MS 7170
- Opel / Vauxhall GME L1301
- VW G12 EVO (TL 774-L)
- MWM 0199-99-2091/12

Toxicity and safety

For toxicity and safety data, please refer to the safety data sheet. The information and advice given must be observed and the necessary precautions taken when handling chemicals. This product should not be used to protect drinking water systems from freezing.

Technical data

Chemical and physical properties				
Features	**STRUB Antifreeze BMC**	**Unit**	**ASTM D3306-Requirements**	**Method**
Ethylene glycol	min. 91	Weight %	Base	
Other glycols	max. 1	Weight %	max. 5 %	
Inhibitor content	approx. 4,5	Weight %		
Water content	max. 4	Weight %	max. 5 %	ASTM D1123
Ash content	max. 4.5	Weight %	max. 5 %	ASTM D1119
Nitrite, Amine, Borate, 2EHA				
Relative density - specific gravity (15°C)	approx. 1,123		1.110 - 1.145	ASTM D5931
Density (20°C)	approx. 1,120	kg/l		ASTM D1122
Equilibrium boiling point	min. 163	°C	> 163	ASTM D1120
Reserve alkalinity	min. 9.1	ml	Report	ASTM D1121
pH value (20°C)	approx. 8,5			ASTM D1287
Refractive index (20°C)	approx. 1,432			ASTM D1218

Physical data - typical values			
	50 % dilution	**35 % dilution**	**Method**
pH value	8.2	8.1	ASTM D1287
Initial crystallization, °C	-36.4	-19.9	ASTM D1177
Density (20°C), kg/l	1.072	1.051	ASTM D1121
Refractive index	1.387	1.371	ASTM D1218
Equilibrium boiling point, °C	109	106	ASTM D1120

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Lab test results

ASTM D1384 - Glass corrosion test						
	Weight change in mg/coupon[1]					
	Brass	Copper	Lot	Steel	Cast iron	Aluminum
ASTM D3306 (max.)	10	10	10	10	10	10
STRUB Antifreeze BMC	0	0	1	0	0	0

1 Weight loss AFTER dry cleaning according to ASTM procedure.

ASTM D4340 - Aluminum heat rejection test (corrosion test on hot surfaces)	
	Weight change in mg/cm /week[21]
ASTM D3306 (max.)	1.0
STRUB Antifreeze BMC	-0.1

1 Weight loss AFTER dry cleaning according to ASTM procedure.
Weight gain is indicated by a - sign

ASTM D2570 - Simulated corrosion test (circulation test)						
	Weight change in mg/coupon[1]					
	Brass	Copper	Lot	Steel	Cast iron	Aluminum
ASTM D3306 (max.)	20	20	60	20	20	60
STRUB Antifreeze BMC	2	3	20	0	0	-2

1 Weight loss AFTER dry cleaning according to ASTM procedure.
Weight gain is indicated by a - sign

ASTM D2809 - Water pump cavitation test			
	Pump capacity[1]	pH value	
ASTM D3306 requirement	> / = 8	Before test	After test
	8	8.01	7.6

1 ASTM D3306 requires a pump rating of 8 or higher on a scale of 10.

JIS K2234:2018 - Circulating corrosion properties (30 v%, 88°C, 1000 hr).						
	Weight change in mg/coupon[1]					
	Brass	Copper	Lot	Steel	Cast iron	Aluminum
JIS K2234:2018	0.3	0.3	0.6	0.3	0.3	0.6
STRUB Antifreeze BMC	00.3	0.03	-0.07	0	0.22	0.04

1 Weight loss AFTER dry cleaning according to ASTM procedure.
Weight gain is indicated by a - sign

	pH value	
	After test	Change
JIS K2234:2018	6.55 to 11	+/- 1.0
STRUB Antifreeze BMC	8.06	-0.01

Shelf life and storage

STRUB Antifreeze BMC can be stored in unopened containers for at least 3 years without affecting product quality or performance. The product should be stored above -20°C and preferably at room temperature. Periods of exposure to temperatures above 35°C should be minimized. Exposure of coolant in clear packaging to direct sunlight is strongly discouraged as this may cause color fading or discoloration over time. In conjunction with high ambient temperatures, this reaction can be accelerated. It is therefore advisable to store the coolant

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indoors, to use new and non-recycled containers, and to use packaging with a UV filter whenever possible. As with any antifreeze, the use of galvanized steel for pipes or other parts of the storage/mixing equipment and for packaging is not recommended.

Compatibility and miscibility

STRUB Antifreeze BMC is compatible with most ethylene glycol based coolants such as the (previous) generations of Si-OAT coolants. However, for optimum performance, the exclusive use of STRUB Antifreeze BMC is recommended. As with all coolants, we recommend the use of deionized or distilled water to prepare the ready-to-use dilutions to ensure optimum performance and controlled quality.

Note

For optimum performance and controlled quality, we recommend the use of deionized, distilled or tap water not exceeding the following limits for the preparation of the ready-to-use solution:

- Hardness of max. 3.6 mmol/l
- Chlorides max. 500 ppm
- Sulfates max. 500 ppm

Transportation

ADR/SDR No dangerous goods

Disposal

FVO VeVA / EAK 16 01 14

Antifreeze BMC covers all types/specifications listed below:

Art.-Nr.	Bezeichnung
30932	STRUB Antifreeze AFC Fluorescein
32677	STRUB Antifreeze AFC 50/50 blue-green
32816	STRUB Antifreeze AFC Blue ready mix -50°C
32032	STRUB Antifreeze AFC blue-green
31897	STRUB Antifreeze AFC Colorless
31572	STRUB Antifreeze AFC ready mix -20°C
32014	STRUB Antifreeze QFC (G13)
31380	STRUB Antifreeze QRC (G12++)
33657	STRUB Antifreeze XLC 33-67 Colorless
30251	STRUB Antifreeze XLC 50 50 green
30830	STRUB Antifreeze XLC 50 50 purple
32632	STRUB Antifreeze XLC Blue
30527	STRUB Antifreeze XLC Colorless
31781	STRUB Antifreeze XLC Yellow
30528	STRUB Antifreeze XLC Green
30239	STRUB Antifreeze XLC Purple
33348	STRUB Antifreeze XLC Orange

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Specifications and approvals	Antifreeze XLC is approved by the following engine manufacturers:		
OEM Group	**OEM**	**Specifications**	**Color-Code**
ADE	ADE		
AGCO	Fendt		
AGCO	Valtra		
Aston Martin	Aston Martin		
BAIC Group	Foton	Q-FPT 2313005-2013	
Behr	Behr		
Caterpillar	MAK	A4.05.09.01	
Caterpillar	MWM	0199-99-2091/11	
Caterpillar	Perkins		
Claas	Claas		
Cummins	Cummins	IS series u N14	
Cummins	Cummins	CES 14439, CES 14603	
Daimler AG	Mercedes-Benz	325.3	OF02/RL04/RL02
Daimler AG	Detroit	DFS93K217	
Deutz	Deutz	DQC CB-14	
DRB-HICOM	Proton		
Fiat	Case New Holland	MAT3624	
Ford	Ford	WSS-M97B44-D	OF02
General Electric Company	Jenbacher	TA 1000-0201	
General Electric Company	Waukesha		
General Motors	Chevrolet		
General Motors	Opel - GM	GMW 3420	OF07
General Motors	Saab	B 040 1065	
General Motors	Saturn		
General Motors	Vauxhall	GME L1301	BD04
General Motors	Vauxhall	GM 6277M (+B040 1065)	OF07
Great Wall Motor Co Ltd.	Great Wall		OF02
Hitachi	Hitachi		
Isuzu	Isuzu		
Irisbus	Karosa		
John Deere	John Deere	JDM H5	
Kobelco	Kobelco		
Komatsu	Komatsu	07.892 (2009)	
Liebherr	Liebherr	MD1-36-130	
Mazda	Mazda	MEZ MN 121 D	
MG-Motors	Rover		
Mitsubishi Heavy Industry	Mitsubishi MHI		
Paccar	DAF	74002	
Paccar	Leyland Trucks	DW 03 24-5403	OF02
Renault-Nissan	Renault RNUR	41-01-001/--S Type D	YF06
Rolls Royce Power Systems AG	MTU	MTL 5048	
Rolls Royce Power Systems AG	Bergen Engines	2.13.01	
Scania Group	Scania	TB 1451	
Suzuki	Santana Motors		OF02
Tata Motors	Jaguar	CMR 8229	
Tata Motors	Jaguar	STJLR 651.5003	OF02
Tata Motors	Land-Rover		
Tata Motors	Land-Rover	STJLR 651.5003	
Tedom	Tedom		
Thermo King	Thermo King		
Volvo AB	Mack	014 GS 17009	
Volvo AB	Renault Trucks	41-01-001/- -S Type D	YF06
Volvo AB	Volvo Penta		
Volvo AB	Volvo Construction		
Volvo AB	Volvo Trucks	VCS	
VW	Audi	TL-774 D = G 12	RL02 (OF02)
VW	Audi	TL-774 F = G 12+	RL04
VW	MAN	324 Typ SNF	
VW	MAN B&W AG	D36 5600	
VW	MAN B&W A/S	(Denmark)	
VW	Seat	TL-774 D = G 12	RL02 (OF02)
VW	Seat	TL-774 F = G 12+	RL04
VW	Semt Pielstick		
VW	Skoda	TL-774 D = G 12	RL02 (OF02)
VW	Skoda	TL-774 F = G 12+	RL04
VW	Skoda	61-0-0257	
VW	Volkswagen	TL-774 D = G 12	RL02 (OF02)
VW	Volkswagen	TL-774 F = G 12+	RL04
Wärtsilä	SACM Diesel	DLP 799861	
Wärtsilä	Wärtsilä	32-9011	CL00
Yanmar	Yanmar		

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STRUB Antifreeze XLC meets and exceeds the following requirements:
Standards & Specifications

BRB	BRB 637	**MIL Standards MIL Belgium**	BT-PS-606 A
ASTM Standards	ASTM D3306	**MIL Standards MIL France**	DCSEA 615/C
	ASTM D4656	**MIL Standards MIL Italy**	E/L-1415b
	ASTM D4985	**MIL Standards MIL Sweden**	FSD 8704
	ASTM D 6210		
		SAE Standards	SAE J1034
British Standards	BS 6580	**UNE Standards**	UNE 26-361-88/1
CuNA Standards Italy	NC 956-16		
CuNA Standards Italy	NC 956-18		
French Standards	NFR 15-601		
FW Standards Germany	FW Heft R443		
Japanese Standards	JASO M325		
Korean Standards	KSM 2142		
NATO Standards	NATO S-759		
Önor	Önorm V5123		

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