



# Havoline<sup>®</sup> XLC

## High performance extended life antifreeze coolant

### Product description

Havoline XLC is a high performance extended life engine coolant concentrate. Fleet tested for in excess of 100,000,000km, Havoline XLC offers protection against freezing, boiling and cooling system corrosion, including high temperature corrosion in modern aluminium engines.

Havoline XLC is an ethylene glycol based formulation and is designed with advanced non-depleting corrosion inhibitor technology, offering a long, low maintenance service life.

### Customer benefits

- Advanced non-depleting corrosion inhibitor technology promotes extended low maintenance service life
- Mixed fleet applications offer in excess of 650,000 km in trucks and buses, 250,000 km in passenger cars and 32,000 hours in stationary engines
- Promotes reliability and corrosion protection in thermostats, radiators, water pumps and other vulnerable cooling system components
- High performance silicate and phosphate-free formulation contributes to reliable hard water stability
- Aids high temperature corrosion protection in modern aluminium engines, helps reduce maintenance and increases uptime
- Advanced carboxylic additives promote environmental protection

### Product highlights

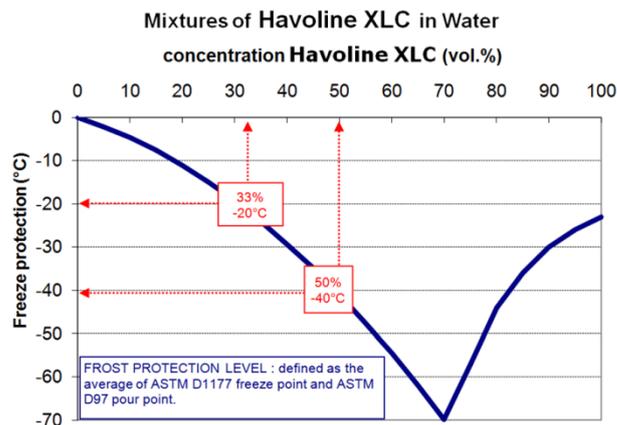
- **Extended low maintenance service life**
- **Tested on trials in excess of 100,000,000km**
- **Vulnerable component protection**
- **Reliable hard water stability**
- **High temperature aluminium corrosion resistance**

#### Selected specification standards include:

DAF	Ford
General Motors	MAN
Mercedes-Benz	Volkswagen

## Applications

- Based on patented silicate-free aliphatic additive technology, Havoline XLC provides long-life corrosion protection for most engine metals, including aluminium and ferrous alloys. During extensive fleet testing, the synergistic combination of mono- and di-carboxylates present in this coolant, offered protection for at least 650,000 km (8,000 hours) in trucks and buses, 250,000 km (2,000 hours) in passenger cars and 32,000 hours (or 6 years) for stationary engines
- It is recommended to change the coolant every five years or at the above distances or operating times, whichever comes first.
- Havoline XLC offers long-life protection against many types of corrosion through patented organic corrosion inhibitors.
- Havoline XLC offers long-term high temperature corrosion protection in the aluminium heat transfer surfaces in modern engines. The inhibitor package of Havoline XLC promotes cavitation protection without the use of nitrite or nitrite-based supplemental coolant additives (SCA's)
- Havoline XLC promotes long-life frost and corrosion protection. To ensure good corrosion protection it is recommended to use at least 33 vol. % of Havoline XLC in the coolant solution. This offers frost protection to -20°C.
- Typical mixtures in Northern Europe are 50/50, offering frost protection down to -40°C. Mixtures with more than 70 vol. % Havoline XLC in water are not recommended. The maximum frost protection (about -69°C) is obtained at 68 vol. % Havoline XLC
- Havoline XLC may be used in engines manufactured from cast iron, aluminium or combinations of the two metals, and in cooling systems containing aluminium or copper alloys. Havoline XLC is recommended for hi-tech engines, where high temperature aluminium protection is important. For racing cars we recommend the use of Havoline Extended Life Corrosion Inhibitor, an aqueous solution of the same carboxylic additives



## Compatibility

- Havoline XLC is compatible with most other coolants based on ethylene glycol. Exclusive use of Havoline XLC is, however, recommended for optimum corrosion protection and sludge control
- While soft water is preferred for dilution, laboratory testing has shown that acceptable corrosion results are still obtained with water of 20°dH, containing up to 500 ppm chlorides or 500 ppm sulphates

## Storage and handling

- This product should be stored above -20°C and preferably at ambient temperatures. Periods of exposure to temperatures above +35°C should be minimized
- Exposure of the coolant in translucent packages to direct sunlight can degrade the dyes present in the coolant, and result in fading of the colour or discoloration over time. This reaction can be accelerated if coupled with high ambient temperatures. It is therefore advisable to store coolant in translucent packages indoors
- Havoline XLC can be stored for approximately 8 years in unopened containers without any effect on the product quality or performance. It is strongly recommended to use new containers and not recycled ones
- As with any antifreeze coolant, the use of galvanized steel is not recommended for pipes or any other part of the storage/mixing installation

## Approvals, performance and recommendations

### Approvals

• Ford	WSS-M97B44-D
• Mercedes-Benz	325.3
• General Motors	GM 6277M
• MAN	324 type SNF
• Volkswagen	TL 774F
• DAF	74002

Even though some OEMs have not yet given a formal approval, Havoline XLC is suitable for use as antifreeze/coolant in a wide range of combustion engines. See the OEM manual on recommended coolant type.

### Performance

- ASTM D 3306

Typical test data			
Chemical & physical properties	Havoline XLC	ASTM 3306 reqs.	Method
Ethylene glycol	93 % w/w glycol	Base	—
Other glycols	0.5 % max.	5 % w/w max.	—
Inhibitor content	5 % w/w	—	—
Water content	5 % w/w max	5 % w/w max	ASTM D1123
Ash content	1.1 % w/w typ.	5 % w/w max	ASTM D1119
Nitrite, amine, phosphate, borate, silicate	Nil	—	—
Colour	Orange	—	—
Specific gravity, 15°C	1.116 typ.	1.110 to 1.145	ASTM D5931
Specific gravity, 20°C	1.113 typ.	—	ASTM D5931
Equilibrium boiling point	180°C typ.	> 163°C	ASTM D1120
Reserve alkalinity (pH 5.5)	6.2 typ.	Report	ASTM D1121
pH, 20°C	8.6 typ.	—	ASTM D1287
Refractive Index, 20°C	1.430 typ.	—	ASTM D1218

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Typical test data					
Chemical & physical properties					
Dilution, %	50%	40%	33%	ASTM 3306	Method
pH	8.6	8.4	8.3	7.5 to 11.0	ASTM D1287
Foaming properties, 25°C	50 ml typ	—	—	—	ASTM D1881
- break time	5 sec. typ.				
Foaming properties, 88°C	50 ml typ.	—	50 ml typ.	150 ml max.	ASTM D1881
- break time	5 sec. typ.		5 sec. typ.		
Initial crystallization	< - 37°C	< - 24°C	< -18°C	< - 37 °C	ASTM D1177
Freezing protection	- 40°C typ.	- 27°C typ.	- 20°C typ.	—	—
Specific gravity, 20°C	1.068 typ.	1.056 typ.	1.053 typ.	—	ASTM D5931
Reserve alkalinity (pH 5.5)	3.0 typ.	2.4 typ.	2.1 typ.	—	ASTM D1121
Refractive Index, 20°C	1.385 typ.	—	1.369 typ.	—	ASTM D1218
Equilibrium boiling point	108°C typ.	—	104°C typ.	—	ASTM D1120
Effect on non-metals	no effect	no effect	no effect	—	GME60 255
Staining characteristics	—	—	no effect	no effect	ASTM D1882
Hard water stability	no precipitate	—	—	—	VW PV 1426

## Corrosion Protection

### ASTM D1384 glassware corrosion tests

	Weight loss in mg/coupon <sup>1</sup>					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
ASTM D3306 (max)	10	10	30	10	10	30
Havoline XLC	1.6	1.9	0.1	-0.5	-1.4	4.6

<sup>1</sup> Weight loss AFTER chemical cleaning acc. to ASTM procedure. Weight gain is indicated by a - sign.

### ASTM D4340 Aluminium heat rejection test, 25 %

	Weight loss in mg/coupon <sup>1</sup>
ASTM D3306 (max)	1.0
Havoline XLC	< 0.2

<sup>1</sup> Weight loss AFTER chemical cleaning acc. to ASTM procedure. Weight gain is indicated by a - sign.

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**Modified MTU High Temperature corrosion test (2000W)**

Test duration, hrs	Weight loss in mg/coupon <sup>2</sup>					
	Cast Iron			Aluminium		
	48	69	116	48 <sup>2</sup>	69	116
Reference coolant <sup>3</sup>						
- hot coupon	-30.0	-13.1	4.3	-18.2	284.2	—
- top coupon	-20.0	1.6	5.7	6.2	152.2	—
Havoline XLC						
- hot coupon	-0.2	-2.1	-0.5	20.2	24.6	35.1
- top coupon	3.4	0.1	1.9	20.1	42.1	18.5

<sup>2</sup> Weight loss AFTER chemical cleaning acc. to (shortened) MTU procedure. Weight gain is indicated by a - sign.

<sup>3</sup> Reference coolant is a conventional, high quality, silicate-based coolant.

## Corrosion Protection

### Aging test

To emphasise the corrosion protection offered by Havoline XLC, the aging test is conducted under more severe conditions compared to those commonly used in the industry.

Test Conditions	Typical Industry	Havoline XLC
<b>Test duration</b>	<b>169 h</b>	<b>504 h</b>
Fluid content	5.0 l	6.0 l
Pressure	1.5 bar	2.5 bar
Flow	3.0 l/min	3.5 l/min
Heat input	5500 W	5000 W
Temperature in heating vessel	95°C	115°C
Temperature in cooling vessel	75°C	95°C
Concentration of coolant in water	40 vol. %	20 vol. %

## Havoline® XLC — Continued

Weight loss in g/m <sup>2</sup> (using Chevron test parameters) <sup>1</sup>							
	Al <sup>2</sup>	AlMn	Cast Iron	Steel	Cu	CuZn	Solder CB
<b>Reference Coolant <sup>3</sup></b>							
- after initial cleaning	82.10	64.02	-2.19	-1.68	3.62	2.90	21.45
- after final cleaning	125.01	94.33	-0.36	0.11	4.99	5.66	25.83
<b>Havoline XLC</b>							
- after initial cleaning	9.77	0.71	-0.07	0.17	1.44	1.62	0.43
- after final cleaning	23.58	4.14	0.0	0.24	2.63	2.53	0.55

<sup>1</sup> Weight loss AFTER chemical cleaning acc. to (shortened) MTU procedure. Weight gain is indicated by a - sign.

<sup>2</sup> Aluminium SAE 329.

<sup>3</sup> Reference coolant is conventional, high quality, silicate-based coolant.

The information given in the typical data does not constitute a specification but is an indication based on current production and can be affected by allowable production tolerances. The right to make modifications is reserved. This supersedes all previous editions and information contained in them.

Disclaimer Chevron accepts no liability for any loss or damage suffered as a result of using this product for any application other than applications specifically stated in any Product Data Sheets.

Health, safety, storage and environmental Based on current available information, this product is not expected to produce adverse effects on health when used for the intended application and in accordance with the recommendations provided in the Material Safety Data Sheet (MSDS). MSDSs are available upon request through your local sales office, or via the Internet. This product should not be used for purposes other than its intended use. When disposing of used product, take care to protect the environment and follow local legislation.

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EU v2 20 September 2011  
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