

Havoline extended life antifreeze coolant-PG

1 Description

Havoline extended life antifreeze coolant-PG (Havoline XLC-PG) - mixed with the appropriate amount of water - is used as a cooling and heat transferring fluid in combustion engines. The heat of the internal combustion is transferred via the fluid to the radiator where the mixture is cooled by means of air flow. **Havoline XLC-PG** is a

propylene glycol based fluid that provides maintenance-free protection against *freezing and boiling* but also against *corrosion*. Extended coolant life, often for the whole life of the engine or vehicle, is obtained through the use of virtually non-depleting corrosion inhibitors.

2 Benefits

Havoline XLC-PG offers many benefits to the engine designer as well as to the user :

- | | |
|--|--|
| ▪ extended life | by synergistic combination |
| ▪ improved heat transfer | leaves more flexibility to engine design |
| ▪ reduces repairs | to thermostat, radiator and water pump |
| ▪ reliability | depletion free and stable inhibitor |
| ▪ improved hard water stability | absence of silicates and phosphates |
| ▪ save time and money | maintenance-free coolant |
| ▪ suitable for mixed fleets | 1 coolant for automotive & heavy duty application |
| ▪ environmentally friendly | by using carboxylic additives in the inhibitor package |

Based on patented *silicate-free* aliphatic additives technology, **Havoline XLC-PG** provides long-life corrosion protection for all engine metals, including aluminium and ferrous alloys. The synergistic combination of mono- and di-carboxylates present in this coolant, has proven to provide protection for at least **650,000 km** (ca. 8,000 hours) in truck & bus-application or **250,000 km** (ca. 2,000 hours) for passenger cars or a minimum of **32,000 hours** (or 6 years) for stationary engines. It is recommended to change the coolant every five years or at above mileages or operating times, whichever comes first.

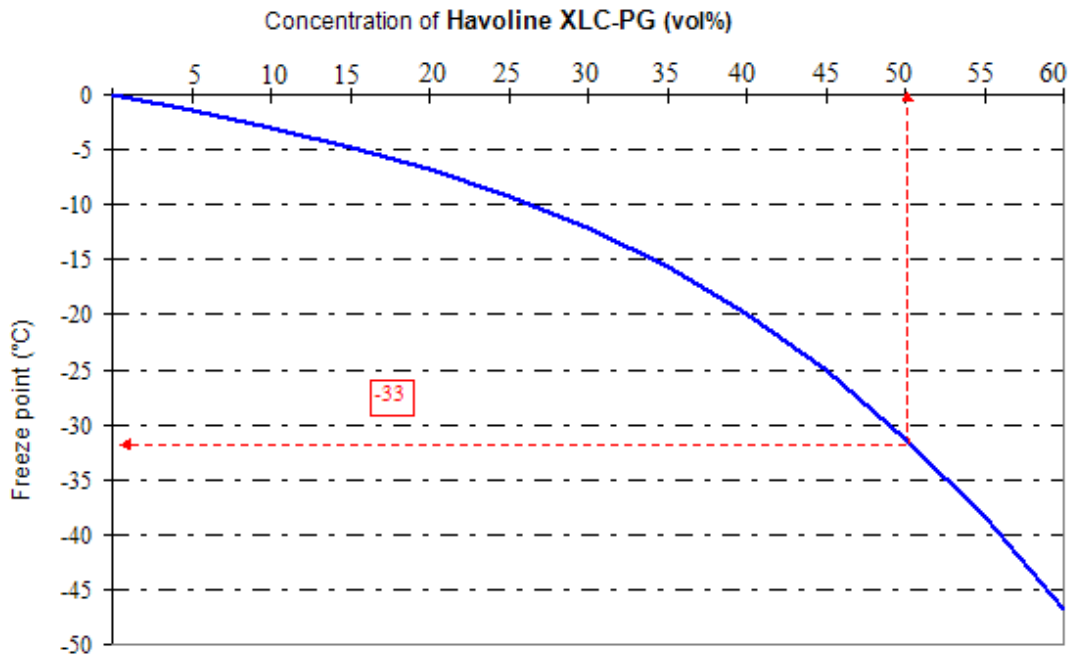
Havoline XLC- PG provides long-life protection against all forms of *corrosion* by the use of optimized and patented organic corrosion inhibitors. Excellent and lasting high temperature corrosion protection is provided for the **aluminium** heat transfer surfaces contained in modern engines. The inhibitor package of **Havoline XLC-PG** offers excellent cavitation protection even without using nitrite or nitrite-based supplemental coolant additives (SCA's).

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3 Application

Havoline XLC-PG provides long-life frost and corrosion protection. To ensure good corrosion protection it is recommended to use at least 33 vol. % of **Havoline XLC-PG** in the coolant solution. This provides frost protection to -17°C . Typical mixtures in Northern Europe are 50/50, offering frost protection down to -38°C .

Havoline XLC-PG may be used with confidence in engines manufactured from cast iron, aluminium or combinations of the two metals, and in cooling systems made of aluminium or copper alloys. **Havoline XLC-PG** is particularly recommended for hi-tech engines, where high temperature aluminium protection is important. For racing cars we recommend the usage of **Havoline extended life corrosion inhibitor**, an aqueous solution of the same carboxylic additives.



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4 Compatibility and mixability

Havoline XLC-PG is compatible with most other coolants based on propylene or ethylene glycol. Exclusive use of **Havoline XLC-PG** is, however, recommended for optimum corrosion protection and sludge

control. Also, the use of soft water is preferred for dilution. Though, lab testing has shown that acceptable corrosion results are still obtained with water of 20°dH, containing up to 500 ppm chlorides or 500 ppm sulfates.

5 Availability

Havoline XLC- PG available in bulk and various packages. Please contact your local arteco area sales manager on availability of packages and dilutions.

In the range of organic additives technology Arteco can offer:

- **Havoline extended life antifreeze coolant (Havoline XLC)** is based on MEG instead of MPG.
- **Havoline extended life antifreeze base (Havoline XLB)** is a MEG based superconcentrate. **Havoline XLC** is obtained by mixing 25% of **Havoline extended life antifreeze base** with 75% MEG.
- **Havoline extended life corrosion inhibitor (Havoline XLI)** is an aqueous superconcentrate of the same inhibitor package.

Separate information bulletins with more details are available for all these different products.

6 Storage and requirements

The product should be stored above -20°C and preferably at ambient temperatures. Periods of exposure to temperatures above 35°C should be minimized.

Further, it is strongly advised not to expose the coolant in translucent packages to direct sunlight because this can degrade the colour 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 filled

in translucent packages indoors to avoid this issue.

Havoline XLC-PG can be stored for minimum 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

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7 Toxicity & safety

For toxicity and safety data we refer to the material safety data sheet. The transport is not regulated. Labeling is not required.

All information contained in this Product Information Leaflet is accurate to the best of our knowledge and belief as at the date of issue specified. However, the Company makes no warranty or representation, express or implied, as to the accuracy or completeness of such information.

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Addendum - technical information

Chemical and physical properties

	Havoline XLC-PG	ASTM 5216 requirements	method	
propylene glycol	93.0 % w/w glycol	base		
other glycol's	0.5 % max.	5 % w/w max.		
inhibitor content	5 % w/w			
water content	4 % w/w max	5 % w/w max	ASTM D1123	
ash content	1.4 % w/w typ.	5 % w/w max	ASTM D1119	
nitrite, amine, phosphate, borate, silicate	nil			
colour	uncoloured			
specific gravity, 15°C	1.045 typ.	1.030 to 1.065	ASTM D1122	
specific gravity, 20°C	1.042 typ.		ASTM D1122	
equilibrium boiling point	165°C typ.	> 152°C	ASTM D1120	
reserve alkalinity	6.3 typ.	report	ASTM D1121	
refractive index	1.431 typ.			
	50 % dilution	33 % dilution	ASTM 5216	method
pH	8.8	8.3	7.5 to 11.0	ASTM D1287
foaming properties at 25°C	50 ml typ	/		ASTM D1881
■ break Time	5 sec. typ..			
foaming properties at 88°C	50 ml typ.	50 ml typ.	150 ml max.	ASTM D1881
■ break time	5 sec. typ.	5 sec typ		
initial crystallization	< - 32.6 °C	< -15 °C	< - 32 °C	ASTM D 1177
freezing protection	-33°C.typ.	- 15 °C typ.		
effect on non-metals	no effect	no effect		GME 60 255
staining characteristics	/	no effect	no effect	ASTM D 1882
hard water stability	no precipitate	/		VW PV 1426

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ASTM D1384 glassware corrosion tests

	weight loss in mg/coupon ¹						
	Brass	Copper	Solder	Steel	Cast iron	Aluminum	AlMn
ASTM D5216 (max)	10	10	30	10	10	30	-
Havoline XLC-PG	0.7	1.1	1.8	0.1	-0.3	1.5	2.1

¹ 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/cm ² /week ¹
ASTM D5216 (max)	1.0
Havoline XLC-PG	< 0.4

¹ weight loss AFTER chemical cleaning acc. to ASTM procedure. Weight gain is indicated by a - sign.

Modified MTU high temperature corrosion test (2000 W)

	weight loss in mg/coupon ²					
	Cast iron			Aluminium		
test duration, hrs	48	69	116	48	69	116
reference coolant ³						
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-PG						
hot coupon	-	3.8	-	-	23.9	29.0
top coupon	-	0.3	-	-	-0.6	-3.7

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

³ reference coolant is a conventional, high quality, silicate-based MEG coolant

Corrosion protection

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Aging test

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

Corrosion protection

test conditions	typical Industry	Havoline	
test duration	169 h	504 h	
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. %	

	weight loss in g/m ² (using arteco test parameters) ¹						
	Al ²	AlMn	Cast Iron	Steel	Cu	CuZn	solder CB
reference coolant ³							
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
Havoline XLC-PG							
after initial cleaning	1.40	0.38	-0.02	0.10	1.66	1.55	0.36
after final cleaning	11.02	5.81	0.16	0.10	2.51	2.19	0.51

1. weight loss AFTER chemical cleaning acc. to (shortened) MTU procedure. Weight gain is indicated by a - sign.
2. aluminum SAE 329.
3. reference coolant is a conventional, high quality, silicate-based MEG coolant