



HAVOLINE[®] EXTENDED LIFE ANTI-FREEZE/COOLANT

PRODUCT NUMBER 227994 (MSDS 10299)

HAVOLINE EXTENDED LIFE ANTI-FREEZE/COOLANT

Havoline Extended Life Anti-Freeze/Coolant is a single-phase, ethylene glycol type universal automotive engine coolant based on a Texaco's patented long life organic corrosion inhibitor system.

PRODUCT NUMBER 227995 (MSDS 10307)

HAVOLINE EXTENDED LIFE PREDILUTED 50/50 ANTI-FREEZE/COOLANT

Havoline Extended Life Anti-Freeze delivers unsurpassed automotive cooling system protection for up to 5 years or 150,000 miles. Its patented carboxylate inhibitors, first to receive General Motor's DEX-COOL approval, provide excellent corrosion protection and heat transfer, extend water pump life, and improve component durability.

PRODUCT APPLICATION

Havoline Extended Life Anti-Freeze/Coolant is a universal engine coolant that incorporates patented organic acid corrosion inhibitor technology. This coolant meets both ASTM D 3306 for automotive service and ASTM D 4985 for heavy-duty diesel service. It is a nitrite-, nitrate-, phosphate-, silicate-, borate and amine-free formulation which uses Texaco's patented carboxylate technology to provide maximum protection of the six basic metal alloys found in most heat transfer systems. Since the coolant contains no phosphates or silicates, hard water deposits in the cooling system are almost eliminated. The low level of abrasive dissolved solids in Havoline Extended Life Anti-Freeze/Coolant results in improved water pump seal life.

The life of a coolant in an automobile engine is limited by the corrosion protection ability of the corrosion inhibitors. The main corrosion inhibitors in Havoline Extended Life Anti-Freeze/Coolant have been shown to remain above 95% of their original concentration after 150,000 miles in automobiles. This allows much longer intervals between coolant changes without worrying about loss of corrosion protection.

Used Havoline Extended Life Anti-Freeze/Coolant was tested in laboratory controlled corrosion tests for new

coolants after it had already been in service for more than 100,000 miles. The used Havoline Extended Life Anti-Freeze/Coolant passed the ASTM D 1384 requirements for glassware corrosion with results equivalent to new coolants and also passed the ASTM D 4340 Aluminum Hot Surface Test for new coolant. Havoline Extended Life Anti-Freeze/Coolant represents the next generation of universal engine coolants. This coolant is suitable for a five year or 150,000 miles service life in automotive applications.

Note: These products are not to be used to protect the inside of potable water systems against freezing

PRODUCT DESCRIPTIONS AND FEATURES

Havoline Extended Life Anti-Freeze/Coolant is manufactured from ethylene glycol and a highly effective long term corrosion inhibitor package based on carboxylate technology. This inhibitor system eliminates the need for silicates, phosphates, borates, nitrites, nitrates and amine additives traditionally used for this purpose.

The replacement of these inhibitors is significant for water pump life because many of these conventional inhibitors have been shown to be abrasive to water pump seals. In comparison field tests with conventional coolants in taxi fleets, Havoline Extended Life Anti-Freeze/Coolant significantly reduced the need to replace water pumps during the 100,000 mile test.

In addition to fleet tests, this product has also been tested by a major manufacturer of water pump seals, and has been found to be more compatible with the seals than any other coolant tested.

BENEFITS

In service, Havoline Extended Life Anti-Freeze/Coolant provides:

- meets GM 6277M--GM's Long Life Coolant specification
- 5 year or 150,000 mile service interval
- effective, long term corrosion protection for aluminum, brass, cast iron, steel, solder and copper
- protection against winter freeze up and minimizes the chance of summer boil over
- compatibility with water pump seal materials and minimizes the formation of abrasive dissolved solids
- storage stable for at least eight years

- no silicate dropout or gel formation during use or storage
- 100% biodegradable in its pure unused form
- excellent heat transfer properties
- nitrite-, borate-, phosphate-, nitrate- and amine-free
- outstanding hot surface aluminum protection
- superior protection in high operating temperatures
- compatibility with conventional antifreeze. Dilution with conventional antifreeze will reduce extended life benefits. Chevron recommends that this product not be diluted by more than 10% with conventional coolants.

PRODUCT RECOMMENDATIONS AND APPROVALS

Havoline Extended Life Anti-Freeze/Coolant is recommended for use in the cooling systems of all types of automotive engines. This product meets ASTM D 3306 for automotive service and ASTM D 4985 for heavy-duty diesel service.

Havoline Extended Life Prediluted 50/50 Anti-Freeze/Coolant meets ASTM D 4656 for automotive preblend and ASTM D 5345 for heavy-duty preblend.

Note: For optimum year round protection against freezing, boiling, and corrosion, a 50 percent Havoline Extended Life Anti-Freeze/Coolant solution (1 part antifreeze/1 part water) is recommended. For maximum protection against freezing in extremely cold areas, a 60 percent solution (3 parts anti-freeze/2 parts water) can be used. Concentrations greater than 67 percent or less than 40 percent are not recommended.

PRODUCT MAINTENANCE

Traditional phosphate and borate containing coolants exhibit high pH and reserve alkalinity (RA) when compared with Texaco's Havoline Extended Life Anti-Freeze/Coolant. This comparison can not be used to make conclusions about relative corrosion protection since the definition of RA is based upon the buffering curve of inhibitors that are not present in the coolant. Its unique corrosion inhibitor system is designed to protect aluminum and other system metals at lower pH levels than conventional coolants.

RA is defined as the amount, in milliliters (mL), of 0.1 normal hydrochloric acid required to reduce the pH of 10 ml of antifreeze to 5.5.

A comparison of Chevron's extended life coolant with traditional coolants is shown below:

	Havoline Extended Life Anti-Freeze/Coolant	Traditional antifreeze/coolant
Typical pH	8.3	10.5
Typical RA (mL)	6.0	12.0

This long life coolant has low pH and RA relative to traditional coolants. The pH change profile in service is a more important performance measure than the RA level. Havoline Extended Life Anti-Freeze/Coolant shows a typical pH reduction of less than 1.5 units in 100,000-mile fleet tests compared with a pH reduction of up to 3 units for traditional coolants.

The American Society for Testing Materials (ASTM) has eliminated minimum RA Level requirements in both key antifreeze specifications: ASTM D 3306 for automotive and ASTM D 4985 for heavy-duty engines. This action by the ASTM acknowledges that coolants that are not based on phosphate and borate can provide excellent corrosion protection for cooling system metals.

Recommended Dilutions for Havoline Extended Life Anti-Freeze/Coolant

Boiling Protection, °C (15 lb pressure cap) 50% 1:1 (1 part antifreeze/1 part water)	129.4
Freezing Protection, °C	
40% 2:3 (2 parts antifreeze/3 parts water)	-24.4
50% 1:1 (1 part antifreeze/1 part water)	-36.7
60% 3:2 (3 parts antifreeze/2 parts water)	-52.2

Notes

For optimum year round protection against freezing, boiling and corrosion, a 50 percent Havoline Extended Life Anti-Freeze/Coolant solution (1 part antifreeze/1 part water) is recommended. For maximum protection against freezing in extremely cold areas a 60 percent solution (3 parts antifreeze/2 parts water) can be used. Concentrations greater than 67 percent or less than 50 percent are not recommended.

Havoline Extended Life Prediluted 50/50 Anti-Freeze/Coolant should be used as manufactured. No dilution is recommended.

Always dispose of used coolant in accordance with local, state, and federal guidelines.

Because this product is silicate free, Havoline Extended Life Anti-Freeze/Coolant can be stored at least 8 years with no problem.

TYPICAL TEST DATA

Havoline Extended Life Anti-Freeze/Coolant

Product Number		227994
MSDS Number		10299
Appearance		Orange
Specific gravity 15/15°C		1.130
Freezing point, °C ^a	ASTM D 1177	-36.7
pH ^b	ASTM D 1287	8.3
Reserve alkalinity ^c	ASTM D 1121	6.0
Silicate, % ^d		None

- a. 50 vol % aqueous solution
- b. 1:2 dilution with water
- c. as received
- d. as anhydrous alkali metasilicate

Typical test data are average values only. Minor variations which do not affect product performance are to be expected in normal manufacturing.

Havoline Extended Life Anti-Freeze/Coolant ASTM D 1384 Glassware Corrosion Test

	ASTM Limit	Weight loss, mg per coupon*
Copper	10 max	2
Solder	30 max	-2
Brass	10 max	2
Steel	10 max	-1
Iron	10 max	-3
Aluminum	30 max	4

* Negative indicates net gain

HANDLING PRACTICES

The primary limiting factor in the shelf life of a coolant is silicate instability. Since silicate will eventually polymerize to silicate gel, all traditional coolants have a shelf life of about 18 months. Havoline Extended Life Anti-Freeze/Coolant is silicate-free and therefore can be stored for at least 8 years without a problem, provided the integrity of the container is maintained.

For information on the safe handling and use of these products, refer to their Material Safety Data Sheets. For more information and availability, call 1-866-688-8890.