



TECHNICAL BULLETIN

ZEREX® DEX-COOL® Formula Silicate & Phosphate FREE – Long Life Organic Acid Technology (OAT)

Zerex DEX-COOL® Formula antifreeze coolant is the latest automotive engine coolant development from Valvoline. The patented* carboxylate formulation has a service life of up to five years or 150,000 miles. It incorporates state-of-the-art organic acid technology in an ethylene glycol base for protection of all cooling system metals including aluminum. **Zerex DEX-COOL Formula** antifreeze coolant is approved by General Motors to the GM 6277M DEX-COOL specification.

Zerex DEX-COOL Formula antifreeze coolant contains no phosphates, silicates, borates, nitrates, amines and nitrites. It's global formulation meets the phosphate-free requirements of European automobile manufacturers and the silicate free requirement of Asian automobile manufacturers like Toyota, Hyundai, Kia, Dae Woo, Honda, Isuzu and others. It can be mixed with any DEX-COOL formula and is approved by Opel and Saab. It is dyed orange to distinguish it's unique chemistry from traditional green and yellow silicate coolants.

When diluted 50% with water, **Zerex DEX-COOL Formula** protects modern engine components from winter freezing and summer boiling. The chart at the top right provides detailed mixing information. **Zerex DEX-COOL Formula** is storage stable for up to five years as both a concentrate or diluted with water. It contains a high quality defoamer and will not harm gaskets, hoses, plastics or original vehicle paint.

Zerex DEX-COOL Formula antifreeze coolant meets or exceeds the following coolant specifications:

- | | |
|-----------------|----------------------------|
| ASTM D3306 | ASTM D4985 |
| SAE J1034, J814 | Saab Approved |
| SAE J1941 | Opel Approved |
| TMC of the ATA | GM 6277M DEX-COOL Approved |
| RP - 302B | |

* US patents 6,235,217 and 6, 126,852

This information only applies to products manufactured in the following location(s): USA

Effective Date:
05-23-06

Expiration Date:
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Replaces:
New

Author's Initials:
DET

Zerex DEX-COOL Formula Antifreeze Coolant Freeze/Boil Protection		
% Antifreeze	Freezing Point, °F/°C	Boiling Point**, °F/°C
40	-12/-24	260/126
50	-34/-36	265/128
70*	-90/-67	277/135

* Maximum freeze protection is at 70%.

** Boiling point shown using conventional 15 psi radiator cap.

Typical Physical Properties		
Antifreeze Glycols	mass %	93.5
Corrosion Inhibitors	mass %	3.5
Water	mass %	3.0
Flash Point	°F/°C	250/121
Weight per gallon @ 60°F/16°C	lbs./KG	9.299/4.218
Si from silicates	PPM	10 max.
Phosphates	PPM	30 max.

Aluminum Water Pump Tests ASTM D2809 Pump Cavitation		
Test Period	Results	Specification
100 hours	9	8

ASTM cavitation corrosion rating: 10 - perfect 1 - perforated

Valvoline recommends that spent coolant never be disposed of by dumping into a septic system, storm sewer or onto the ground. Instead, contact your state or local municipality for instructions on where to and how to properly dispose of this coolant and protect our environment.

If any coolant is spilled onto the ground, contain the spill and call the state authorities and ask for proper instruction on how to clean up the spill.

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Characteristic	Specifications	Typicals	ASTM Method
Chloride	25 PPM, max.	<25	D3634
Silicon, as Si	250 PPM, max.	<10	-
Specific gravity, 60/60° F	1.11 - 1.14	1.112	D1122
Freezing point, 50% V/V	-34°F/-36°C	-34°F/-36°C	D1177
Boiling point, undiluted	325°F/162°C	330°F/162°C	D1120
Boiling point, 50% V/V	226°F/107°C	226°F/107°C	D1120
Effect on engine or vehicle finish	No Effect	No Effect	-
Ash content, mass %	5 max.	1.36	D1119
pH, 50% V/V	8.3 - 8.8	8.6	D1287
Reserve alkalinity*	Report*	4.8	D1121
Water mass %	5 max.	3.0	D1123
Color	Distinctive	Orange	-
Effect on nonmetals	No adverse effect	No adverse effect	-
Storage stability	-	5 years	-
Foaming	150 ml vol., max. 5 sec. break, max.	31.7 ml 3 sec.	D1881 D1881
Cavitation-erosion rating	8 min.	9	D2809

**Reserve alkalinity (RA) is a term used to indicate the amount of alkaline inhibitors present in an antifreeze formulation. It is incorrect to relate a high RA with a high-quality antifreeze. Present state-of-the-art antifreeze formulations contain many new inhibitors which give added protection to certain metals but do not raise the RA number.*

Typical ASTM Corrosion Test Results			
Glassware Corrosion Test	Weight Loss Mg/Specimen		
	Spec.	Actual	ASTM Method
Copper	10	2	D1384
Solder	30	6	
Brass	10	3	
Steel	10	0	
Cast iron	10	0	
Aluminum	30	0	
Simulated Service Test			
Copper	20	2	D2570
Solder	60	5	
Brass	20	1	
Steel	20	1	
Cast iron	20	0	
Aluminum	60	0	
Hot Surface Corrosion			
Specimen weight loss	1.0	0.1	D4340
Electrochemical			
Ford Pitting Test	-400	-120.7	FLTM BL5-1

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