

**RECOMMENDED  
PRACTICE SAE J1034**

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**ENGINE COOLANT CONCENTRATE—  
ETHYLENE-GLYCOL TYPE**

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## ENGINE COOLANT CONCENTRATE— ETHYLENE-GLYCOL TYPE—SAE J1034

## SAE Recommended Practice

Report of Nonmetallic Materials Committee approved June 1973.

**Scope**—This standard covers glycol-type compounds which, when added to engine cooling systems at concentrations of 40-70% by volume of coolant concentrate in water, provide corrosion protection, lower the freezing point, and raise the boiling point of the coolant. Such compounds are intended for a minimum of 1 year (approximately 12,000 miles) service in a properly maintained cooling system. (Reference: SAE HS-40, Maintenance of Automotive Engine Cooling Systems.) Coolants meeting this standard do not require the use of supplementary materials. For additional information on engine coolants, see SAE J814.

**Material**—The base material shall be essentially ethylene-glycol. Other glycols such as propylene or diethylene-glycol may be incorporated if the physical and chemical properties mentioned below are met. Solutions of the coolant concentrate, when installed in a properly maintained cooling system, shall not adversely affect the normal fluid flow.

**Freezing Points and Boiling Points**—The engine coolant concentrate shall have a freezing point of no higher than 0°F (−18°C) and a boiling point of no lower than 300°F (149°C)<sup>1</sup>.

A 50% solution of engine coolant concentrate in water shall have a freezing point no higher than −34°F (−37°C) and a boiling point no lower than 226°F (108°C)<sup>1</sup>. (See Appendix.)

ASTM D 1120, Standard Method of Test for Boiling Point of Engine Antifreezes, and D 1177, Standard Method of Test for Freezing Point of Aqueous Engine Antifreeze Solution, shall be used for these determinations.

**Specific Gravity and Refractive Index**—The coolant concentrate shall have a gravity of 1.115-1.145 at 60/60°F or 1.113-1.143 at 20/20°C when tested according to ASTM D 1122, Standard Method of Test for Specific Gravity of Engine Antifreezes by the Hydrometer. A mixture of one part concentrate to one part water shall have a refractive index of 1.3840-1.3855 at 20°C. These requirements permit checking the freezing protection of aqueous solutions with commercially available antifreeze testers of either the hydrometer or refractometer type.

**Ash Content**—The ash content of the concentrated product shall not exceed 5.0% by weight when determined by ASTM D 1119, Standard Method of Test for Ash Content of Engine Antifreezes and Antirusts.

**pH Value**—The pH of a solution of one part of concentrate to one part of distilled water by volume, as determined with a pH meter following the procedures outlined in ASTM D 1287, Standard Method of Test for pH of Engine Antifreezes and Antirusts, shall fall within the range of 7.5-11.0.

**Reserve Alkalinity**—The reserve alkalinity of the concentrated product shall not be less than 10 when determined by ASTM D 1121, Standard Method of Test for Reserve Alkalinity of Engine Antifreezes and Antirusts. NOTE: Reserve alkalinity in itself is not an adequate indication of the quality of an antifreeze product. It should not be used to measure a product's ability to prevent corrosion.

**Compatibility with Cooling System Nonmetals**—Solutions of the coolant concentrate as normally used in cooling systems shall not have deleterious effects on the nonmetallic components, as determined from examination of the nonmetallic components used in conjunction with the test outlined in the paragraph on corrosion inhibition. The hoses used in the test shall conform to SAE J20. After test, the tube of the coolant hose must meet the physical requirements of the coolant immersion test of SAE J20 (J20R4, Class D-1).

**Foaming**—The coolant concentrate when tested in accordance with ASTM D 1881, Standard Method of Test for Foaming Tendencies of Engine Antifreezes in Glassware, shall not have an increase in volume greater than 150 ml and the foam shall break within 5 s after aeration is stopped.

**Dye**—The coolant concentrate shall be distinctively colored (preferably green through blue green) with a stable dye.

**Effect on Car Finishes**—The coolant shall have no effect on standard original finishes used on automotive vehicles when evaluated by ASTM D 1882, Standard Method of Test for Effect of Antifreeze and Cooling System Chemical Solutions on Organic Finishes for Automotive Vehicles.

**Storage Stability**—The utility of the coolant concentrate as packaged shall not be adversely effected by storage for a minimum period of 1 year.

**Corrosion Inhibition**—The coolant concentrate shall be suitably inhibited to mitigate corrosion of the cooling system metals in a properly

<sup>1</sup>At 760 mm pressure (atmospheric).

maintained system. The performance is indicated by the following weight loss limits per test specimen when tested according to ASTM D 2570, Standard Method for Simulated Service Corrosion Testing of Engine Coolants:

Copper	20 mg max
Solder	60 mg max
Brass	20 mg max
Steel	20 mg max
Cast iron	20 mg max
Cast aluminum	60 mg max

**Cavitation and Erosion**—There shall be no pitting, cavitation damage, or erosion of the water pump which will produce a rating below 8 when tested according to ASTM D 2809, Standard Method of Test for Cavitation Erosion-Corrosion Characteristics of Aluminum Automotive Water Pumps with Coolants.

TABLE A-2—BOILING POINTS OF SOLUTIONS OF COOLANT CONCENTRATIONS

Vol % Concentrate	Boiling Point			
	At Atmospheric Pressure (760 mm)		Using 14 lb (62N) Pressure Cap in Good Condition	
	°F	°C	°F	°C
40	222	105.5	259	126.1
50	226	107.8	263	128.3
60	232	111.1	268	131.1
70	238	114.4	274	134.4