



RE-REFINED ANTIFREEZE

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INTRODUCTION

Automotive antifreeze is usually made from an ethylene glycol formulation. Such antifreeze can be re-refined to produce pure ethylene glycol, which can then be used to manufacture new antifreeze.

Antifreeze has been "recycled" in many ways. The most pure ethylene glycol is obtained with a fractional distillation process, in which ethylene glycol is isolated and contaminants are removed. Many filtration systems do not achieve the purity specifications required by warranties of equipment manufacturers. Filtration system users must be certain that the use of the filtered material is allowable under warranty requirements and they should routinely obtain laboratory test results to ensure that they are within warranty tolerances.

USAGE HISTORY AND EXPERIENCE

County agencies, including Motor Pool, Solid Waste Operations, Fleet's Renton Maintenance Facility and Metro Transit purchase antifreeze manufactured with re-refined ethylene glycol. Metro Transit uses a concentrated product for buses and introduces the necessary "additive packages" in the maintenance shops. In 2010, the county purchased 22,487 gallons of re-refined antifreeze and recycled it at no cost.

BID AND CONTRACT SPECIFICATIONS

King County agencies purchase re-refined antifreeze, in ready-to-use and concentrated form, and antifreeze recycling services through a term-contract with a local vendor. This section contains excerpts (shaded area) from the 2009 Invitation-To-Bid that resulted in contract.

Technical Specifications

6.1 Introduction of Specifications

The Contractor shall deliver and pick-up, as needed, antifreeze in accordance with the terms, conditions, and specifications of this invitation to bid and resulting contract.

The antifreeze shall be delivered into King County owned storage tanks or in 55 gallon drums depending on the delivery location and as specified on the purchase order.

The Contractor shall be an established distributor or dealer with facilities, personnel and equipment necessary to perform all expected requirements in the event of contract award. If awarded a contract, the bidder shall have the capability of starting deliveries within twenty-one (21) days of contract award. The actual scheduled start date shall be at the discretion of King County.

The Contractor must be audited and approved by the King County Environmental Specialist prior to the contract award.

6.2 Permits/Licenses

The Bidder shall possess all Federal, State and local permits, licenses and approvals to perform the required work as specified herein.

The Bidder shall be licensed to conduct business in the State of Washington and shall have the operating authority to transport antifreeze as issued by the Washington State Department of Utilities and Transportation in order to perform this contract.

King County shall not be responsible for overweight load nor assume any responsibility for damage caused by overweight loads.

Contract performance shall be confined to limits indicated by laws, ordinances, permits, and directions by King County and shall not unreasonably encumber the premises with equipment, materials or personnel.

6.3 Safety Standards

The handling of antifreeze shall comply with all applicable safety laws, regulations, standards and accepted practices of the United States Government, State of Washington, King County and City requirements. These included, but are not limited to safety laws, regulations and standards of the Washington State Department of Labor and Industries, Washington Industrial Safety and Health Act, United States Department of Transportation and United States Department of Labor's Occupational Safety and Health Act (OSHA). The Contractor shall provide a MSDS,

6.4 Clean Up

The premises shall be kept free of all accumulation of waste, spillage or other debris caused by the delivery and unloading of the antifreeze or the pick-up of waste antifreeze.

6.5 Contractor's Responsibility

The Contractor shall assume all liability and responsibilities for the transportation, handling, and loading of antifreeze until it has been loaded into the storage tanks or removed from the storage tanks.

In case of mishap or the unplanned release of antifreeze, the Contractor shall take immediate corrective action to mitigate damage and abate, remove, and clean up any antifreeze. In the event of a delay in corrective action by the contractor or the Contractor fails to comply with these requirements within a reasonable time, King County may authorize the corrective action, repair of damages, and performance of the necessary services. The Contractor shall be liable for those expenses incurred by King County.

The Contractor shall be responsible for any damage to property, vehicles and persons caused by the Contractors delivery trucks or personnel. The Contractor shall be responsible for damage or services required by the failure to deliver antifreeze or the delivery of faulty product. Any repair or clean up services shall be made at the Contractor's expense to the satisfaction of the County. If the Contractor fails to comply with these requirements within a reasonable time, King County may repair damages and perform the necessary services at the expense of the Contractor.

The Contractor shall be responsible for removing any non-conforming or contaminated antifreeze they deliver within twenty-four (24) hours after notification.

6.6 Requirements

The Contractor shall deliver bulk and drum deliveries of antifreeze. At the time of delivery, a delivery slip shall be provided and the delivery signed for by an authorized King County employee. A separate invoice shall be submitted for each delivery.

6.7 Product Quality

All antifreeze delivered by the Contractor shall be free from impurities and harmful additives that would cause damage to King County buses. The Contractor shall be responsible for removing non-conforming product, traceable to Contractor, at their expense.

6.8 Technical Specification

- A. The Contractor shall provide quality antifreeze suitable for use in a heavy duty transit bus application. The antifreeze shall be compatible with the current antifreeze used by King County Metro Transit, King County Solid Waste Division and King County Fleet Administration. Blend Tech blending additives are currently used in the antifreeze.

The antifreeze shall:

1. Have a useful life of twenty-four (24) months, 100,000 miles or longer from the date of installation.
2. Contain a precharge dosage of a Nitrate/borate approved SCA suitable for heavy-duty diesel engine use.
3. Shall meet: ASTM D-3306 – Standard Specification for Ethylene Glycol Base Engine Base Engine Coolant for Automobiles and Light-Duty Trucks;
ASTM D-4985 – Standard Specification for Ethylene Glycol Base Engine Coolant for Heavy Duty Diesel Service;
ASTM D-6210 – Standard Specification for Fully-Formulated Ethylene-Glycol-based Engine Coolant for Heavy-Duty Engines;
American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103-1187
TMC RP-329 Fleet Purchasing Specification for Nitrite-Containing Ethylene Glycol Base Coolant
The Maintenance Council
American Trucking Association
2200 Mill Road
Alexandria, VA 22314
4. Shall also meet or exceed engine manufactures warranty and maintenance specification coolant requirements for:
Cummins 90T8-4, Caterpillar

- A. If recycled ethylene glycol is used, it shall be recycled through fractional distillation, re-refined and shall meet or exceed ASTM E-1177 Standard Specification for Engine Coolant Grade Ethylene Glycol and be delivered in a concentrate that is not more than five (5%) percent water. On-site recycled product will not be considered.
- B. Only ethylene glycol based antifreeze shall be provided in concentration form, that is five (5%) percent or less water. The specified antifreeze shall provide corrosion and cavitation protection and shall reduce the freeze point and increase the boiling point of the ethylene glycol based fluid.
- C. Antifreeze Technical Specifications:

Item	Value	ASTM Test
Freezing Point Concentrate 50% Solution	Max. - 18°C	D 1177
	Max. - 37°C	D 1177
Boiling Point Concentrate 50%	Max. - 149°C	D 1120

Item	Value	ASTM Test
Solution	Max. - 108°C	D 1120
Specific Gravity Concentrate 20°C	1.11 – 1.14	D 1122
Ash Content Concentrate	Max 1.5% by weight	D 1119
PH Value: 50% Solution (DI water)	8.0 – 11.0	D 1287
Reserve Alkalinity: 50% Solution (DI water)	Vendor supply	D 1121
Foaming Behavior Volume Increase Foam Break	Max. 75 ml Max. 3 sec	D 1881 D 1881
Storage Stability	Min one (1) year	
Phosphate Content	0	Meets or exceeds ASTM D4985 for “low silicate ethylene glyco” engine coolant for heavy duty diesel engines requiring an initial charge of SCA (Supplemental Coolant Additive)
Silicon	250 PPM Max	
<u>Corrosion Inhibition:</u>	<u>Industry Standard:</u>	<u>ASTM Test Method:</u>
Copper	10 Max	D 2570
Solder	30 Max	D 2570
Brass	10 Max	D 2570
Steel	10 Max	D 2570
Cast Iron	10 Max	D 2570
Aluminum	30 Max	D 2570
<u>Glassware Corrosion Test:</u>	<u>Industry Standard:</u>	<u>ASTM Test Method:</u>
Copper	10 Max	D 1384
Solder	30 Max	D 1384
Brass	10 Max	D 1384
Steel	10 Max	D 1384
Cast Iron	10 Max	D 1384
Aluminum	30 Max	D 1384
Aluminum Heat Rejection (mg/cm ² /week)	.5 mg/cm ² /week	D 4340
Cavitation and Erosion	8 – 10 rating	D 2809

Test Solution: The total water hardness for the 50/50 mix must not exceed the grains per U.S. gallon, as per ASTM D 4985

6.9 Pick-up of Waste Antifreeze

The waste antifreeze generated at County Facilities is approximately 40% to 50% water, 50% to 60% ethylene glycol and less than 1% oil. The waste antifreeze is produced during the routine maintenance on transit buses and non-revenue vehicles. It is not contaminated with chlorinated hydrocarbons. The Contractor shall be a fully licensed, permitted and insured waste hauler. Waste antifreeze processing must be done at a fully permitted RCRA facility. All waste antifreeze shall be recycled.

6.10 Licenses/Permits

The contractor must be a fully licensed, permitted and insured waste hauler.

EPA #: _____

Waste antifreeze processing must be done a fully permitted RCRA facility. All waste antifreeze is to be recycled.

EPA#: _____

6.11 Pricing

In the event of a discrepancy between the unit price and the extended price, the unit price will prevail.

Schedule 1 – Antifreeze

Schedule 2 – Pick-up of Waste Antifreeze

Item#	Qty	Description	Unit Price	Extended Price
1	14,000 gal	Antifreeze, 100% Concentrate	\$	\$
2.	8,500 gal	Antifreeze, 50%/50% Blend	\$	\$
		Total Schedule 1		\$
1.	22,000 gal	Pick-up of Waste Antifreeze	\$	\$
		Total for Schedule 1 & 2		\$

FOR MORE INFORMATION

[Green California - Antifreeze](#)

VENDOR INFORMATION

King County's current supplier:

[Emerald Services](#), (206)832-3100 - antifreeze
[King County Contract B22069B](#)

Phoenix Environmental Services – waste antifreeze pick-up
[King County Contract B22563B](#)