



## Lubricants

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## INTRODUCTION

King County is proud to have purchased re-refined motor oil since 1992. This helps the environment by reducing the impacts of refining and also conserves a non-renewable resource.

Engine lubricating oil does not "wear out." Producers can re-refine oil to remove contaminants introduced during its use and replace the "additive packages" that confer its specific properties, such as viscosity. Current technologies allow used oil to be re-refined into a high-quality base-stock and several oil companies now market products that have been certified by the American Petroleum Institute (API). API Certification is the basis for warranty requirements of motor vehicle manufacturers and is used in specifications of motor oil buyers.

In addition to using re-refined motor oils, King County began using vegetable-based hydraulic oils in 2001.

## USAGE HISTORY AND EXPERIENCE

Motor oil made with re-refined base stock has been used in County vehicles operated by the Renton Maintenance Facility, Motorpool and Solid Waste Operations since 1992. In 1999, Metro Transit became one of the first major metropolitan transit authorities in the nation to adopt the use of re-refined motor oil for its entire fleet of over 1,300 buses. In 2011, the County purchased 86,232 gallons of primarily 15w40 in bulk and drums.

For the third year in a row, purchasing re-refined oil in bulk saved the County approximately \$.20 a gallon or \$17,146 in 2011. For years it was at a premium, but now it is less expensive due to the rising cost of petroleum products. The County recycles its used motor oil. Metro Transit alone recycled 84,862 gallons of used motor oil and received \$50,470 in revenue.

The Renton Maintenance Facility of the Fleet Administration Division (Fleet) has purchased vegetable-based hydraulic oils for use in their equipment, from lawn mowers to dump trucks, since 2001. Bio-based lubricants were tested by Fleet and found to perform as well as, or better than, petroleum oils. They are readily biodegradable, low in toxicity, and safer for workers. They require manufacturers to fill new equipment with vegetable-based hydraulic fluid and provide documentation at time of delivery. Although the initial cost of these lubricants is more expensive than their petroleum counterparts, there is reduced liability in case of a spill. In the past year, they purchased 2,035 gallons of bio-based lubricants.

## BID AND CONTRACT SPECIFICATIONS

### King County Contracts

#### RE-REFINED MOTOR OIL

King County is now using the [State of Washington's contract # 02411](#). Here is an excerpt of the specifications:

Re-refined lubricants must meet applicable E.P.A. Product Standards and must have a minimum content of re-refined base oils at 25%. Additionally, these products must meet the API Service Classifications of the virgin lubricants they may be substituted for.

#### **SPECIFICATIONS**

##### Re-refined Motor Oil SAE 15W-40:

Multi-Viscosity engine oil formulated with re-refined base oils designed to meet the performance requirements of API Service Classifications CJ-4, CI-4, CI-4 PLUS, CH-4, SM. Re-refined content to be 25% or higher of product. To be 76 Firebird Heavy Duty EC 15W40 Motor Oil or equal.

##### Re-refined Motor Oil SAE 5W-30:

Multi-Viscosity engine oil formulated with refined base oils designed to meet the performance requirements of API Service Classifications SN Resource Conserving, SJ, Energy conserving. ILSAC GF-5. Re-refined content to 25% or higher of product. To be 76 Firebird LD 5W30 Motor Oil or equal.

##### Re-refined Hydraulic Oil AW ISO 46:

Formulated with high viscosity index re-refined paraffinic base oils designed to satisfy the following performance requirements. Vickers I-286-S, M-2950-S, Denison HF-O, HF-1, and HF-2, Cincinnati Machine (formerly Cincinnati Milicron) P-70. Re-refined content to equal or exceed 25% of product. To be 76-Firebird AW 46 or equal.

##### Environmental AW Hydraulic Oil ISO 32 and 46:

Must be non-toxic per OECD Test Method 203 1-12. Must be inherently biodegradable per OECD Test Method 301-B. Must pass as "no sheen" per U.S. EPA Static Sheen Test. Must meet the following major specifications: Denison HF-O, HF-1, HF-2. Vickers M-2950-S and I-286-S. Bosch Rexroth RE 90 220. DIN 51524 Part 2 AW Hydraulic Oil Type HLP. U.S Steel 127. To be 76 Ecoterra Hydraulic Oil 32 or 46 or equal

#### BIOBASED OILS

This section contains excerpts (shaded areas) from the provisions of the 2012 ITB for lubricants.

### **7.1 Specification and Specification Checklist**

It is the intent of these specifications to describe the minimum acceptable performance standards for obtaining **Bio-Based Biodegradable Hydraulic Tractor Fluid**. The specifications are not intended to limit competition, but to ensure that only quality products are received. King County shall be notified, and these specifications amended, when new industry standards are set or existing standards are superseded. The bidder shall state in the checklist below if the product bid meets or exceeds the specifications.

#### A. Description:

Hydraulic Tractor Fluid or approved equal is a readily biodegradable and non-hazardous ISO 40 grade hydraulic tractor oil for use in general purpose hydraulic systems. This oil must be a direct

replacement for petroleum oil based hydraulic tractor fluids. Oil must meet or exceed the requirements of petroleum oil based hydraulic fluids and have excellent anti-wear characteristics.

- B. Products supplied to King County shall be rated as Commercial and/or Industrial Grade.
- C. Contractors need to bid their nationally known, first line, premium quality products.
- D. All products shall be API certified and the vendor shall furnish documentation of the certification upon request. Products must meet the performance and warranty requirements of the manufacturers listed in the specifications.
- E. Technical Requirements

	<b>Meets or Exceeds Specifications</b>
<b>GENERAL:</b>	
1. Must be readily biodegradable & non-toxic ISO 46 (J-20-C) Grade tractor oil for use in heavy-duty brake, transmission and hydraulic systems.	_____
2. Must be based on natural ester technology and a direct replacement for petroleum oil based tractor fluids.	_____
3. Must exceed the requirements of petroleum oil based tractor fluids and have excellent anti-wear characteristics.	_____
4. Must meet John Deere, Caterpillar, Vickers, Denison and Military specifications.	_____
<b>PHYSICAL PROPERTIES:</b>	
1. Flash Point .....ASTM D-92 ..... 220° C	_____
2. Specific Gravity, 60 ° F .....ASTM D-1298 ..... 0.90	_____
3. Viscosity @ 40° C, cst. ....ASTM D-445 ..... 46	_____
4. Viscosity @ 100° C, cst. ....ASTM D-445 ..... 10.1	_____
5. Viscosity Index .....ASTM D-2270 ..... >200	_____
6. Pour Point .....ASTM D-97 ..... -36° C	_____
7. Brookfield Viscosity .....ASTM D-2983 ..... 11,500 @ -35° C, cPs	_____
<b>EQUIPMENT REQUIREMENTS:</b>	
1. John Deere	_____
2. New Holland	_____
3. Case Corp. (Case I.H.)	_____
4. AGCO Massey-Ferguson	_____
5. Fiat	_____
6. Kubota	_____
7. Transmissions/Wetbrakes MIL-L-2105C	_____

	Meets or Exceeds Specifications
8. Caterpillar TO-2	_____
<b>GEAR PERFORMANCE:</b>	
1. GL-4 Requirements	_____
<b>HYDRAULIC APPLICATIONS:</b>	
1. Vickers	_____
2. Rexroth	_____
3. Denison	_____
4. Sauer-Sundstrand	_____
5. Commercial Intertech	_____
6. White	_____
<b>FRICTION:</b>	
1. Ford, Brake Noise and Capacity, Ford 6610	_____
2. John Deere, Power Shift Transmission, JDQ94	_____
<b>ANTIWEAR:</b>	
1. Ford 3000	_____
2. Final Drive - High Torque	_____
3. John Deere JDQ95	_____
4. Spiral Bevel - High Torque	_____
5. FZG	_____
6. Low Speed High Torque	_____
<b>THERMAL/OXIDATION STABILITY:</b>	
1. John Deere JDQ16	_____
2. Allison C4	_____
<b>SEAL COMPATIBILITY:</b>	
1. Ford M2C134D	_____
a. ATRR 100 Nitrile	_____
2. John Deere JDQ9	_____
a. BUNAN	_____
3. Allison	_____
a. Polyacrylate	_____
b. Silicone	_____
c. Viton	_____
<b>CORROSION AND WATER SENSITIVITY:</b>	

			Meets or Exceeds Specifications
1. Rust Protection, hours	ASTM D1748	>100	_____
2. Copper Corrosion	ASTM D130	1a	_____
3. Water Sensitivity Solids, %Additive Loss 0.0 (0.5% Volume H2O)			_____
<b>BIODEGRADABILITY AND ECOTOXICITY:</b>			
1. CEC L33A93	80-90%		_____
2. WGK Rating*	1		_____
*Rating:	0=least harmful		_____
	3=most harmful		_____

## 7.2 Prompt Pay Discount

Prompt payment discounts offered by Contractors shall be used to calculate the low bid provided the discount offered allows a minimum of 20 days for payment. The number of days is calculated from the date of acceptance of goods or services or from the date a complete invoice is date stamped as received by King County, whichever event occurs last, and the check/warrant date. The County will take advantage of any prompt payment discount terms bid. Discount periods shall be extended if:

- The date printed on the invoice is more than three days earlier than the invoice receipt date;
- The delay is caused awaiting a credit memo, invoice correction, adjustment or reissue;
- An invoice is received prior to receiving goods ordered.

**Prompt pay discount offered** \_\_\_\_\_ % - \_\_\_\_\_ Days, Net \_\_\_\_\_

## 7.3 Pricing

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

1344-12-PLR Hydraulic Tractor Fluid, Bio-Based, Biodegradable							
Item #	Est. Qty	UOM	Description	List Price	% Disc	Unit Price	Extended Price
1	20	Each	Hydraulic Tractor Fluid, Bio-Based, Biodegradable, 55 Gallon Drums				
			Terresolve Envirollogic 700 or approved equal				
<b>TOTAL BID PRICE</b>							<b>\$</b>

## **FOR MORE INFORMATION**

[API Standards for Motor Oil](#)

[State of Washington Oil Contract #02411](#)

## **VENDOR INFORMATION**

Current King County suppliers:

Re-refined Motor Oil and Bio-based Lubricants -

[Nelson Petroleum](#) (425)353-9701 or (800)562-9882 Everett, WA CPA#: 5422698  
[76 Lubricants](#) (manufacturer)

[Renewable Lubricants](#) (manufacturer)