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Analytical Results

Client: Combustion Technologies 179 E Main Street # B Sandy, Utah 84070	Test Control #'s: ULSD: 39194 CleanBoost Gold: 39781	Dates: Received: 2/23/2015 Tested: 2/26/2015	Remarks: ULSD Baseline Fuel CleanBoost Gold Treat Rate 1:4000
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ASTM Method	Physical Properties	Test Description	ULSD Fuel	CleanBoost Gold	Benefits
D7346	Pour Point °F	Gel Temperature	-10	-10	
<i>The pour point of a petroleum product is an index of the lowest temperature of its utility for certain applications. Flow characteristics, like pour point, can be critical for the correct operation of lubricating oil systems, fuel systems, and pipeline operations.</i>					
D4737	Cetane Index	Ignition quality	47.4	47.6	
<i>The Calculated Cetane Index by Four Variable Equation is useful for estimating ASTM cetane number when a test engine is not available for determining this property directly and when cetane improver is not used. It may be conveniently employed for estimating cetane number when the quantity of sample available is too small for an engine rating.</i>					
D93	Flash Point	Vapor Flame Point	132	127	
<i>Flash point is used in shipping and safety regulations to define flammable and combustible materials. One should consult the particular regulation involved for precise definitions of these classifications.</i>					
D189	Carbon Residue	Injector Deposit Formation	0.01	0.006	Reduced Soot, drop in carbon build up
<i>The carbon residue value of burner fuel serves as a rough approximation of the tendency of the fuel to form deposits in vaporizing pot-type and sleeve-type burners. Similarly, provided alkyl nitrates are absent (or if present, provided the test is performed on the base fuel without additive) the carbon residue of diesel fuel correlates approximately with combustion chamber deposits.</i>					
D5453	Sulfur PPM	Corrosion & Acidity	6.76	6.39	
<i>Some process catalysts used in petroleum and chemical refining can be poisoned when trace amounts of sulfur bearing materials are contained in the feedstocks. This test method can be used to determine sulfur in process feeds sulfur in finished products, and can also be used for purposes of regulatory control.</i>					
D86	Distillation		Base Fuel	Fuel with CB Gold	
<i>The basic test method of determining the boiling range of a petroleum product by performing a simple batch distillation has been in use as long as the petroleum industry has existed.</i>					
IP	Initial Boiling Point °F		338	340	
	10%		416	415	
	20%		445	447	
	30%		469	471	
	40%		491	492	
	50%		512	512	
	60%		533	533	
	70%		556	556	
	80%		582	582	
	90%		617	618	
EP	End Point		672	673	
D2161	SUS Viscosity 100 °F	Thickness	35.1	35.1	
<i>This practice covers the conversion tables and equations for converting kinematic viscosity in mm²/s at any temperature to Saybolt Universal viscosity in Saybolt Universal seconds (SUS) at the same temperature and for converting kinematic viscosity in mm²/s at 122 °F and 210 °F (50 °C and 98.9 °C) to Saybolt Furol viscosity in Saybolt Furol seconds (SFS) at the same temperatures. Used to measure viscosity of diesel fuels D1, D2, B5, B20.</i>					
D975	Sediment	Unusable Content	0.01	0.008	More complete burn of the fuel.
<i>This specification covers seven grades of diesel fuel oils suitable for various types of diesel engines.</i>					
D482	Ash Content %	Non-Combustible Material	0.002	0.001	Ash reduction 50%
<i>This test method covers the determination of ash in the range 0.001–0.180 mass %, from distillate and residual fuels, gas turbine fuels, crude oils, lubricating oils, and other petroleum products, in which any ash-forming materials present are normally considered to be undesirable impurities or contaminants during the combustion process.</i>					
D4868	BTU Per Gallon	Energy Output	138684	139644	More Energy /BTU's
D4868	BTU Per Pound	Energy Output	19602	19744	More Energy /BTU's
<i>This test method covers the estimation of the gross and net heat of combustion in SI units, megajoules per kilogram, of hydrocarbon fuels and blend stocks from the fuel density and sulfur, water, and ash contents. This test method is especially useful for estimating the heat of combustion of burner and diesel fuels</i>					

D6078	PSI Load Rate	Lubricity	0.57mm	0.35mm	Better Lubricity
This test method evaluates the lubricity (load carrying ability) of diesel fuels using a scuffing load ball-on-cylinder lubricity evaluator (SLBOCLE).					
D6079	HFFR Micron Size	Lubricity Max 520 µm	461	234	49% better Lubricity for the fuel injectors and fuel components
This test method covers the evaluation of the lubricity of diesel fuels using a high-frequency reciprocating rig (HFRR). Diesel fuel injection equipment has some reliance on lubricating properties of the diesel fuel. Shortened life of engine components, such as diesel fuel injection pumps and injectors, has sometimes been ascribed to lack of lubricity in a diesel fuel.					
D130	Copper Corrosion	Copper Corrosion level	1a	1a	
<i>This test method covers the determination of the corrosiveness to copper of aviation gasoline, aviation turbine fuel, automotive gasoline, cleaners (Stoddard) solvent, kerosene, diesel fuel, distillate fuel oil, lubricating oil, and natural gasoline or other hydrocarbons.</i>					
ICP	Iron Organic % Purity	Catalyst % of Organic FE	N/A	99.20%	
<i>ICP-AES Analysis is a technique that can determine elemental concentrations of trace to major while detecting most elements in the periodic table. Reliable results can be obtained for about 70 elements with detection limits in the parts per billion range. This test determines the purity of an elemental or chemical product determining the cleanliness of elements measured in ppm.</i>					
Cummins L10 Test	Deposit Injector Test	Plunger Rating	26.3	9.9	62% Improvement over base diesel fuel
<i>Cummins L10 Injector Depositing Test to Evaluate Diesel Fuel Quality, deposits, ash and other contaminants in diesel fuel.</i>					
Stability Test	Reflectance Test	National Council of Weights and Measures	<80%	>80%	Great for storage of diesel fuels
<i>Testing for stability as illustrated by the high light reflection. Shows if product protects against thermal degradation of diesel fuel which can cause the formation of gums, and increase deposits and the chance of filter plugging.</i>					
D6468	Peroxide Formation in Diesel	Storage Tank Peroxide	110ppm	11ppm	Great for storage of diesel fuels
When the test method is used to monitor manufacture or storage of fuels, changes in filter rating values can indicate a relative change in inherent stability. Storage stability predictions are more reliable when correlated to longer-term storage tests.					
D6304	Water Content measured in ppm	H2O content in diesel	1026ppm	744ppm	27.60%
A knowledge of the water content of lubricating oils, additives, and diesel fuels that is important in the manufacturing, purchase, sale, or transfer of such petroleum products to help in predicting their quality and performance characteristics.					

Note: Fuel treatments being tested with the ULSD Fuel show quality improvements over fuel alone.
Note: ULSD Fuels need to utilize some sort of additive to improve performance in today's diesel engines.

Respectfully Submitted,
Research Laboratories Inc.

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