

## Inhouse Equipment vs Out-Sourced Labs for ASTM D 6751 Testing of B100 Biodiesel

10-Jan-07		Testing options			comments
Properties	ASTM Test Method	Inhouse Equipment Options	Inhouse Equipment ~Cost	Outsource Lab (range)	Cost to purchase the individual standard test methods from ASTM are in ( )
<b>Glycerine (free)</b>	D6584	Shimadzu GC-17A Gas Chromatograph	\$18,000	\$89 - \$296	D6584 by gas chromatography (std \$34)
<b>Glycerine (total)</b>					
<b>Glycerine (free)</b>		Perkin Elmer Clarus	\$43,000		with auto sampler, external computer, analysis-software
<b>Glycerine (total)</b>					
<b>Flash Point</b>	D93	Hertzog MP 329 Automatic Pensky-Martens Tester	\$10,300	\$35 - \$89	D93 - closed cup tester (std \$40)
		Koehler Pensky-Martens Flash Cup Tester	\$2,200		
<b>Acid Number</b>	D664	KEM AT-150 Automatic Potentiometric Titrator	\$7,000	\$15 - \$100	D664 Potentiometric Titrator method (std \$34)
<b>Cloud Point</b>	D2500	Koehler Cloud and Pour Point Bath	\$5,500	\$25 - \$84	D2500 standard test method (std \$29)
		Koehler Automated Cloud and Pour Point System	\$21,000		
<b>Water &amp; Sediment</b>	D2709	PAC 67310 Benchtop Centrifuge	\$6,600	\$20 - \$74	D2709 by centrifuge (std \$29)
<b>Carbon Residue</b>	D4530			\$50 - \$112	D4530 - micro method (std \$34)
<b>Cetane</b>	D613			\$156 - \$364	D613 standard test method (std \$34)
<b>Copper Strip</b>	D130	Koehler K25330 Copper Strip Test Bath	\$3,700	\$35 - \$93	D130 copper strip method (std \$34)
		Stds: ASTM - \$ 195; Koehler - \$ 466	\$661		
<b>Distillation Curve</b>	D1160			\$150- \$349	D1160 standard test method / reduced pressure (std \$40)
<b>Sulfated Ash</b>	D874	Koehler Isotemp Basic Muffle Furnace, 0.58 cu.ft.	\$2,500	\$60 - \$130	D874 standard method (std \$40.80)
<b>Phosphorus</b>	D4951	ICP Laser Ablation Inductively Coupled Plasma Mass Spectrometer	\$60,000	\$17 - \$201	D4951 by Inductivity Coupled plasma Atomic emission Spectrometry (std \$34)
<b>Sulfur</b>	D5453			\$60 - \$166	D5453 by Inductivity Coupled plasma Atomic emission Spectrometry (std \$34)
<b>Na / K Sodium / Potassium</b>	U391			\$150 - \$201	UOP391
<b>(Na / K) &amp; (Ca / Mg) Sodium / Potassium &amp; Calcium / Magnesium</b>				tbd	

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	<a href="#">ASTM D6751 Standard Specified</a>	Testing options			comments
Properties (compositional rqmts)	ASTM Test Method	Inhouse Equipment Options	Inhouse Equipment ~Cost	Outsource Lab (range)	
<b>Viscosity</b>	D445	Koehler AKV9500 Automated Kinematic Viscosity System	\$22,500	\$10 - \$116	D445 standard test method for kinematic viscosity (std \$34)
		with Polystat Constant Temperature Bath (Cole – Parmer)	\$2,900		
		with Viscometer Cleaning and Drying Apparatus (Koehler)	\$3,400		
		with Viscometers, various ranges	\$120 ea		
<b>Alcohol Stability</b> (Rancimat)		same as Flash point	same as	same as	

NOTES	
<b>ASTM Standards Most Current Revision</b> ref: ASTM.org	see ASTM.org for most current revisions Parent ASTM Std D6751 (\$34) include budget for purchase of recurring revisions
Vocabulary	
GC	Gas Chromatography
HPLC	High Performance Liquid
ICP	Inductively Coupled Plasma Mass
MS	Mass Spectrometry