



ASTM Summary for Biodiesel D6751 and B6 to B20 specs

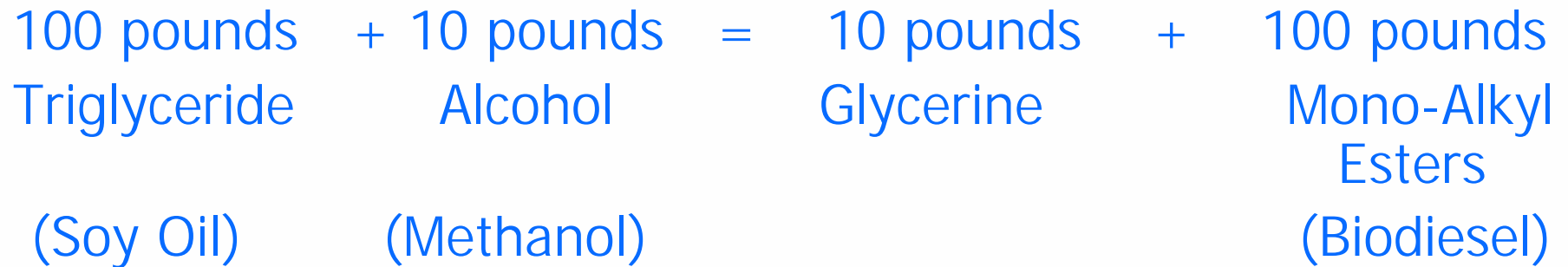
Steve Howell





Biodiesel Process

(Catalyst)



- Raw Oil and Fats are NOT Biodiesel!
- Other 'Renewable Products' are NOT Biodiesel
- Must be long chain mono alkyl esters of fats and oils and meet ASTM D6751
- This tight definition needed to secure OEM approvals and encourage testing



Written Definition

- ◆ biodiesel, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100.
- ◆ biodiesel blend, n. -- a blend of biodiesel fuel with petroleum-based diesel fuel designated BXX, where XX is the volume percent of biodiesel.





Written Definition

◆ Eliminates:

- Coal Slurries
- Raw Vegetable Oils and Fats
- Non-Esterified Oils
- Hydro-treated Oils and Fats
- Blends With Diesel

◆ Needed to secure auto, engine, and fuel injection equipment OEM acceptance





Spec Background

- ◆ ASTM B100 spec based on existing specs for #1 and #2 petrodiesel in ASTM D975
- ◆ If #1 and #2 meet specs, blends are OK
 - No separate set of specs for blends of #1/#2
- ◆ If B100 meets D6751 and diesel meets D975, up to 20% biodiesel may be used
 - Blends up to B20 are approved
 - No separate set of specs for the blend
- ◆ This has worked well in the marketplace





ASTM Current Status

- ◆ ASTM D6751 is the approved standard for B100 to be used for blending up to B20 in the US
 - ASTM has approved D6751 for B100 use only for up to B20 in the final blend
 - Higher blends upon consultation with the OEM





ASTM D6751 Activity

- ◆ Significant ballot activity as a result of ballots on blended fuel specifications
- ◆ Changes to D6751 so no change is needed for B5 in D975, D396:
 - Lowered acid number from 0.8 to 0.5
 - Add stability parameter for B100 targeted for acceptable B20 and B5 performance
 - Added limits for calcium and magnesium
 - Added limits for sodium and potassium





ASTM D6751-07b

<u>Property</u>	<u>Test Method</u>	<u>Limits</u>	<u>Units</u>
Calcium & Magnesium	EN 14538	5 max	ppm (ug/g)
Alcohol control			
either Flash Point	D93	130 min.	Degrees C
or GC methanol	EN 14110	0.2	% Volume
Flash Point	D93	93 min.	Degrees C
Kin. Viscosity, 40C	D445	1.9 - 6.0	mm ² /sec.
Sulfated Ash	D874	0.02 max.	% mass
Sulfur S500	D5453	0.05 max (500)	% mass (ppm)
S15	D5453	0.0015 max (15)	% mass (ppm)
Copper Corrosion	D130	No. 3 max.	
Cetane number	D613	47 min.	
Cloud Point	D2500	Report	degrees C
Carbon Residue	D4530	0.05 max.	% mass
Acid Number	D664	0.50 max.	mg KOH/g
Free Glycerin	D6854	0.020	% mass
Total Glycerin	D6854	0.240	% mass
Phosphorous content	D4951	0.001 max	% mass
Distillation, T90 AET	D1160	360 max	degrees C
Na/K, combined	EN 14538	5 max	ppm (ug/g)
Oxidation Stability	EN 14112	3 min	hours
(Visual Appearance)	D4176	Free of un-dissolved water, sediment and suspended matter	

BOLD = BQ-9000 Critical Specification Testing Once Production Process Under Control





ASTM D6751 Activity

- ◆ Precipitate above the cloud point issue identified in the market in 2005:
 - Most due to out of specification biodiesel
 - Small portion could be caused by minor components not controlled in the spec
- ◆ ASTM is in process of adding a cold soak filterability specification to D6751 that will address this issue
- ◆ Passed subcommittee E in December 2007
- ◆ This ballot must be successful in order for blended fuel ballots to pass



ASTM Current Status

- ◆ B5 being balloted into the petrodiesel specifications: D975, D396 (heating oil)
 - No changes to properties in table 1 of D975 and D396
 - B100 must meet D6751 prior to blending
 - Passed Subcommittee E in December 2007
 - Ballot is linked to the satisfactory resolution of the cold soak filterability in D6751





ASTM Current Status

- ◆ B6 to B20 for on/off road diesel engines will be a stand alone specification
- ◆ Designed so that if B100 meets D6751 and petrodiesel meets D975, B6 to B20 will meet its specification:
 - Widest of #1/#2 specifications
 - Allow T-90 to be 5 degrees C higher
 - Add stability (induction period 6 hours min.)
 - Add acid number of 0.3 maximum
- ◆ Passed Subcommittee E in December 2007
- ◆ Ballot is linked to the satisfactory resolution of the cold soak filterability in D6751



ASTM Activity: June 2008

- ◆ Ballots are planned for Main Committee D02 this spring with results in June 2008
- ◆ Cold Soak Filterability in D6751
- ◆ B5 in D975
- ◆ B5 in D396
- ◆ B6 to B20 for on/off road fuel

