



ASTM Specification Update

CARB Biodiesel Work Group

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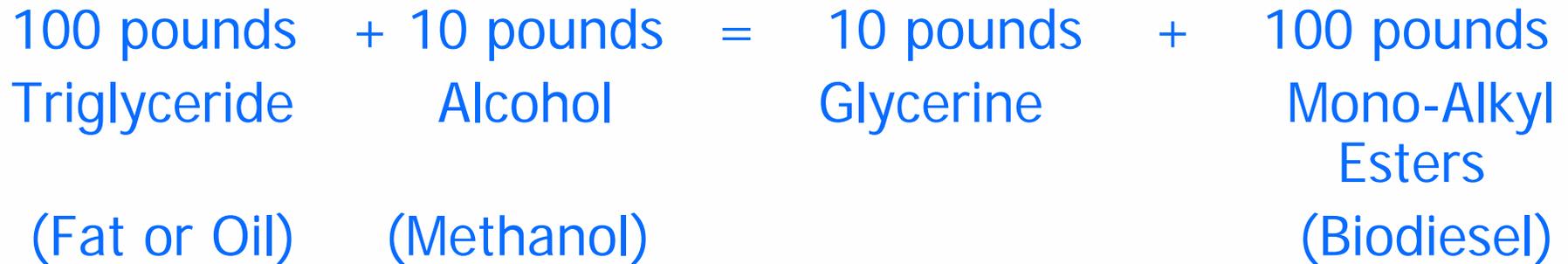
ASTM Summary for Biodiesel





Biodiesel Process

(Catalyst)



- Raw Fats and Oils are NOT Biodiesel!
- Other 'Renewable Products' are NOT Biodiesel!
- Must be long chain mono alkyl esters of fats and oils AND meet ASTM D 6751
- This tight definition needed to secure ASTM specs, OEM approvals, and encourage testing





Spec Background

- ◆ ASTM B100 spec based on existing specs for #1 and #2 petrodiesel in ASTM D 975
- ◆ If #1 and #2 meet specs, blends are OK
 - No separate set of specs for blends of #1/#2
- ◆ If B100 meets D 6751 and diesel meets D 975, 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 D 6751-07a

<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	D 93	130 min.	Degrees C
or GC methanol	EN 14110	0.2	% Volume
Flash Point	D 93	93 min.	Degrees C
Kin. Viscosity, 40C	D 445	1.9 - 6.0	mm ² /sec.
Sulfated Ash	D 874	0.02 max.	% mass
Sulfur S500	D 5453	0.05 max (500)	% mass (ppm)
S15	D 5453	0.0015 max (15)	% mass (ppm)
Copper Corrosion	D 130	No. 3 max.	
Cetane number	D 613	47 min.	
Cloud Point	D 2500	Report	degrees C
Carbon Residue	D 4530	0.05 max.	% mass
Acid Number	D 664	0.50 max.	mg KOH/g
Free Glycerin	D 6854	0.020	% mass
Total Glycerin	D 6854	0.240	% mass
Phosphorous content	D 4951	0.001 max	% mass
Distillation, T90 AET	D 1160	360 max	degrees C
Na/K, combined	EN 14538	5 max	ppm (ug/g)
Oxidation Stability	EN 14112	3 min	hours
(Visual Appearance)	D 4176	Free of un-dissolved water, sediment and suspended matter	

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





Spec Background

- ◆ Some users, regulators and OEM's wanted blended fuel specs for biodiesel blends
 - What do you measure if the parent fuel quality is not known? Bid specs, enforcement easier
- ◆ Blended fuel specifications are being set so blends will always be in-spec if two good parent fuels are used
- ◆ The key is getting B100 that meets D 6751
- ◆ Buying from BQ-9000 companies provides added assurance B100 will meet D 6751





ASTM Current Status

- ◆ ASTM D 6751 is the approved standard for B100 to be used for blending up to B20 in the US
 - ASTM approval for B100 use only up to B20 in the final blend
 - Higher blends upon consultation with the OEM
- ◆ B5 being balloted into the petrodiesel specifications as a fungible component: D 975, D 396 (heating oil)
 - No changes to D975, D 396 parameters
 - B100 must meet D 6751 prior to blending
 - NCWM: No special labeling recommended
- ◆ B6 to B20 for on/off road diesel engines will be a stand alone specification
 - Widest of #1/#2 specifications, T-90 5 C increase
 - Addition of stability and acid number specs for final blend
 - NCWM: Label 'B6 to B20' recommended
 - B6 to B20 for heating oil evaluated in future





ASTM D 6751 Activity

- ◆ Changes to D 6751 so that no change is needed for B5 in D 975, D 396
 - Completed: lower acid number; add stability parameter, add Ca/Mg, Na/K
- ◆ 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 specification to D 6751 that will address this issue in D 6751
- ◆ Once addressed, blended fuel ballots can move forward for approval. Fall/Winter 2007/2008





ASTM Activity

- ◆ New 'Blended and Alternative Fuels' category for D 975 and D 396
- ◆ All non-petroleum fuels would fall into this category, which would identify:
 - ASTM spec for the blend component
 - Maximum allowable concentration
 - Test method for measuring the component
- ◆ No parameters added and none changed compared to current D 975 or D 396





ASTM Activity

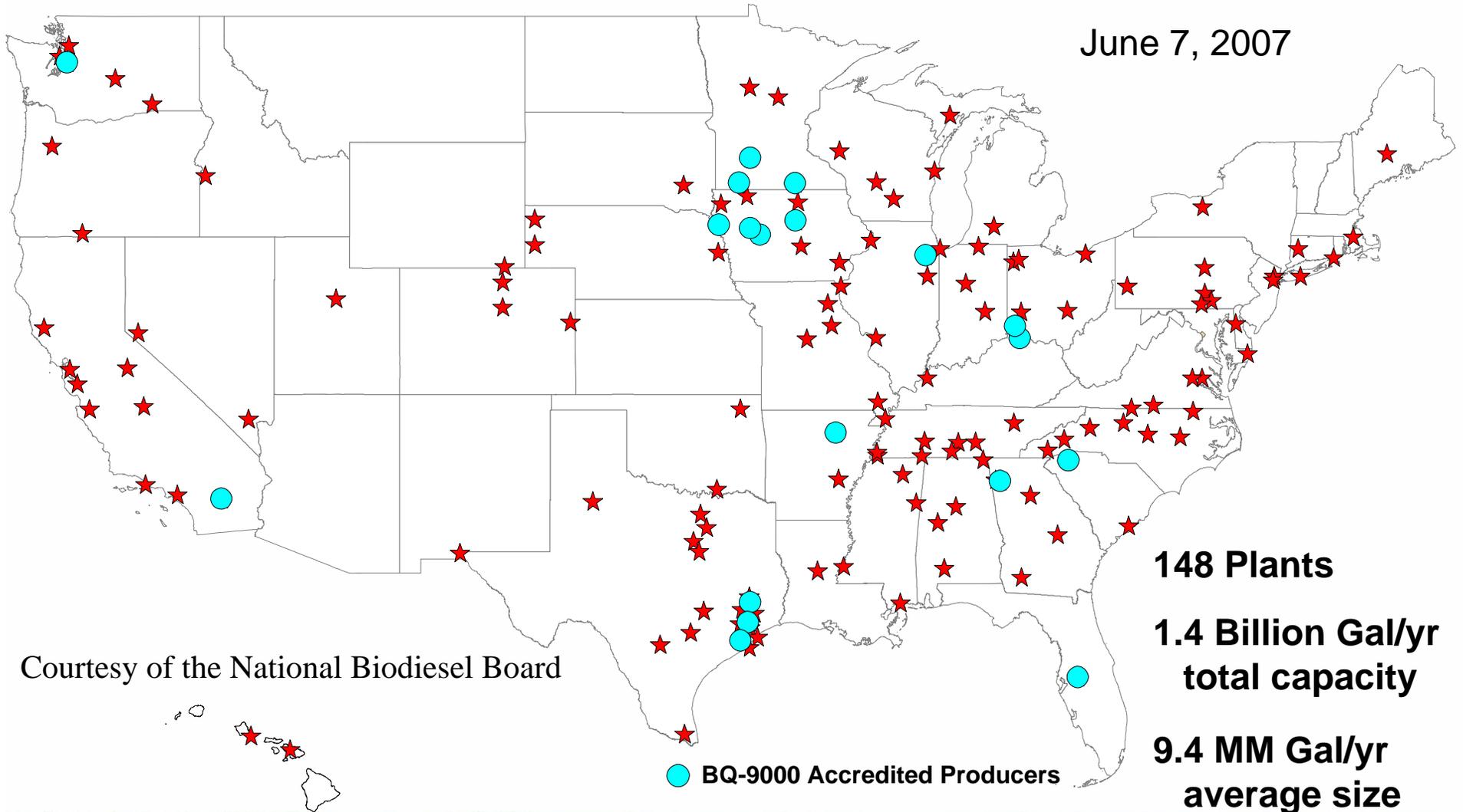
- ◆ Category was needed to address deficiencies in blend stocks not covered by D 975 or D 396
 - i.e. 5% raw vegetable oil could be blended into D 975 and meet properties of D 975 but could have severe problems not prevented by existing D 975 parameters
 - Biodiesel is covered through meeting D 6751 prior to blending
- ◆ Where do mostly hydrocarbon fuels like FT from biomass, hydrotreated oils/fats, pyrolysis oils, etc. fall?
 - Are they already 'covered' by existing D 975 or D 396?
 - Do they need an ASTM spec prior to blending?
 - Are there minor components in these fuels that can cause major problems which are not covered by D 975 or D 396?
- ◆ Task Force set up by ASTM to address these questions
 - Larger issue than just biodiesel, FT, hydrotreated oils/fats
 - Avoid one bad apple spoiling it for all renewables





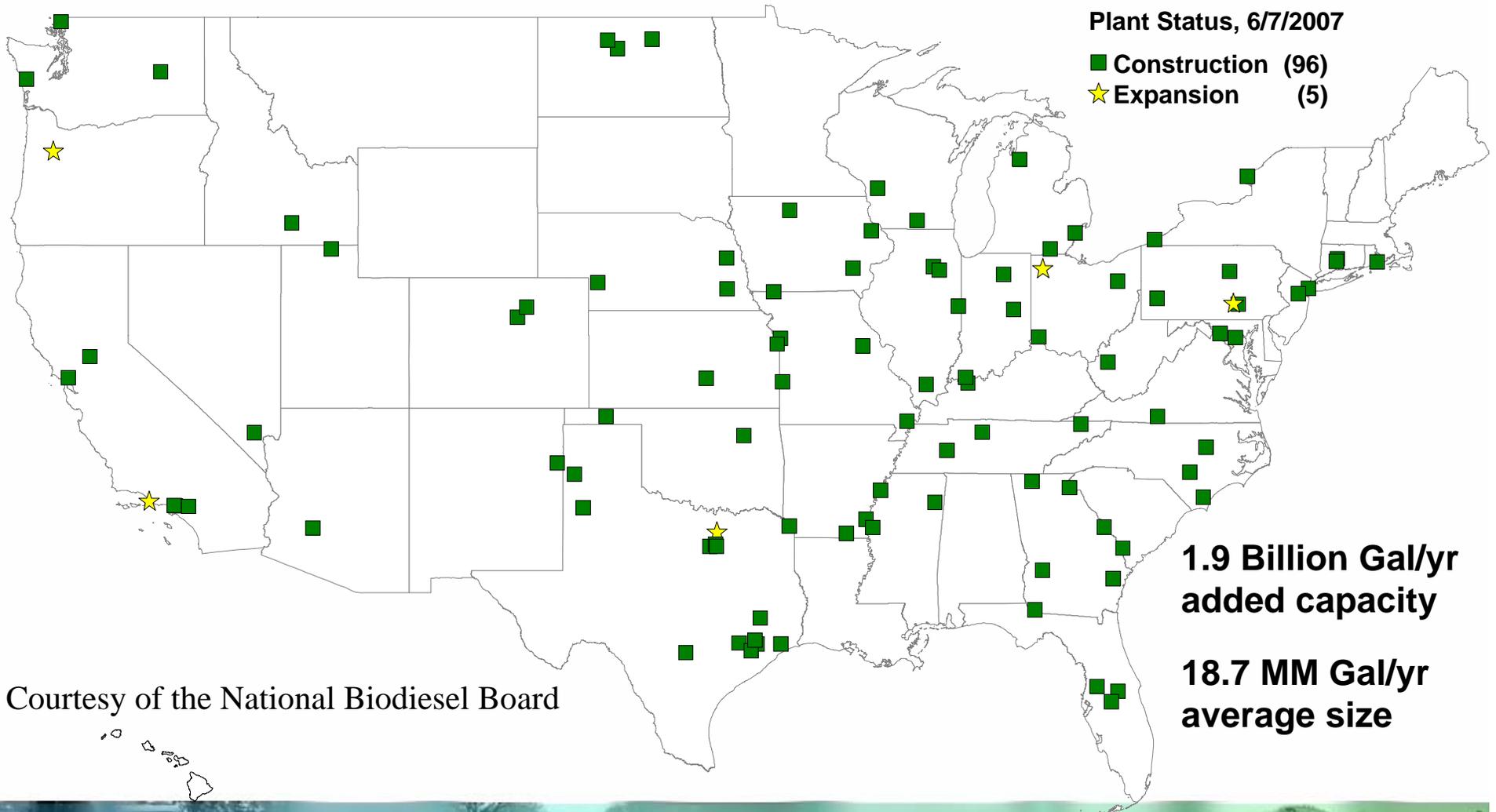
B100 Plants: Production Locations

June 7, 2007



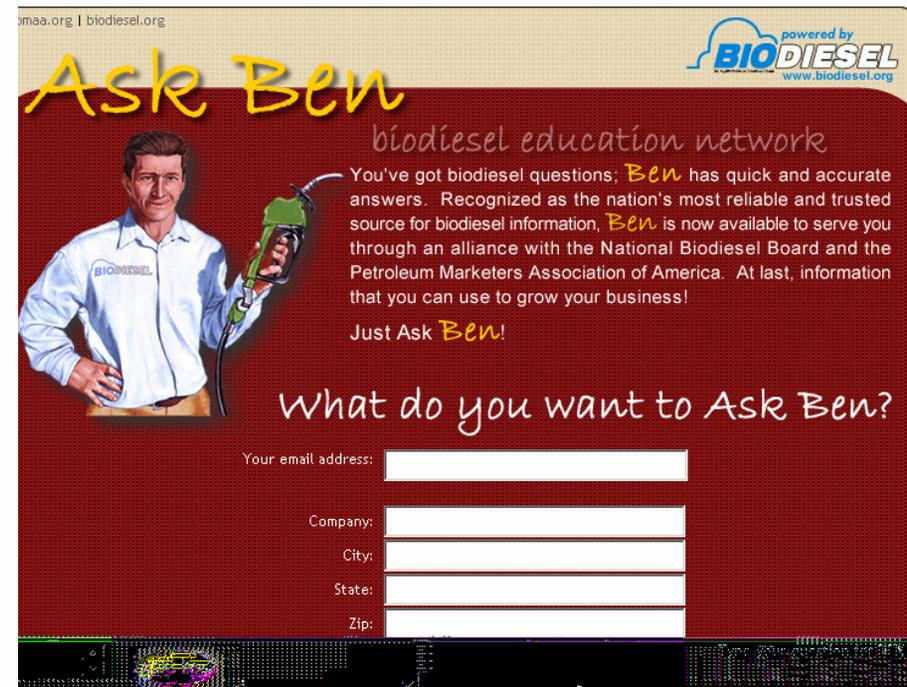


B100 Plants: Construction/Expansion



Educational Resources

- ◆ BEN: Biodiesel Education Network
- ◆ Web-based resource specifically for petroleum marketers
- ◆ Partnership between NBB/PMAA
- ◆ www.pmaa.org
- ◆ www.biodiesel.org



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Ask Ben

biodiesel education network

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What do you want to Ask Ben?

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Company:

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State:

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Other Biodiesel Resources

- ◆ Biodiesel Magazine
 - A **MUST HAVE'** magazine
- ◆ Biodiesel Industry Directory On-Line



- www.biodiesel.org
- Technical Library
- Biodiesel Bulletin
- Educational Videos Available
- Informational Resources
- Technical Resources
- On-line Database & Spec Sheets

