BIODIESEL BLENDS – Finished Fuel Specifications

An Engine Manufacturer Perspective

Biodiesel Forum and Technology Roundtable

SCAQMD
Diamond Bar, CA

November 7, 2006

Engine Manufacturers Association

Scope of EMA Representation

- Foreign and domestic manufacturers of diesel, gasoline and alternate-fueled internal combustion engines
- Principally, non-integrated manufacturers of loose engines for on-highway and off-highway mobile applications, marine, locomotive and stationary applications
- Wide range of engine sizes, from 1 hp to over 7000 hp

EMA's Technical Position

- Biodiesel only acceptable as a blend component with petroleum diesel fuel up to B5 maximum
- Biodiesel must meet established standards
  - ASTM D6751
  - EN 14214
- Petroleum diesel fuel utilized can be D1 or D2 of any sulfur grade (S5000, S500, or S15)
- Finished blend (as utilized in the engine) must meet ASTM D975 standards
- EMA Statement is available at:

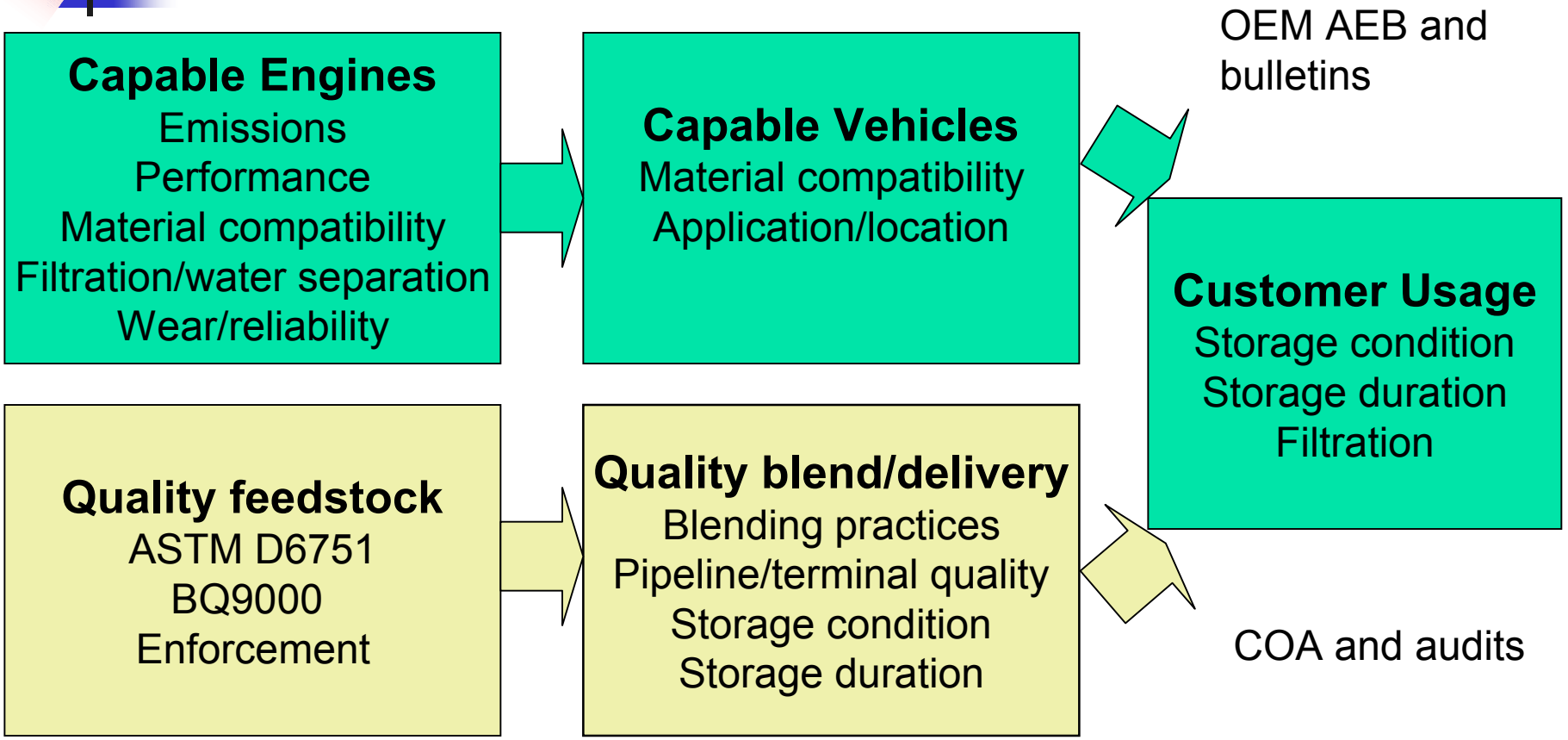
  http://www.enginemanufacturers.org/admin/library/upload/297.pdf

EMA's Test Fuel Specification

- Biodiesel only acceptable as a blend component with petroleum diesel fuel up to B20 maximum
- Biodiesel must meet established standards
  - ASTM D6751
  - EN 14214
- Finished blend (as utilized in the engine) must meet EMA Test Fuel Specification standards
- Fuel to be utilized for testing/evaluation of fuel blends with current and future engine technologies
- EMA Test Fuel Specification is available at:

http://www.enginemanufacturers.org/admin/library/upload/924.pdf

Successful Implementation of Biodiesel Blends



Concerns – Biodiesel Quality

- Biodiesel must meet established standards to assure consistency and quality
  - B100 Specifications when produced
  - BXX Finished Fuel Specifications when distributed
- Biodiesel changes over time
  - Distribution to the final product / vehicle for use
  - Infrequently used product - fuel storage concerns
- National Biodiesel Board's BQ-9000 program is one example of a quality program intended to provide assurance that biodiesel fuels meet established industry standards

Concerns – Fuel Performance

- Oxidation Stability
  - Peroxides
  - Acids
  - Insolubles
- Microbial Growth
- Water Separator Performance
  - Water bypass
  - Media degradation
- Material Compatibility
  - Elastomers
  - Metals including – copper, lead, zinc, etc.
- Cold Flow
  - Compatibility of existing cold flow improvers
  - Interaction with different petroleum diesel compounds

Next Steps

- Improve B100 industry standards
- Create industry finished fuel biodiesel blend standards -
  - Define oxidation stability criteria
  - Define water separator criteria
  - Identify cold flow improvers
- Promote improved industry practices
  - Develop a biodiesel fuel education program
  - Promote and expand the use of BQ-9000 or similar quality programs intended to provide consistent product