



JAMA's recommendation on Bio-fuels: Bio-ethanol and Bio-diesel (FAME)

Sustainable mobility is becoming increasingly important in the automotive industry as it faces various unprecedented challenges. Two of these most pressing ones are from global warming and energy shortages. To address these twin challenges, stakeholders have pinpointed the reduction of petroleum consumption with the use of bio-fuels.

An increasingly important alternative to petroleum, bio-fuels also introduce more variety to automotive fuels available for use. Many countries, including those in the ASEAN region, have begun to pursue the use of bio-fuels. Automakers, on the other hand, have supported the active utilization of bio-fuels by producing compliant vehicles. As with gasoline and diesel fuel, ensuring the quality of bio-fuels is an important issue. Bio-fuels with low quality will not be accepted by users and this in turn will affect their sustainability.

As part of the integrated approach to the reduction of CO₂ emissions as well as conservation of fossil fuels, Japanese auto makers have been consistently in support of the use of bio-fuels complying with the appropriate sustainability criteria. To help promote the understanding of the use of bio-fuels in ASEAN region, JAMA decided to issue its Position Statements on bio-fuels quality, and experts from JAMA have visited six countries (Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam) to share their recommended specifications of FAME (fatty acid methyl ester) and bio-ethanol.

JAMA endorses the use of FAME-blended diesel as well as ethanol-blended gasoline and believes it imperative that they have quality equivalent to the conventional gasoline or diesel fuel so that satisfactory safety and emission performance of vehicles can be achieved. To this end, clear and harmonized fuel quality standards, which ensure vehicle and engine compatibility, and 'fit-for-purpose' specifications for bio-fuels are necessary. At the same time, appropriate handling rules to assure their quality control in the distribution process and quality-monitoring scheme to eliminate improperly prepared FAME-blended diesel and ethanol-blended gasoline from the market are also required.

Blending ratio and compatibility with vehicles

For the use of FAME-blended diesel as conventional diesel fuel for vehicles, JAMA recommends a blending ratio of maximum 5% (B5), provided that FAME before blending is added with oxidation stability enhancing additives to secure its quality. Except for vehicles specially designed and operated by fleet users with special vehicle management qualification, JAMA does not recommend exceeding 5% FAME content.

In the event where diesel fuel with a high FAME content is to be introduced widely, JAMA strongly recommends the use of HVO (hydro-treated vegetable oil) or BTL (biomass to liquid) as blendstocks.

For the use of ethanol-blended gasoline as conventional gasoline for vehicles, JAMA recommends a blending ratio of maximum 10% (E10). Similarly, JAMA does not recommend the use of ethanol-blended gasoline of more than 10% ethanol content except for vehicles specially designed so or for flexible-fuel vehicles.

However, so long as in-use vehicles that are incompatible with ethanol-blended gasoline remain in the market, it is necessary to keep supplying conventional gasoline at some of the fuelling pumps. The materials of these vehicles' fuel systems are not compatible with ethanol, and the use of ethanol-blended gasoline may result in leakage of fuel.

To prevent misfuelling of vehicles that are incompatible with FAME-blended diesel (of a high FAME content) or ethanol-blended gasoline, it is also necessary that the fuelling pumps of these fuels have to be labelled clearly indicating their specific FAME or ethanol content.

Appropriate specifications

To ensure safety and emission performance of vehicles, it is useful to follow guidelines in the Worldwide Fuel Charter (WWFC) for the specification of fuels. The WWFC spells out quality specifications for fuels recommended by the world auto industry. First drafted in 1998, its contents have been revised to comply with the strengthened emission regulations. Together with three other industry associations from America and Europe, JAMA drafted up the WWFC specifications as well as the 'WWFC Bio-fuels Guidelines'. (Click [here](#) for more details)

Confident that the WWFC 'Guidelines for B100 Blendstock for use in up to B5 Blends' and 'Guidelines for E100 Blendstock for use in up to E10 Blends' issued in March 2009 will contribute towards the optimization and global harmonization of bio-fuels specifications in the various countries, JAMA drafted the 'JAMA Recommendation on FAME (B100) Specification for up to B5 Blends' as well as 'JAMA Recommendation on bio-ethanol (E100) Specification for up to E10 Blends' specifically suited for the climate in ASEAN region based on the 'Guidelines', and attached these recommendations to its position statements on bio-fuels quality. JAMA proposes that ASEAN countries follow the recommended specifications to ensure appropriate quality of bio-fuels.

Quality control

FAME and FAME-blended diesel have poor oxidation stability, thus acids generated through oxidation-induced deterioration corrode metallic materials used in the vehicle fuel systems. To prevent this, JAMA recommends that ASEAN countries insist that an induction period of at least 10 hours for the oxidation stability requirement by the Rancimat method shall be introduced in each country's FAME quality specification. Additionally, to ensure sustainable stability of FAME and FAME-blended diesel, it is mandatory to add additives such as BHT to enhance the oxidation stability.

In addition, water content and vapour pressure for bio-ethanol, and the restriction of impurities for FAME are also important points of quality control that should be adhered to during the series of processes of production, distribution as well as the use of them.

To help pave for the smooth introduction of bio-fuels, JAMA encourages ASEAN countries to adopt its recommendations.

[Read JAMA's position statement on Bio-ethanol quality](#)

[Read JAMA's position statement on Bio-diesel \(FAME\) quality](#)