

## COMPLIANT COMPONENTS

Biodiesel components and blends are generally compliant. Biodiesel is not compatible with natural rubber elastomers or copper metals. The effects of the former are minimised with B20.

Soutwest Research's recent elastomer test programme using a matrix of ten mixes of B100, B20 and B30 and petrodiesel included pull strength, elongation, hardness and volume level measurements.

- ELASTOMERS
- Nylon 66
- Nitrile
- Viton A401C
- Viton GFLT
- Fluorsilicone
- Polyurethane
- Polypropylene

Soutwest reported that biodiesel blends are compatible with the tested elastomers, with some minor differenced for nitrile rubber. The best-performing elastomers included Teflon, Viton 401C and Viton GFLT.

Biodiesel compatibility with metals (mainly copper) needs to be considered for biodiesel storage. Glass containers have proven to be acceptable. Thin polyethylene and polypropylene vessels have proven to be unsuitable. If biodiesel is to be stored in plastic containers, HDPE or fluor-lined casing vessels are recommended to avoid infiltration.

Additional precautions should be taken, including:

- cloth soaked with biodiesel must be dried to avoid spontaneous combustion.
- biodiesel may damage surface coatings. Spills should be immediately cleaned to avoid damages.
- concrete exposed to biodiesel for a long time may be prematurely damaged.

Oxidation, temperature and stability levels for biodiesel storage.

In addition to the typical advantages of diesel fuels (including capacity, torque and durability), diesel engines – particularly the injection systems, pressure and temperature levels - have been reengineered to reduce polluting emissions.

Oxidation and temperature levels in petrodiesel engines have been extensively measured.

Trials have demonstrated that the impact of biodiesel blends on engine durability is similar to that of petrodiesel, except for blends with high biodiesel content in DI engines.

The life of biodiesel generally depends on pre-storage biodiesel quality and properties. The typical petrodiesel storage practices (i.e. avoid moisture, sunlight, changing

temperatures and pollutants) are also applicable to biodiesel storage. Some assays have demonstrated that the acid number, viscosity and cetane rating of B100& B20 have changed after 6/12 month storage.

No significant variance of total insoluble matter in B20 relative to petrodiesel has been identified during the stability trials performed by NBB, using ASTM D 4625. This clearly demonstrates B20's satisfactory storage conditions.

Even though non-compliant acid and viscosity levels were observed, no significant impact on engine performance has been identified in vehicles using biodiesel that had been stored for a period of 2 years during the trial programme run by the University of Idaho.

NBB ran a long-term trial programme using B20 with a high acid number and some minor impacts on the fuel pump have been observed. Since biodiesel is generally used within a term of 6 to 9 months as from the relevant date of manufacturing, no additional storage precautions should be taken.

While traditional vegetable oil stabilisers (including TBHQ - Tertiary Butyl Hydroquinone) should be added to pure biodiesel for storage over longer periods, oil stabilisers such as T13HQ are most suitable for biodiesel blends.