

# Biodiesel Filtration

## Racor Filtration



Biodiesel is a diesel fuel produced by the chemical refining of vegetable oils into “fatty acid methyl esters”, or FAME. Glycerin is removed in the refining process, lowering the oil viscosity to match diesel fuel. Pure biodiesel is most often added to diesel fuel in a 2%, 5%, or 20% blend — referred to as B2, B5, or B20 respectively.

Other renewable “biofuels” available are raw oils or recycled greases that have not been transformed into biodiesel. These products require extra heat, filtration, and extensive vehicle modifications to burn in only older pre-high pressure injection diesel engines.

### Challenges and Solutions

Racor fuel filters and heaters are uniquely suited for filtering and conditioning biodiesel and biofuels for use in diesel engines.

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Biodiesel tends to dissolve the natural fuel “tar” deposits coating the inside of diesel tanks, piping, and hoses. The dissolved deposits are carried to fuel filters, causing shortened fuel filter life. Most biodiesels have a low “interfacial tension”. This means that water easily disperses and dissolves in the fuel. Low interfacial tension greatly reduces water separation efficiency for all types of water separators and coalescers. Removal of water from a fuel system is necessary for proper engine performance.

Racor recommends using the largest filter practical for the application. A larger filter adds more filtration media surface area, which lowers the flow velocity going to each square inch of the media. This extends filter life and increases water removal efficiency. When specifying a new biodiesel fuel system, de-rate fuel filter flow by 50% and install on the vacuum side of any pumps, where possible.

Pure biodiesel has high cloud and pour points, necessitating the use of electric and/or coolant heaters in cold weather. Lower percentage blends (B20) act more like standard diesel fuel, but some lower fuel blends have been known to cause problems.

Racor recommends using at least 200 watts of thermostatically controlled electric heating in the head and/or filter bowl to help avoid biofuel waxing and gelling. Pour point suppressants and biocides are necessary for reliable operation. A coolant heat exchanger is required to heat the fuel in extreme cold weather conditions.

Biodiesel is known to attack certain synthetic rubber compounds, making them swell and soften, or the opposite, shrink and harden. Racor uses very high quality synthetic rubber compounds that perform equally well in biodiesel as in standard diesel.

Seals subject to biodiesel exposure are generally replaced at the same time as the replacement filter. Racor uses all materials compatible with up to 20% biodiesel blend. Above 20% may require material changes to dynamic seals that are not normally replaced at element change-outs.

### Racor Engineering Leadership

Racor has participated in several biodiesel filtration field tests with major OEMs. Racor is actively participating in industry wide research and development on biodiesel fuel filtration and water separation challenges. Development of technology to support the use of all biofuels is on-going at Racor Division.

### Biodiesel and Biofuel Filtration Specification Considerations









1. Large primary and secondary filters at 50% of their rated flow.
2. High quality, corrosion resistant materials in construction.
3. High quality, synthetic rubber compounds for seals and hoses.
4. Applicable coolant, return fuel and electric heating.
5. Fuel source with high efficiency fuel dispensing.



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## Fuel Filtration Systems Recommended for Biodiesel/Biofuels

Fuel Dispensing	Electric Heated Primary Filtration <sup>2</sup>	Coolant or Return Fuel Heated Primary Filtration <sup>3</sup>	Coolant/Electric Heaters <sup>4</sup>
FBO Series <sup>2</sup>	6120R1230	GreenMAX Series	320HTR4
			
RVFS Series	1000FH31230	390RC1210	14278
			

Notes: 1. See bulletins 7529, 7749, and RSL0020 for additional information on these products.

2. Marine rated versions are available—consult factory.

3. Available with additional electric heat.

4. Also available—Thermoline Heaters, 300 and 500 watt, 12 and 24 volt.