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No minimum order charge in the US or Canada!
Biodiesel blends are designated as B6 to B20, where the fuel blend grade of 6 to 20 volume percent is biodiesel with the remainder being light middle or middle distillate diesel fuel. The biodiesel component of the blend must conform to the requirements of ASTM D6751, Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.

For biodiesel blend fuels to conform to the specifications of ASTM D7467, they are required to pass the following test methods. Click the test methods below for more information.

- **ASTM D664** - Acid Number of Petroleum Products by Potentiometric Titration
- **ASTM D93** - Flash Point by Pensky-Martens Closed Cup Tester
- **ASTM D2500** - Cloud Point of Petroleum Products
- **ASTM D6371** - Cold Filter Plugging Point of Diesel and Heating Fuels
- **ASTM D2709** - Water and Sediment in Middle Distillate Fuels by Centrifuge
- **ASTM D524** - Ramsbottom Carbon Residue of Petroleum Products
- **ASTM D482** - Ash from Petroleum Products
- **ASTM D86** - Distillation of Petroleum Products at Atmospheric Pressure
- **ASTM D445** - Kinematic Viscosity of Transparent and Opaque Liquids
- **ASTM D1319** - Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- **ASTM D4052** - Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
- **ASTM D976** - Calculated Cetane Index of Distillate Fuels
- **ASTM D130** - Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- **ASTM D7371** - Determination of Biodiesel (Fatty Acid Methyl Esters) Content in Diesel Fuel Oil Using Mid Infrared Spectroscopy
- **ASTM D4539** - Filterability of Diesel Fuels by Low-Temperature Flow Test (LTFT)
- **ASTM D5453** - Determination of Total Sulfur by Ultraviolet Fluorescence
- **ASTM D6079** - Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)
- **ASTM D613** - Determination of Oxidation Stability by Accelerated Oxidation Method
- **EN 15751** - Determination of Oxidation Stability by Accelerated Oxidation Method
ASTM D664 – Acid Number of Petroleum Products by Potentiometric Titration

Determines acid constituents in biodiesel products; also used to indicate relative changes that occur during use under oxidizing conditions regardless of the color or other properties of the resulting oil. This Total Acid Number (TAN) titrator is used to determine the level of free fatty acids or processing acids that may be present in biodiesel. Biodiesel with a high acid number has been shown to increase fueling system deposits and may increase the likelihood for corrosion.

Acid number: The quantity of potassium hydroxide per gram of sample necessary to titrate a biodiesel sample within a specified solvent.

Aquamax Total Acid Number (TAN) Titrator

Conforms to ASTM D664 for determination of acidic constituents in petroleum products, lubricants, and transformer insulating oils

- Data logger automatically stores up to 55 analysis results for easy recall
- High precision syringe provides superior dispensing resolution

The Aquamax TAN titrator is easy to operate: simply calibrate, run a blank, select the correct preprogrammed TAN analysis, and the titrator performs the analysis. Intuitive function guide display walks you through operation. Results are displayed on screen in units of KOH/g and are also stored via internal data logger.

Flexible data management options allow for export of readings to a PC or printer. TiCom software (order separately below) allows viewing and printing of sample input, blank, and titration measurement data. Optional thermal printer accessory allows for the printing of results data; order separately below.

What’s included: glass syringe, burette inlet and outlet tubes, filter cartridge, support with magnetic stirrer, two conical adapters, two support hole caps, three titration vessels, indicator electrode, reference electrode, two electrode cables, calibration vessel, 250-mL bottle of electrode fill solution, ten O-rings, and universal power adapter.

Specifications

- Dispensing accuracy: ±0.2% for volumes higher than 10% of syringe
- Dispensing repeatability: ±0.1% for volumes higher than 10% of syringe
- Capacity: 10 mL syringe
- Resolution: 1/40000 of syringe volume
- Input: two BNC connectors
- Output: two RS-232 ports for connection to a PC, printer, telephone connector, or balance
- Data logging: 55 points
- Display: graphic backlit LCD, 128 x 64 dots
- Dimensions (L x W x H): 5 1/8” x 6 5/16” x 11 3/16” (13 x 16 x 30 cm)

For this test method, you may also need . . .

- GP-05942-15 pH buffer solutions pack
- GP-06137-74 50-mL graduated cylinder
- Ethanol
- Lithium chloride
- Potassium hydroxide
- Propan-2-ol
ASTM D93 – Flash Point by Pensky-Martens Closed Cup Tester

Determines the flash point of biodiesel samples within the temperature range of 140 to 374°F (60 to 190°C). Pensky-Martens Closed Cup Flash Tester determines the ignition point of fuels with a closed cup method by stirring the sample with two speed options. Flash point tests are used in shipping and safety regulations for detecting contaminants by volatile and flammable materials in biofuel samples.

Flash point: The lowest temperature at which the vapors of a sample ignite.

Manual Flash Point Testers

Adjustable heater provides excellent accuracy

Pensky-Martens closed-cup flash testers are used to determine the flash point of fuels, lubricating oils, liquids containing suspended solids, and liquids that tend to form a surface film during testing.

They feature a cover that slides the shutter open to apply test flame. Select from electrical or gas heated models. Electrical models are equipped with a 750 watt nickel-chromium heater. Gas model has a built-in nickel-plated brass natural gas burner and liquid propane burner mounted on a cast iron base.

What’s included: thermometer holder, brass test cup with handle, pilot flame, test flame reference bead, built-in stirrer, plated brass thermometer ferrule, and cooling vents. Order stirrer motor separately below.

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>ASTM method</th>
<th>Power (50/60 Hz)</th>
<th>Dimensions (L x W x H)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59871-00</td>
<td>D93</td>
<td>115 VAC</td>
<td>9 1/2” x 8” x 22 1/2”</td>
<td></td>
</tr>
<tr>
<td>GP-59871-06</td>
<td></td>
<td>220 VAC</td>
<td>(24.1 x 20.3 x 57.2 cm)</td>
<td></td>
</tr>
<tr>
<td>GP-59871-07</td>
<td></td>
<td>Gas heated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GP-59871-50 Stirrer motor for Pensky-Martens tester. Slow-speed motor rotates stirrer at 115 rpm. Features adjustable support bracket and rod. Installs in base of flash tester. 115 VAC, 50/60 Hz operation

GP-59871-51 Stirrer motor for 230 VAC, 50 Hz operation

MORE information!

These manual flash point testers are also required for testing ASTM D6751 – Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.

For this test method, you may also need . . .

<table>
<thead>
<tr>
<th>Product number</th>
<th>Description</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-08009-07</td>
<td>ASTM glass thermometer,</td>
<td>23 to 220°F (-5 to 110°C)</td>
</tr>
<tr>
<td></td>
<td>Toluene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acetone</td>
<td></td>
</tr>
</tbody>
</table>
ASTM D2500 – Cloud Point of Petroleum Products

Detects the temperature at which liquids within the biodiesel sample begin to change to a solid, by crystals appearing in the fuel. This defines the lowest usable temperature of the fuel for trouble-free operation in cold climates. The Cloud Point Refrigerated Bath is used to cool the fuel sample at specified set points.

Cloud point: The temperature of a sample when the smallest cluster of hydrocarbon crystals is first visible.

Cloud and Pour Point Refrigerated Bath

Cascade refrigeration system provides reliable, long-term service

- Conforms to ASTM D2500 and related specifications
- Determine the temperature when the smallest observable cluster of crystals occurs upon cooling, in accordance with ASTM D2500. Benchtop unit features three jacketed mechanically refrigerated baths, each preset to a different temperature: –30, 0, and 30°F (–35, –18, and –1°C).
- Each bath has a phenolic top plate with ports for a thermometer and four copper test jackets. Bath interior is constructed of stainless steel; cabinet is constructed of polyester-epoxy finished steel.
- What’s included: thermometer holder, 12 test jackets and gaskets, 12 cork disks, and 12 test jar gaskets. Order test jar and thermometer separately below.

Specifications

Bath temperature presets: –30, 0, and 30°F (–35, –18, and –1°C)
Dimensions (W x H x D): 28” x 35” x 30” (71 x 89 x 76 cm)

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Power (VAC, Hz)</th>
<th>Shpg wt lb (kg)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59861-10</td>
<td>115, 60</td>
<td>550 (250)</td>
<td></td>
</tr>
<tr>
<td>GP-59861-15</td>
<td>220 to 240, 50</td>
<td>550 (250)</td>
<td></td>
</tr>
</tbody>
</table>

GP-59861-50 Test jar, clear flat bottom with sample height graduation

More information!

These cloud point refrigerated baths are also required for testing ASTM D6751 – Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.

For this test method, you may also need . . .

GP-08009-03 ASTM glass thermometer, –38 to 50°C
GP-08009-04 ASTM glass thermometer, –36 to 120°F
Sodium sulfate
**ASTM D6371 – Cold Filter Plugging Point of Diesel and Heating Fuels**

Estimates the lowest temperature at which a fuel will give trouble-free flow in certain fuel systems. A sample is cooled to a specific temperature and drawn into a pipet through a wire mesh filter. The sample is repeatedly drawn into the pipet, at 1°C below the previous temperature. Testing continues until crystals separated from the sample stop the flow or the pipet fill time exceeds 60 seconds. The temperature at which the last filtration was completed is recorded as the cold filter plugging point.

**Cold Filter Plugging Point (CFPP):** The lowest temperature at which fuel can pass through a 45 micrometer filter. As biodiesel is cooled, it will gel and solidify and potentially plug fuel filters.

---

**Mechanically Refrigerated Cold Filter Plugging Point Bath**

Cascade hermetic cooling system achieves temperatures down to −90°F (−68°C)

- Conforms to ASTM D6371, IP309, and DIN 51428 specifications

Determine the low-temperature flow characteristics of biofuels, diesel fuels, and gas oils. Mechanically refrigerated bath uses cascade hermetic cooling to reach temperatures as low as −90°F (−68°C).

Bath consists of an insulated stainless steel tank and polished stainless steel cabinet. Insert the cold filter plugging point apparatus (sold separately below) into the top plate of the bath. The vacuum system (sold separately below; pump not included) has everything needed to connect a vacuum pump to the cold filter plugging point apparatus.

**Specifications**

<table>
<thead>
<tr>
<th>Minimum bath temperature: −90°F (−68°C)</th>
</tr>
</thead>
</table>

**Dimensions (W x H x D):** 26” x 35” x 31” (66 x 89 x 79 cm)

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Power (VAC, Hz)</th>
<th>Shpg wt lb (kg)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-90</td>
<td>115, 60</td>
<td>373 (170)</td>
<td></td>
</tr>
<tr>
<td>GP-59876-91</td>
<td>220 to 240, 50</td>
<td>373 (170)</td>
<td></td>
</tr>
</tbody>
</table>

**GP-59876-90 Cold filter plugging point apparatus** includes Pyrex® test jar with graduations, brass jacket with plastic support ring, plastic stopper, plastic insulating ring and spacer, pipette, and brass filter unit with stainless steel wire mesh screen

**GP-59876-93 Vacuum system** includes a U-tube manometer, three-way stopcock, air vent tube, cork stopper with elbows, and large glass bottle (pump not included)

---

**For this test method, you may also need . . .**

- Glass thermometer
- Vacuum pumps
- GP-06648-91 Glass microfiber filter paper; 47 mm; 0.7 µm
- Timers
- Acetone
- Heptane
ASTM D2709 – Water and Sediment in Middle Distillate Fuels by Centrifuge

Centrifugation provides a means of determining the volume of water content and sediment in a sample of biodiesel with viscosity between 1.0 to 4.1 mm²/s (1.0 to 4.1 cSt) and densities between 770 to 900 kg/m³ at 104°F (40°C). The Automatic Heated Oil Test Centrifuge separates the layers of the biodiesel sample by density to determine the amount of water content and sediment within the sample. High volumes of water in the oil have the potential to cause system corrosion. Sediment in the oil obstructs the flow of the biodiesel.

**Automatic Heated Oil Test Centrifuges**

- Fully automatic benchtop unit is designed expressly for petroleum testing applications
- Automatic control of acceleration ramp, centrifugation speed, and timing functions
- Doubly insulated to reduce heat loss and increase reproducibility
- Sliding stainless steel lid with large clear top to view your samples
- Group D, Class 1, Division 2 explosion-resistant rating

This oil test centrifuge is used for water and sediment determination and is fully automated. Use the integrated 4½” touch-screen control panel to set test duration, the RCF and rpm values, and choose your specific rotor assembly and its corresponding glassware. You may set the unit to your desired speed. Quiet running unit features an elastic suspension of the drive motor for self-balancing operation. The operating speed will remain constant due to the voltage compensated circuitry in the event of voltage fluctuations.

Molded PTFE cushions provide excellent chemical resistance, ease of tube positioning, and longevity of your unit. View your samples while they are spinning from the clear 18½” viewing window on the top of the lid. The lid allows easy access to the rotor and tube holders for easy cleaning. Unit is equipped with a safety lockout mechanism and an automatic electronic braking system.

What’s included: rotor assembly and power cord.

**Specifications**

- Capacity: four oil test centrifuge tubes (order separately)
- Maximum speed: 2200 rpm
- Set speed: 500 to 2200 rpm
- Temperature control: ambient to 200°F (93°C)
- Temperature readout: digital
- Timer: 0 to 999 min
- Dimensions (L x W x H): 31” x 25¾” x 14¾” (78.7 x 65.5 x 36.3 cm)
- Shpg wt: 122 lb (55.4 kg)

**1 Automated Heated Oil Test Centrifuges**

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Rotor (included) for tube type</th>
<th>Max RCF x g</th>
<th>Power</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-17300-01</td>
<td>Cone/long (100 mL)</td>
<td>1327</td>
<td>230</td>
<td>115</td>
</tr>
<tr>
<td>GP-17300-03</td>
<td>Cone/long (100 mL)</td>
<td>865</td>
<td>230</td>
<td>115</td>
</tr>
<tr>
<td>GP-17300-09</td>
<td>Pear (100 mL)</td>
<td></td>
<td>115</td>
<td>60</td>
</tr>
<tr>
<td>GP-17300-11</td>
<td>Pear (100 mL)</td>
<td></td>
<td>115</td>
<td>60</td>
</tr>
</tbody>
</table>

**2 Tubes**

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Description</th>
<th>ASTM method(s)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-17300-33</td>
<td>Cone/long, 100 mL, with capillary tip capable of measuring 0.01 mL</td>
<td>D2273, D2709</td>
<td></td>
</tr>
<tr>
<td>GP-17300-51</td>
<td>Pear, 100 mL with tube tip having graduations of 0.01 mL over the range 0 to 0.2 mL</td>
<td>D2709</td>
<td></td>
</tr>
</tbody>
</table>

**MORE information!**

These automated heated oil test centrifuges are also required for testing ASTM D6751 – Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.
Biodiesel Blend Test Methods & Products

ASTM D524 – Ramsbottom Carbon Residue of Petroleum Products

Determines the carbon residue left after evaporation and pyrolysis of a sample in a Ramsbottom furnace, providing an indication of the deposit forming tendencies of biodiesel blends. While not directly correlated with engine deposits, this property is considered an approximation.

Carbon residue: Remainder of a carbon-containing material formed by evaporation and thermal degradation.

Heavily insulated stainless steel cabinet with three-layer refractory top provides excellent heat retention

- Conforms to ASTM D524 and related specifications

Determine the carbon residue of your sample which provides an indication of the deposit-forming tendencies of fuels. Simply insert up to five samples; the furnace quickly reaches the test temperature of 1022°F (550°C). The microprocessor temperature control keeps 2°F (1°C) stability. Apparatus features digital temperature setting, overtemperature control, ceramic band heater with cast iron block, and heavily insulated stainless steel cabinet.

Optional communication software retrieves temperature data and automatically performs calculations of carbon residue in real-time when also using a balance with RS-232 output. Software prompts the user at each step of the testing procedure. Export data and graphs to Microsoft® Excel® or other spreadsheet programs; or send data directly to a printer. Data is saved in a database format for determining averages, standard deviation, and ASTM test repeatability.

Specifications

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Description</th>
<th>Power (VAC, Hz)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-60</td>
<td>Ramsbottom carbon residue apparatus</td>
<td>115, 50/60</td>
<td></td>
</tr>
<tr>
<td>GP-59876-61</td>
<td></td>
<td>220 to 240, 50/60</td>
<td></td>
</tr>
</tbody>
</table>

GP-59876-62 Pyrex® coking bulb with capillary, conforms to ASTM D524 specifications
GP-59876-63 Coking bulb filling device, fills up to 5 bulbs at one time
GP-59876-64 Control bulb, with type J thermocouple for verifying performance of the furnace
GP-59876-65 Sample charging syringe, 10 mL
GP-59876-66 Needle, 18 gauge, 2” (5.1 cm) L
GP-59876-67 Digital thermometer, 115 VAC. Accepts type J thermocouple input from the control bulb to verify furnace performance
GP-59876-68 Digital thermometer, 220 to 240 VAC. Accepts type J thermocouple input from the control bulb to verify furnace performance
GP-59876-69 Optional Ramsbottom communication software

59876-60

For this test method, you may also need . . .

Balances
Pipettes
ASTM D482 – Ash from Petroleum Products

Determines ash of a sample in the range 0.001 to 0.180 mass %, in which any ash-forming materials present are undesirable impurities and contaminants. The sample is heated in a muffle furnace at 1427°F (775°C), and the ash and carbon residue is cooled and weighed. Ash from a sample can result from oil or water-soluble metallic compounds, or from extraneous solids such as dirt or rust. This test method applies to fuels, oils, waxes, and other petroleum products which do not contain ash-forming additives; products containing ash-forming additives should be tested according to ASTM D874 (Sulfated Ash).

Programmable Ashing Furnaces

Conforms to ASTM specifications D482, D874, and D5184

- Ideal for determining amount of ash in petroleum products
- Maximum temperature of 2012°F (1100°C)

Determine the amount of ash in distillate and residual fuels, gas turbine fuels, crude oils, lubricating oils, waxes, and other petroleum products with this ashing furnace. The digital PID control accurately maintains temperature settings. A special air intake and exhaust system provides six air exchanges every minute while incoming air is preheated to ensure good temperature uniformity. Control panel allows you to store up to nine different programs and contains an integrated timer.

Double-walled stainless steel housing provides stability and a low external temperature. Highly durable, cured vacuum fiber module lining offers excellent temperature distribution. Oven is heated from two sides by ceramic heating plates with integrated heating elements that remain safe from fumes and splashing. Solid-state relays help provide low-noise operation.

What’s included: power cord.

Specifications

Temperature range: ambient to 2012°F (1100°C)
Temperature stability: ±3°C

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Capacity cu ft (L)</th>
<th>Dimensions (W x H x D)</th>
<th>Rise time</th>
<th>Air exchange rate</th>
<th>Power Shpg wt lb (kg)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Chamber</td>
<td>Overall</td>
<td>120 minutes</td>
<td>6 per minute</td>
<td>208, 50/60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9” x 6 1/2” x 13 5/8”</td>
<td>(23 x 17 x 34 cm)</td>
<td>19” x 35 1/2” x 25 1/2”</td>
<td>(48 x 90 x 65 cm)</td>
<td></td>
</tr>
<tr>
<td>GP-33859-10</td>
<td>0.47 (13.3)</td>
<td>120 minutes</td>
<td>6 per minute</td>
<td>208, 50/60</td>
<td>3600</td>
<td>140 (64)</td>
</tr>
<tr>
<td>GP-33859-11</td>
<td>0.47 (13.3)</td>
<td>120 minutes</td>
<td>6 per minute</td>
<td>208, 50/60</td>
<td>3600</td>
<td>140 (64)</td>
</tr>
<tr>
<td>Lift-gate door</td>
<td></td>
<td>9” x 6 1/2” x 13 5/8”</td>
<td>(23 x 17 x 34 cm)</td>
<td>19” x 35 1/2” x 25 1/2”</td>
<td>(48 x 90 x 65 cm)</td>
<td></td>
</tr>
<tr>
<td>GP-33859-12</td>
<td>0.47 (13.3)</td>
<td>120 minutes</td>
<td>6 per minute</td>
<td>208, 50/60</td>
<td>3600</td>
<td>140 (64)</td>
</tr>
<tr>
<td>GP-33859-13</td>
<td>0.47 (13.3)</td>
<td>120 minutes</td>
<td>6 per minute</td>
<td>208, 50/60</td>
<td>3600</td>
<td>140 (64)</td>
</tr>
</tbody>
</table>

For this test method, you may also need . . .

- GP-17803-14 Porcelain crucible, 100 mL
- GP-10000-15 Analytical balance, 120 g / 0.1 mg
- Propan-2-ol
- Toluene
ASTM D86 – Distillation of Petroleum Products at Atmospheric Pressure

Quantitatively determines the range of boiling points for samples at atmospheric conditions. The distillation (volatility) characteristics determine the tendency of a biodiesel blend sample to produce potentially explosive vapors during storage and use. The volatility can affect automotive starting, warm-up, and potential vapor lock at high operating temperatures. High boiling point components within the sample affect the amount of solid combustion deposits.

Front View Distillation Apparatus

Observe temperatures of samples when evaporated and condensed under controlled conditions

- Conforms to ASTM D86, D285, and related international specifications
- Distillation system evaporates and condenses samples under controlled conditions, for observation of the temperatures at which various percentages are recovered, and/or the percentages recovered at specified temperatures.

Front View Distillation Apparatus (Groups 0, 1, 2, and 3) is designed for testing motor and aviation gasolines, aviation turbine fuels, naphthas, kerosenes, distillate fuels, natural gasoline, liquid hydrocarbon mixtures, and other petroleum products. Features a 1000 W heater with stepless variable control and push-turn heater elevation control knob.

Front View Distillation Apparatus (Group 4) is designed for testing grade no. 2 fuel oil, grade no. 2-D diesel fuel oil, and other distillates requiring condenser bath temperatures up to 140°F (60°C). Also suitable for gasolines, aviation turbine fuels, naphthas, kerosenes, and other liquid petroleum products. Features a 300 W copper immersion condenser heater with stepless electronic control.

What's included: fully insulated stainless steel condenser and heater units (flask support platform, viewing window, and rack and pinion heater elevation mechanism), and graduate support block and flask support boards A and C.

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Heater unit orientation</th>
<th>Capacity</th>
<th>Dimensions (L x W x H)</th>
<th>Power (VAC, Hz)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59873-00</td>
<td>Right side</td>
<td>13.2 cu ft</td>
<td>15 7/16” x 16 1/4” x 19 1/2” (38.7 x 46.4 x 49.5 cm)</td>
<td>115, 50/60</td>
<td>220, 50/60</td>
</tr>
<tr>
<td>GP-59873-05</td>
<td>Left side</td>
<td></td>
<td></td>
<td>115, 50/60</td>
<td>220, 50/60</td>
</tr>
<tr>
<td>GP-59873-10</td>
<td>Right side</td>
<td>13.2 cu ft</td>
<td>15 7/16” x 16 1/4” x 19 1/2” (38.7 x 46.4 x 49.5 cm)</td>
<td>115, 50/60</td>
<td>220, 50/60</td>
</tr>
<tr>
<td>GP-59873-15</td>
<td>Left side</td>
<td></td>
<td></td>
<td>115, 50/60</td>
<td>220, 50/60</td>
</tr>
</tbody>
</table>

For this test method, you may also need . . .

Glass thermometers
Hexadecane
Toluene
ASTM D445 – Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

Kinematic viscosity is determined by measuring the time it takes for a sample to flow through a glass capillary viscometer. Calibrated Capillary Viscometers are used to measure flow under gravity or vacuum at precisely controlled temperatures. The viscosity of the fuel is important for determining the appropriate storage and operational conditions.

**Kinematic viscosity:** The resistance of a fluid to flow under gravity.

**Dynamic viscosity:** The ratio between the applied shear stress and rate of shear of a liquid; a measure of the resistance to the flow of liquid.

Constant-Temperature Viscosity Baths

Save time—seven viscometer holders and seven bath timers allow multiple measurements at the same time

- Motorized stirrer provides uniform temperature control, thorough circulation without turbulence

Baths feature PID microprocessor controller to deliver precise temperature control, with ASTM specified tolerances throughout the operating temperature range. Dual digital displays show set point time and actual temperature. Timers display in 0.01-second resolution and have ±0.01% accuracy.

Models with RS-232 port also allow you to enter the viscosity constant of each viscometer on the controller panel. Controller automatically displays test results in efflux time and viscosity units when timers stop.

Controller automatically shuts off power when there is an overtemperature condition or if the primary probe is disconnected.

The integrated low-level sensor interrupts operations if the bath liquid does not fill to the proper level, and shuts off power if the liquid falls below the level.

Bath chamber is a clear Pyrex® tank enclosed in a polyester-epoxy finished steel housing. Top plate holds the viscometers and is made of stainless steel for easy cleaning. Front viewing window reduces distortion. Glare-free fluorescent lights in the bath and a background baffle enhance the view of the viscometers. Baths rest on adjustable leveling feet.

**What’s included:** circulator, controller, cooling coil, bath chamber, top plate, thermometer holder, seven plastic holder covers, and 6-ft cord with plug (US standard for 115 VAC, European for 230 VAC).

Specifications

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Bath capacity</th>
<th>Temperature range</th>
<th>Accuracy</th>
<th>Output</th>
<th>Power (VAC, Hz)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-98944-00</td>
<td>22 L (5.8 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>—</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
<tr>
<td>GP-98944-05</td>
<td>22 L (5.8 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>RS-232</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
<tr>
<td>GP-98944-10</td>
<td>22 L (5.8 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>—</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
<tr>
<td>GP-98944-15</td>
<td>22 L (5.8 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>RS-232</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
<tr>
<td>GP-98944-20</td>
<td>34 L (8.9 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>—</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
<tr>
<td>GP-98944-25</td>
<td>34 L (8.9 gal.)</td>
<td>Ambient to 302°F (150°C)</td>
<td>Exceeds ASTM standards</td>
<td>RS-232</td>
<td>115, 60</td>
<td>230, 50</td>
</tr>
</tbody>
</table>

**What's included:**
- GP-98934-51 Glass capillary viscometer, size #50
- GP-98934-52 Glass capillary viscometer, size #75
- GP-98934-53 Glass capillary viscometer, size #100
- GP-98934-90 Plastic viscometer holder
- GP-98934-98 Brass viscometer holder

For this test method, you may also need . . .

- Viscosity standards
- Chromic acid cleaning solution
- Petroleum naphtha
- Acetone

Biodiesel Blend Test Methods & Products

ASTM D445
**ASTM D1319 – Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption**

Determines the aromatic content and the volume percentage of hydrocarbon types (aromatics, olefins, and saturates) within the biodiesel blend sample. The total volume percentage of each hydrocarbon type characterizes the quality as gasoline blending components and as feeds to catalytic reforming processes. Aromatics content is specified to avoid an increase in average aromatics content in biodiesel blend fuels, which could have a negative impact on emissions.

**Aromatics:** The volume percentage of monocyclic and polycyclic aromatics, plus aromatic olefins, some dienes, compounds containing sulfur and nitrogen, or higher boiling oxygenated compounds.

**Olefins:** The volume percentage of alkenes plus cycloalkenes and some dienes.

**Saturates:** The volume percentage of alkanes plus cycloalkanes.

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**Fluorescent Indicator Adsorption Apparatus**

Quick column connection for fast setup and analysis

- Conforms to ASTM D1319 specifications
- Conduct up to six FIA analyses simultaneously

Determine the total volume percent of aromatic, olefins, and saturates in petroleum fractions with this fluorescent indicator adsorption apparatus. Multiposition air manifold features independently operated gauges, pressure regulators, and ball O-ring joints for individual pressure control at each column. An integrated electric vibration system facilitates the dry gel packing of the columns.

After the sample is introduced and adsorbed into the column, fluorescent dye indicators mark the boundaries of aromatics, olefins, and saturates, which are visible with a UV lamp. Calculate the volume percentage using the length of each zone in the column.

**What’s included:** six adsorption columns, 40 analyzer tubes, one 1-mL syringe, one 4” (10.2 cm) needle, two gel bottles, connectors, support tip fittings, O-rings, mounting bracket with screws, and handheld UV lamp. Order silica gel for columns separately below.

---

**Specifications**

**Positions:** 6 columns  
**Dimensions (W x H x D):** 26” x 82” x 8” (66 x 208 x 20 cm)

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Description</th>
<th>Voltage (VAC, Hz)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-85</td>
<td>Fluorescent indicator adsorption apparatus</td>
<td>115, 50/60</td>
<td></td>
</tr>
<tr>
<td>GP-59876-86</td>
<td></td>
<td>230, 50/60</td>
<td></td>
</tr>
</tbody>
</table>

GP-59876-87 Silica gel, 500 gram  
GP-59876-88 Silica gel, dried, 40 gram

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**For this test method, you may also need . . .**

- **GP-35420-20**, **GP-05942-15**  
  Benchtop pH meter, pH buffer solutions pack

- **Stir bars**, **Syringes**, **Acetone**  
  Stir bars, Syringes, Acetone

- **Isopropyl alcohol**  
  Isopropyl alcohol
**ASTM D4052 – Density, Relative Density, and API Gravity of Liquids by Digital Density Meter**

Determines the density, relative density, and API gravity of biodiesel blend samples that is necessary for the conversion of measured volumes to volumes at the standard temperature of 59°F (15°C). Density or API gravity values are used for ASTM D976 – Calculated Cetane Index of Distillate Fuels to directly estimate the ASTM cetane number of distillate fuels when a test engine is not available. Calculated cetane index equals:

\[
G = -420.34 + 0.016 G^2 + 0.192 G \log M + 65.01 (\log M)^2 - 0.0001809 M^2
\]

Or

\[
G = 454.74 - 1641.416 D + 774.74 D^2 - 0.554 B + 97.803 (\log B)^2
\]

Where:

\[G = \text{API gravity determined by ASTM D4052}\]

\[M = \text{Mid-boiling temperature (°F) determined by ASTM D86 (page 9) and corrected to standard barometric pressure}\]

\[D = \text{Density at 15°C, g/mL determined by ASTM D4052}\]

\[B = \text{Mid-boiling temperature (°C) determined by ASTM D86 (page 9) and corrected to standard barometric pressure}\]

**Automatic Density Meter**

**VideoView™ with 10x magnification detects bubbles that cause reading errors—providing more accurate results!**

- Conforms to ASTM D4052, D1250, D5002; and DIN 51757
- cGMP/GLP compliant using multiple measurement mode

Automatically determine the density of crude oils, biofuels, and light and heavy fractions of petroleum products. Measurements are based on the mechanical oscillation principle: a U-tube is filled with your sample and vibrated. The frequency of vibration is compared to that of an empty tube and the shift in frequency is proportional to the mass of the sample. The U-tube has a fixed volume, so the density is calculated and displayed.

Often, undetected bubbles in the U-tube cause inaccurate readings. The VideoView feature found in this meter allows you to view the U-tube with 10x magnification as you fill it, making it easy to detect and remove the smallest bubbles in advance.

Select from three measurement modes: continuous, where results are updated continuously on the display; single, where a reading is taken and displayed once the specified measurement conditions are met; and multiple, where a specified number of measurements are made and full statistical information is displayed.

Meter also features eight preloaded methods, multipoint calibration, 2 GB memory, selections for measurement and temperature stability criteria, multiple communication interfaces, and the ability to interface with an external keyboard, mouse, or barcode scanner.

**What’s included:** desiccant tube, filling nozzles, luer syringes, fittings, tubing, flask, calibration standards, and power cord.

**Specifications**

<table>
<thead>
<tr>
<th>Density</th>
<th>Range: 0 to 3 g/cm³</th>
<th>Resolution: 0.00001 g/cm³</th>
<th>Accuracy: ±0.00005 g/cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Range: 32 to 194°F (0 to 90°C)</td>
<td>Resolution: 0.01°F</td>
<td>Accuracy: ±0.05°F (±0.03°C)</td>
</tr>
</tbody>
</table>

**Wetted materials:** borosilicate glass, PTFE, ECTFE

**Minimum sample volume:** 1 mL

**Display:** 10.4” (26.4 cm) diagonal color touch screen

**Output:** three USB ports, two RS-232 ports, and Ethernet port

**Internal memory:** 2 GB

**Power:** 85 to 260 VAC, 48 to 62 Hz

**Dimensions (W x H x D):** 19” x 18” x 36” (48.3 x 45.7 x 91.4 cm)

**Catalog number** | **Description** | **Price**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-83</td>
<td>Automatic density meter</td>
<td></td>
</tr>
</tbody>
</table>

For this test method, you may also need . . .

- Acetone
- Petroleum naphtha
ASTM D130 – Corrosiveness to Copper from Petroleum Products by Copper Strip Test

Determines how corrosive the biodiesel sample is toward copper. A polished copper strip is immersed in a biodiesel sample at an elevated temperature. The test strip is examined for evidence of corrosion and classified based on a comparison with ASTM Copper Strip Corrosion Standards. This test serves as a measure of possible difficulties with copper, brass or bronze parts of the fuel system. The presence of acids or sulfur-containing compounds can tarnish the copper strip, indicating the possibility for corrosion.

Copper Corrosion Test Bath System

Microprocessor temperature controller for stability

- Complies with ASTM D130 specifications
- Determine the corrosiveness to copper of petroleum-based fuels and biodiesel by immersing a copper strip in the test sample at an elevated temperature. Compare the tarnish color of the strip to an ASTM copper strip corrosion standard (sold separately below) to assess the relative corrosiveness level.

The constant-temperature bath features a digital temperature controller with RTD temperature probe and holder, stirrer motor, and a 750-watt heater; maintains a temperature stability of ±2°F (1°C). Overtemperature control interrupts power to the heater if programmed temperature is reached.

Built-in support rack holds up to 16 test tubes.

What’s included: digital temperature controller with RTD temperature probe and holder, stirrer motor with mounting clamp, 750-watt heater, and power cord.

Specifications

- Test tube capacity: 16 tubes
- Bath capacity: 5 gal. (18.9 L)
- Temperature range: ambient to 374°F (190°C)
- Temperature stability: ±2°F (1°C)
- Heater wattage: 750 W
- High-temperature cutoff: adjustable
- Wetted materials: stainless steel
- Dimensions (W x H x D): 12½” x 14” x 15½” (32 x 36 x 39 cm)

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Description</th>
<th>Power (VAC, Hz)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-30</td>
<td>Copper corrosion test bath</td>
<td>115, 50/60</td>
<td>230, 50/60</td>
</tr>
<tr>
<td>GP-59876-31</td>
<td>Copper corrosion test bath</td>
<td>115, 50/60</td>
<td>230, 50/60</td>
</tr>
</tbody>
</table>

- GP-59876-32 Copper test strip. Pack of 6
- GP-59876-33 ASTM copper corrosion standard
- GP-59876-34 Test tube, 25 x 150 mm. Pack of 16
- GP-59876-35 Vented cork. Pack of 16
- GP-59876-36 Viewing test tube. Pack of 16
- GP-59876-37 Polishing vise for copper strips

- GP-59876-38 Silicone carbide paper; FEPA grade, 220 grit. Pack of 50
- GP-59876-39 Silicone carbide paper; FEPA grade, 150 grit. 1-lb pack by weight
- GP-59876-40 White mineral bath oil, 5 gal. (18.9 L)

For this test method, you may also need . . .

- GP-08009-09 ASTM glass thermometer, –20 to 102°C
- GP-08009-10 ASTM glass thermometer, –5 to 215°F
- Stainless steel forceps
- 2, 2, 4-Trimethylpentane (Isooctane)
**ASTM D7371 – Determination of Biodiesel (Fatty Acid Methyl Esters) Content in Diesel Fuel Oil Using Mid Infrared Spectroscopy**

Determines the blend percentage, total glycerin, methanol content, and acid number of fatty acid methyl esters (FAME) in biodiesel blend samples ranging from 1.00 to 20 volume percent. Testing biodiesel samples comprising fatty acid ethyl esters (FAEE) will result in an overall lower concentration percentage. Testing samples is critical for quality control during production and distribution of the biodiesel blend product.

**Note:** ASTM D7371 requires the use of an FTIR mid-range spectrometer. The portable biodiesel analyzer (below) uses impedance spectroscopy, which provides results that highly correlate to FTIR testing results.

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**Portable Biodiesel Analyzer**

Determine the blend percentage, total glycerin, methanol content, and acid number of biodiesel and biodiesel blends

This portable biodiesel analyzer provides quick and easy identification of the quantity of biodiesel within a sample. Using Impedance Spectroscopy (IS) technology, instantaneous measurements can be made in the field—without time-consuming laboratory analysis. Analyzer features rechargeable lithium-ion batteries and a docking station for recharging. To use, simply fill a cartridge with your sample and press a button. The analyzer checks for blend percentage, total glycerin, methanol content, and acid number.

**What's included:** sample cartridges, calibration cartridge, plastic syringe, docking station, and wall charger.

**Specifications**

<table>
<thead>
<tr>
<th>Range</th>
<th>Display: LCD with backlight</th>
<th>Output: infrared for link with optional wireless printer</th>
<th>Power: rechargeable lithium ion battery</th>
<th>Battery life: 12 hours fully charged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blend range: 2 to 100% biodiesel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total glycerin: 0.03 to 0.7% (B6 to B100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acid number: pass/fail (B100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methanol: pass/fail (B100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Price**

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-59876-84</td>
<td>Portable biodiesel analyzer</td>
<td></td>
</tr>
</tbody>
</table>

**For this test method, you may also need . . .**

- Acetone
- Methanol
- Toluene

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For this test method, you may also need . . .

- Acetone
- Methanol
- Toluene
Biodiesel Blend Test Methods & Products

**ASTM D4539 – Filterability of Diesel Fuels by Low-Temperature Flow Test (LTFT)**

Estimate the filterability of biodiesel blend samples at low temperatures in 60 seconds or less. The results correlate to the flow performance of the test fuel in diesel vehicles, and is useful in the evaluation of fuels containing additives to improve flow in the range of 50 to –22°F (10 to –30°C).

**ASTM D5453 – Determination of Total Sulfur by Ultraviolet Fluorescence**

Determine the total sulfur content in biodiesel samples, which should be essentially sulfur-free. Sulfur can affect the performance of the emissions control systems and engine wear.

**ASTM D6079 – Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)**

Determine the lubricity of a fluid by evaluating the wear scar, in microns, produced on an oscillating ball from contact with a stationary disc immersed in the biodiesel blend sample operating under defined and controlled conditions. Shortened life of diesel fuel injection pumps and injectors has been attributed to lack of lubricity in fuels.

**Lubricity**: A qualitative term describing the ability of a fluid to affect friction between, and wear to, surfaces in relative motion under load.

**ASTM D613 – Cetane Number of Diesel Fuel Oil**

 Determines the cetane value (typically between 30 to 65) of the biodiesel using a single cylinder, four-stroke cycle, variable compression ratio, indirect injected diesel engine. Engine manufacturers and petroleum refineries use this test for fuel and engine compatibility.

**Cetane number**: Measurement of the combustion quality during ignition.

**EN 15751 – Determination of Oxidation Stability by Accelerated Oxidation Method**

During the oxidation process of biodiesels, acids can form and cause deposits in fuel systems, which can lead to clogging of filters and ultimately fuel system malfunctions. The conductivity of samples is measured during the oxidation process to determine the stability of the sample over time.

**Oxidation stability**: Rate of degradation of biodiesel by oxygen in the air, potentially harming physical properties such as viscosity and acid values.

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*For these test methods...*

Contact us at 800-323-4340 for more information on products that conform to these test methods.