



**Certified  
Reference  
Standards**

# **BioFuels**

*Glycerin*

*FAME Mixtures*

*FAEE Mixtures*

*Sulfur Standards*

*Physical Standards*

*Wear Metals*

*ASTM & EN Method  
Standards*

*Custom Formulations*

**BioFuels**

**AccuStandard**

ASTM, EN and other test methods have been developed to monitor the properties (physical and chemical), constituent distribution, impurities and suitability of use.

The source materials that are used to produce these fuels vary from plant oils, ethyl alcohol (usually from corn) and even waste products.

Biodiesel refineries have opened all over the world.

- The Minister for the Environment and Heritage of Australia has signed the Fuel Standard (Biodiesel) in 2006 which sets out the physical and chemical parameters with the associated test methods to determine compliance.
- In Germany the sale of biodiesel in gas stations is over 2 million cubic meters.
- In the USA, some state legislatures have mandated 2% biodiesel content in all diesels sold in those states.

## ASTM D6584 / EN 14105 Free and Total Glycerin in Biodiesel by GC

| Compound   | Qty./Conc. | Matrix                          | Cat. No.             | Unit           |
|--|------------|---------------------------------|----------------------|----------------|
| Glycerin   | 0.5 mg/mL  | Pyridine                        | BF-D-6584-01         | 2 mL           |
| Monolein   | 5 mg/mL    | Pyridine                        | BF-D-6584-02         | 2 mL           |
| 1,3-Diolein  | 5 mg/mL    | Pyridine                        | BF-D-6584-03         | 2 mL           |
| Triolein   | 5 mg/mL    | Pyridine                        | BF-D-6584-04         | 2 mL           |
| (S)-(-)-1,2,4-Butanetriol                                | 1 mg/mL    | Pyridine                        | BF-D-6584-05-IS      | 5 mL           |
| Tricaprin  | 8 mg/mL    | Pyridine                        | BF-D-6584-06         | 5 mL           |
| MSTFA  | 5 mL       | Neat                            | BF-D-6584-07N        | 5 mL           |
| <b>SET of 7 above compounds</b>                          |            |                                 | <b>BF-D-6584-SET</b> | <b>7 units</b> |
| <b>Mix of above compounds, on right (MSTFA separate)</b> |            |                                 |                      |                |
| Biofuel 20   | 0.5 mg/mL  | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-030-D          | 2 mL           |
| Biofuel 20   | 20 mg/mL   | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-030-D-40X      | 2 mL           |
| Biofuel 100 Consumer grade                               | 0.5 mg/mL  | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-029-D          | 2 mL           |
| Biofuel 100 Consumer grade                               | 20 mg/mL   | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-029-40X        | 2 mL           |
| Biofuel 100  | 0.5 mg/mL  | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-032-D          | 2 mL           |
| Biofuel 100  | 20 mg/mL   | CH <sub>2</sub> Cl <sub>2</sub> | BF-FU-032-D-40X      | 2 mL           |

## ASTM D6584 Mixture

**BF-D-6584-MIX** 1 mL  
At stated conc. in Pyridine 6 comps.

|                           |           |
|---------------------------|-----------|
| Glycerol                  | 0.5 mg/mL |
| Monolein                  | 5 mg/mL   |
| 1,3-Diolein               | 5 mg/mL   |
| Trioctadecenoil (Olein)   | 5 mg/mL   |
| (S)-(-)-1,2,4-Butanetriol | 1 mg/mL   |
| Tricaprin                 | 8 mg/mL   |

Note: MSTFA (BF-D-6584-07N) can be ordered separately.

## EN 14103 Fatty Acid Methyl Esters (FAMES)

The methyl esters in the mixture are those derived from typical glycerides present in biomass sources.

### Soy & Corn

|                  |               |
|------------------|---------------|
| <b>BF-SOY-ME</b> | <b>100 mg</b> |
| 16:0 Palmitate   | 6% Wt.        |
| 18:0 Stearate    | 3% Wt.        |
| 20:0 Arachidate  | 3% Wt.        |
| 18:1 Oleate      | 35% Wt.       |
| 18:2 Linoleate   | 50% Wt.       |
| 18:3 Linolenate  | 3% Wt.        |

### Palm Kernel

|                   |               |
|-------------------|---------------|
| <b>BF-PALM-ME</b> | <b>100 mg</b> |
| 8:0 Caprylate     | 7% Wt.        |
| 10:0 Caprate      | 5% Wt.        |
| 12:0 Laurate      | 48% Wt.       |
| 14:0 Myristate    | 15% Wt.       |
| 16:0 Palmitate    | 7% Wt.        |
| 18:0 Stearate     | 3% Wt.        |
| 18:1 Oleate       | 12% Wt.       |
| 18:2 Linoleate    | 3% Wt.        |

### Percent Methanol Calibration Standard Set (EN 14110)

|                         |                         |
|-------------------------|-------------------------|
| <b>BF-MEOH-SET</b>      | <b>5 x 1 mL</b>         |
| BF-MEOH-1X (100 µg/g)   | BF-MEOH-25X (2500 µg/g) |
| BF-MEOH-5X (500 µg/g)   | BF-MEOH-50X (5000 µg/g) |
| BF-MEOH-10X (1000 µg/g) |                         |

Methanol in Water

### Rapeseed Oil

|                  |               |
|------------------|---------------|
| <b>BF-RAP-ME</b> | <b>100 mg</b> |
| 14:0 Myristate   | 1% Wt.        |
| 16:0 Palmitate   | 4% Wt.        |
| 18:0 Stearate    | 3% Wt.        |
| 20:0 Arachidate  | 3% Wt.        |
| 22:0 Behenate    | 3% Wt.        |
| 24:0 Lignocerate | 3% Wt.        |
| 18:1 Oleate      | 60% Wt.       |
| 22:1 Erucate     | 5% Wt.        |
| 18:2 Linoleate   | 12% Wt.       |
| 18:3 Linolenate  | 5% Wt.        |
| 20:1 Eicosenoate | 1% Wt.        |

### Beef Tallow & Palm Oil

|                   |               |
|-------------------|---------------|
| <b>BF-BT-ME</b>   | <b>100 mg</b> |
| 14:0 Myristate    | 2% Wt.        |
| 16:0 Palmitate    | 30% Wt.       |
| 16:1 Palmitoleate | 3% Wt.        |
| 18:0 Stearate     | 14% Wt.       |
| 18:1 Oleate       | 41% Wt.       |
| 18:2 Linoleate    | 7% Wt.        |
| 18:3 Linolenate   | 3% Wt.        |

### Technical Note

All products are refinery grade stock, unless specifically marked consumer grade.

### Technical Note

Individual Mixes packaged under Nitrogen for stability.

## Fatty Acid Ethyl Esters (FAEEs)

### Ethyl Esters in Soy & Corn

|                       |               |
|-----------------------|---------------|
| <b>BF-SOY-EE</b>      | <b>100 mg</b> |
| 16:0 Ethyl palmitate  | 6% Wt.        |
| 18:0 Ethyl stearate   | 3% Wt.        |
| 20:0 Ethyl arachidate | 3% Wt.        |
| 18:1 Ethyl oleate     | 35% Wt.       |
| 18:2 Ethyl linoleate  | 50% Wt.       |
| 18:3 Ethyl linolenate | 3% Wt.        |

### Ethyl Esters in Palm Kernel Oil

|                      |               |
|----------------------|---------------|
| <b>BF-PALM-EE</b>    | <b>100 mg</b> |
| 8:0 Ethyl caprylate  | 7% Wt.        |
| 10:0 Ethyl caprate   | 5% Wt.        |
| 12:0 Ethyl laurate   | 48% Wt.       |
| 14:0 Ethyl myristate | 15% Wt.       |
| 16:0 Ethyl palmitate | 7% Wt.        |
| 18:0 Ethyl stearate  | 3% Wt.        |
| 18:1 Ethyl oleate    | 12% Wt.       |
| 18:2 Ethyl linoleate | 3% Wt.        |

Neats are 100 mg.  
Solutions are 1 mL of 10 mg/mL conc. in Hexane as a solvent.

| Compound                        | Neats     | Solutions |
|---------------------------------|-----------|-----------|
| Ethyl palmitate (16:0)          | FAEE-006N | FAEE-006S |
| Ethyl stearate (18:0)           | FAEE-007N | FAEE-007S |
| Ethyl arachidate (20:0)         | FAEE-008N | FAEE-008S |
| Ethyl oleate (18:1)             | FAEE-014N | FAEE-014S |
| Ethyl linoleate (18:2)          | FAEE-012N | FAEE-012S |
| Ethyl linolenate (18:3)         | FAEE-016N | FAEE-016S |
| Ethyl myristate (14:0)          | FAEE-005N | FAEE-005S |
| Ethyl behenate (22:0)           | FAEE-009N | FAEE-009S |
| Ethyl lignocerate (24:0)        | FAEE-010N | FAEE-010S |
| Ethyl erucate (22:1)            | FAEE-011N | FAEE-011S |
| Ethyl caprylate (8:0)           | FAEE-002N | FAEE-002S |
| Ethyl caprate (10:0)            | FAEE-003N | FAEE-003S |
| Ethyl laurate (12:0)            | FAEE-004N | FAEE-004S |
| Ethyl palmitoleate (16:1)       | FAEE-001N | FAEE-001S |
| Ethyl nervonate (24:1)          | FAEE-013N | FAEE-013S |
| Ethyl heptadecanoate (17:0)     | FAEE-015N | FAEE-015S |
| Ethyl linolenate (gamma) (18:3) | FAEE-020N | FAEE-020S |

### Ethyl Esters in Rapeseed Oil

|                        |               |
|------------------------|---------------|
| <b>BF-RAP-EE</b>       | <b>100 mg</b> |
| 14:0 Ethyl myristate   | 1% Wt.        |
| 16:0 Ethyl palmitate   | 4% Wt.        |
| 18:0 Ethyl stearate    | 3% Wt.        |
| 20:0 Ethyl arachidate  | 3% Wt.        |
| 22:0 Ethyl behenate    | 3% Wt.        |
| 24:0 Ethyl lignocerate | 3% Wt.        |
| 18:1 Ethyl oleate      | 60% Wt.       |
| 22:1 Ethyl erucate     | 5% Wt.        |
| 18:2 Ethyl linoleate   | 12% Wt.       |
| 18:3 Ethyl linolenate  | 5% Wt.        |
| 20:1 Ethyl eicosenoate | 1% Wt.        |

### Ethyl Esters in Beef Tallow

|                         |               |
|-------------------------|---------------|
| <b>BF-BT-EE</b>         | <b>100 mg</b> |
| 14:0 Ethyl myristate    | 2% Wt.        |
| 16:0 Ethyl palmitate    | 30% Wt.       |
| 16:1 Ethyl palmitoleate | 3% Wt.        |
| 18:0 Ethyl stearate     | 14% Wt.       |
| 18:1 Ethyl oleate       | 41% Wt.       |
| 18:2 Ethyl linoleate    | 7% Wt.        |
| 18:3 Ethyl linolenate   | 3% Wt.        |

## ASTM D6751 & ASTM D5453 Sulfur as Di-n-butyl sulfide in Biodiesel

### Sulfur in Biodiesel 5%

| ppm (µg/g) | % Wt.  | Cat. No.           | Unit       |
|------------|--------|--------------------|------------|
| 0          | 0      | BF-5453-B5-BL      | 100 mL     |
| 5          | 0.0005 | BF-5453-B5-5X-SET  | 2 x 100 mL |
| 10         | 0.001  | BF-5453-B5-10X-SET | 2 x 100 mL |
| 15         | 0.0015 | BF-5453-B5-15X-SET | 2 x 100 mL |
| 30         | 0.003  | BF-5453-B5-30X     | 100 mL     |
| 50         | 0.005  | BF-5453-B5-50X     | 100 mL     |
| 75         | 0.0075 | BF-5453-B5-75X     | 100 mL     |
| 100        | 0.01   | BF-5453-B5-100X    | 100 mL     |
| 200        | 0.02   | BF-5453-B5-200X    | 100 mL     |
| 500        | 0.05   | BF-5453-B5-500X    | 100 mL     |

### Sulfur in Biodiesel 20%

|     |        |                     |            |
|-----|--------|---------------------|------------|
| 0   | 0      | BF-5453-B20-BL      | 100 mL     |
| 5   | 0.0005 | BF-5453-B20-5X-SET  | 2 x 100 mL |
| 10  | 0.001  | BF-5453-B20-10X-SET | 2 x 100 mL |
| 15  | 0.0015 | BF-5453-B20-15X-SET | 2 x 100 mL |
| 30  | 0.003  | BF-5453-B20-30X     | 100 mL     |
| 50  | 0.005  | BF-5453-B20-50X     | 100 mL     |
| 75  | 0.0075 | BF-5453-B20-75X     | 100 mL     |
| 100 | 0.01   | BF-5453-B20-100X    | 100 mL     |
| 200 | 0.02   | BF-5453-B20-200X    | 100 mL     |
| 500 | 0.05   | BF-5453-B20-500X    | 100 mL     |

Note: 10,000 ppm = 1% Wt.

### Sulfur in Biodiesel 100%

| ppm (µg/g) | % Wt.  | Cat. No.             | Unit       |
|------------|--------|----------------------|------------|
| 0          | 0      | BF-5453-B100-BL      | 100 mL     |
| 5          | 0.0005 | BF-5453-B100-5X-SET  | 2 x 100 mL |
| 10         | 0.001  | BF-5453-B100-10X-SET | 2 x 100 mL |
| 15         | 0.0015 | BF-5453-B100-15X-SET | 2 x 100 mL |
| 30         | 0.003  | BF-5453-B100-30X     | 100 mL     |
| 50         | 0.005  | BF-5453-B100-50X     | 100 mL     |
| 75         | 0.0075 | BF-5453-B100-75X     | 100 mL     |
| 100        | 0.01   | BF-5453-B100-100X    | 100 mL     |
| 200        | 0.02   | BF-5453-B100-200X    | 100 mL     |
| 500        | 0.05   | BF-5453-B100-500X    | 100 mL     |

### Biofuel Blank

#### B100

|                 |       |
|-----------------|-------|
| BF-WM-B100-BL-1 | 100 g |
| BF-WM-B100-BL-5 | 500 g |

#### Technical Note

The 5, 10 and 15 ppm sulfurs are supplied as a set including a blank. We suggest using the blank for analysis to compensate for matrix interferences, such as low levels of native sulfur.

#### Technical Note

Formulations for EN 12916, other methods and custom formulations are available.

### Physical Standards

| Compound  | Conc.       | Matrix | Cat. No.           | Unit      |
|---|-------------|--------|--------------------|-----------|
| <b>ASTM D2500</b>                                 |             |        |                    |           |
| Cloud Point                                       | -16 °C *    | B5     | BF-D-2500-B5       | 200 mL    |
|   | -14 °C *    | B20    | BF-D-2500-B20      | 200 mL    |
|   | -1 °C *     | B100   | BF-D-2500-B100     | 200 mL    |
| <b>ASTM D93 / EN-ISO 3679</b>                     |             |        |                    |           |
| Flash Point                                       | 60 °C *     |        | BF-D-93-60C        | 200 mL    |
|   | 65 °C *     |        | BF-D-93-65C        | 200 mL    |
|   | 140 °C *    |        | BF-D-93-140C       | 200 mL    |
| <b>ASTM D4951 / EN 14107</b>                      |             |        |                    |           |
| Phosphorus Content                                | 0.001 % Wt. | B100   | BF-D-4951-B100     | 100 g     |
| <b>ASTM D6304 / EN ISO 12937</b>                  |             |        |                    |           |
| (KF) Water Content                                | 60 µg/g     |        | BF-KF-0.6X-5ML-VAP | 10 x 5 mL |
|   | 100 µg/g    |        | BF-KF-1X-5ML-VAP   | 10 x 5 mL |
|   | 1000 µg/g   |        | BF-KF-10X-5ML-VAP  | 10 x 5 mL |
|   | 5000 µg/g   |        | BF-KF-50X-5ML-VAP  | 10 x 5 mL |
| <b>ASTM D6751 / UOP 391 / EN 14108 / EN 14109</b> |             |        |                    |           |
| Sodium / Potassium                                | 100 ppm     | B100   | BF-UOP-391-B100    | 100 g     |
| <b>EN 14538</b>                                   |             |        |                    |           |
| Calcium / Magnesium                               | 100 ppm     | B100   | BF-14538-B100      | 100 g     |

\* These are nominal values and the actual value will be recorded on the certificate.



### EN 14214 Wear Metals

Each is 100 grams at 500 µg/g concentration.

| Compound   | Matrix | Cat. No.           | 100 grams |
|------------|--------|--------------------|-----------|
| Aluminum   | B100   | BF-WM-B100-01-0.5X |           |
| Calcium    | B100   | BF-WM-B100-09-0.5X |           |
| Chromium   | B100   | BF-WM-B100-13-0.5X |           |
| Copper     | B100   | BF-WM-B100-15-0.5X |           |
| Iron       | B100   | BF-WM-B100-27-0.5X |           |
| Lead       | B100   | BF-WM-B100-29-0.5X |           |
| Magnesium  | B100   | BF-WM-B100-32-0.5X |           |
| Phosphorus | B100   | BF-WM-B100-41-0.5X |           |
| Potassium  | B100   | BF-WM-B100-43-0.5X |           |
| Sodium     | B100   | BF-WM-B100-54-0.5X |           |
| Zinc       | B100   | BF-WM-B100-70-0.5X |           |

### Biofuel Metals Mix

#### Multi-Element Biofuel Standard

|                       |                |
|-----------------------|----------------|
| BF-WM-B100-MIX1       | 100 g          |
| 200 µg/g each in B100 | 5 comps.       |
| Ca (Calcium)          | Na (Sodium)    |
| K (Potassium)         | P (Phosphorus) |
| Mg (Magnesium)        |                |

#### Technical Note

All products are refinery grade stock, unless specifically marked consumer grade.

**Ethanol Impurities  
Solution A****EN-15721-A**

1% w/w each in Ethanol

Methanol  
Acetaldehyde  
3-Methyl-1-butanol  
2-Methyl-1-butanol  
2-Methyl-1-propanol**1 mL**  
10 comps.2-Butanol  
1-Butanol  
1-Propanol  
Ethyl acetate  
Acetal**Internal Standard  
Solution A****EN-15721-A-IS**

1% w/w in Ethanol

3-Propanol

**1 mL****EN 15721 Solution A Set****EN-15721-A-SET****2 x 1 mL****EN-15721-A and EN-15721-A-IS****EN 14105 BioFuel Glyceride Solutions****Solution I****EN-14105-01****1 mL**At stated ( $\mu\text{g/mL}$ ) conc. in Pyridine  
6 comps.(s)-(-)-1,2,4-Butanetriol 80  
Monoolein 250  
Diolein 50  
Triolein 50  
Glycerol 5  
Tricaprin 8**Solution II****EN-14105-02****1 mL**At stated ( $\mu\text{g/mL}$ ) conc. in Pyridine  
6 comps.(s)-(-)-1,2,4-Butanetriol 80  
Monoolein 600  
Diolein 200  
Triolein 150  
Glycerol 20  
Tricaprin 800**Solution III****EN-14105-03****1 mL**At stated ( $\mu\text{g/mL}$ ) conc. in Pyridine  
6 comps.(s)-(-)-1,2,4-Butanetriol 80  
Monoolein 950  
Diolein 350  
Triolein 300  
Glycerol 35  
Tricaprin 800**Solution IV****EN-14105-04****1 mL**At stated ( $\mu\text{g/mL}$ ) conc. in Pyridine  
6 comps.(s)-(-)-1,2,4-Butanetriol 80  
Monoolein 1250  
Diolein 500  
Triolein 400  
Glycerol 50  
Tricaprin 800**AccuStandard<sup>®</sup>**

ISO Guide 34 ■ ISO/IEC 17025 ■ ISO 9001

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