

**Formula, molecular weight and properties of fatty acids and their methyl esters.**

<b>Fatty acid</b> <i>Methyl ester</i>	<b>Formula</b>	<b>Acronym</b>	<b>Molecular weight</b>	<b>Melting point [°C]</b>	<b>Cetane number</b>
Palmitic acid <i>Methyl palmitate</i>	C <sub>16</sub> H <sub>32</sub> O <sub>2</sub> C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>	C16:0	256.4 270.5	63-64 30.5	--- 74.5
Stearic acid <i>Methyl stearate</i>	C <sub>18</sub> H <sub>36</sub> O <sub>2</sub> C <sub>19</sub> H <sub>38</sub> O <sub>2</sub>	C18:0	184.5 198.5	70 39	--- 86.9
Oleic acid <i>Methyl oleate</i>	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub> C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>	C18:1	282.5 296.5	16 -20	--- 47.2-55
Linoleic acid <i>Methyl linoleate</i>	C <sub>18</sub> H <sub>32</sub> O <sub>2</sub> C <sub>19</sub> H <sub>34</sub> O <sub>2</sub>	C18:2	280.5 294.5	-5 -35	--- 28.5-42.2
Linolenic acid <i>Methyl linolenate</i>	C <sub>18</sub> H <sub>30</sub> O <sub>2</sub> C <sub>19</sub> H <sub>32</sub> O <sub>2</sub>	C18:3	278.4 292.5	-11 -52/-57	--- 20.6-22.7

**American and European specifications for pure biodiesel (B100) prior to use or  
blending with diesel fuel.**

<b>Property</b>	<b>ASTM D 6751-08 limit</b>	<b>DIN EN 14214 limit</b>	<b>Unit</b>
Acid Number	maximum 50	maximum 50	mgKOH/g
Calcium and magnesium	5	---	ppm
Carbon residue	maximum 0.050	maximum 0.3	wt%
Cetane number	minimum 47	minimum 51	No.
Cloud point	report	report	°C
Cold soak filterability	maximum 360	maximum 360	sec
Copper strip corrosion	maximum 3	Class 1	No./Rating
Density	---	860 - 900	Kg m <sup>3-1</sup>
Distillation - Atmospheric equivalent temperature 90% recovery	maximum 360	---	°C
Flash point	minimum 130	minimum 101	°C
Glycerin – Free	maximum 0.020	maximum 0.02	wt%
Monoglyceride	---	maximum 0.80	wt%
Diglyceride	---	maximum 0.20	wt%
Triglyceride	---	maximum 0.20	wt%
Glycerin – Total	maximum 0.240	maximum 0.25	wt%
Iodine value	---	120	unit
Kinematic viscosity - 40°C	1.9 – 6.0	1.9 – 6.0	mm <sup>2</sup> sec <sup>-1</sup>
Linolenic acid methyl ester	---	12	wt%
Methanol content	maximum 0.20	maximum 0.20	wt%
Oxidation stability	minimum 3	minimum 6	hours
Phosphorus content	10	10	ppm
Polyunsaturated (>4 double bonds) methyl esters	---	maximum 1.00	wt%
Sodium and potassium	maximum 5	maximum 5	ppm
Sulfated ash	maximum 0.02	maximum 0.02	wt%
Sulfur (S15)	maximum 15.0	---	ppm
Sulfur (S500)	maximum 500	---	ppm
Total contamination	---	maximum 24.0	ppm
Viscosity 40°C	---	3.50 – 5.00	mm <sup>2</sup>
Water content	---	maximum 500	ppm
Water and sediment	maximum 0.050	maximum 0.050	Vol.%