



FUEL, DIESEL, INITIAL FILL, BRAZIL, 46 CENTANE, FAME ALLOWED

WSS-M4C136-A

1. SCOPE

The material defined by this specification is a well-refined middle distillate petroleum product containing normal commercial additives. This fuel may contain Fatty Acid Methyl Ester (FAME).

2. APPLICATION

This specification was released originally for material used as initial fill fuel for diesel engines in passenger cars and trucks. This product may also be used for general purpose. FAME is not allowed in Camaçari Assembly Plant.

3. REQUIREMENTS

This material must be produced using current refinery practices for commercial diesel fuels and in addition to the requirements of this specification, must also meet all pertinent local requirements.

3.1. STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2. CETANE RATING

3.2.1. Cetane Number 46 min
(ASTM D613-preferred / ISO 5165)

3.2.2. Derived Cetane Number (DNC) 46 min
(ASTM D6890 / D7170)

3.3. TOTAL SULFUR

(ASTM D7212 / D 7220)
Limit required until Dec 31st, 2012 50 mg/kg max
New limit required from Jan, 1st 2013: 10 mg/kg max

3.4. ASH CONTENT

(ASTM D482 / NBR 9842, mass %) 0.010% max

3.5. COMPOSITION

3.5.1. Water 200 mg/kg max
(ISO 12937 / ASTM D6304)

3.5.2. Total Contamination 24 mg/kg max
(EN 12662)

3.5.3. Water and Sediments 0.05% vol, max
(ASTM D2709)

Date	Action	Revision	Rev 01
2014 07 08	Revised	Changed Ester content from 5% to 7%	L. Benvenuti, SA
2012-07 25	Activated		L. Benvenuti, SA



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| 3.5.4. | Hydrocarbon types
(ISO 3837 / ASTM D1319) | Report |
| 3.5.5. | Polycyclic Aromatic Hydrocarbons
(ASTM D5186 / D6591) | Report |
| 3.5.6. | Ester Content (FAME)
(EN 14078) | 7% vol max |

Note: FAME is not allowed for Camaçari Assembly Plant

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| 3.6. | DISTILLATION RANGE
(NBR 9619 / ISO 3405 / ASTM D86) | Temperature, °C |
| | Initial boiling point | Report |
| | 10% vol recovery at | Report |
| | 50% vol recovery at, | 245 – 310 °C |
| | 90% vol recovery at | 360 °C max |
| | Final boiling point | Report |
| 3.7. | DENSITY, measured at 20°C
(NBR 7148 / 14065 / ASTM D1298 / D4052 / ISO 3675) | 820 - 850 kg/m ³ |
| 3.8. | KINEMATIC VISCOSITY,
(NBR 10441 / ASTM D445 / ISO 3104, 40 °C) | 2.0 – 5.0 mm ² /S |
| 3.9. | OXIDATION STABILITY, total insolubles
(ASTM D2274 / ISO 12205) | 2.5 mg/100 mL max |
| 3.10. | OXIDATION STABILITY, RANCIMAT
(EN 15751)
Not applicable for Camaçari Assembly Plant only. | 28 h min |
| 3.11. | OXIDATION STABILITY, PETROXY
(prEN16091)
Not applicable for Camaçari Assembly Plant only. | 70 minutes min |
| <p><u>Note:</u> Rancimat and PetroOxy Oxidation Stability tests to be performed in all batches until Ford confirms that Rancimat is not required.</p> | | |
| 3.12. | CALORIFIC VALUE, gross
(ASTM D240) | Report |
| 3.13. | CORROSION | |
| | 3.13.1. Copper Tarnish
(NBR 14359 / ASTM D130 / ISO 2160, 3 h at 100 +/- 1 °C) | 1b max |