



FUEL, E22, UNLEADED, INITIAL FILL, BRAZIL

WSS-M4C113-B

1. SCOPE

The material defined by this specification is a well-refined unleaded gasoline containing 22% ethanol and normal commercial additives.

2. APPLICATION

This specification was released originally for material used as initial fill fuel for vehicles designed to operate on gasoline in Brazil. Additives are present to protect the fuel system.

This material is not specifically intended for use in certification testing. It may be used for engine hot test, mileage accumulation or general fueling.

3. REQUIREMENTS

This material must be produced using current refinery practices for market place fuels and must meet all pertinent legal gasoline requirements in the country in use.

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

3.3 ADDITIVES

Fuels shall contain normal commercial additives at concentrations representative of good commercial practice in the receiving locale (unless otherwise specified). Metallic additives, including lead, manganese and phosphorus are not allowed.

3.4 ODOR

The material shall have the usual characteristic odor of gasohol. There shall be no obvious foreign odors.

3.5 COLOR

(Visual, using apparatus from NBR 7148 or ASTM D 1298)

Color can vary from colorless to yellow when no dye is used. The use of dye is permitted at a maximum concentration of 50ppm, except blue, restricted for aviation.

3.6 APPEARANCE

(Visual, using apparatus from NBR 7148 or ASTM D 1298)

Clean and free
of impurities

Date	Action	Revisions
2009 05 21	Revised	Revised 3.3, 5.3; Inserted 3.5 to 3.16, deleted 3.2 L. Benvenuti
2004 04 28	Revised	Para 3.0 inserted; paras 3.1, 3.5, 4 deleted
1998 03 24	Activated	

**3.7 OCTANE NUMBERS**

3.7.1	Motor (ISO 5163 / ASTM D2700)	82.0 min
3.7.2	Research (ISO 5164 / ASTM D2699)	94.0 min

3.8 TOTAL SULFUR 0.1% mass max
(NBR 6563 / 14533 / ASTM D 1266/ D 2622 / D 3120 / D 4294 / D 5453)**3.9 METAL CONTENT**

3.9.1	Lead (ASTM D3237)	0.0050 g/L max
3.9.2	Phosphorus (ASTM D3231)	0.0010 g/L max
3.9.3	Manganese (ASTM D3831)	0.0010 g/L max

3.10 COMPOSITION

3.10.1	Hydrocarbons (NBR 14932 / ASTM D1319 / DIN 51 791)	
	Aromatics	% volume 45 max
	Olefins	30 max
	Saturates	Report max
3.10.2	Benzene (ASTM D3606 / EN 12177 / EN 238)	1.0 %vol max
3.10.3	Gum Content (NBR 14525 / ASTM D381)	
	Washed	5 mg/100 mL max
	Unwashed	Report max
3.10.4	Ethanol Content (anhydrous) (NBR 13992)	21 – 23%vol BR

3.11 DISTILLATION RANGE
(NBR 9619 / ASTM D 86)

Volume Evaporated	Temperature
Initial boiling point	Report max
10%	65 °C max
50%	80 °C max
90%	145 °C – 190 °C max
Final boiling point	220 °C max
Residue,	2% volume max