

Recommended on Oct 1st 2007.

IETHA's Udenatured Anhydrous Fuel Ethanol Specification

Characteristics	Unit		IETHA	Métodos / Methods
Density @ 20°C	kg/m ³	max.	790.8	NBR 5992 / ASTM D4052
Alcoholic strength @ 20°C	%m/m	min.	99,5*	NBR 5992 / ASTM D4052
Alcoholic strength @ 20°C	%v/v	min.	99,7*	NBR 5992 / ASTM D4052
Ethanol Content	%v/v	min	97,1**	ASTM D5501
Water (Karl Fischer)	%m/m	max.	0.5	ASTM E203 / E1064
Water (Karl Fischer)	%v/v	max.	0,4	Calculated
Total Acidity - max	mg/L	max.	30	NBR 9866 / ASTM D1613-06
Electrical Conductivity	uS/m	max.	500	NBR 10547
pHe			6.5 - 9,0	ASTM D6423
Copper	mg/kg	max.	0.07	NBR 10893/ASTM D1688A
Chloride	mg/kg	max.	1	NBR 10894, ASTM D7319-07, ASTM D7328-07e1
Solvent-washed gum	mg/100mL	max.	5	ASTM D381
Aspect			Clear	Visual
Methanol	%v/v	max.	0.5	ASTM D5501
C3-C5	%v/v	max.	2.0	ASTM D5501
Sulfur	mg/kg	max.	10	ASTM D2622, D3120, D5453, D6428
Sulfate	mg/kg	max.	4	NBR 10894, ASTM D7319-07, D7328-07e1
Non-volatile material	mg/L	max.	100	ASTM D1353

* Densimetry

** Chromatography (100 - % water- %methanol - %C3-C5)

Calculated = Density @ 20°C x water% m/m / 1000

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IETHA's Hydrous Ethanol Specifications

Characteristics	Unit		Hydrated			Methods / Métodos
			IETHA1	IETHA2	IETHA3	
Density @ 20°C	kg/m ³	max.	811.0 - 807.6	810.4	807.6	NBR 5992 / ASTM D4052
Alcoholic Strength	% m/m	min.	92,6 - 93,8	93.0	93,8	NBR 5992 / ASTM D4052
Alcoholic Strength	% v/v	min.	95.0 - 96.0	95.3	96.0	NBR 5992 / ASTM D4052
Total acidity	mg/L	max.	30	20	10	NBR 9866 / ASTM D1613
Conductivity	uS/m	max.	500			NBR 10547
pH	-	-	6.0 a 8.0			NBR 10891
Iron	mg/kg	max.	5			NBR 11331
Sodium	mg/kg	max.	2			NBR 10422
Sulfate	mg/kg	max.	4			NBR 10894
Chloride	mg/kg	max.	1			NBR 10894
Aspect	-	-	LI			Visual
Colour	-	-	Incolor			Visual
Alcalinity	-	-	Negativa			NBR 9866
Non-volatile Matter	mg/L	max.	-	30	15	ASTM D1353
Acetaldehyde	mg/L	max.	-	50	10	GC
Methanol	mg/L	max.	-	40	20	GC
Ethyl Acetate	mg/L	max.	-	120	80	GC
Isopropanol	mg/L	max.	-	20	5	GC
N-propanol	mg/L	max.	-	180	-	GC
N-butanol	mg/L	max.	-	10	-	GC
Acetal	mg/L	max.	-	100	50	GC
Isoamyl	mg/L	max.	-	200	-	GC
Higher alcohols	mg/L	max.	-	400	50	GC
Benzene (UV)	mg/kg	-	< 0.1 ⁽¹⁾	< 0.1 ⁽¹⁾		UV
Cyclohexane	mg/L	-	< 0.1 ⁽¹⁾	< 0.1 ⁽¹⁾		GC
Hydrocarbons ⁽²⁾	% vol	-	< 1	< 1 ⁽¹⁾		NBR 13993
Hydrocarbons ⁽³⁾	-	-	absent	absent		ASTM 1722
Crotonaldehyde	mg/kg	-	-	< 0.5 ⁽¹⁾		GC
Dioxane	mg/L	-	-	< 0.05 ⁽¹⁾		GC
Permanganate Test @20°C	mg/L	min.	-	-	10	NBR 5824 / ASTM D1363

GC - Gas Chromatography

UV - Ultraviolet spectrophotometry

⁽¹⁾ - below the limit of detection of the method

⁽²⁾ - Not detected by the method - ABNT NBR 13993

⁽³⁾ - Not detected by the method - ASTM 1722