

Certificate of Analysis

CARGILL INCORPORATED
650 INDUSTRIAL PARK DRIVE
Blair, NE USA 68008
Fax: (402) 533-4312
Tel: 1-(402) 533-4100

Customer Phone Line: 1-800-215-7754

Product	Denatured Fuel Ethanol
Lot Number	B192229
Today's Date	Monday, April 22, 2019
Date Manufactured	Saturday, April 13, 2019

<u>Parameter</u>	<u>Limit</u>	<u>Test Procedure</u>	<u>RESULT</u>	<u>Notes</u>
Ethanol Purity	92.1 vol %, min	ASTM D5501	97.02 %	In House Test Result
Moisture, wt %	1.25 wt %, max	ASTM E1064	1.0200 %	In House Test Result
Moisture, vol %	1.0 vol %, max	ASTM E1064	0.8100 %	In House Test Result
Acidity (as Acetic Acid)	0.0070 wt %, max	ASTM D1613	0.0029 %	In House Test Result
pHe	6.5 - 9.0	ASTM D6423	7.80	In House Test Result
Chloride	6.7 ppm, max (5 mg/L, max)	ASTM D7319	< 1.00 ppm	In House Test result
Copper	0.1 mg/kg, max	ASTM D1688	0.05 mg/kg	Quarterly Test Result
Solvent Washed Gums	5.0 mg/100 mL, max	ASTM D381	0.80 mg/100mL	Quarterly Test Result
Sulfur	10 ppm, max	ASTM D5453	1.07 ppm	In House Test Result
Methanol	0.5 vol % , max	ASTM D5501	0.027 %	In House Test Result
Specific Gravity	0.78393 - 0.79718	ASTM D4052	0.79415	In House Test Result
API Gravity	46.0 - 49.0	Calculated	46.7	In House Test Result
Appearance	Clear and Bright	Visual Inspection	Clear and Bright	In House Test Result
Benzene	0.06 vol %, max	ASTM D5580	0.01 %	Quarterly Test Result
Aromatics	1.7 vol %, max	ASTM D5580	0.14 %	Quarterly Test Result
Olefins	0.5 vol %	ASTM D6550	0.16 %	Quarterly Test Result
Sulfate	4 ppm, max	ASTM D7319	< 1.0 ppm	In House Test Result

The sulfur content complies with the default CARB specification in the California Code of Regulations, Title 13, Section #s 2262.9(A)(1)(A) 1., and the denaturant used in this shipment meets the default CARB specifications for fuel ethanol denaturants in California Code of Regulations, Title 13, Section 2262.9(A)(3)(A).

Cargill certifies this product has been denatured in the range of 1.96 - 2.49 volume %.

This product contains a corrosion inhibitor at a treat rate of up to 30 PTBE.

Meets or Exceeds ASTM D4806 Specifications.

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Customer Phone Line: 1-800-215-7754

Product	Denatured Fuel Ethanol
Lot Number	B192617
Today's Date	Monday, April 22, 2019
Date Manufactured	Tuesday, April 16, 2019

<u>Parameter</u>	<u>Limit</u>	<u>Test Procedure</u>	<u>RESULT</u>	<u>Notes</u>
Ethanol Purity	92.1 vol %, min	ASTM D5501	97.05 %	In House Test Result
Moisture, wt %	1.25 wt %, max	ASTM E1064	1.1223 %	In House Test Result
Moisture, vol %	1.0 vol %, max	ASTM E1064	0.8916 %	In House Test Result
Acidity (as Acetic Acid)	0.0070 wt %, max	ASTM D1613	0.0023 %	In House Test Result
pHe	6.5 - 9.0	ASTM D6423	8.16	In House Test Result
Chloride	6.7 ppm, max (5 mg/L, max)	ASTM D7319	< 1.00 ppm	In House Test result
Copper	0.1 mg/kg, max	ASTM D1688	0.05 mg/kg	Quarterly Test Result
Solvent Washed Gums	5.0 mg/100 mL, max	ASTM D381	0.80 mg/100mL	Quarterly Test Result
Sulfur	10 ppm, max	ASTM D5453	1.15 ppm	In House Test Result
Methanol	0.5 vol % , max	ASTM D5501	0.043 %	In House Test Result
Specific Gravity	0.78393 - 0.79718	ASTM D4052	0.79445	In House Test Result
API Gravity	46.0 - 49.0	Calculated	46.6	In House Test Result
Appearance	Clear and Bright	Visual Inspection	Clear and Bright	In House Test Result
Benzene	0.06 vol %, max	ASTM D5580	0.01 %	Quarterly Test Result
Aromatics	1.7 vol %, max	ASTM D5580	0.13 %	Quarterly Test Result
Olefins	0.5 vol %	ASTM D6550	0.15 %	Quarterly Test Result
Sulfate	4 ppm, max	ASTM D7319	< 1.0 ppm	In House Test Result

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Customer Phone Line: 1-800-215-7754

Product	Denatured Fuel Ethanol
Lot Number	C192808
Today's Date	Monday, April 22, 2019
Date Manufactured	Wednesday, April 17, 2019

<u>Parameter</u>	<u>Limit</u>	<u>Test Procedure</u>	<u>RESULT</u>	<u>Notes</u>
Ethanol Purity	92.1 vol %, min	ASTM D5501	96.87 %	In House Test Result
Moisture, wt %	1.25 wt %, max	ASTM E1064	1.1400 %	In House Test Result
Moisture, vol %	1.0 vol %, max	ASTM E1064	0.9057 %	In House Test Result
Acidity (as Acetic Acid)	0.0070 wt %, max	ASTM D1613	0.0032 %	In House Test Result
pHe	6.5 - 9.0	ASTM D6423	8.43	In House Test Result
Chloride	6.7 ppm, max (5 mg/L, max)	ASTM D7319	< 1.00 ppm	In House Test result
Copper	0.1 mg/kg, max	ASTM D1688	0.05 mg/kg	Quarterly Test Result
Solvent Washed Gums	5.0 mg/100 mL, max	ASTM D381	0.80 mg/100mL	Quarterly Test Result
Sulfur	10 ppm, max	ASTM D5453	1.14 ppm	In House Test Result
Methanol	0.5 vol % , max	ASTM D5501	0.030 %	In House Test Result
Specific Gravity	0.78393 - 0.79718	ASTM D4052	0.79450	In House Test Result
API Gravity	46.0 - 49.0	Calculated	46.6	In House Test Result
Appearance	Clear and Bright	Visual Inspection	Clear and Bright	In House Test Result
Benzene	0.06 vol %, max	ASTM D5580	0.01 %	Quarterly Test Result
Aromatics	1.7 vol %, max	ASTM D5580	0.15 %	Quarterly Test Result
Olefins	0.5 vol %	ASTM D6550	0.16 %	Quarterly Test Result
Sulfate	4 ppm, max	ASTM D7319	< 1.0 ppm	In House Test Result

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Cargill certifies this product has been denatured in the range of 1.96 - 2.49 volume %.

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Product Denatured Fuel Ethanol
Lot Number A192478
Today's Date Monday, April 22, 2019
Date Manufactured Monday, April 15, 2019

<u>Parameter</u>	<u>Limit</u>	<u>Test Procedure</u>	<u>RESULT</u>	<u>Notes</u>
Ethanol Purity	92.1 vol %, min	ASTM D5501	96.98 %	In House Test Result
Moisture, wt %	1.25 wt %, max	ASTM E1064	1.0470 %	In House Test Result
Moisture, vol %	1.0 vol %, max	ASTM E1064	0.8315 %	In House Test Result
Acidity (as Acetic Acid)	0.0070 wt %, max	ASTM D1613	0.0023 %	In House Test Result
pHe	6.5 - 9.0	ASTM D6423	7.99	In House Test Result
Chloride	6.7 ppm, max (5 mg/L, max)	ASTM D7319	< 1.00 ppm	In House Test result
Copper	0.1 mg/kg, max	ASTM D1688	0.05 mg/kg	Quarterly Test Result
Solvent Washed Gums	5.0 mg/100 mL, max	ASTM D381	0.80 mg/100mL	Quarterly Test Result
Sulfur	10 ppm, max	ASTM D5453	1.27 ppm	In House Test Result
Methanol	0.5 vol %, max	ASTM D5501	0.028 %	In House Test Result
Specific Gravity	0.78393 - 0.79718	ASTM D4052	0.79420	In House Test Result
API Gravity	46.0 - 49.0	Calculated	46.7	In House Test Result
Appearance	Clear and Bright	Visual Inspection	Clear and Bright	In House Test Result
Benzene	0.06 vol %, max	ASTM D5580	0.01 %	Quarterly Test Result
Aromatics	1.7 vol %, max	ASTM D5580	0.14 %	Quarterly Test Result
Olefins	0.5 vol %	ASTM D6550	0.16 %	Quarterly Test Result
Sulfate	4 ppm, max	ASTM D7319	< 1.0 ppm	In House Test Result

The sulfur content complies with the default CARB specification in the California Code of Regulations, Title 13, Section #s 2262.9(A)(1)(A) 1., and the denaturant used in this shipment meets the default CARB specifications for fuel ethanol denaturants in California Code of Regulations, Title 13, Section 2262.9(A)(3)(A).
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Product	Denatured Fuel Ethanol
Lot Number	C192353
Today's Date	Monday, April 22, 2019
Date Manufactured	Sunday, April 14, 2019

<u>Parameter</u>	<u>Limit</u>	<u>Test Procedure</u>	<u>RESULT</u>	<u>Notes</u>
Ethanol Purity	92.1 vol %, min	ASTM D5501	97.02 %	In House Test Result
Moisture, wt %	1.25 wt %, max	ASTM E1064	1.1400 %	In House Test Result
Moisture, vol %	1.0 vol %, max	ASTM E1064	0.9056 %	In House Test Result
Acidity (as Acetic Acid)	0.0070 wt %, max	ASTM D1613	0.0033 %	In House Test Result
pHe	6.5 - 9.0	ASTM D6423	7.80	In House Test Result
Chloride	6.7 ppm, max (5 mg/L, max)	ASTM D7319	< 1.00 ppm	In House Test result
Copper	0.1 mg/kg, max	ASTM D1688	0.05 mg/kg	Quarterly Test Result
Solvent Washed Gums	5.0 mg/100 mL, max	ASTM D381	0.80 mg/100mL	Quarterly Test Result
Sulfur	10 ppm, max	ASTM D5453	1.20 ppm	In House Test Result
Methanol	0.5 vol % , max	ASTM D5501	0.030 %	In House Test Result
Specific Gravity	0.78393 - 0.79718	ASTM D4052	0.79440	In House Test Result
API Gravity	46.0 - 49.0	Calculated	46.6	In House Test Result
Appearance	Clear and Bright	Visual Inspection	Clear and Bright	In House Test Result
Benzene	0.06 vol %, max	ASTM D5580	0.01 %	Quarterly Test Result
Aromatics	1.7 vol %, max	ASTM D5580	0.14 %	Quarterly Test Result
Olefins	0.5 vol %	ASTM D6550	0.15 %	Quarterly Test Result
Sulfate	4 ppm, max	ASTM D7319	< 1.0 ppm	In House Test Result

The sulfur content complies with the default CARB specification in the California Code of Regulations, Title 13, Section #s 2262.9(A)(1)(A) 1., and the denaturant used in this shipment meets the default CARB specifications for fuel ethanol denaturants in California Code of Regulations, Title 13, Section 2262.9(A)(3)(A).

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