

E Grade Denatured Fuel Ethanol Specifications

| Specification Points | Test Method | Shipments | Deliveries ^{1/} |
|---|---|---|--------------------------|
| Apparent Proof, 60°F Or Density, 60°F | Hydrometer ASTM D-4052 | Report Report | |
| Water, Volume %, Maximum | ASTM E-203 or E-1064 | 1.0 | |
| Ethanol, Volume % Minimum | ASTM D-5501 | 93.5 | 93.0 |
| Methanol, Volume %, Maximum | ASTM D-5501 | 0.5 | |
| Sulfur, ppm (wt/wt), Maximum | ASTM D5453 | 10 | |
| Solvent Washed Gum, mg/100mL Maximum | ASTM D-381 Air Jet Method | 5.0 | |
| Potential Sulfate, mass ppm Maximum | ASTM D7319 | 4 | |
| Chloride, mg/L Maximum | ASTM D-7319 | 5 | |
| Copper, mg/L Maximum | ASTM D-1688 Method A, Modified per D-4806 | 0.08 | |
| Acidity (as acetic acid), Mass % Maximum | ASTM D-1613 or D-7795 | 0.007 | |
| pHe Minimum Maximum | ASTM D-6423 | 6.5 9.0 | |
| Appearance @ 60°F | Visual Examination | Visibly free of suspended or precipitated contaminants. Must be clear and bright. | |
| Denaturant Content and Type ^{2/} Volume % | | 2 | |
| Corrosion Inhibitor Additive, One of the following is required: | Minimum treat rate | Vendor | Additive |
| | 6 lbs./1000 bbls. | Innospec | DCI-11 Plus |
| | 20 lbs/1000 bbls. | G. E. Betz | Endcor GCC9711 |
| | 20 lbs./1000 bbls. | Petrolite | Tolad 3222 |
| | 20 lbs./1000 bbls. | Nalco | 5403 |
| | 20 lbs./1000 bbls. | Betz | ACN 13 |
| | 3 lbs./1000 bbls. | Midcontinental | MCC5011PHE |
| | 13 lbs./1000 bbls. | Petrolite | Tolad 3224 |
| | 13 lbs/1000 bbls. | US Water Services | Corrpro 654 |
| | 13 lbs/1000 bbls. | US Water Services | Corrpro 656 |
| | 6 lbs/1000 bbls | Ashland | Amergy ECI-6 |
| | 3 lbs/1000 bbls. | G.E. Power & Water | 8Q123ULS |
| | 5 lbs/1000 bbls. | NALCO | EC5624A Plus |
| | 6 lbs/1000 bbls. | US Water Services | Corrpro Pro NT |

E Grade Denatured Fuel Ethanol Specifications (continued)

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Only approved denaturants listed in D4806. The denaturant range must be within the guidelines provided for in IRS Notice 2009.06, which is 1.96% to no more than 2.5