

I T E C
Refining and Marketing Company Ltd.



The Grove Country Offices
 22 East Dundee Road, Suite 21
 Barrington, IL 60010-7410 USA

Tel: 847-304 4700
 Fax: 847-304 4710
 E-mail: alcohol@itecraf.com
 URL: www.itecraf.com

PRODUCT SPECIFICATIONS

REN 190 PROOF SPECIFICATION

| <u>Parameter</u> | <u>Limits</u> | <u>Method</u> |
|--|-------------------------|----------------------|
| Ethanol, vol.% @ 15.56 Deg. C. | ≥ 95.0 | ASTM D 4052 |
| Ethanol, wt.% | ≥ 92.42 | ASTM D 4052 |
| Water Karl Fisher, wt.% | ≤ 7.58 | ASTM D 1364 |
| Proof @ 15.56 Deg. C. | 190.0 – 190.4 | ASTM D 4052 |
| Acidity, as acetic acid (% by weight) | ≤ 0.0020 | ASTM D 1613 |
| Acetaldehyde | ≤ 10 ppm | ASTM D 5501-MOD |
| Methanol | ≤ 10 ppm | ASTM D 5501-MOD |
| I-Propanol | ≤ 10 ppm | ASTM D 5501-MOD |
| N-Propanol | ≤ 10 ppm | ASTM D 5501-MOD |
| Higher Alcohols (as I-Propanol, N-Propanol, I-Butanol, N-Butanol & I-Amyl) | ≤ 30 ppm | ASTM D 5501-MOD |
| Esters (as Ethyl Acetate) | ≤ 10 ppm | ASTM D 5501-MOD |
| Permanganate Test @ 15 Deg. C. | ≥ 15 minutes | ASTM D 1363 |
| Color | ≤ 10 platinum cobalt | ASTM D 1209 |
| Appearance | Clear, Bright | Visual |
| Odor | Free from foreign odors | ASTM D 1296 |
| Hydrocarbons | Pass | ASTM D 1722 |
| Benzene | < 1 ppm | ASTM D 5501-MOD |
| Toluene | < 1 ppm | ASTM D 5501-MOD |
| Xylene | < 1 ppm | ASTM D 5501-MOD |
| Cyclohexane | < 1 ppm | ASTM D 5501-MOD |
| Total Sulfur by UV Fluorescence | <1.0 mg/kg | ASTM D 5453 |
| Total Sulfur by UV Fluorescence | <1.0 ppm-wt | ASTM D 5453 |
| Inorganic Chlorides | < 1 ppm | ASTM D 7328 |
| Crotonaldehyde | ≤ 0.5 ppm | ASTM D 5501-MOD |
| Acetal | ≤ 5 mg/100 mL | ASTM D 5501-MOD |
| Non volatile matter | ≤ 1.5 mg/100 mL | ASTM D 1353 |
| Alkalinity as ammonia | <0.0003 wt % | ASTM D 1614 |
| 1.4 Dioxane | ≤ 0.01 mg/L | GLC/MS |