VeryOne® Cetane Improver

2-EHN
SYNONYMS
- Nitric acid, 2-ethylhexyl ester (EINECS Name)
- 2-Ethylhexyl Nitrate (2EHN) (IUPAC name)

ASPECT
Colourless clear liquid.
Pungent, fatty, fruity ester odour

USES
Cetane improver (Fuel additive)

TRANSPORT
Refer to corresponding Safety Data Sheet

PHYSICAL PROPERTIES

Boiling point:
Decomposition before boiling
Decomposition Temperature:
- DSC thermal analysis (42.8°F/mn (6°C/mn)):
  - Start:  320°F (160°C)
  - ONSET:  363.2°F (184°C)
  - T° max:  410°F (210°C)
  - Δ H:  1210 J/g
- RSST (Thermal runaway temperature): 266°F (130°C)

Vapour pressure:
5.8e-4 - 7.7e-4 Psi at 50°F (4.0-5.3 Pa at 10°C)
3.9e-3 Psi at 68°F (27 Pa at 20°C)
5.8e-3 - 7.7e-3 Psi at 104°F (40-53 Pa at 40°C)

Solubility:
- In water: 12.6 mg/l at 68°F (20°C)
- In hydrocarbons, methanol and typical chlorinated solvents.

STORAGE
- Store in a ventilated area in tightly closed containers equipped with means of preventing the product from reaching 212°F (100°C)
- Maximal recommended handling temperature: 140°F (60°C)
- Maximal recommended storage temperature: 104°F (40°C)
- Shelf life: 2 years

SPECIFICATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Guaranteed value</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td>Clear liquid</td>
<td>Visual examination</td>
</tr>
<tr>
<td>Color</td>
<td>≤ 50 APHA</td>
<td>Coloration (APHA)(1)</td>
</tr>
<tr>
<td>Purity</td>
<td>≥ 99.0 %</td>
<td>Gas chromatography</td>
</tr>
<tr>
<td>Alcohol content</td>
<td>≤ 1.0 %</td>
<td>Gas chromatography</td>
</tr>
<tr>
<td>Water</td>
<td>≤ 500 ppm</td>
<td>Karl Fischer</td>
</tr>
<tr>
<td>Mineral Acidity (HNO₃)</td>
<td>≤ 30 ppm</td>
<td>Titration</td>
</tr>
<tr>
<td>Density at 138.2°F (59°C)</td>
<td>8.06 ± 0.04 lbs/gal (0.967 ± 0.005 kg/l)</td>
<td>Digital Density Meter</td>
</tr>
<tr>
<td>Sulfur Content</td>
<td>&lt; 15 ppm</td>
<td>Wavelength Dispersive X-Ray Fluorescence Spectometry</td>
</tr>
</tbody>
</table>

Note(1): 50 APHA equivalent to 50 Hazen according to ASTM D 1209
250 APHA equivalent to 0 according to ASTM D 1500
280 APHA equivalent to 0.5 according to ASTM D 1500

PHYSICAL PROPERTIES

Gradual Solidification : < -122 °F (-50 °C)
Kinematic Viscosity (68°F/20 °C) : 2.76e-3 inch²/s (1.78 mm²/s)
Dynamic Viscosity (68°F/20 °C) : 2.47e-7 Psi/s (1.7 mPa/s)
Nitrogen content : 7.92 to 8.00 %

GARANTEED VALUES WITH RESPECT OF THESE ABOVE CRITERIA AND PERIODICAL CHECKING

<table>
<thead>
<tr>
<th>Property</th>
<th>Guaranteed value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>&gt; 149°F (65 °C)</td>
</tr>
<tr>
<td>Pensky-Martens</td>
<td></td>
</tr>
<tr>
<td>Closed Cup Tester</td>
<td></td>
</tr>
</tbody>
</table>

STANDARD PACKAGING
- Bulk
- Drums
- Totes