



HYDROCAL™ NAPHTHENIC BASE OILS

HYDROCAL naphthenic base stocks are produced exclusively by Calumet™ using a multi-stage hydrotreating process operating at pressures above 2500 psi. This process offers the unique ability that currently meets established and future performance standards.

- More than 30 years of history manufacturing naphthenic base stocks
- Broad range of viscosities available from 38 SUS @ 100 °F to Bright Stock
- All HYDROCAL products pass the IP346 Standard
- Meets FDA 21 CFR 178.3620(c) requirements

Calumet Specialty Products Partners, L.P. produces naphthenic base oils by using a multi-stage hydrotreating process operating at pressures above 2500 psi. This process offers the unique ability to produce naphthenic base stocks that meet currently established performance standards.

The HYDROCAL refining process selectively saturates large cyclical aromatic subgroups which result in the production of very high-quality, stable base stocks. The HYDROCAL product line passes the IP346 Standard and does not require labeling as carcinogenic under the OSHA Hazard Communication Standard. Further quality control practices that Calumet implements on crude oil selection and subsequent refining processes assure consistent uniformity and product performance.

APPLICATIONS

- Metalworking Fluids
- Heat Transfer Fluids
- Hydraulic Oils
- Compressor Oils
- Gear Oils
- Aviation Hydraulic Fluids
- Cutting Oils
- Greases
- Automatic Transmission Fluids



TYPICAL PROPERTIES

| PHYSICAL PROPERTIES* | METHOD | 38 | 45 | 60 | 100 | 500 | 750 | 1200 | 2400 |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Viscosity@ 100 °F (SUS) | D2161 | 37.5 | 44.9 | 62.9 | 109.3 | 510.3 | 765.1 | 1227.1 | 2411.1 |
| Viscosity @ 210 °F (SUS) | D2161 | 30.3 | 31.9 | 34.6 | 38.7 | 56.3 | 64.6 | 79.3 | 99.6 |
| Viscosity @ 40 °C (cSt) | D445 | 3.3 | 5.5 | 10.3 | 20.6 | 96.4 | 143.2 | 227.6 | 440.4 |
| Viscosity @ 100 °C (cSt) | D445 | 1.3 | 1.7 | 2.5 | 3.7 | 8.9 | 11.1 | 14.8 | 21.8 |
| Viscosity Index | D2270 | 85 | 65 | 39 | 20 | 48 | 43 | 44 | 43 |
| API Gravity @ 60 °F | D4052 | 29.8 | 28.0 | 27.1 | 25.7 | 24.7 | 23.7 | 23.2 | 22.2 |
| Flash Point, COC (°F) | D92 | 219 | 265 | 317 | 329 | 429 | 438 | 471 | 481 |
| Pour Point (°F) | D97 | -81 | -81 | -78 | -64 | -21 | -15 | -11 | 10 |
| Color, ASTM | D1500 | L0.5 | L0.5 | L0.5 | L0.5 | 1.0 | 1.0 | L1.5 | L2.0 |
| Aniline Point (°F) | D611 | 138.6 | 149.0 | 162.8 | 175.3 | 206.8 | 207.6 | 213.4 | 217.7 |
| Aniline Point (°C) | D611 | 59.2 | 65.0 | 72.7 | 80.3 | 97.1 | 97.5 | 100.8 | 103.2 |
| Neut. No (mg KOH/g) | D974 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Sulfur (Wt.%) | D4294 | 0.0024 | 0.0054 | 0.0078 | 0.0210 | 0.0025 | 0.0228 | 0.0698 | 0.0715 |
| Refractive Index @ 20 °C | D1218 | 1.4768 | 1.4837 | 1.4899 | 1.4910 | 1.4924 | 1.4999 | 1.5012 | 1.5041 |
| Clay Gel (Wt.%) | D2007 | | | | | | | | |
| Asphaltenes | | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 |
| Polar Compounds | | 0 | 0 | 0 | 0 | 0 | 0 | - | 2 |
| Aromatics | | 25 | 31 | 32 | 24 | 18 | 26 | - | 32 |
| Saturates | | 75 | 69 | 68 | 76 | 82 | 74 | - | 66 |
| Carbon Type Analysis (%) | D2140 | | | | | | | | |
| Ca | | - | 9 | 13 | 8 | 3 | 10 | 10 | 9 |
| Cn | | - | 51 | 40 | 47 | 47 | 36 | 36 | 36 |
| Cp | | - | 40 | 47 | 45 | 50 | 54 | 54 | 55 |
| FDA 21 CFR 178.3620 (c) | | - | PASS | PASS | PASS | PASS | PASS | PASS | PASS |

*All product specifications are typical values, unless otherwise noted.

TECHNICAL ASSISTANCE

For product or technical questions, contact your Sales Representative or Calumet Product Support at (800) 437-3188 or email technical@clmt.com.

Calumet's sampling and testing procedures in effect at the time of production will be used for certification testing. Results may be based on tank certification, manufacturing data, periodic testing and/or most recent product restock. Typical values only represent the values one would expect if the property were tested in our laboratories with our test methods on the specified date. Some product properties are not frequently measured, and accordingly typical values are not based on a statistically relevant number of tests. The information in this document relates only to the named product. The user is solely responsible for all determination regarding any use and any process.



CORPORATE HEADQUARTERS

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