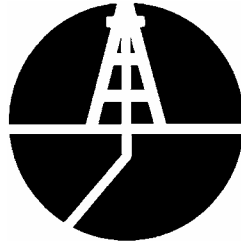


Drilling Technologies

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**Determination of the Effect
Of Different Base Oils
On the Solubility of NER's PipeRubber
From 200°F to 300°F**

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**Determination of the Effect
Of Different Base Oils
On the Solubility of NER's PipeRubber
From 200°F to 300°F**

Introduction

At the request of Robert Wood (NER International), the Westport Technology Center International Drilling Fluids Lab conducted a series of tests to determine the solubility of NER's PipeRubber in various base oil fluids. Tests were conducted in three commercially-available synthetic base fluids and diesel at three temperatures (200°F, 250°F and 300°F) for 72 hours and 168 hours.

Conclusions

At the end of three days, NER PipeRubber expanded by 97% to 127% in three synthetic base fluids and 158% in #2 diesel. After seven days, expansion values of 82% to 127% were seen in synthetics, while expansion of 103% to 158% was seen in #2 diesel. All of the fluids appeared to partially solublize NER PipeRubber at 300°F.

**Sample Identification
(Westport ID numbers)**

- 00-056 – One gallon container of NER International PipeRubber, received 4/10/00.
- 00-061 – Commercially-available IO base fluid
- 99-261 – Commercially-available LAO base fluid
- 99-322 – Commercially-available IO base fluid
- 00-022 – lab-standard #2 diesel

Test Procedure

1. 20 mls of base fluid was added to a 150 mm test tube.
2. 2.29 grams of PipeRubber was added to the base fluid in the test tube and shaken gently to wet the PipeRubber.
3. The total height of the base fluid plus PipeRubber was measured at 108 mm. The height of the PipeRubber was 33 mm.
4. The test tube was placed in a Baroid 500 ml static-aging cell and pressurized to 300 psi with nitrogen.
5. The static-aging cell was placed in an oven and static-aged for three days. A duplicate sample was also static-aged for seven days.
6. After static-aging, the test tube was removed from the test cell. The height of the PipeRubber in the test tube was measured. The amount of expansion of the PipeRubber was calculated **((height of PipeRubber after exposure / 33) – 1)**.
7. Each sample was also inspected to determine if PipeRubber had gone into solution, or if the base fluid was clear.

Test Results

Table #1 – Solubility and Percent Expansion of NER PipeRubber after three day tests

<u>Temperature</u>	<u>IO Base</u>	<u>LAO Base</u>	<u>IO Base</u>	<u>#2 Diesel</u>
200°F	103%	97%	127%	158%
250°F	109%	109%	97%	152%
300°F	112%*	112%*	97%	158%*

- - Denotes partial solubility of PipeRubber in Base Fluid

Table #2 – Solubility and Percent Expansion of NER PipeRubber after seven day tests

<u>Temperature</u>	<u>IO Base</u>	<u>LAO Base</u>	<u>IO Base</u>	<u>#2 Diesel</u>
200°F	82%	97%	103%	106%
250°F	112%	118%	118%	158%
300°F	127%	97%*	112%*	103%*

- * - Denotes partial solubility of PipeRubber in Base Fluid