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Compatibility of Oils with M-531

To: Customer

From: Cortec Laboratories, Inc.
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Project #: 18-075-1325.bis

Results reported by:

A handwritten signature in black ink, appearing to read "Ben Voight".

Ben Voight
Process & Technical Service Engineer

Approved by:

A handwritten signature in blue ink, appearing to read "John Wulterkens".

John Wulterkens
Technical Service Engineer



Background:

The customer is a global provider of offshore drilling services to the petroleum industry. A variety of different oils are used by the customer on their equipment that they want to preserve. They have requested testing nine of their different oils compatibility with Cortec additive M-531.

Sample Received:

- Castrol Transmax Dex III Multivehicle
- Shell Gadinia 40
- Chevron Rando HD 150
- Castrol MHP 154
- Castrol Alphasyn T 220
- Castrol Alpha SP 460
- Castrol Alpha SP 220
- Castrol Alphasyn EP 320
- Castrol Alpha SP 150
- TS-90 Moly Gear Concentrate

All samples appear to be in good condition with no visual contaminants.

Method:

Compatibility of Cortec Additives with test oils (CC-013)

Materials:

M-531 batch#244717

Procedure:

Two solutions of 5% M-531 by weight in each oil sample received were made and mixed thoroughly. Two samples of all oils were also put into test tubes. One sample of all oils and 5% M-531 in oil mixtures were put into a 75°C oven for two weeks. The other samples of all oils and 5% M-531 in oils were put into a refrigerator at 5°C for two weeks. All samples were inspected after one week in each condition, and inspected again after two weeks.

Results:

Sample	Conditions	Compatible [Y/N]	Notes
Castrol Transmax Dex III Multivehicle + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Shell Gadinia 40 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Chevron Rando HD 150 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol MHP 154 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol Alphasyn T220 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol Alpha SP 460 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol Alpha SP 220 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol Alphasyn EP 320 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
Castrol Alpha SP 150 + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--
TS-90 Moly Gear Concentrate + 5% M-531	75 °C ± 2 °C	Fully Compatible	--
	5 °C ± 3 °C		--

Interpretations:

As of 14 days of testing in both hot (75°C) and cold (5°C) conditions of all oil samples with 5% weight M-531 have shown results of compatibility. No phase separation, color change, or particulate has been observed in any of the samples.