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3,063,941

NON-FLUORESCING PIPE THREAD
COMPOSITION

Doyle L. Wilson, Pasadena, Calif., assignor to Oil Base, Inc., Compton, Calif., a corporation of California
No Drawing. Filed Nov. 5, 1954, Ser. No. 467,239
2 Claims. (Cl. 252-16)

This invention relates to pipe thread compositions, commonly referred to as "compounds," and has particular reference to a composition for use as a lubricant and sealant for threaded joints in oil-country tubular goods.

In the discovery of new oil reserves, it is necessary to drill exploratory or so-called "wildcat" wells in core improved areas. The oil potential of the area being drilled is determined by an analysis of cores and cuttings removed from the formation during the drilling operation. One widely used method of analysis is to expose a core section to ultraviolet light within the range of 2600-3700 Angstroms which will induce fluorescence in the sample if crude oil and/or distillate is present. Another method of analysis is to shake the core fragments or cuttings from the well hole with petroleum ether, carbon tetrachloride or a similar solvent. Any crude oil or distillate present in the sample is thus extracted and is recognized by fluorescence upon exposure to ultraviolet light and/or by its color or "cut."

It is readily apparent that contamination of the core or cuttings with oil, characterized by fluorescence and color, from an extraneous source would result in a positive test for fluorescence and a petroleum ether color or "cut." Since these tests are utilized by the core analyst and petroleum geologist in locating the potentially productive oil zones in a wildcat well, it is essential that the tests be thoroughly reliable, for erroneous conclusions from misleading data could result in costly testing in zones which are actually nonproductive.

Pipe thread compounds commonly consist of a soft metallic filler dispersed in a suitable grease vehicle. Considerable attention has been paid to the composition of thread compounds used in oil well tubing, particularly from the standpoint of their sealing qualities when exposed to the pressure and temperature conditions existing in oil wells, in view of the present trend toward the drilling of deeper wells where such conditions become increasingly severe. However, those skilled in the art have failed to recognize that the oils used in such thread compounds fluoresce to such a degree, and they give such a pronounced "cut," that it is likely that the drilling fluid system in which the string of tubing is being used will gradually accumulate sufficient of the oil phase of the compound to cause penetration of the cores and cuttings thereby, making it virtually impossible to evaluate the sample under study with any degree of certainty with respect to fluorescence and coloration. In my copending application, Serial No. 306,299, filed August 25, 1952, now U.S. Patent No. 2,698,833, of which this application is a continuation-in-part, is disclosed non-fluorescing and thermally stable emulsion drilling fluids. The use of thread compounds containing a fluorescing oil would seriously impair the evaluation of formation cores and cuttings in wildcat wells drilled with such fluids.

Accordingly, the principal object of this invention is to provide a pipe thread compound or composition which can be safely used in oil well tubing employed in the drilling of wildcat wells.

Another object of this invention is to provide a pipe thread compound or composition in which the oil component thereof is non-fluorescing, colorless and does not develop these properties under conditions of use.

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Other objects and advantages of this invention it is believed will be readily apparent from the following detailed description of preferred embodiments thereof.

I have found that certain refined oils which contain a relatively low amount of aromatics and unsaturates are especially suitable for use as a component of pipe thread compounds. I have further found that substantially all refined mineral oils containing less than about 5% aromatics and unsaturates are suitable for use as the oil component of thread compounds utilized in pipe tubing, exhibiting negligible fluorescence on exposure to ultraviolet light, except for use in especially deep holes where extreme temperature conditions are encountered. In such circumstances, as an added safeguard in the event of accumulation of large amounts of the oil in the drilling fluid, it is preferred to utilize an oil which, in addition to containing less than about 5% aromatics and unsaturates which exhibit appreciable fluorescence when exposed to ultraviolet light within the range of 2600-3700 Angstroms, are thermally stable insofar as coloration is concerned. By the expression "thermally stable" or similar expressions is meant oils which evidence no appreciable discoloration through the formation therein of color bodies upon heating to at least 250° F.

Examples 1-8 below are illustrative of typical refined oils, taken from widely separated sources, which have been found to be suitable for use in thread compounds in accordance with this invention. The most suitable oils are those which have been refined by the Edeleanu process to remove aromatics and unsaturates. As is well known to those skilled in the art, this process comprises solvent extraction of the kerosene with liquid sulfur dioxide, or a mixture thereof with benzene, usually followed by a clay treatment, the raffinate being the desirable fraction.

Example 1

Source	California.
API gravity	42°.
Flash point (P&M)	126° F.
Sulfur	.02%.
Distillation:	
Initial boiling point	334° F.
End point	486° F.
Aniline point	162° F.
Aromatics and unsaturates	2%.
Color	+28 Minimum-Saybolt (water white).
Fraction	Straight run.
Treatment	Edeleanu and clay.
Crude base	Asphaltic.
Fluorescence at 3660 Angstroms	Negligible.

Example 2

Source	California.
API gravity	40°.
Flash point (P&M)	125° F.
Sulfur	.01%.
Distillation:	
Initial boiling point	370° F.
End point	504° F.
Aniline point	156° F.
Aromatics and unsaturates	5%.
Color	25 Saybolt (water white).
Fraction	Straight run.
Treatment	Edeleanu and clay.
Crude base	Asphaltic.
Fluorescence at 3660 Angstroms	Negligible.

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Example 3

Source.....	Oklahoma.
API gravity.....	45.6°.
Flash point (P&M).....	144° F.
Sulfur.....	0.6%.
Distillation:	
Initial boiling point.....	365° F.
End point.....	502° F.
Aniline point.....	149° F.
Aromatics and unsaturates.....	<2%.
Color.....	25 Saybolt (water white).
Fraction.....	Straight run.
Treatment.....	Edeleanu and clay.
Crude base.....	Naphthenic.
Fluorescence at 3660 Angstroms.....	Negligible.

Example 4

Source.....	Pennsylvania.
API gravity.....	47.7°.
Flash point (P&M).....	140° F.
Sulfur.....	0.2%.
Distillation:	
Initial boiling point.....	365° F.
End point.....	485° F.
Aniline point.....	163° F.
Aromatics and unsaturates.....	<2%.
Color.....	25 Saybolt (water white).
Fraction.....	Straight run.
Treatment.....	Edeleanu and clay.
Crude base.....	Paraffinic.
Fluorescence at 3660 Angstroms.....	Negligible.

Example 5

Source.....	Oklahoma.
API gravity.....	42.3°.
Flash point (P&M).....	134.5° F.
Sulfur.....	0.4%.
Distillation:	
Initial boiling point.....	356° F.
End point.....	513° F.
Aniline point.....	147° F.
Aromatics and unsaturates.....	<2%.
Color.....	25 Saybolt (water white).
Fraction.....	Straight run.
Treatment.....	Edeleanu and clay.
Crude base.....	Naphthenic.
Fluorescence at 3660 Angstroms.....	Negligible.

Example 6

Source.....	Pennsylvania.
API gravity.....	45.9°.
Flash point (P&M).....	128° F.
Sulfur.....	0.2%.
Distillation:	
Initial boiling point.....	364° F.
End point.....	518° F.
Aniline point.....	162° F.
Aromatics and unsaturates.....	<2%.
Color.....	25 Saybolt (water white).
Fraction.....	Straight run.
Treatment.....	Edeleanu and clay.
Crude base.....	Paraffinic.
Fluorescence at 3660 Angstroms.....	Negligible.

Example 7

Source.....	Pennsylvania.
API gravity.....	44.6°.
Flash point (P&M).....	140° F.
Sulfur.....	1%.

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Distillation:

Initial boiling point.....	372° F.
End point.....	536° F.
Aniline point.....	148° F.
5 Aromatics and unsaturates.....	2%.
Color.....	25 Saybolt (water white).
Fraction.....	Straight run.
Treatment.....	Sulfuric acid.
Crude base.....	Paraffinic.
10 Fluorescence at 3660 Angstroms.....	Negligible.

Example 8

15 Source.....	Louisiana.
API gravity.....	43.4°.
Flash point (P&M).....	255° F.
Sulfur.....	Trace.
Distillation:	
Initial boiling point.....	510° F.
End point.....	644° F.
Aniline point.....	160° F.
Aromatics and unsaturates.....	2%.
Color.....	+19 Saybolt (Water white).
25 Fraction.....	Straight run.
Treatment.....	Sulfuric acid.
Crude base.....	Naphthenic-paraffinic.
Fluorescence at 3660 Angstroms.....	Negligible.
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In preparing pipe thread compounds in accordance with this invention it is to be understood that a mineral oil such as those of the above examples is merely substituted for the oils utilized in conventional thread compounds. The following is a specific example of a pipe thread compound prepared in accordance with this invention:

	Percent by weight
40 Vehicle	40.2
Powdered lead.....	17.9
Powdered copper.....	38.7
Molybdenum sulfide.....	3.2

The vehicle was a petroleum-base grease composition consisting of the oil of Example 1 and 6% of aluminum stearate, prepared in the usual manner of preparing greases. The mixture of oil and metal stearate was heated to about 140° F. with continuous stirring until the soap was gelled completely. The gel was allowed to cool to room temperature and was worked to form a grease. The metallic powders which comprised the remainder of the compound were then mixed together and dispersed in the vehicle to provide the finished composition.

It will be understood that the above example is merely illustrative and, as has been indicated, the compounds of this invention may be prepared utilizing any suitable soap to form a grease and any suitable filler material or mixtures thereof. By way of further example, the soap may consist of lithium stearate, aluminum octoate, etc., and the filler may include graphite, and in addition to those disclosed above, metal powders such as zinc and aluminum. The relative proportions of the ingredients may be varied within relatively wide limits, as will be apparent to those skilled in the art.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details set forth, but my invention is of the full scope of the appended claims.

70 I claim:

1. A pipe thread composition comprising a vehicle consisting of a grease, the oil component of said grease consisting essentially of a mineral oil that is thermally stable against appreciable discoloration through the formation therein of color bodies when heated under conditions of

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use, said oil containing less than about 5% aromatics and unsaturates which exhibit appreciable fluorescence when exposed to ultraviolet light within the range of 2600-3700 Angstroms; and a powdered metallic filler.

2. A pipe thread composition comprising a vehicle consisting of a grease, the oil phase thereof consisting essentially of a mineral oil that is thermally stable against appreciable discoloration through the formation therein of color bodies when heated under conditions of use, said oil comprising the raffinate from the Edeleanu process and containing less than about 5% aromatics and unsaturates which exhibit appreciable fluorescence when exposed to

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ultraviolet light within the range of 2600-3700 Angstroms; and a powdered metallic filler.

References Cited in the file of this patent

UNITED STATES PATENTS

2,021,885	Bird	Nov. 26, 1935
2,065,247	Smith	Dec. 22, 1936
2,065,248	Smith	Dec. 22, 1936

OTHER REFERENCES

Kalichevsky: "Chem. Refining of Pet.," Chemical Catalog Co. (1933), pages 83, 220-8 and 294.