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METHOD OF PRODUCING HYDRAULIC OIL

by

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METHOD OF PRODUCING HYDRAULIC OIL

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In current use as working fluids for hydraulic drives is a large assortment of hydraulic oils with a petroleum base: AGM(MRTU-38-1-193-66), GM-50I(MRTU-38-1-192-66), AUP(MRTU-38-1-194-66), AMG-10, AU, and others. However, oils AGM, AU, and AUP do not assure operation of hydraulic systems at a temperature of -55°C (they can function from a temperature of -30 to -40°C); due to an absence of corrosion-resistant additives in them, oils AU and AMG-10 do not protect parts from corrosion when water is introduced; oil GM-50I has a low viscosity level at a temperature of 50°C (6-7 cSt at demands no lower than 10 cSt).

In addition, these hydraulic fluids are functional in contact with seals of only certain rubber brands.

The great variety in hydraulic oils and rubber seals creates operational complications.

A single hydraulic oil with improved operational properties is proposed.

This oil is based on a fraction of paraffin-free petroleum which boils in a 220-312°C range, has a viscosity of 2-2.2 cSt at 50°C and 160-180 cSt at -50°C, a solidification point no higher than -70°C, and an aniline point of 66-66.5°C.

By adding to this base known viscous (Vinypol VB-2, polyisobutylene), antioxidant (Ionol, phenyl- α -naphthylamine), and anticorrosion (MNI-5) additives we produce a hydraulic oil with particularly favorable low-temperature characteristics, which assures the functioning of the hydraulic oil in a temperature range of from -55°C to 90°C and has high anticorrosion properties and a high antioxidant stability.

These additives enable the hydraulic oil to function when in contact with a number of brands of rubber (9086, 9088, 8075, 3012, and others) which are employed in hydraulic systems.

This single hydraulic oil is obtained by mixing the following components, wt. %:

Vinypol VB-2.....	5-7
Additive MNI-5.....	1-1.5
Additive DBK (Ionol).....	0.45-0.50
Petroleum fraction.....	up to 100

The quality of the prepared hydraulic oil must correspond to following requirements:

Viscosity, cSt	
at +50°C.....	≥ 10
at -50°C.....	≤ 1500
Solidification temperature, °C	≤ -70

Antioxidant stability per GOST is 981-55.

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increase in acid number,

mg KOH..... ≤ 0.15

residue none

Change in weight of rubber of brands 9086, 9088, 8075, 3012, %

weight loss..... ≤ 2

weight increase ≤ 7

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The carbon content of the petroleum fraction used as the hydraulic oil base must be strictly determined. This is assured by the fraction composition (boiling point 220°C, end boiling point 312°C) and by the degree of purification (by sulfuric acid of 33% of the monohydrate at a temperature of 40-45°C or by adsorption).

The petroleum base of this single hydraulic oil is a fraction of Anastas'yev petroleum obtained by removing from the distillate of this petroleum 30-35% monohydrate and a mixture of 60-70% by weight of the Anastas'yev petroleum distillate and 30-40% by weight of a Balakhany petroleum with 60-65% monohydrate removed.

When the above mixture is used the fraction of Anastas'yev petroleum is not subjected to sulfuric acid purification, since this method enables us to obtain a single hydraulic oil with properties analogous to that of an oil based on a purified distillate fraction of Anastas'yev petroleum.

The table shows data on the physicochemical indicators and the ring composition determined by the "n-d-m" method for the base of the single hydraulic oil.

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Table

Indicator	Base of single hydraulic oil	
	from Anastas'yev petroleum after sulfuric acid purification of distillate fraction	from a mixture of the described fraction of Balakhany petroleum (40%) and the Anastas'yev petroleum distillate (60%)
Viscosity:cSt:		
at 50°C	2.2	2.32
at -50°C	167	164
Fraction composition		
°C:		
boiling point.....	220	223
end boiling point.....	307	319
Change in weight of rubber weight, %:		
brand 9086.....	-1.5	-1.6-1.3
brand 9088.....	+5.7	+5.9-6.3
Ring composition of hydrocarbons of the fraction by the "n-d-m" method, %:		
of hydrocarbon in aromatic rings.....	3.0	-
of hydrocarbon in rings (all).....	45.0	-
number of aromatic rings..	0.15	-
average number of hydrocarbon rings in petroleum rings	1.25	-
of hydrocarbon in paraffin chains	42.0	-
of hydrocarbon in paraffin chains	55.0	-
number of petroleum rings.....	1.1	-

With the addition of viscous, antioxidant, and anticorrosion additives this base increases the viscosity of the single hydraulic oil at 50°C from 6-7 cSt (for hydraulic oil GM-50I, MRTU-38-1-192-66) to 10-10.5 cSt and improves its low-temperature properties. At -50°C the viscosity of the single hydraulic oil is 1300-1400 cSt and the solidification temperature does not exceed -70°C, while for oil GM-50I viscosity at -50°C is >2000 cSt.

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Example 1. To prepare the single hydraulic oil the following substances are taken, wt. %:

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Vinypol VB-2.....	6.3
Additive MNI-5.....	1.1
	0.5
Anastas'yev oil fraction.....	92.1
Total	100

The hydraulic oil thus obtained has the following properties:

Viscosity, cSt

at +50°C.....	10.2
at -50°C.....	1380

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Solidification point, °C..... -70

Antioxidant stability:

increase in acid number,

mg KOH	0.02
residue.....	none

Change in weight of rubber brands, wt. %:

9086.....	-1.42
9088.....	+6.7
8075.....	-1.8
3012.....	+3.3

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Example 2. To prepare the single hydraulic oil the following substances are taken, wt. %:

Vinypol VB-2.....	6.50
Additive MNI-5	1.20
Ional additive	0.49
Anastas'yev petroleum fraction.....	57.21
Bolakhany petroleum fraction.....	34.60

The hydraulic oil thus obtained has the following properties:

Viscosity, cSt:

at +50°C	10.26
at -50°C.....	1342

Solidification point, °C..... -70

Antioxidant stability:

increase in acid number,	
mg KOH.....	0.03
residue.....	none

Weight change in rubber brands, wt. %:

9086	-1.25
9088	+6.4
8075	-1.71
3012	+2.9

Object of the Invention

1. The method of producing hydraulic oil on a petroleum base by adding viscous, antioxidant, and anticorrosion additives is *distinguished by the fact that*, in order to improve the operational properties of the hydraulic oil a fraction of paraffin-free petroleum, which boils within a 220-312°C range and has a viscosity at

+50°C of 2-2.2 cSt and at -50°C of 160-180 cSt, whose solidification temperature does not exceed -70°C and aniline point, 66-66.5°C, is used as the petroleum base.

2. The method according to part 1 *is distinguished by the fact that the petroleum base of the hydraulic oil is a fraction of Anastas'yev petroleum, obtained by removing 30-35% monohydrate from the distillate.*

3. The method according to part 1 *is distinguished by the fact that the petroleum base of the hydraulic oil is a mixture of 60-70 wt. % of the Anastas'yev petroleum distillate and 30-40 wt. % of the Balakhany petroleum fraction with 60-65% monohydrate removed.*

4. The method according to part 1 *is distinguished by the fact that it uses 5-7 wt. % Vinypol VB-2 as the viscous additive, 0.45-0.5 wt. % Ionol as the antioxidant additive, and 1-1.5 wt. % MNI-5 as the anticorrosion additive.*