(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 349 534 B1**

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **02.12.92**

(51) Int. Cl.5: **C10M 129/10**, C10M 133/12, C10M 141/00

(21) Application number: **88901051.8**

(22) Date of filing: **27.01.88**

(86) International application number:
PCT/FI88/00011

(87) International publication number:
WO 88/05808 (11.08.88 88/18)

(54) HYDRAULIC FLUIDS.

(30) Priority: **28.01.87 US 7627**

(43) Date of publication of application:
10.01.90 Bulletin 90/02

(45) Publication of the grant of the patent:
02.12.92 Bulletin 92/49

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(56) References cited:

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DK-B- 117 012	**GB-A- 2 134 923**
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Description

The present invention is concerned with hydraulic fluids based on oily triglycerides of fatty acids.

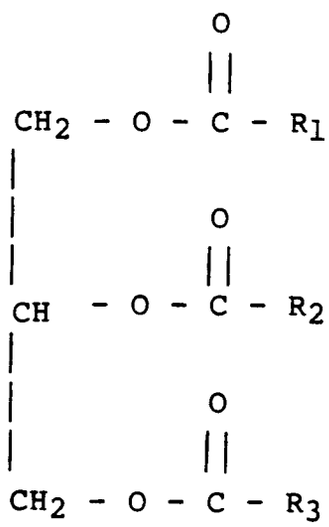
The hydraulic fluids commonly used are petroleum-based, chemically saturated or unsaturated, straight-chained, branched or ring-type hydrocarbons.

The petroleum-based hydraulic fluids involve, however, a number of environmental and health risks. Hydrocarbons may constitute a cancer risk when in prolonged contact with the skin, as well as a risk of damage to the lungs when inhaled with the air. Moreover, oil allowed to escape into the environment causes spoiling of the soil and the ground water, even in small quantities. They are also toxic to the aquatic life in rivers, lakes, etc.

In addition to the above, hydrocarbon oils as such have in fact a rather limited applicability for hydraulic purposes, wherefor the hydraulic fluids based on such oils contain a variety of additives in considerable amounts. Petroleum is also a non-renewable, and consequently limited, natural resource.

Thus there is an obvious need for fluids for hydraulic purposes which are based on renewable natural resources, and which are, at the same time, environmentally acceptable. One such a natural base component for hydraulic fluids is the oily triglycerides, as suggested in the patent specification GB 2 134 923.

The triglycerides described in the said specification GB 2 134 923 are glycerol esters of fatty acids, and the chemical structure of the said esters can be defined by means of the following formula:



wherein R_1, R_2 and R_3 can be the same or different and are selected from the group consisting of saturated and unsaturated straight-chained alkyl, alkenyl, and alkadienyl chains of ordinarily 9 to 22 carbon atoms.

The triglyceride may also, according to the teaching of the specification GB 2 134 923, contain a small quantity of an alkatrienylic acid residue, but a larger quantity is detrimental, because it promotes oxidation of the triglyceride oil. Certain triglyceride oils, so-called drying oils, contain considerable quantities of alkatrienyl and alkadienyl groups, and they form solid films, under the effect of the oxygen in the air. Such oils, the iodine number of which is usually higher than 130 and which are used i.a. as components of special coatings, cannot be considered for use in the hydraulic fluids.

As is stated in the specification GB 2 134 923, any other oily triglyceride with an iodine number of at least 50 and no more than 128 is suitable for the purpose. Particularly suitable are the triglycerides of the oleic acid-linoleic acid type which contain no more than 20 per cent by weight of esterified saturated fatty acids calculated on the quantity of esterified fatty acids. These oils are liquids at 15 to 20 °C, and their most important fatty acid residues are derived from the following unsaturated acids: oleic acid, 9-octadecenoic acid, linoleic acid, 9,12-octa-decadienoic acid. The most preferred among these triglycerides of vegetable origin, under normal temperatures of use, are described to be those that contain esterified oleic acid in a quantity in excess of 50 per cent by weight of the total quantity of fatty acids (Table 1).

Table 1

Usable triglyceride oils

		Olive oil	Peanut oil	Maize oil	Rape oil
Iodine number 1)		77-94	84-100	103-128	94-126
Cloud point °C 2)		-5 - -6	4 - 5	4 - 6	2 - 4
Fatty acids %					
Saturated					
Palmitic acid	C 16	7-16	6-9	8-12	4-6
Stearic acid	C 18	1-3	3-6	2-5	1-3
Unsaturated					
Oleic acid	C 18:1	65-85	53-71	19-50	51-62
Linoleic acid	C 18:2	4-15	13-27	34-62	16-24

1) Methods AOCS Cd 1-25, ASTM D 1959 or AOAC 28.020
2) Method AOCS Co 6-25

It is characteristic of all of these oily triglycerides that their viscosities change on change in temperature to a lesser extent than the viscosities of hydrocarbon basic oils. The viscosity-to-temperature ratio characteristic of each oil can be characterized by means of the empiric viscosity index (VI), the numerical value of which is the higher the less the viscosity of the oil concerned changes with a change in temperature. The viscosity indexes of triglycerides are clearly higher than those of hydrocarbon oils with no additives, so that triglycerides are to their nature so-called multi-grade oils. This is of considerable importance under conditions in which the operating temperature may vary within rather wide limits. The viscosities and viscosity indexes of certain triglycerides are given in Table 2.

Table 2

Viscosity properties of oils			
	Viscosity mm^2/s		Viscosity index
	38 ° C	99 ° C	
	1)		2)
Olive oil	46.68	9.09	194
Rape seed oil (eruca)	50.64	10.32	210
Rape seed oil	36.04	8.03	217
Mustard oil	45.13	9.46	215
Cottonseed oil	35.88	8.39	214
Soybean oil	28.49	7.60	271
Linseed oil	29.60	7.33	242
Sunflower oil	33.31	7.68	227
Hydrocarbon-based basic oils			0 - 120
1) Method ASTM D 445 2) Method ASTM D 2270			

The fume point of triglycerides is above 200 ° C and the flash point above 300 ° C (both determinations as per AOCS Ce 9a-48 or ASTM D 1310). The flash points of hydrocarbon basic oils are, as a rule, clearly lower.

The triglyceride oils differ from the non-polar hydrocarbons completely in the respect that they are of a polar nature. This accounts for the superb ability of triglycerides to be adsorbed on metal faces as very thin adhering films. A study of the operation of glide faces placed in close relationship to each other, and considering pressure and temperature to be the fundamental factors affecting lubrication, shows that the film-formation properties of triglycerides are particularly advantageous in hydraulic systems.

In addition, water cannot force a triglyceride oil film off a metal face as easily as a hydrocarbon film.

Rape seed oil has been considered as an example of the monomeric triglyceride oils used in the hydraulic fluids in accordance with the specification GB 2 134 923, which rape seed oil is also obtained from the sub-species Brassica campestris and which oil, in its present-day commercial form, contains little or no erucic acid, 13-docosenoic acid. However, it is to be kept in mind that applicable triglyceride oils differ from rape seed oil only in respect of the composition of the fatty acids esterified with glycerol, which difference comes out as different pour points and viscosities of the oils. Even oils obtained from different sub-species of rape and from their related sub-species display differences in pour points and viscosities, owing to differences in the compositions of fatty acids, as appears from Table 3. Of the rape seed oils mentioned in the table, the first one (eruca) has been obtained from a sub-species that has a high content of erucic acid (C 22:1).

Table 3

Properties of certain Brassica oils

		Rape seed oil (eruca)	Rape seed oil	False flax	White mustard
Fatty acids %					
Saturated					
	C 16	2.2	3.5	5.4	2.5
	C 18	1.1	1.0	2.2	0.8
	C 20	0.8	0.5	1.1	0.6
Unsaturated					
	C 18:1	11.6	59.0	13.4	22.3
	C 18:2	14.0	21.3	17.5	8.0
	C 18:3	10.0	11.9	36.5	10.6
	C 20:1	8.5	1.3	14.7	8.0
	C 22:1	48.0	0.5	3.6	43.5
Pour point	°C 1)	- 17	- 26	- 26	- 17
Viscosity	mm^2/s 100oC	10.3	8.0	9.0	9.5

1) Method ASTM D 97

The characterizing data of rape seed oil are compared in Table 4 with certain commercial basic mineral oils.

Table 4

Characteristic data of rape seed oil and certain basic mineral oils						
		Rape seed oil	Gulf 300 paramid	Gulf 300 Texas oil	Nynäs S 100	Nynäs H 22
Density g/cm^3 1)	15 °C	0.9205	0.878	0.914	0.910	0.926
Viscosity mm^2/s	-20 °C	660				
	40 °C	34.2	60.7	57.9	99	26
	100 °C	8	8.1	6.6	8.6	3.9
Viscosity index		217	101	26	31	-
Pour point °C		-27	-12	-34	-18	-33
Flash point °C 2)		> 300	238	188	215	180
Acid value mg KOH/g 3)		0.06	0.04	0.09	0.01	0.01

1) Method ASTM D 1298
2) Method ASTM D 93
3) Method ASTM D 974

The above data indicate that the said triglycerides have many properties which are of advantage especially in hydraulic fluids. As mentioned already before, the viscosity index (VI) of triglycerides, as compared with mineral oil products, is superior. The viscosity index of the triclyceride oils is apparently also more stable against mechanical and heat stresses existing in the hydraulic systems than the viscosity index of the hydraulic fluids based on formulated mineral oils and containing polymeric viscosity index improves. In addition it can be expected that the ability of the polar triglyceride molecule to adhere onto metallic surfaces improves the lubricating properties of these triglycerides.

The only property of the natural triglycerides which has shown to impede their intended use for hydraulic purposes is their tendency to be easily oxidized.

The oxidation has many negative effects to the properties of a natural triglyceride based hydraulic fluid, wherefore the fluid has to be replaced by fresh fluid more frequently than fluids based on hydrocarbon oils.

For instance the viscosity of the natural triglyceride hydraulic fluid is increased due to the oxidation. The oxidation causes also foaming of the fluid, the filtration properties of the fluid are decreased, and the higher water solubility causes problems in the hydraulic system. The oxidation products are also corrosive. In order to avoid these problems caused by oxidation the working temperature of the hydraulic system is to be kept lower than when hydrocarbon based oils are used.

It has, however, been noted that the tendency of the said natural triglycerides to be oxidized can be decreased essentially to the same level as that of the common hydrocarbon based hydraulic oils, by using additives in very moderate amounts, which additives have been selected according to the invention. This fact is evident from the results of the following example 1.

Example 1

In this example the stability of the hydraulic fluids against oxidative degradation was tested. The fluids were tested with an apparatus according to the test method ASTM D 525 by introducing into a pressure vessel 100 ml of the fluid to be tested. The vessel was closed and placed into boiling water. During the test the oxygen pressure in the vessel was determined.

The oils tested were:

Oil number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Refined rape seed oil:	100	98.97	97.95	96.85	96.5	97.0	98.5	98.0	99.0	95.0	97.0	96.0	95.5	95.8	0	0
- additive, percent by weight																
Irgalube 349		0.5	1.0	1.0		0.5					0.5		0.5			
Irganox L 130		0.5	1.0	2.0												
Reomet 39		0.03	0.05	0.05												
Anglamol 75					1.5	0.5	1.5			1.5		1.5		1.5		
EN 1235				0.1												
Hitec 4735					2.0	2.0		2.0		1.5		2.0	1.5	2.0		
Additin 10											1.5					
Irganox L 57									1.0	0.5						
Irganox L 180										1.0	1.0					
Vanlube AZ												0.5		0.5		
Irgalube TPPT													0.5			
Tinuvin 770														0.2		
Irganox PS 800													2.0			
Additives, tot.		1.03	2.05	3.15	3.5	3.0	1.5	2.0	1.0	4.5	3.0	4.0	4.5	4.2		
Shell Tellus T 32															100%	
Esso Univis HP-32																100%

The additives used were: Irgalube 349, amino phosphate derivative, Ciba-Geigy; Irganox L 130, mixture of tertiary-butyl phenol derivatives, Ciba-Geigy; Reomet 39, triazole derivative, Ciba-Geigy; Anglamol 75, zinc dialkyldithio-phosphate, Lubrizol; EN 1235, kortacid T derivative, Akzo Chemie; Hitec 4735, mixture of tertiary-butyl phenol derivatives, Ethyl Pertoleum Additives Ltd; Irganox PS 800, dilauryl thio di propionate, Ciba-Geigy; Irganox L 180, triaryl phosphite, Ciba-Geigy; Irganox L 57, mixed alkyl diphenyl amine, Ciba-

Geigy; Irganlube TPPT, triphenylphosphorothionate, Ciba-Geigy; Tinuvin 770, bis (2,2,6,6-tetramethyl-4-piperidyl) sebacate, Ciba-Geigy; Vanlube AZ, zinc diamyldithiocarbamate, R.T. Vanderbilt; Additin 10, 2,6-di-tertiary-butyl-4-mathylphenol, Rhein-Chemie.

The results of this test are given in Table 5.

Table 5

Oil

Time, hours	Pressure, psi															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	120	121	127	124	126	125	125	128	124	124	129	124	121	125	125	121
12	109	113	124	121	121	123	117	120	115	122	126	120	118	123	119	118
24	76	103	121	119	116	120	110	113	107	119	123	118	116	120	118	117
36	33	97	117	116	110	118	104	107	100	117	120	115	113	117	116	116
48	16	88	114	114	106	116	92	102	92	115	118	112	111	115	114	116
60	–	80	110	112	101	114	77	96	83	113	116	110	108	113	112	114
72	–	71	107	110	97	112	64	91	76	110	114	107	106	111	111	113

As can bee seen from the results of Table 5, the compositions 3, 4, 5, 6, 8, 10, 11, 12, 13 and 14 are clearly comparable with the common mineral-oil based hydraulic oils 15 and 16 used for comparison in this example. The compositions 2 and 9 contain the anti-oxidant additives selected according to the invention, but the amounts used have not been sufficient. From the data in Table 5 it can be derived that a triglyceride complying with the definitions presented at the beginning of this description and containing a certain amount of carefully selected anti-oxidant additives can form a base for a fluid composition usable for hydraulic purposes.

According to the invention the anti-oxidant fraction in the composition forms 2.0 to 4.5 percent by weight of the composition, and the anti-oxidants are selected so that at least one compound is from the group (1) of hindered phenolics and aromatic amines, and the remaining compound(s) forming the balance in the composition, is from the group (2) of metal salts of dithioacids, phosphites and sulphides, or from the group (3) of amides, non-aromatic amines, hydrazides and triazols.

Examples of compounds which belong to the abovementioned groups can be named as follows:

1) 2,6-di-tert-butyl-4-methyl phenol; 2'2-methylenebis-(4-methyl-6-tert-butylphenol); N,N'-disecbutyl-p-phenylene-diamine; alkylated diphenyl amine; alkylated phenyl-alfa-naphtyl amine

2) zinc dialkyldithiophosphates; tris (nonylphenyl) phosphite; dilauryl thiodipropionate

3) N,N'-diethyl-N,N'-diphenyloxamide;

N,N'-disalicylidene-1,2-propenylenediamine;

N,N'-bis (beta-3,5-ditertbutyl-4-hydroxyphenylpropiono) hydrazide

One indication of the resistance towards oxidation of oils is also their ability to keep the lubrication properties in higher temperatures. This ability was tested in the following example 2.

Example 2

In the tests a Cameron Plint tester (High Frequency Friction Machine TE. 77) was used. In this tester the friction between a moving and a stationary element is determined at increasing temperatures. As the moving element is used a steel ball having a diameter of 6 mm, whereas the stationary element consists of a steel plate. The lubricant to be tested is spread on the plate, and it is exposed to the ambient air oxygen during the tests. In the tests conducted the ball was pressed towards the plate by a force of 40 N during its reciprocating movement having an amplitude of 5 mm and a frequency of 20 Hz. The temperature at the beginning of each test was adjusted to 40 °C, whereafter it was increased by 2 °C per minute. The temperature in which the friction began to increase sharply was registered, and it was used as an indication of the failure of the lubricative film between the ball and the plate. The film failure temperature is a measure of the oxidation resistance of the oil.

The results of this test are given in the following table 6.

Table 6

	Test No								
	1	2	3	4	5	6	7	8	9
Refined rape seed oil, % (W),	100	98	99	96.5	98.5	98	97.8		
Additive, % (W),									
Hitec 4735		2		2		1.5	2		
Irganox L 57			1		1				
Anglamol 75				1.5					
Irgalube 349					0.5	0.5			
Irgalube TPPT							0.2		
Mobil DTE Heavy Medium								100	
Esso Univis HP-32									100
Film failure Temperature, °C	125	171	148	232	205	226	225	192	164

From the results of table 6 (tests 2 and 3) it can be seen, that if the oil contains an anti-oxidant which can be classified to hindered phenolics (Hitec 4735) or to aromatic amines (Irganox L 57) the film failure temperature is higher than that of pure rape seed oil. The test 3, however, shows that the percentage of the anti-oxidant has not been high enough. The result is clearly better if the oil contains also a small amount of other anti-oxidant (Irgalube 349, amino phosphate derivative, test 5). Higher percentages of the anti-oxidants give results which are superior to the results of commercial hydrocarbon based hydraulic oils.

The ability of the hydraulic fluids according to the invention was also tested in a full scale test, which is described in the following example 3.

Example 3

A vegetable oil based hydraulic fluid was tested using as a reference a commercial mineral oil based

hydraulic fluid. In the test two new identical hydraulic driven mining loaders were used. During the test the pressures in the hydraulic circuits varied from 0 to 165 bar and the hydraulic fluid temperature from 60 to 80 °C. Hydraulic pressure was generated by gear pumps and the power was taken out by means of cylinder-piston devices.

The hydraulic fluids tested were:

1. Vegetable oil

- refined rape seed oil, 98.5 % by weight
- additive, Anglamol 75, 1.5 % "

2. Vegetable oil

- refined rape seed oil 96.5 % by weight
- additive 1, Anglamol 75, 1.5 % "
- additive 2, Hitec 4735, 2.0 % "

3. Mineral oil based hydraulic fluid, Teboil OK 14 - 46

The following Table 7 gives the viscosity of the oils after a prolonged time in operation.

Table 7

Time, hours	Viscosity, mm^2/s / 40 °C		
	Fluid		
	1	2	3
0	34	33.2	44.6
300	36.8	33.2	38.1
600	39.5	33.5	35.2
900	44.3	33.9	34.3
1200	51.8	34.1	34.2
1500	55.6	34.3	34.2

In the same test also the volumetric efficiency of the hydraulic systems 2 and 3 was recorded during the test period and the results are given in the following table 8.

Table 8

Time, hours	μ v / μ ref	
	Fluid	
	2	3
0	1	1
300	0.960	0.94
600	0.945	0.88
900	0.940	0.84
1200	0.935	0.79
1500	0.93	0.76
μ v means efficiency recorded μ ref means efficiency at the beginning of the test		

The efficiency tests were conducted using a fluid pressure of 165 bar, and a temperature of 65 ° C.

The test results of Table 7 indicate that the durability against shear stress of the vegetable oil based fluid was better than that of the mineral oil based fluid.

The test results of Table 8 indicate that the efficiency of the system containing the vegetable oil based fluid decreased slower than that of the mineral oil based fluid.

The lubricative properties of a hydraulic fluid based on the triglyceride composition of the invention were tested by using the testing method described in the following example 4.

Example 4

The suitability of rape seed oil as a hydraulic fluid was tested in a four ball tester according to the test method IP 239, in which the test period is one hour and the load 1 kg, as well as according to the standard Test Method STD No 791/6503,1, in which the load is increased stepwise during the test period of 10 seconds. The oils tested are given in the Table 9.

Table 9

No	Oil	
1.	Refined rape seed oil,	96.5 % by weight
	Additives,	
	- Anlamol 75,	1.5 % "
	- Hitec 4735,	2.0 % "
2.	Shell Tellus T 32	
3.	Esso Univis HP-32	
4.	Neste Hydraulic 32 Super, manufacturer Neste, Finland	
5.	Teboil Hydraulic Oil 32 S	
6.	Mobil Flowrex Special	

All the oils tested belong to the viscosity cathegory ISO VG 32 according to the test method ASTM D 2422.

The results of the said tests are given in the Table 10.

Table 10

	IP 239, 1 h / 50 kg wear, mm	STD No 791/6503,1 load to welding of the balls
1.	0.46	over 300
2.	0.71	200
3.	1,52	140
4.	1.49	200
5.	0.81	260
6.	0.57	200

The lubricating properties were compared also by using a gear system, which test is described in the following Example 5.

Example 5

The protective action of three hydraulic fluids on gear systems against wear was tested by using the FZG-method according to the standard DIN 51354 E (FZG gear rig test machine).

The oils used were:

Oil No		
1	Refined rape seed oil	96.5 % by weight
	Anglamol 75	1.5 "
	Hitec 4735	2.0 "
2	Refined rape seed oil	98.9 % by weight
	Irgalube 349	0.5 "
	Additin 10	0.5 "
	Reomet 39	0.05 "
	Sarkosyl 0	0.05 "
3	Mobil DTE 25	

- Sarkosyl 0 is N-acyl-sarcosine, manufacturer Ciba-Geigy

The results of this test are given in the following table 11.

Table 11

Oil	Load degree to damage	Specific wear, mg/horsepower/hour
1	above 12	0.05
2	above 12	0.033
3	11	0.10

In addition to the basic composition the hydraulic fluid according to the invention may also comprise other constituents such as:

- Boundary lubrication additives, such as
  metal dialkyl dithiophosphates;
  metal diaryl dithiophosphates;
  metal dialkyl dithiocarbamates;
  alkyl phosphates;
  phosphorized fats and olefins; sulphurized fats and fat derivatives; chlorinated fats and fat derivatives
- Corrosion inhibitors, such as metal sulfonates;
  acid phosphate esters; amines; alkyl succinic acids
- VI (Viscosity Index) improvers, such as polymethacrylates; styrene butadiene copolymers; polyisobutylenes
- Pour point depressants, such as chlorinated polymers; alkylated phenol polymers; polymethacrylates
- Foam decomposers, such as polysiloxanes; polyacrylates
- Demulsifiers, such as heavy metal soaps; Ca and Mg sulphonates

From the base composition according to the invention can be made hydraulic fluids for different purposes by adjusting its viscosity. The following table 12 gives one example of adjusting possibilities.

Table 12

From a base composition according to the invention was made hydraulic fluids for different viscosity classes (ASTM D 2422)				
	Oil	comp. % by weight	visc. mm^2/s	class
1.	Refined rape seed oil Rilanit EHO Hitec 4735 Anglamol 75	62.5 35 2.0 1.5	20.6	ISO VG 22
2.	Refined rape seed oil Hitec 4735 Anglamol 75	96.5 2.0 1.5	34.3	ISO VG 32
3.	Refined rape seed oil Priolube 3987 Hitec 4735 Anglamol 75	73.5 23 2.0 1.5	45.2	ISO VG 46
4.	Refined rape seed oil Priolube 3987 Priolube 3986 Hitec 4735 Anglamol 75	76.5 14 6 2.0 1.5	73.0	ISO VG 68
Rilanit EHO, 2-ethylhexyl oleate, Henkel Priolube 3987, pentaerythritol ester, Unichema Priolube 3986, complex ester, Unichema				

Claims

1. A base composition for hydraulic fluids consisting of:
- one or several natural triglycerides which are esters of a straight-chain C_{10} to C_{22} fatty acid and glycerol, which triglyceride has an iodine number of at least 50 and not more than 128, and
- one or several anti-oxidant additives,
- characterized in
- that the anti-oxidant additive fraction forms at least 1.5 percent by weight of the composition,
- that the anti-oxidant additive fraction contains one or several compounds selected from the group:
- (I) hindered phenolics and aromatic amines,
- and in that at least in anti-oxidant percentages of 1.5 to 2.0 the anti-oxidant fraction contains one or several additional anti-oxidants selected from one or both of the following groups:
- (II) metal salts of dithioacids, phosphites and sulfides.
- (III) amides, non aromatic amines, hydrazides and triazols.

2. A base composition for hydraulic fluids according to the claim 1, characterized in that the anti-oxidant fraction forms 1.5 to 4.5 percentage by weight of the composition.

3. A base composition for hydraulic fluids according to the claims 1 or 2, characterized in that the anti-oxidants selected from the group I form 1.0 to 3.0 percentage by weight of the composition.

4. A base composition for hydraulic fluids according to the claims 1 to 3, characterized in that the triglyceride is of oleic-acid-linoleic-acid type and contains saturated fatty acids of not more than 20 percent by weight calculated on the quantity of fatty acids esterified with glycerol.

5. A base composition for hydraulic fluids according to the claim 4, characterized in that the triglyceride consists of rape seed oil.

6. A hydraulic fluid made of a base composition according to any of the preceeding claims 1 to 5, characterized in that the fluid in addition contains at least one component selected from: boundary lubrication additives, corrosion inhibitors, VI-improvers, pour point depressants, foam decomposers, demulsifiers.

Patentansprüche

1. Basismischung für Hydraulikflüssigkeiten, bestehend aus:
   - einem oder mehreren Triglyceriden, die Ester von geradkettigen C_{10} bis C_{22} fettigen Säuren und Glycerol sind, wobei dieses Triglycerid eine Jodzahl von mindestens 50 und höchstens 128 hat sowie
   - einen oder mehrere Oxidationsschutzadditive,
   - dadurch gekennzeichnet,
   - daß der Anteil des Oxidationsschutzadditivs mindestens 1,5 Prozent Gewichtsanteil des Gemischs ausmacht,
   - daß der Anteil des Oxidationsschutzadditivs eine oder mehrere Verbindungen aus den folgenden Gruppen enthält:
   - (I) verhinderte Phenoplaste und aromatische Amine,
   - und dadurch, daß mindestens zu Oxidationsschutzanteilen von 1,5 bis 2,0 % der Oxidationsschutzanteil ein oder meherere weitere Oxidationschutzmittel enthält, die aus einer oder beiden der flgenden Gruppen stammen:
   - (II) Metallsalze von Dithiosäuren, Phosphiten und Sulfiden;
   - (III) Amiden, nicht-aromatischen Aminen, Hydraziden und Triazolen.

2. Basismischung für Hydraulikflüssigkeiten nach Anspruch 1, dadurch gekennzeichnet, daß der Anteil des Oxidationsschutzadditivs 1,5 bis 4,5 Prozent Gewichtsanteil des Gemischs ausmacht.

3. Basismischung für Hydraulikflüssigkeiten nach Anspruch 1 oder Anspruch 2, dadurch gekennzeichnet, daß die Oxidationsschutzmittel aus Gruppe I 1,0 bis 3,0 Prozent Gewichtsanteil des Gemischs ausmachen.

4. Basismischung für Hydraulikflüssigkeiten nach Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß das Triglycerid von der Art der Ölsäure-Linolsäure ist und höchstens 20 % Gewichtsanteil gesättigte Fettsäuren enthält, berechnet nach der Menge mit Glycerol veresterter Fettsäuren.

5. Basismischung für Hydraulikflüssigkeiten nach Anspruch 4, dadurch gekennzeichnet, daß das Triglycerid aus Rapssamenöl besteht.

6. Hydraulikflüssigkeit hergestellt aus einer Basismischung nach einem der vorstehenden Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Flüssigkeit zusätzlich mindestens einen Bestandteil enthält, der aus einer der folgenden Gruppen stammt: Grenzschmieradditive, Korrosionsverhinderer, VI-Verbesserer, Stockpunkterniedriger, Schaumzerfallsmittel, Demulgatoren.

Revendications

1. Composition de base pour fluides hydrauliques, consistant en
   - un ou plusieurs triglycérides naturels qui sont des esters d'un acide gras à chaîne droite en C_{10} à C_{22} et de glycérol, lequel triglycéride possède un indice d'iode d'au moins 50 et de pas plus de 128, et
   - un ou plusieurs additifs anti-oxydants,
   - caractérisée en ce que la fraction additif anti-oxydant forme au moins 1,5 % en poids de la composition,
   - que la fraction additif anti-oxydant contient un ou plusieurs composés choisis dans le groupe :
   - (I) amines phénoliques et aromatiques bloquées,
   - et en ce qu'au moins dans les pourcentages d'anti-oxydant compris entre 1,5 et 2,0, la fraction anti-oxydant contient un ou plusieurs anti-oxydants supplémentaires choisis dans l'un ou les deux des groupes suivants :
   - (II) sels métalliques de dithioacides, phosphites et sulfures,

- (III) amides, amines non aromatiques, hydrazides et triazols.

2. Composition de base pour fluides hydrauliques selon la revendication 1, caractérisée en ce que la fraction anti-oxydant forme un pourcentage de 1,5 à 4,5 en poids de la composition.

3. Composition de base pour fluides hydrauliques selon l'une des revendications 1 et 2, caractérisée en ce que les anti-oxydants choisis dans le groupe I forment un pourcentage de 1,0 à 3,0 en poids de la composition.

4. Composition de base pour fluides hydrauliques selon l'une des revendications 1 à 3, caractérisée en ce que le triglycéride est du type acide oléique-acide linoléique et contient des acides gras saturés de pas plus de 20 % en poids, calculés sur la quantité d'acides gras estérifiés avec le glycérol.

5. Composition de base pour fluides hydrauliques selon la revendication 4, caractérisée en ce que le triglycéride est constitué d'huile de graine de colza.

6. Fluide hydraulique fait d'une composition de base selon l'une quelconque des revendications 1 à 5 précédentes, caractérisé en ce que le fluide contient en plus au moins un composant choisi parmi : additifs de lubrification limite, inhibiteurs de corrosion, agents d'amélioration de l'indice de viscosité, agents dépresseurs du point d'écoulement, agents de décomposition de la mousse, désémulsifiants.