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(54) **Hydraulic oil composition for shock absorbers**

(57) The present invention provides a hydraulic oil composition comprising a base oil composed of a mineral oil (A) and/or synthetic oil (B) incorporated with 20 wt% or less, based on the whole composition, of one or more types of additives (C) including viscosity index improver and/or pour point depressant, and having a kinematic viscosity of 1 to 20 mm²/s at 100°C, a viscosity index of 140 or more and a Brookfield viscosity of 2000 mPa•s or less at -40°C, wherein the mineral oil (A) is a

deeply dewaxed mineral oil (a) having a kinematic viscosity of 2 to 3 mm²/s at 100°C, pour point of -30°C or less and cloud point of -27.5°C or less, or a mixed mineral oil of the deeply dewaxed mineral oil (a) and a low-viscosity mineral oil (b) having a kinematic viscosity of 1.0 to 6.0 mm²/s at 40°C, and the synthetic oil (B) is a poly- α -olefin (c) having a kinematic viscosity of 1.5 to 45 mm²/s at 100°C, and/or an ester compound (d) having a kinematic viscosity of 1.5 to 20 mm²/s at 100°C and pour point of -30°C or less.

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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 7976

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 857 220 A (HASHIMOTO KATSUMI) 15 August 1989 (1989-08-15) * abstract * column 1, lines 18-33, 45-68; column 2, lines 15-31, 42-50; column 3, lines 10-13, 19-37; column 4, lines 4-14, 19-28, 37-49; column 4, line 62 to column 6, line 8; claims 2,5,6 ---	1-4,7	C10M169/04 C10M101/02 C10M105/38 C10M107/10 C10M111/02 C10M111/04 //(C10M111/04, 101:02,105:36, 105:38,107:10)
X	US 4 776 967 A (ICHIHASHI TOSHIHIKO ET AL) 11 October 1988 (1988-10-11) * abstract * * column 1, line 16-26 * * column 1, line 51 - column 2, line 2 * * column 3, line 1-15,30-38,55-63 * * column 6, line 8-12 * * column 6, examples 1-3, comparative example 1 * * column 7, comparative example 3 * ---	1-4,7	
X	US 5 646 099 A (WATTS RAYMOND FREDERICK ET AL) 8 July 1997 (1997-07-08) * column 1, line 44-65 * * column 2, line 47 - column 3, line 27 * * column 4, line 11-14 * * column 9, line 47,48 * * table 1, blends 13-16 * ---	1,7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) C10M
A	US 5 641 732 A (BLOCH RICARDO ALTREDO ET AL) 24 June 1997 (1997-06-24) * column 1, line 18-20 * * column 2, line 28-45 * * column 2, line 55 - column 3, line 36 * * column 3, line 50-67 * * column 4, line 38-45 * * column 5, line 11-67 * * column 6, line 29-32 * -----	1-4,7	
-The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 30 June 2000	Examiner Perakis, N
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-4,7

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1,4,7

CLAIMED INVENTION 1

A hydraulic oil composition comprising:

- i) a base oil consisting of a deeply dewaxed mineral oil and
- ii) 20% wt or less, based on the whole composition, of one or more of a viscosity index improver, pour point depressant,

the deeply dewaxed oil having the following characteristics: a kinematic viscosity of 2 to 3 mm²/s at 100AC, a pour point of -30AC or less and a cloud point of -27.5AC or less and

the composition having the following characteristics: a kinematic viscosity of 1 to 20 mm²/s at 100AC, a viscosity index of 140 or more and a Brookfield viscosity of 2000 mPa.s or less at -40AC.

2. Claims: 1,2,3,4,7

CLAIMED INVENTION 2

A hydraulic oil composition comprising:

- i) a base oil consisting of a deeply dewaxed mineral oil and a low-viscosity mineral oil having a kinematic viscosity of 1 to 6 mm²/s at 40AC wherein the content of the low-viscosity mineral oil is below 20 wt% based on the whole mixed mineral oil and

- ii) 20 wt% or less based on the whole composition of one or more of a viscosity index improver, pour point depressant

the composition having the following characteristics: a kinematic viscosity of 1 to 20 mm²/s at 100AC, a viscosity index of 140 or more and a Brookfield viscosity of 2000 mPa.s or less at 40AC.

3. Claims: 1,7

CLAIMED INVENTION 3

A hydraulic oil composition comprising:

- i) a base oil consisting of a synthetic oil which is a poly-alpha-olefin having a kinematic viscosity of 1,5 to 45 mm²/m at 100AC and



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LACK OF UNITY OF INVENTION
SHEET B

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

ii) 20 wt% or less based on the whole composition of one or more of a viscosity index improver, pour point depressant

the composition having the following characteristics:
a kinematic viscosity of 1 to 20 mm²/s at 100AC, a viscosity index of 140 or more and a Brookfield viscosity of 2000 mPa.s or less at -40AC.

4. Claims: 1,7

CLAIMED INVENTION 4

A hydraulic oil composition comprising:

i) a base oil consisting of a synthetic oil which is an ester compound having a kinematic viscosity of 1,5 to 20 mm²/s at 100AC and pour point of -30AC or less and

ii) 20 wt% or less, based on the whole composition, of one or more of a viscosity index improver, pour point depressant

the composition having the following characteristics:
a kinematic viscosity of 1 to 20 mm²/s at 100AC, a viscosity index of 10 or more and a Brookfield viscosity of 2000 mPa.s or less at -40AC.

5. Claims: 1-4,7

CLAIMED INVENTION 5

The hydraulic oil composition comprising:

the combination of the base oils of the claimed inventions 1 and 2 with the viscosity index improver, pour point depressant.

6. Claims: 1,5,7

CLAIMED INVENTION 6

The hydraulic oil composition comprising:

the combination of the base oils of the claimed invention 3 and 4 with the viscosity index improver, pour point depressant.

7. Claims: 1,4,6,7



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LACK OF UNITY OF INVENTION
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

CLAIMED INVENTION 7

The hydraulic oil composition comprising:

The combination of the base oils of the claimed invention 1 and 3 with the viscosity index improver, pour point depressant.

8. Claims: 1-3,7

CLAIMED INVENTION 8

The hydraulic oil composition comprising:

the combination of the base oils of the claimed inventions 2 and 3 with the viscosity index improver, pour point depressant.

9. Claims: 1-3,7

CLAIMED INVENTION 9

The hydraulic oil composition comprising:

the combination of the base oils of the claimed inventions 1 and 4 with the viscosity index improver, pour point depressant.

10. Claims: 1-3,7

CLAIMED INVENTION 10

A hydraulic oil composition comprising:

the combination of the base oils of the claimed inventions 2 and 4 with the viscosity index improver, pour point depressant.

11. Claims: 1-4,7

CLAIMED INVENTION 11

A hydraulic oil composition comprising:
the combination of the base oils of claimed inventions 1, 2 and 3 with the viscosity index improver, pour point depressant.



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LACK OF UNITY OF INVENTION
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

12. Claims: 1-4,7

CLAIMED INVENTION 12

The hydraulic oil composition comprising:
the combination of the base oils of the claimed inventions
1,2 and 4 with the viscosity index improver, pour point
depressant.

13. Claims: 1,4-7

CLAIMED INVENTION 13

The hydraulic oil composition comprising:
the combination of the base oils of the claimed inventions
1,3 and 4 with a viscosity index improver, pour point
depressant.

14. Claims: 1-3,5,7

CLAIMED INVENTION 14

The hydraulic oil composition comprising:
the combination of the base oils of the claimed inventions
2,3 and 4 with a viscosity index improver, pour point
depressant.

15. Claims: 1-7

CLAIMED INVENTION 15

The hydraulic oil composition comprising:
the combination of the base oils of the claimed inventions
1,2,3 and 4 with a viscosity index improver, pour point
depressant.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30-06-2000

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