content 12.0 mass %)

Calcium-based detergent 2: calcium salicylate (total base number 220 mg KOH/g, calcium content 8.0 mass %)

[0073]

Molybdenum-based friction modifier (B)

Molybdenum-based friction modifier: MoDTC (molybdenum content 10 mass %)

[0074]

Anti-wear agents

Anti-wear agent 1: pri-ZnDTP (primary alkyl type)

Anti-wear agent 2: sec-ZnDTP (secondary alkyl type)

[0075]

Other additives

Antioxidant: phenolic antioxidant

Ashless dispersant: succinimide

Viscosity index improver: polymethacrylate

Defoaming agent: dimethyl silicone

[0076]

Examples 1 to 8 and Comparative Examples 1 to 6

Lubricating oil compositions were prepared by mixing the components in the amounts shown in Table 1. The amounts of the magnesium-based detergents, calcium-based detergents, and molybdenum-based friction modifier are respectively represented in terms of the content of magnesium, calcium, and molybdenum in mass ppm relative to the total lubricating oil composition amount, and the amounts of the anti-wear agents and the other additives are represented in parts by mass relative to the total lubricating oil composition amount (100 parts by mass). The amounts of magnesium-based detergents and calcium-based detergents were set so that the total molar amount of the magnesium and calcium contained in these detergents are identical in all the examples and comparative examples. The resulting compositions were subjected to the following tests. The results are shown in Table 1. Examples 1 to 5, 7, and 8 are reference examples.

[0077]

(1) High-Temperature High-Shear Viscosity at 150°C (HTHS150)

Measured in accordance with ASTM D4683.

[0078]

(2) CCS Viscosity at -35°C (CCS viscosity)

Measured in accordance with ASTM D5293.

[0079]

(3) Kinematic Viscosity at 100°C (KV100)

CLAIMS

1. A lubricating oil composition comprising a lubricant base oil, (A) a magnesium-based detergent, and (B) a molybdenum-based friction modifier, wherein the amount of component (A) is in the range of 200 to 1200 mass ppm in terms of a concentration in mass ppm of magnesium [Mg] in the lubricating oil composition, and the amount of component (B) is in the range of 500 to 1500 mass ppm in terms of a concentration in mass ppm of molybdenum [Mo] in the lubricating oil composition, and the lubricating oil composition is free of calcium-based detergents.

2. The lubricating oil composition of claim 1, wherein the lubricating oil composition satisfies the following formula (1):

$[Mg]/[Mo] \leq 2.4$ (1).

3. The lubricating oil composition of claim 1 or 2, having a CCS viscosity at -35°C of less than or equal to 6.2 Pa•s.

4. The lubricating oil composition of any one of claims 1 to 3, having a High-Temperature High-Shear Viscosity at 150°C (HTHS viscosity) of 1.7 to 2.9 mPa•s.

5. The lubricating oil composition of any one of claims 1 to 4, having a kinematic viscosity at 100°C of less than 9.3 mm^2/s.

6. The lubricating oil composition of any one of claims 1 to 5, wherein the lubricating oil composition is for use in an internal combustion engine.