FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Technical Data Sheet

FUNCTIONAL MB-1010

Methacrylate-based Viscosity Index Improver for Gear Oil

APPLICATION:

FUNCTIONAL MB-1010 is a liquid-form polyalkylmethacrylate viscosity modifier that offers high thickening efficiency with excellent shear stability. **FUNCTIONAL MB-1010** has been specifically formulated to provide additional VI improvement, demulsibility, and pour point depressancy. The high shear stability also makes **FUNCTIONAL MB-1010** attractive in gear oil formulations. Use **FUNCTIONAL MG-3000** for multi-grade gear oils intended for low temperature operation.

For a complete hydraulic fluid formulation, use **FUNCTIONAL MB-1010** with **FUNCTIONAL HF-580**. To complete a gear oil formulation, consider **FUNCTIONAL GA-602** (open gear) or **FUNCTIONAL GA-604** (closed gear).

COMPOSITION:

FUNCTIONAL MB-1010 is a blend of polyalkylmethacrylates and highly refined mineral oil.

Typical Properties	
Lbs per Gallon (ASTM D 1475)	7.8
Specific Gravity	0.93
Kinematic Viscosity (ASTM D 445)	900 at 100 ˚C
Thickening Efficiency (10% in ISO 32)	8.6 cSt at 100 ˚C
PSSI (5% in 150N, ASTM D 6278)	0 – 1%
KRL (20 hour)	15%
Flash Point (ASTM D 92)	>150˚C
Color (ASTM D 1500)	< 1.0

TREATMENT LEVEL:

Typical treatment level for methacrylate-based viscosity modifiers ranges from 5 to 10% for hydraulic fluids and 5% to 20% for gear oils.

10wt% **FUNCTIONAL MB-1010** will increase an ISO 32 oil to ISO 46.

Please see the next page for examples of preparing specific ISO viscosity grades from 100N and 150N oil.

FUNCTIONAL MB-1010 Treat Level vs. Viscosity @ 100˚C

wt% Treat	100N Oil (ISO 22)	150N Oil (ISO 32)	200N Oil (ISO 46)	350N Oil (ISO 68)
0%	3.9	5.4	6.5	8.3
10%	6.5	8.4	9.9	12.7

HANDLING:

FUNCTIONAL MB-1010 should be warmed to about 50°C (120°F) to facilitate pumping and handling. The base oil should be heated to 60-80˚C (140-180˚F) during blending to allow for good mixing. Mixing time will vary with equipment but is typically at least one hour. Safe handling precautions are the same as those to be taken with base oil; see the current Safety Data Sheet.

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Suggested* Treat Levels for FUNCTIONAL MB-1010:

Hydraulic Fluids:

To obtain specific viscosity grades from a 100N (ISO 22) base oil:

Base Oil	Treat Level (wt%)	40˚C Viscosity	100˚C Viscosity	VI
100N (ISO 22)	0.0%	19.4 cSt	3.9 cSt	92
150N (ISO 32)	9.9%	32.2 cSt	6.5 cSt	161

To obtain specific viscosity grades from a 150N (ISO 32) base oil:

Base Oil	Treat Level (wt%)	40˚C Viscosity	100˚C Viscosity	VI
150N (ISO 32)	0.0%	30.6 cSt	5.4 cSt	117
200N (ISO 46)	9.9%	47.7 cSt	8.4 cSt	153

Gear Oils:

Base Oil	Desired ISO VG (40˚C)	Desired SAE Gear (100˚C)	Treat Level (wt%)
ISO 150 SN (SAE 85)	220	SAE 90	7 – 12%
		SAE 110	12 – 15%
	320	SAE 140	15 – 21%
	460		25 – 30%
		SAE 190	4 – 9%
ISO 460 BS (SAE 140)	680		11 – 16%
		SAE 250	15 – 20%
	1000		24 – 29%

Functional Products Inc. offers a full line of additive packages and individual components to complete any hydraulic fluid and gear oil formulations. For more information go to www.functionalproducts.com or call 1-330-963-3060.

* These treat levels are approximates. Exact treat levels will require experimentation in a full formulation and will vary due to base oil and other additive packages (anti-wear, EP, corrosion inhibitors, AO, pour point depressants, etc.).

The oils featured on this page are separate from the ISO 32 oil for 10wt% thickening efficiency on page 1.

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