FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Technical Data Sheet

FUNCTIONAL V-705

HIGH PERFORMANCE LIQUID VISCOSITY MODIFIER AND BASE STOCK

APPLICATION:

FUNCTIONAL V-705 is a pure liquid viscosity modifier with high thickening efficiency and low temperature fluidity for high performance at lower cost per treat. The exceptional shear stability of **FUNCTIONAL V-705** allows it to act as a high viscosity synthetic base stock.

COMPOSITION:

FUNCTIONAL V-705 is pure low molecular weight liquid polymer with no diluent oil.

Typical Properties	
Appearance	Clear Colorless Liquid
Kinematic Viscosity, ASTM D445	6,500 cSt @ 100°C 37,000 cSt @ 40°C
Viscosity Index	516
Density (lb/gal)	7.5 lb/gal
Specific Gravity	0.90 g/mL
Flashpoint, ASTM D92 COC	>220°C (428°F)
Thickening Efficiency (10wt% in ISO 32 Gr. II)	20.3 cSt @ 100°C
Thickening Efficiency (10wt% in Canola)	26.4 cSt @ 100°C
Shear Stability Index (PSSI), ASTM D6278 (10wt% in PAO4)	0 SSI
20hr KRL Shear Stability, CEC L-45-A-99 (10wt% in PAO4)	3.9%

TREATMENT LEVEL:

FUNCTIONAL V-705 is compatible in petroleum oils (Group I-III and naphthenic), PAO, vegetable oils, polyol esters, diesters, and estolides. **FUNCTIONAL V-705** is incompatible in all PAG fluids. See next page for sample formulations and viscosities at treat.

Treatment levels of 2 – 30% are typical in industrial lubricants and greases. **FUNCTIONAL V-705** can be used as either a VI improver or a shear stable base stock depending on the need.

HANDLING:

Dissolving is best accomplished with continuous agitation at temperatures of 104-140°F (40-60°C). **FUNCTIONAL V-705** may be preheated in a hot room or tank at up to 176°F (80°C) to aid in pumping but long term storage should remain below 140°F (60°C).

FUNCTIONAL V-705 is a non-hazardous material; see the current Safety Data Sheet.

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FORMULATION GUIDE:

FUNCTIONAL V-705 formulations shown with Functional Products Inc. packages and pour point depressants. Contact Functional for custom design and formulation using your oils, additives, and packages.

High VI Industrial/Mining Gear Oils:	**ISO 680**	**ISO 1000**	**ISO 1500**	**ISO 2200**	**ISO 3200**	**ISO 4600**
150 Bright Stock	93.2	87.7	81.7	75.7	67.7	59.7
FUNCTIONAL V-705 (thickener)	3.5	9	15	21	29	37
FUNCTIONAL GA-614 (gear package)	2.8	2.8	2.8	2.8	2.8	2.8
FUNCTIONAL PD-610 (Gr. I/II pour point)	0.5	0.5	0.5	0.5	0.5	0.5
20hr KRL Viscosity Loss	1.0%	2.0%	2.6%	3.0%	3.3%	3.5%
Viscosity Index	117	163	209	250	294	328

Group III GL-5 Automotive Gear Oils:	**XW-80**	**XW-90**	**XW-140**
4 cSt Group III	90.5	86.5	81.5
FUNCTIONAL V-705 (thickener)	5	9	14
FUNCTIONAL GA-614 (gear package)	4	4	4
FUNCTIONAL PD-630 (Gr. III pour point)	0.5	0.5	0.5
KV100, cSt	9	16	28
KV100 at 20hr KRL, cSt	8.8	15.5	27.1
20hr KRL Viscosity Loss	2.2%	3.0%	3.3%
D2983 BF @ -40°C, cP	< 30,000	< 30,000	31,000

Biobased Hydraulic Fluids ISO 46 to ISO 100:	**ISO 46**	**ISO 68**	**ISO 100**
Canola Oil or **High Oleic Soybean Oil**	95.3	92.3	88.3
FUNCTIONAL V-705 (thickener)	2	5	9
FUNCTIONAL HF-595 (package)	2.2	2.2	2.2
FUNCTIONAL PD-585 (veg pour point)	0.5	0.5	0.5
20hr KRL Viscosity Loss	0.9%	1.8%	2.5%
Viscosity Index	238	240	260

Biodegradable Industrial Gear Oils ISO 1000 - 1500:	**ISO 1000**	**ISO 1500**
ISO 680 Estolide (ester, 76% biodegradable)	89	81.4
FUNCTIONAL V-705 (thickener)	8.2	15.8
FUNCTIONAL GA-614 (gear package)	2.8	2.8
20hr KRL Viscosity Loss	1.3%	2.2%
Viscosity Index	232	262
% Biodegradability (est.)	67.6	61.9

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