

FUNCTIONAL GA-307

Zinc-Free Industrial and Automotive Gear Oil Package

APPLICATION:

FUNCTIONAL GA-307 is an EP gear oil package for both industrial and automotive gear oils formulated in conventional and/or synthetic base stocks. **FUNCTIONAL GA-307** utilizes milder, non-corrosive chemistry which can perform at US Steel 224 and API GL-5 levels but remains safer for applications where yellow metals are used (API GL-4 automotive).

COMPOSITION:

FUNCTIONAL GA-307 is a blend of antiwear, EP, inhibitors, antioxidant, and surface active agents in oil.

Typical Properties	
Appearance	Red to Brown Liquid
Color (ASTM D1500)	≤ 5.0
Odor	Sulfur
Lbs. per Gallon	8.3
Flash Point (ASTM D92)	149°C / 300°F
Kinematic Viscosity (ASTM D445)	35 cSt @ 40°C, 5.4 cSt @ 40°C

TREATMENT LEVEL:

Treat rate depends on base oil type, viscosity grade, and the severity of the application. Conventional stocks may require extra demulsifier; or synthetic stocks may require extra defoamer, see next page.

Application	Weld Load (D2783)	Base Oil	wt%
• R&O Oil	N/A	Any	1wt%
• US Steel 224 and AGMA 9005 industrial gear • API GL-4 automotive	250 kg	Gr. I/II Gr. III PAO	3wt% 4wt% 6wt%
• EP industrial fluids (air tool) • API GL-5 automotive (SAE XW-90, XW-140)	315 kg	Gr. I/II Gr. III PAO	5wt% 6wt% 7wt%
• Heavy duty EP industrial fluids (rock drill) • Racing automotive gear	400 kg	Gr. I/II Gr. III	6wt% 8wt%
• Extreme duty EP industrial fluids (mining)	500 kg	Gr. I/II	12wt%

HANDLING:

Store in a cool, dry area. See current Safety Data Sheet before use.

FUNCTIONAL GA-307 is hazard-free after dilution at recommended treat rates in base oil.

This Technical Data Sheet and the Safety Data Sheet contain information believed to be accurate and reliable. No warranty is made, however, to information beyond the control of FUNCTIONAL PRODUCTS INC. The engineering and management personnel of the user are responsible for determining the suitability of this or any product for any specific application, and this information is offered to them for that purpose.

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FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Technical Data Sheet

FORMULATION GUIDE:

To improve demulsibility in conventional oil, 0.1wt% **FUNCTIONAL DM-240** or EO-PO demulsifier is preferred.

To improve foam retention in synthetic oil, 0.1wt% of **FUNCTIONAL DF-110** or silicone defoamer is preferred.

Conventional Oils (Group I/II, bright stock, naphthenic):

- **FUNCTIONAL GA-307** is compatible in blends of Group I/II/III, naphthenic, and bright stocks.
- Conventional formulas may require extra demulsifier.

FUNCTIONAL GA-307 in Conventional ISO 220 EP Industrial Gear Oil

Typical Performance in ISO 220 EP Industrial Gear		Formula by wt%	
EP Weld Load, D2783	400 kg	600 Solvent Neutral	43.9
Load Wear Index, D2783	66	150 Bright Stock	50.0
Timken OK Load, D2782	>60 lbs	FUNCTIONAL GA-307	6.0
US Steel Wear (1hr, 54°C, 1800 rpm, 20 kg)	0.3 mm	FUNCTIONAL DM-240	0.1
Demulsibility, D1401 (82°C)	40/40/0 (10)		
Demuls., D2711B – %water, mL free water, mL emulsion	1%/84/0		
Foam I,II,III D892	0/0,10/0,0/0		
Copper Strip Corrosion, D130 (3hrs, 100°C)	1a		
Turbine Oil Rust, D665A (24hrs, distilled water)	Pass		
Turbine Oil Rust, D665B (24hrs, syn. seawater)	Pass		

Synthetic Oils (Group III/IV with mPAO, polyolefin, etc.):

- **FUNCTIONAL GA-307** may require 10wt% synthetic ester for solvency in full PAO formulas or Group III with very high amounts of thickener (polybutene, EPO, etc.). Adipates like DTDA are preferred.
- Synthetic formulas may require extra defoamer.

FUNCTIONAL GA-307 in Group III 75W-90 GL-5 Automotive Gear Oil

Typical Performance in 75W-90 GL-5		Formula by wt%	
EP Weld Load, D2783	315 kg	4 cSt Group III	84.4
Load Wear Index, D2783	58	Synthetic Thickener	9.0
Timken OK Load, D2782	> 60 lbs.	FUNCTIONAL GA-307	6.0
4-Ball Wear, D4172 (1hr, 75°C, 1200 rpm, 15kg)	0.175 mm	FUNCTIONAL PD-630	0.5
Demulsibility, D1401 (82°C)	40/40/0 (15)	FUNCTIONAL DF-110	0.1
Foam I,II,III D892	0/0, 10/0, 0/0		
Copper Strip Corrosion, D130 (3hrs, 100°C)	1b		
Turbine Oil Rust, D665A (24hrs, distilled water)	Pass		
Turbine Oil Rust, D665B (24hrs, syn. seawater)	Pass		

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