

FUNCTIONAL GA-400

HX-1 Hydraulic and Gear Package for Lubricants with Incidental Food Contact

APPLICATION:

FUNCTIONAL GA-400 is an additive package for H1 hydraulic fluids, light duty gear oils, chain oils, and more. **FUNCTIONAL GA-400** contains antiwear, extreme pressure, antioxidant, friction modifier, and corrosion inhibitors optimized for PAO base oils and provides no change in color to the finished lubricant.

COMPOSITION:

FUNCTIONAL GA-400 is an ashless HX-1 additive package containing sulfur/phosphorus/nitrogen chemistry. **FUNCTIONAL GA-400** does not contain hazardous HX-1 aryl dithiophosphate esters like TPPT.

Typical Properties	
Appearance	Clear Liquid
Color, ASTM D1500	< 2.5
Odor	Mild
Specific Gravity @ 60°F	0.98 – 1.02
Lbs per Gallon	8.3 -8.5
Flash Point, COC, ASTM D92	160°C/320°F
Viscosity, ASTM D445	150 cSt @ 40°C

Typical Composition	
Sulfur (wt%)	13.9%
Phosphorus (wt%)	0.55%
Total Base Number (D4739)	15
Biobased Content (wt%)	9%
OECD 301B Biodegradation (%)	15%, Est.
Ashless (no Zn, Ca, Na, Si, etc.)	Yes

TREATMENT LEVEL:

FUNCTIONAL GA-400 is recommended at 0.55 – 1.1wt% depending on level of performance.

HX-1 defoamer and demulsifier are not included. The correct type and wt% of defoamer and demulsifier must be added based on the specific base oil blend and viscosity grade. **FUNCTIONAL DF-400** HX-1 defoamer is recommended at 0.05 – 0.2wt%.

Performance in ISO 320 mPAO65/PAO4 Blend		
	0.55wt%	1.1wt%
4-Ball EP Weld Load, ASTM D2783	160 kgf	200 kgf
Load Wear Index, ASTM D2783	33.0	40.0
Falex EP Load, ASTM D3233A	760 lbs.	1020 lbs.
4-Ball Wear, ASTM D4172 – 20 kg	0.48 mm	0.31 mm
RPVOT, ASTM D2722	1700	1200
Turbine Oil Rust, ASTM D665A – distilled water	Pass	Pass
Copper Strip Corrosion, ASTM D130 – 3 and 24 hours @ 100°C	1b	1b

HANDLING:

Store indoors at 20-40°C (68-104°F). Use normal safe procedures for handling and blending. In its concentrated form, **FUNCTIONAL GA-400** may cause skin and eye irritation and should be handled with suitable personal protection. See the Safety Data Sheet. At treat, **FUNCTIONAL GA-400** presents no hazards.

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.

FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Technical Data Sheet

FORMULATION GUIDE:

0.55wt% is recommended for H1 hydraulic fluids and 1.1wt% for H1 gear oils.

FUNCTIONAL GA-400 does not contain defoamer or demulsifier due to the various needs of different H1 base fluid types. **FUNCTIONAL DM-400** is recommended at 1.0wt% for either 0.55wt% and 1.1wt% **GA-400**. This combination provides synergistic wear and corrosion performance.

FUNCTIONAL DF-400 defoamer is recommended at 0.1wt% (0.55wt% **GA-400**) for 0.2wt% (1.1wt% **GA-400**).

FUNCTIONAL GA-400 Performance in H1 White Oils		
Formula by wt%	ISO 46 HF	ISO 220 Gear
Light White Oil	28.35	--
Heavy White Oil	70	84.7
Polyisobutylene (PIB)	--	13.0
FUNCTIONAL GA-400 package	0.55	1.1
FUNCTIONAL DM-400 demulsifier	1.0	1.0
FUNCTIONAL DF-400 defoamer	0.1	0.2
Color, ASTM D1500	≤ 0.5	≤ 0.5
4-Ball EP Weld Load, ASTM D2783	160 kgf	200 kgf
Load Wear Index, ASTM D2783	22.3	29.4
Falex EP Load, ASTM D3233A	388 lbs.	750 lbs.
4-Ball Wear, ASTM D4172 – 20 kg	0.343 mm	0.274 mm
4-Ball Wear, ASTM D4172 – 40 kg	0.360 mm	0.313 mm
RPVOT, ASTM D2272	1411 min	677 min
Turbine Oil Rust, ASTM D665A – distilled water	Pass	Pass
Turbine Oil Rust, ASTM D665B – synthetic sea water	Pass	Pass
Copper Strip Corrosion, ASTM D130 – 3 hours @ 100°C	1b	1b
Demulsibility, ASTM D1401	40/40/0 (25)	40/40/0 (25)
Foam Sequence I, ASTM D892	0/0	0/0
Foam Sequence II, ASTM D892	0/0	15/0
Foam Sequence III, ASTM D892	0/0	0/0

Nonfood Compounds Program Listed
Category Codes: HX-1 and HX-2
Registration No. 164360



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.