

FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Technical Data Sheet

FUNCTIONAL GA-549

High EP Industrial Gear Package for Open Gear Lubricants and Sugarmill

APPLICATION:

FUNCTIONAL GA-549 is designed for preparing open gear lubricants with very high load carrying capacity in a wide range of petroleum, synthetic, and biobased formula types while maintaining low copper corrosion. Solid additives are not included but may added by the formulator to meet certain customer requirements.

COMPOSITION:

FUNCTIONAL GA-549 is based on sulfur, phosphorus, and nitrogen additive chemistry.

Typical Properties	
Odor and Appearance	Mild, Hazy liquid
Lbs per Gallon	8.4 – 8.7
Flash Point (COC)	>110°C / 230°F
Kinematic Viscosity at 40°C	40 - 50 cSt
Elemental Analysis, XRF	35.8% S, 0.11% P

TREATMENT LEVEL:

Use **FUNCTIONAL GA-549** from 3 to 10wt% to obtain weld loads up to 800 kg by ASTM D2783. Formulations using more shear stable viscosity modifiers will tend to use less package to meet the desired weld. 0.1 to 0.2wt% **FUNCTIONAL AW-116** is recommended as a top treat to tune and improve antiwear properties based on the final viscosity grade and base oil type.

See next page for formulation examples.

HANDLING:

FUNCTIONAL GA-549 is a skin irritant and should be handled with suitable personal protection in a well-ventilated area. The maximum heating temperature is 140° F to prevent release of fumes which may cause respiratory irritation. **FUNCTIONAL GA-549** is non-hazardous at typical treat rates.

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.

Version 8/23/2023

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SAMPLE FORMULATIONS:

A standard formulation for shear stable open gear lube using high viscosity synthetic base stock **FUNCTIONAL V-732** with a light oil. Bright stock or another high viscosity petroleum may be substituted for the 120N oil. **FUNCTIONAL AW-116** is added to obtain 4-ball wear scars < 0.5mm versus commercial OGLs.

Formula by wt%	ISO 20K Synthetic OGL
FUNCTIONAL V-732	86.50%
120N Group II Oil	10.30%
FUNCTIONAL GA-549	3.0%
FUNCTIONAL AW-116	0.20%
Properties	
Kinematic Viscosity @ 40C	20,000 cSt
Viscosity Index (D2270)	277
Weld Load, kg (D2783)	620 kg
Wear Scar (D2266)	0.42 mm
Turbine Oil Rust (D665A)	Pass
Turbine Oil Rust (D665B)	Pass
Copper Strip (D130, 3hrs, 100C)	1B

A low cost total-loss biobased and biodegradable open gear lubricant using **FUNCTIONAL V-521** biobased viscosity modifier. The greater shear thinning effect of using a viscosity modifier rather than a base stock calls for more GA package.

Formula by wt%	ISO 30K Biobased OGL
FUNCTIONAL V-521	88.6%
Canola Oil	1.3%
FUNCTIONAL GA-549	10.1%
Properties	
Kinematic Viscosity @ 40C	30,000 cSt
Weld Load, kg (D2783)	800 kg
Load Wear Index (D2783)	178
Wear Scar (D2266)	0.42 mm
Turbine Oil Rust (D665A)	Pass
Turbine Oil Rust (D665B)	Pass
Copper Strip (D130, 3hrs, 100C)	1B
Pour Point (D97)	-21C

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