

FUNCTIONAL PRODUCTS INC.
Innovative Chemistry for Lubricants

Grease Additives



Engineer value and performance into each batch.

Select polymers and additives to improve structure, durability, water resistance, tack, and load carrying:

- Polymers • Water Resistance • Synthetic Grease
- AW/EP • Dropping Point • Tack • Viscosity • *and More*

Explore more options at functionalproducts.com

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The Art and Science of Grease

The performance of each additive in your grease will depend on many factors, including thickener type and content, base oil viscosity and Group, and even the design of your grease kettle and its cooling rate.

Try our additives at the recommended wt%, half the recommended wt%, and double the recommended wt% to dial in the performance you need. Contact us to get the latest recommendations for your need.

Basic Grease Polymers

Formulators should try two or three different grease polymer types to establish which type works best with the formulator's grease composition and production method. The basic grease polymer options are readily available and efficient in modifying most greases.

The key products to try first in a new grease formulating project are:

Product	Suggested wt%	Form	Polymer Type	Recommended Use
V-4020	0.3wt%	Pellet	Reactive	Lithium, lithium complex, aluminum complex
V-207	0.5wt%	Flake	Temp. Sensitive	Calcium sulfonate, calcium sulfonate complex
V-191	0.5wt%	Liquid	Hydrogen Bonding	Particle (clay, silica)

Treat rate can have a strong influence on the performance of grease polymers. Test three different treat rates – the suggested wt%, 2x the suggested wt%, and 0.5x the suggested wt%.

Advanced Grease Polymers

Advanced grease polymers are more situational variants of the basic grease polymers above. If performance with a basic grease polymer is improved but still not on target, then try an advanced grease polymer of the same type.

Reactive Type Polymers

For Lithium, Lithium Complex, and Aluminum Complex Greases

Product	Typical wt%	Viscosity @ 100°C, cSt	Polymer Type	Application Note
V-4040P	0.3%	Flake	Reactive	Colorless flake, alternate to V-4020; dissolves faster
V-4004A	5%	650	Reactive	Liquid alternative to V-4020 for rapid addition
V-4033	3%	3500	Reactive	Enhanced version of V-4004A
V-4051	5%	200	Reactive	Ecolabel LuSC listed biobased liquid additive
V-4051FN	10%	400	Reactive	Enhances low temp. flow and water resistance
V-4270	2%	3700	Reactive	'Extra' enhanced version of V-4004A
V-4700	5%	10000	Reactive	Effective option for high viscosity PAO or PB

FUNCTIONAL V-4040P is a flaked, solid alternative to **FUNCTIONAL V-4020** which offers lower color, faster dissolving time, and improved yield in the finished grease.

FUNCTIONAL V-4004A offers a convenient liquid alternative to the **FUNCTIONAL V-4020** pellet if dissolution of pellets or flakes remains incomplete due to poor base oil solvency, fast reaction kettles, etc. **FUNCTIONAL V-4033** and **V-4270** are enhanced versions of the **FUNCTIONAL V-4004A**. These enhanced grades deliver a synergistic polymer blend for superior performance and treat cost.

FUNCTIONAL V-4700 is a specialized grease polymer for improving the water resistance properties of high viscosity PAO/mPAO base stocks. **FUNCTIONAL V-4700** performs in these low solvency fluids.

Temperature Sensitive Type Polymers

For H1 Calcium Sulfonates, Aluminum Complex, and Polyurea Greases

Product	Typical wt%	Form	Polymer Type	Recommended Use
V-211	0.5%	Flake	Temp. Sensitive	Industrial; aluminum complex; polyurea
V-4064	2.0%	Pellet	Temp. Sensitive	H1 greases with full PAO or mPAO base fluid

FUNCTIONAL V-211 is styrene-enhanced upgrade to **FUNCTIONAL V-207** for even higher water resistance and mechanical stability. **FUNCTIONAL V-211** performs well in both Group I/II/III paraffinic oils and white oil; but avoid naphthenic oil or naphthenic/paraffinic oil blends as they may cause a 'gummy' texture. For PAO, use **FUNCTIONAL V-4064** instead.

Hydrogen Bonding Polymers

For Inorganic Particle Greases and Ester/PAG/Biobased Grease

Product	Suggested wt%	Viscosity, @ 100°C, cSt	Polymer Type	Application Note
V-191M	0.5%	Emulsion	Hydrogen Bonding	V-191 with improved storage stability
V-508M	10%	2500	Hydrogen Bonding	Builds toughness, resists water in ester/PAG

FUNCTIONAL V-191M is a modified version of **FUNCTIONAL V-191** which has greater storage stability when reusing a single pail or drum for multiple batches over a period of time.

In biobased greases, **FUNCTIONAL V-508M** is used to build base oil viscosity and fortify grease. See the **Biobased Additives** brochure for more options.

Grease Polymers for Full Synthetic Products

Product	Suggested wt%	Viscosity @ 100°C, cSt	Polymer Type	Recommended Use
V-188P2	1.5%	9250	Temp. Sensitive	Heat resistant OCP tackifier in PAO
V-4004P2	5%	125	Reactive	Liquid reactive grease polymer in PAO

FUNCTIONAL V-188P2 is a PAO-based version of **FUNCTIONAL V-188** olefin copolymer tackifier.

FUNCTIONAL V-4004P2 is a PAO-based version of **FUNCTIONAL V-4004A** liquid reactive additive.

Additives and Packages

These additives and packages have been successful in tackling a range of common challenges in industrial and specialty grease. See the **Components & Packages Brochure** for more options.

Product	wt%	Form	Role	Note
GA-614	3%	Liquid	Gear Oil Package	Ashless sulfur-phosphorus EP package
GA-307	6%	Liquid	Industrial Package	Low corrosion package for gears and grease
GA-400	1.1%	Liquid	Gear Oil Package (HX-1)	Ashless HX-1 gear oil package
CI-426	0.5%	Liquid	Corrosion, Antiwear	Improves rust resistance
CI-426EP	2%	Liquid	Corrosion, Antiwear, EP	Top treat for addition wear and EP protection
CERAMAX	1%	Powder	Extreme pressure (EP)	Boron nitride powder; high temp solid EP

Dropping Point Improvers

FUNCTIONAL DP Series additives are convenient for improving the dropping point of grease without the elevated temperatures and process of making true complex grease. These products work best in lithium or calcium 12-HSA soap greases. Performance depends on the total grease formula.

Product	wt%	Chemistry	Treat Rate Data
DP-200	0.5%	Phosphate	Lithium base grease = 379°F; 0.5wt% = 464°F
DP-300	3%	Borate	Lithium base grease = 379°F; 1wt% = 462°F; 3wt% = 516°F

Tackifiers for Grease

Lube oil tackifiers are highly effective at adding tackiness to grease without affecting other properties. If milling results in significant tack loss then use shear-stable **FUNCTIONAL V-188** or solid grease polymer **FUNCTIONAL V-207** to add tack.

Product	Typical wt%	Viscosity @ 100°C, cSt	Description
V-176	1.0%	2900	Versatile industrial PIB tackifier, excellent handling
V-177	0.5%	10500	Concentrated, high viscosity PIB tackifier
V-188	1.5%	4000	Shear stable and heat resistant OCP tackifier
V-422	1.0%	3000	NSF HX-1 food grade PIB tackifier
V-425	1.5%	3000	NSF HX-1 food grade OCP tackifier
V-572	2.0%	7500	Concentrated tackifier for biobased greases

Not finding exactly what you need?
We can help you navigate your options –
sales@functionalproducts.com