

FUNCTIONAL PRODUCTS INC.
Innovative Chemistry for Lubricants

Grease Additives



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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, alternative to V-4020; faster addition
V-4004A	5%	650	Reactive	Liquid alternative to V-4020 for rapid addition
V-4033	3%	3500	Reactive	Enhanced version of V-4004A
V-4270	2%	3700	Reactive	'Extra' enhanced version of V-4004A
V-4700	5%	10000	Reactive	Enhances water resistance in 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 as needed in these low solvency fluids.

Temperature Sensitive Type Polymers

For H1 Calcium Sulfonate, Calcium Sulfonate Complex, and Aluminum Complex 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. Performs well in both industrial (Group I/II) and NSF H1 (white oil, Group III) based greases. Avoid naphthenic oil or naphthenic/paraffinic oil blends as they may cause a 'gummy' texture.

FUNCTIONAL V-4064 is suited for improving low solvency PAO grease for NSF H1 applications. **FUNCTIONAL V-4064** is a good candidate to replace **FUNCTIONAL V-207** in high solvency naphthenic greases.

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
V-572	10%	7500	Hydrogen Bonding	Best used as a tackifier in ester based greases

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.

FUNCTIONAL V-508M and **V-572** are high molecular weight biobased viscosity modifiers which provide tack and toughness to high solvency greases using vegetable oil, synthetic ester, or PAG base oils; or greases using polar particles like clay and silica. See the **Biobased Additives** brochure for more options.

Full Synthetic Grease Polymers

For Mineral Oil-Free and High Performance Grease Formulas

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

FUNCTIONAL V-188P2 is a PAO-based version of the shear stable and heat resistant **FUNCTIONAL V-188** olefin copolymer tackifier. This is the best option for adding long lasting tackiness to a synthetic grease.

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

Additives and Packages

These additives and packages have been successful in improving the wear, extreme pressure, and corrosion resistance properties of industrial and specialty grease. See the **Industrial Additives** brochure for more.

Product	wt%	Form	Role	Recommended Use
GA-614	3wt%	Liquid	Gear Oil Package	Ashless sulfur-phosphorus EP package
GA-400	1.1wt%	Liquid	Gear Oil Package (HX-1)	Ashless HX-1 gear oil package
CI-426	0.5wt%	Liquid	Corrosion, Antiwear	Improves rust resistance
CI-426EP	2wt%	Liquid	Corrosion, Antiwear, EP	Top treat for addition wear and EP protection
CERAMAX	1wt%	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 but performance depends on all other additives in the grease.

Product	wt%	Chemistry	Treat Rate Data
DP-200	0.5wt%	Phosphate	Lithium base grease = 379°F; 0.5wt% = 464°F
DP-300	3wt%	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. These high molecular weight polymers are sensitive to severe milling of grease. 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

Viscosity Modifiers for Grease

Viscosity modifiers are alternatives to heavy petroleum oils. See the **Viscosity Modifiers** brochure.

Not finding exactly what you need?
We can help you navigate your options –
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