

Food Machinery Additives



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NSF HX-1 Tackifiers

Tackifiers impart anti-fling and anti-mist behavior to improve product retention on high speed equipment and prevent lubricant or grease from spreading around a worksite. See the **Tackifier** brochure from Functional Products Inc. for more information.

Product	Diluent Oil	Chemistry	Viscosity, 100°C	Typical Color	Shear Stability	String Length	Ecolabel LuSC?
V-422	H1 White Oil	PIB	3000	Colorless	Good	53	No
V-475	H1 White Oil	PIB	1650	Colorless	Fair	82	No
V-425	H1 White Oil	OCP	3000	Colorless	Best	15	No
V-188P2	PAO	OCP	9250	Colorless	Best	20	Yes
V-584	Veg Oil	Proprietary	2500 at 40°C	Orange	Good	10	Yes
V-802	Water/Glycol	Proprietary	60000 at 40°C	White	Good	20	No

No maximum treat rate for NSF H1 – use minimum wt% to achieve technical effect.

FUNCTIONAL V-422 and **V-475** are polyisobutylene (PIB) tackifiers in white oil used to provide tack in NSF H1 lubricants. **FUNCTIONAL V-422** uses a high molecular weight polymer for good efficiency and shear stability. **FUNCTIONAL V-475** uses an ultra-high molecular weight polymer to provide excellent tackiness and handling viscosities. Both PIB tackifiers offer clear burn-off at high temperature with minimal potential for varnish which makes them the best choice for ovens and chain oils.

FUNCTIONAL V-425 and **V-188P2** are shear stable olefin copolymer (OCP) tackifiers which provide the most durable source of tack for NSF H1 lubricants. OCP tackifiers withstand shearing and heat over longer durations than PIB tackifiers which makes them the best choice for H1 gear oils.

FUNCTIONAL V-584 is a biobased tackifier for H1 vegetable oils and synthetic esters.

FUNCTIONAL V-802 is a water based tackifier for aqueous lubricants.



Nonfood Compounds Program Listed
Category Code: HX-1
Registration No. #####

NSF HX-1 Viscosity Modifiers

Viscosity modifiers can be used to tune the viscosity and viscosity index of oil to provide the proper ISO viscosity grades for chain oils, hydraulic fluids, gear oils, and more.

Product	Viscosity, at 100°C	PSSI, ASTM D6278	Chemistry	Base Oil	Color	Use With	Ecolabel LuSC?
V-460	3000	25	OCP	White Oil	Colorless	White Oil, Group III, PAO	No
V-160P2	1000	22	OCP	PAO	White	White Oil, Group III, PAO	No
V-508	1250	29	Proprietary	Veg Oil	Yellow	Veg Oil, Synthetic Ester	Yes
V-508F	7000	29	Proprietary	Ester	Yellow	Veg Oil, Synthetic Ester	Yes

No maximum treat rate for NSF H1 – use minimum wt% to achieve technical effect.

FUNCTIONAL V-460 and **V-160P2** are shear stable OCP viscosity modifiers (22-25 SSI) in white oil or PAO, respectively.

FUNCTIONAL V-508 and **V-508F** are biobased viscosity modifiers (29 SSI) in vegetable oil or synthetic ester.

NSF HX-1 Industrial Additives

Additive chemistry is available as packages (synergistic blend of components) or as individual components. These products can improve wear, extreme pressure, corrosion, water separability, and foam resistance of lubricants.

Corrosion Inhibitors

For Protection Against Rust and Moderate Wear

Corrosion inhibitors for corrosion of iron, steel, and other ferrous metals.

Product	Role	Chemistry	Diluent Oil	Application Notes	Max NSF wt%	Ecolabel LuSC?
CI-426	AW/EP/CI	Amine Phosphate	None	Multipurpose rust and wear protection	0.5%	No
CI-427	AW/EP/CI	Amine Phosphate	None	Legacy amine phosphate chemistry	0.5%	No
CI-498	AW/CI	Proprietary	Water	Water corrosion	Any*	No

* = Minimum wt% to achieve desired technical effect.

FUNCTIONAL CI-426 and **CI-427** are neutral amine phosphate corrosion inhibitors which provide rust protection against water and salt water in test methods like ASTM D665 turbine oil rust at treat rates of 0.25wt%. Amine phosphates also provide good antiwear and extreme pressure protection. **FUNCTIONAL CI-427** is a drop-in replacement for legacy amine phosphate corrosion inhibitor, CAS# 80939-62-4.

FUNCTIONAL CI-498 is recommended at 0.1wt% for rust protection in aqueous lubricants.

Antiwear and Extreme Pressure

For Protection Against Severe Wear and Scuffing

Functional Products Inc. manufactures a wide range of multifunctional ashless antiwear/EP additives for use as the primary antiwear chemistry in a formulation or as a top treat to boost wear performance.

Product	Role	Chemistry	Diluent Oil	Application Notes	Max NSF wt%	Ecolabel LuSC?
GA-400	HF/Gear Package	Proprietary	White Oil	Hydraulic (0.55%); gear, grease (1.1%)	1.1%	No
AW-116	AW/EP	Amine Phosphate	None	Gear oil, grease	0.65%	No
CI-426EP	AW/EP/CI	Amine Phosphate	Veg Oil	Chain oils, grease	2.0%	No

FUNCTIONAL GA-400 is an ashless additive package for hydraulic fluid and light duty gear oil which works in a variety of NSF H1 and industrial formulations. **FUNCTIONAL GA-400** requires the formulator to add demulsifier and defoamer as needed for the specific base oil used. **FUNCTIONAL DM-400** and **DF-400** (next page) are recommended.

FUNCTIONAL AW-116 is a mildly acidic multifunctional amine phosphate corrosion inhibitor, antiwear, and extreme pressure additive. Higher phosphorus content than neutral amine phosphate corrosion inhibitors.

FUNCTIONAL CI-426EP is an enhanced neutral amine phosphate for improved lubricity in extreme pressure conditions which is popular in both industrial and NSF H1 lubricants.

Demulsifiers and Defoamers

Surface Active Demulsifiers and Defoamers for Water Separability and Foam Removal

Demulsification and defoaming are critical to the success of industrial and specialty lubricants.

Product	Role	Suggested wt%	Chemistry	Use With	Max NSF wt%	Ecolabel LuSC?
DM-400	Demulsifier	0.20%	Proprietary	Petroleum oils, synthetics, esters	>1%	Yes
DF-400	Defoamer	0.10%	Silicone	Petroleum oils, synthetics, esters	Any*	Yes

* = Minimum wt% to achieve desired technical effect.

FUNCTIONAL DM-400 is a versatile demulsifier for a variety of industrial, NSF H1, and Ecolabel base stocks in ASTM D1401 and ASTM D2711 water separability tests.

FUNCTIONAL DF-400 is a silicone-based defoamer which is compatible and effective in most base stocks.

NSF HX-1 Grease Additives

Grease Polymers

For H1 Calcium Sulfonate, Calcium Sulfonate Complex, and Aluminum Complex Greases

Grease polymers are used to provide water resistance, tack, mechanical strength, and improved yield to grease.

Product	Suggested wt%	Form	Polymer Type	Recommended Use
V-211	0.5wt%	Flake	Temp. Sensitive	Industrial paraffinic grease; H1 greases (white oil, Gr. III)
V-4064	2wt%	Pellet	Temp. Sensitive	H1 greases (PAO, mPAO)

No maximum treat rate for NSF H1 – use minimum wt% to achieve technical effect.

FUNCTIONAL V-211 is a styrene olefin copolymer which further enhances performance over **FUNCTIONAL V-207** for extreme water resistance. 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 negatively affect texture.

FUNCTIONAL V-4064 is best suited for improving low solvency PAO grease for NSF H1 applications. **FUNCTIONAL V-4064** has improved thermal and oxidative stability versus **FUNCTIONAL V-207** or **FUNCTIONAL V-211**.

CERAMAX

HX-1 Micronized Boron Nitride Solid Lubricant

Product	Suggested wt%	Form	Role	Recommended Use	Max NSF wt%
CERAMAX	1wt%	Powder	Extreme pressure (EP)	Micronized boron nitride; high temp. solid lubricant	40%

FUNCTIONAL CERAMAX is a highly durable extreme pressure and solid lubricant additive for improving the EP properties of greases, coatings, metal forming lubricants, and anti-seize compounds. Boron nitride is a ceramic material able to withstand extreme temperatures without degrading.