KING INDUSTRIES
SPECIALTY CHEMICALS

2022
Product Range

Lubricant Additives

Specialty Additives & Synthetic Base Stocks

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King Industries, Inc., a leader in lubricant additive technology, offers a robust product portfolio supported by innovative chemistries and technical support. For nearly a century, the King family has owned and operated from our headquarters in Norwalk, Connecticut implementing a visionary approach to developing multifunctional additives to meet demanding industry challenges.

NA-LUBE® KR
Synthetic Alkylated Naphthalene

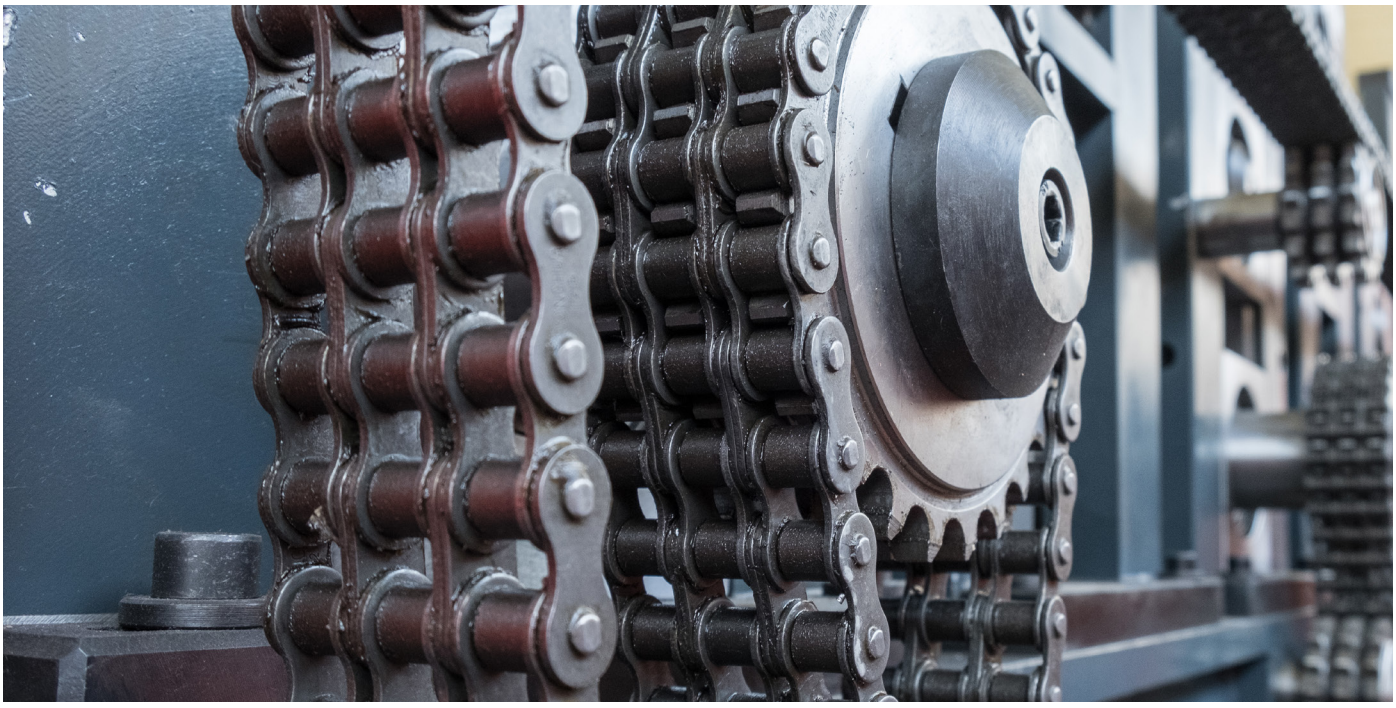
The **NA-LUBE KR** alkylated naphthalene product line offers the lubricant industry's widest available viscosity range and performance capabilities. Alkylated naphthalenes are high performance Group V base oils that can be used alone or as modifiers for other base oils, including Group II, Group III or PAOs. **NA-LUBE KR** alkylated naphthalenes provide superior thermal and thermo-oxidative stability, excellent hydrolytic stability and varnish control to extend the lifetime of high performance lubricants without introducing surface competition with additives. The **NA-LUBE KR** line includes three grades that are FDA 21 CFR compliant for incidental food contact and registered with the **NSF** as **HX-1** lubricant additives.

KR

- » Thermal and thermo-oxidative stability
- » Hydrolytic stability
- » Varnish control

Alkylated Naphthalene Synthetic Base Stocks & Modifiers

	Viscosity @ 40°C *ASTM D445*	*Viscosity @ 100°C* *ASTM D445*	*Viscosity Index* *Calculated*	*Aniline Point* *ASTM D611*	*Noack Volatility* *CEC L40* *ASTM D6375*	*Pour Point* *ASTM D97*	*Flash Point* *ASTM D92*
NA-LUBE KR-008	36 cSt	5.3 cSt	90	42°C	12 wt%	-33°C	223°C
NA-LUBE KR-015	113 cSt	12.3 cSt	115	94°C	2.2 wt%	-39°C	260°C
NA-LUBE KR-019	169 cSt	17.9 cSt	119	103°C	1.4 wt%	-26°C	292°C
NSF **NA-LUBE KR-006FG**	38 cSt	6.6 cSt	90	42°C	11 wt%	-33°C	236°C
NSF **NA-LUBE KR-015FG**	113 cSt	12.4 cSt	115	94°C	2.2 wt%	-42°C	259°C
NSF **NA-LUBE KR-029FG**	170 cSt	17.9 cSt	119	103°C	1.4 wt%	-26°C	282°C



NA-SUL®
Rust Inhibitors

The **NA-SUL** product line consists of premium, rust inhibitors for industrial and automotive lubricants, greases, metalworking fluids, and rust preventive concentrates. The chemistry is based on salts of alkylnaphthalene sulfonic acids using a wide variety of neutralizing metals and amines.

NA-SUL products consistently outperform other synthetic or petroleum sulfonates, offering better performance at equal or lower concentrations with unsurpassed demulsibility, outstanding filterability, and enhanced oxidation stability. Additionally, **NA-SUL** products have exceptional additive compatibility and are soluble in a variety of base fluids.

RI

- » Demulsibility
- » Filterability
- » Oxidation stability

Neutral Sulfonate Metal Salt Rust Inhibitors

	% Metal Content	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NA-SUL 729	2.2% Calcium	3300 cSt	77 cSt	Calcium sulfonate in light mineral oil	>160°C
NA-SUL BSN	6.6% Barium	2100 cSt	55 cSt	Barium sulfonate in light mineral oil	>160°C
NA-SUL ZS	2.8% Zinc	400 cSt	32 cSt	Zinc sulfonate in light mineral oil	>160°C
NA-SUL MG	1.3% Magnesium	3300 cSt	86 cSt	Magnesium sulfonate in light mineral oil	>160°C
NA-SUL SS	2.4% Sodium	2000 cSt	57 cSt	Sodium sulfonate in light mineral oil	>160°C
NSF **NA-SUL CA-770FG**	1.7% Calcium	214 cSt	24 cSt	Calcium sulfonate in PAO	>150°C

Overbased Basic Sulfonate Metal Salt Rust Inhibitors

	% Metal Content	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NA-SUL CA-50*	3.4% Calcium	500 cSt	20 cSt	Carbonated basic calcium sulfonate in light mineral oil	>160°C
NA-SUL BSB*	11.8% Barium	2400 cSt	63 cSt	Basic barium sulfonate in light mineral oil	>160°C
NA-SUL 611*	11.6% Barium	2400 cSt	65 cSt	Carbonated basic barium sulfonate in light mineral oil	>160°C

*TBN: 48 mg KOH/g

High Temperature Sulfonate / Carboxylate Complexes

	% Metal Content	Viscosity @ 40°C	Viscosity @ 100°C	Chemistry	Flash Point ASTM D92
NA-SUL CA-1089	2.3% Calcium	2500 cSt	36 cSt	Calcium sulfonate/carboxylate in light mineral oil	>160°C
NA-SUL CA-HT3	2.6% Calcium	1335 cSt	50 cSt	Calcium sulfonate/carboxylate in light mineral oil	>160°C
NA-SUL ZS-HT	3.8% Zinc	400 cSt	30 cSt	Zinc sulfonate/carboxylate in light mineral oil	>160°C
NA-SUL BSN-HT	8.9% Barium	3100 cSt	75 cSt	Barium sulfonate/carboxylate in light mineral oil	>170°C
NA-SUL MG-HT	1.7% Magnesium	3200 cSt	75 cSt	Magnesium sulfonate/carboxylate in light mineral oil	>160°C

Amine Salts

	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Chemistry	Flash Point ASTM D92
NA-SUL DTA	0.5%	5200 cSt	83 cSt	Alkylnaphthalene sulfonate in light mineral oil	165°C
NA-SUL EDS	0.7%	220 cSt	26 cSt	Alkylnaphthalene sulfonate in aliphatic solvent	70°C

NA-SUL®
Rust Preventive Additives

The **NA-SUL** product line also includes rust preventive additives designed for concentrates that combine King Industries' uniquely effective sulfonate chemistries with complementary polar compounds to produce products with unsurpassed performance. These synergistic combinations can be used to produce hydrophobic, thin-film, temporary rust preventive coatings that exclude water and air from reaching the metal surface. The resulting performance advantage provides multi-metal protection in a wide range of applications, from general and indoor storage to harsh exterior environments. **NA-SUL** rust preventive concentrates are typically effective at very low treat rates compared to competitive products.

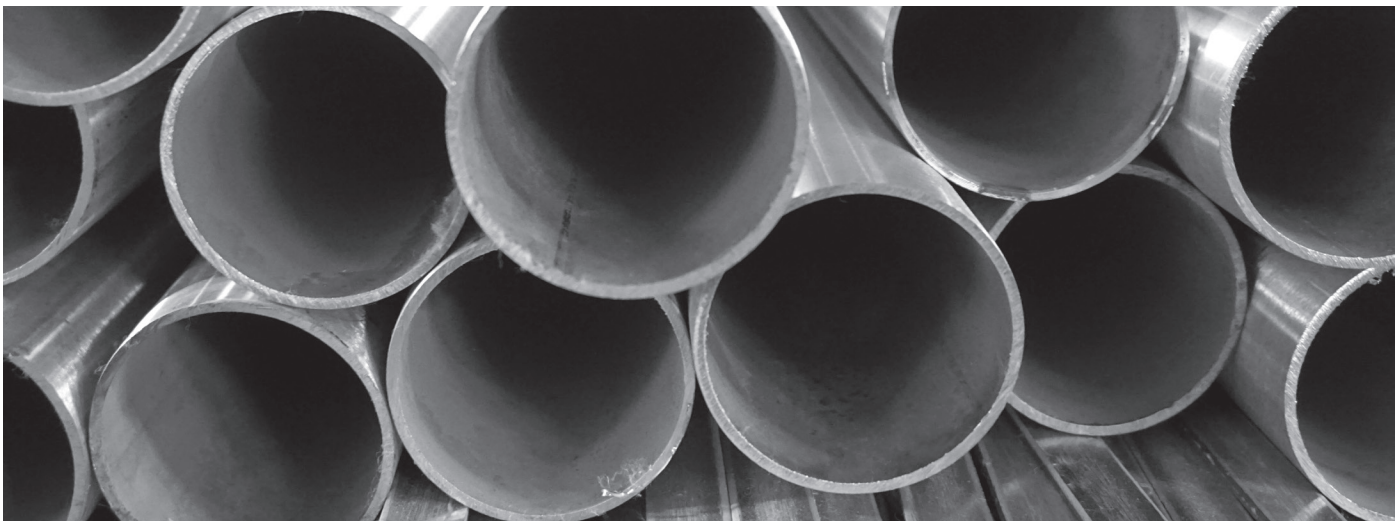
RP

- » Hydrophobic film
- » Multimetal protection
- » Effective at low treat rates

Rust Preventive Additives

	% Metal Content	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NA-SUL CA-HT3	2.6% Calcium	1335 cSt	50 cSt	Calcium sulfonate/carboxylate in light mineral oil	>160°C
NA-SUL CA-1082	1.4% Calcium	795 cSt	38 cSt	Calcium sulfonate/carboxylate in light mineral oil	>150°C
NA-SUL CA-1089	2.3% Calcium	2500 cSt	36 cSt	Calcium sulfonate/carboxylate in light mineral oil	>160°C
NA-SUL CA-1122	2.5% Calcium	476 cSt	28 cSt	Calcium sulfonate/carboxylate in light mineral oil	>150°C
NA-SUL CA-1259	1.4% Calcium	1495 cSt	62 cSt	Calcium sulfonate/carboxylate in light mineral oil	>150°C
NA-SUL CA-1183*	2.6% Calcium	3463 cSt	110 cSt	Calcium sulfonate/mixed diluent oils	>150°C
NA-SUL 1101*	Ashless	769 cSt	35 cSt	Proprietary mixture of ammonium sulfonate and carboxylate derivative in light mineral oil	>150°C
KX1331	0.8% Calcium 3.7% Magnesium	745 cSt	47 cSt	Calcium and magnesium sulfonates with carboxylates	>150°C
KX1292	7.7% Barium	1125 cSt	55 cSt	Barium sulfonate/carboxylate in a light mineral oil	>150°C

* Emulsifiable for aqueous formulations



Wax Containing Rust Preventive Additives

	% Calcium Content	Viscosity @ 100°C	Chemistry	Flash Point ASTM D92
NA-SUL CA/W1177	1.5 %	104 cSt	Calcium sulfonate/carboxylate and oxidized petrolatum	>150°C
NA-SUL CA/W1213	1.5%	350 cSt	Calcium sulfonate/carboxylate and petroleum oxidates	>150°C
NA-SUL CA/W1146	2.1%	350 cSt	Calcium sulfonate/carboxylate and petroleum oxidates	>160°C
NA-SUL CA/W1745	1.9%	250 cSt	Calcium sulfonate in an oxidized petrolatum	>160°C
NA-SUL CA/W1935	1.5%	400 cSt	Calcium sulfonate in a petroleum oxidate	>170°C

Aqueous Rust Preventive Additives

	Sulfonate Salt	Viscosity @ 40°C	Chemistry	Flash Point ASTM D92
NA-SUL 437	Ashless	300 cSt	Preparation of synthetic sulfonic acid, organic acid complex and an amine	>100°C
NA-SUL 1019A	Ashless	350 cSt	Preparation of synthetic sulfonic acid, organic acid complex and an alkanolamine	>140°C
NA-SUL 450	Calcium	660 cSt	Calcium sulfonate/carboxylate, alkanolamines, ester	>80°C
KX460	Calcium Sodium	3770 cSt	Calcium sulfonate with carboxylates and emulsifiers	>90°C

K-CORR®
Rust Inhibitors & Yellow Metal Deactivators

The **K-CORR** product line encompasses a variety of ashless, non-sulfonate rust inhibitors as well as yellow metal deactivators and products specifically designed for greases.

Ashless Additives

K-CORR rust inhibitors cover a broad range of additives that can be used in industrial and automotive lubricants and greases as well as rust preventive fluids.

	Viscosity @ 40°C	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*	*Function*
K-CORR 100	470 cSt	23 cSt	Ester/amide/carboxylate	>150°C	Rust inhibitor & antiwear synergist
K-CORR 1031	1030 cSt	52 cSt	Carboxylic acid/amide	>150°C	Rust inhibitor & antiwear synergist
K-CORR 1227	-	68 cSt	Organic acid/ imidazoline derivative	>150°C	Rust inhibitor film former
K-CORR SA-300	3194 cSt	38 cSt	Alkylated organic acid/ester in light mineral oil	>150°C	Rust inhibitor
KX1311	154 cSt	14 cSt	Amide derivative in mineral oil	>180°C	Low acid value rust inhibitor

Yellow Metal Deactivators

The primary function of the **K-CORR NF** products is to protect copper and its alloys from corrosion when used in a broad range of industrial and automotive lubricants, greases and rust preventive fluids. The **K-CORR NF** products are effective at very low treat rates.

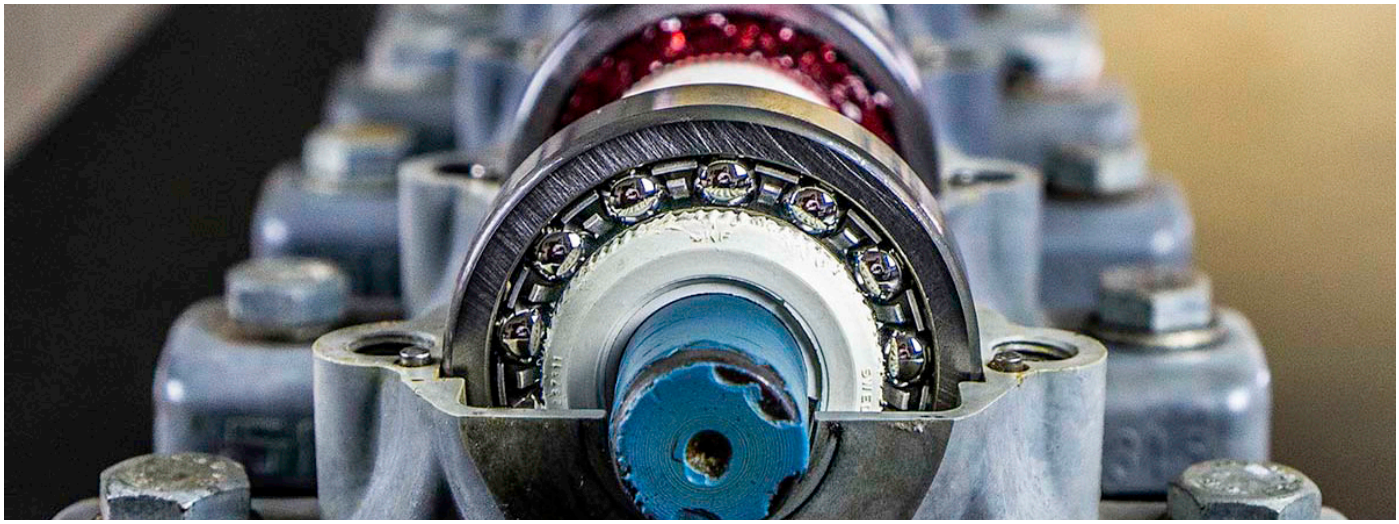
	% Sulfur Content	*% Nitrogen Content*	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*	*Function*
K-CORR NF-200	-	14.5%	78 cSt	6 cSt	Heterocyclic derivative	>170°C	Copper passivator
K-CORR NF-410	35%	6.4%	500 cSt	14 cSt	Sulfur & nitrogen	>150°C	Sulfur scavenger

K-CORR® G
Synergistic Rust Inhibitors for Greases

The **K-CORR G** products are synergistic rust inhibitors specifically developed to provide excellent rust protection to greases used in severe applications or conditions. The **K-CORR G** products are synergistic with many extreme pressure and antiwear additives and can be used at relatively low treat rates while maintaining exceptional performance. These products have excellent compatibility with other functional additives, can be used with a variety of thickener systems and have minimal effect on other grease properties.

G

- » Severe condition rust inhibitors
- » Thickener compatibility
- » Low treat rate



Rust Inhibitor

	% Zinc Content	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Flash Point ASTM D92*
K-CORR G-1086A	8.9%	6400 cSt	153 cSt	>150°C

Synthetic Rust Inhibitors

Recommended for use as zinc naphthenate alternatives

	% Zinc Content	*% Phosphorus Content*	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Flash Point ASTM D92*
K-CORR G-1340	13.2%	1.1%	12878 cSt	135 cSt	>130°C
K-CORR G-1350	8.4%	-	-	-	>150°C
K-CORR G-1360	8.2%	1.1%	815 cSt	31 cSt	>130°C
K-CORR G-1370	13.3%	1.1%	7727 cSt	75 cSt	>140°C

Ashless Rust Inhibitor

	% Phosphorus Content	*% Nitrogen Content*	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Flash Point ASTM D92*
K-CORR G-1107	4.0%	3.7%	719 cSt	34 cSt	>95°C

NA-LUBE® AW
Ashless Multifunctional Antiwear Additives

The **NA-LUBE AW** series are ashless phosphorus based antiwear additives well suited for a variety of applications.

NA-LUBE AW products exhibit excellent extreme pressure and antiwear performance, are soluble in a broad range of base fluids and offer outstanding rust inhibition. Additionally, when combined with select sulfur carriers, the **NA-LUBE AW** products can be used as suitable alternatives to chlorinated paraffins. The **NA-LUBE AW** products also demonstrate synergistic performance with other King Industries additives, including **NA-LUBE EP, NA-LUBE AO** and **K-CORR®** products.

AW

- » Antiwear and extreme pressure performance
- » Rust inhibition
- » Wide range of solubility

Phosphorus Containing Additives

	% Sulfur Content	% Phosphorus Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Flash Point ASTM D92
NA-LUBE AW-6110	-	8.0%	1.8%	448 cSt	34 cSt	>80°C
NA-LUBE AW-6110P	-	5.2%	3.6%	200 cSt	14 cSt	>80°C
NA-LUBE AW-6220	-	4.3%	5.6%	240 cSt	13 cSt	>100°C
NA-LUBE AW-6310	9.9%	4.1%	3.2%	144 cSt	13 cSt	>120°C
NA-LUBE AW-6330	10.6%	5.1%	-	20 cSt	3 cSt	>150°C
NSF **NA-LUBE AW-6400FG**	-	7.2%	2.6%	1400 cSt	50 cSt	>100°C
NSF **NA-LUBE AW-6509**	9.9%	9.2%	-	Crystalline powder 52.2°C Melting point		>200°C

NA-LUBE® FM
Friction Modifiers

NA-LUBE FM friction modifiers enhance lubricity and reduce friction especially during equipment start-up and shut-down operations. King Industries offers molybdenum and tungsten based friction modifiers to improve the coefficient of friction and wear results in a variety of lubricants, including engine oils, industrial and automotive gear oils and greases. The tungsten and molybdenum **NA-LUBE FM** products can be combined to provide synergistic performance. **NA-LUBE FM** products also provide synergistic oxidation protection in formulated systems with antioxidants and zinc dithiophosphates.

FM

- » Reduce friction
- » Enhance lubricity
- » Synergistic oxidation protection

Tungsten Friction Modifiers

	Metal	% Metal Content	Viscosity @ 40°C	Viscosity @ 100°C	Flash Point ASTM D92
NA-LUBE FM-1191	Tungsten	9.7%	33 cSt	5 cSt	>130°C

Molybdenum Friction Modifier

	% Molybdenum Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Flash Point ASTM D92
NA-LUBE FM-1187	7.1%	2.1%	155 cSt	15 cSt	>150°C

The **NA-LUBE EP** series features oxidatively stable additives with low odor, light-colored sulfurized products based on fatty acid esters, fatty acid esters/triglycerides or sulfurized α-olefins/triglycerides. These sulfur-containing additives feature exceptional solubility and superior compatibility with yellow metal deactivators and antioxidants. **NA-LUBE EP** products perform optimally under high loads and temperatures with demonstrated synergistic effects on the coefficient of friction when used in combination with other fatty lubricity and phosphorous products. **NA-LUBE EP** products are available with a variety of active and total sulfur amounts for a wide range of applications.

EP

- » Extreme pressure performance
- » Low odor, light color
- » Additive compatibility

Sulfurized Fatty Acid Ester

	% Sulfur Content	*% Active Sulfur Content*	*Viscosity @ 40°C*	*Flash Point ASTM D92*
NA-LUBE EP-5210	10.5%	<1.0%	24 cSt	170°C
NA-LUBE EP-5218	17.4%	6.0%	50 cSt	180°C

Sulfurized Fatty Acid Ester / Triglyceride

	% Sulfur Content	*% Active Sulfur Content*	*Viscosity @ 40°C*	*Flash Point ASTM D92*
NA-LUBE EP-5310	10.6%	<1.0%	258 cSt	195°C
NA-LUBE EP-5316	15.9%	5.0%	270 cSt	195°C

Sulfurized Olefin / Triglyceride

	% Sulfur Content	*% Active Sulfur Content*	*Viscosity @ 40°C*	*Flash Point ASTM D92*
NA-LUBE EP-5415	14.5%	2.7%	297 cSt	>190°C
NA-LUBE EP-5425	26.7%	17.0%	790 cSt	>155°C

Specialty

	% Sulfur Content	*% Nitrogen Content*	*Viscosity @ 40°C*	*Flash Point ASTM D92*
NA-LUBE EP-5665	63.6%	18.3%	Solid	>93°C

NA-LUBE ADTC

NA-LUBE ADTC is a liquid, ashless, multifunctional additive with extreme pressure, antiwear and antioxidant characteristics. **NA-LUBE ADTC** is well suited for use in both lubricants and greases. This additive is highly effective in low ash EP greases, industrial gear oils, hydraulic fluids and R&O oils formulations.

	% Sulfur Content	*% Nitrogen Content*	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Flash Point ASTM D92*
NA-LUBE ADTC	30.4%	6.5%	383 cSt	15 cSt	>200°C

NA-LUBE® AO
Antioxidants

Primary Antioxidants

The **NA-LUBE AO** product line is a series of aminic and phenolic antioxidants that can be used in a broad range of industrial lubricants, engine oils and greases. These products control the oxidation of lubricants to reduce sludge formation and viscosity increase. The **NA-LUBE AO** products are ashless and non-corrosive and have excellent solubility in a wide range of base fluids.

AO

- » Oxidation control
- » Reduce viscosity increase
- » Reduce sludge formation

Aminic

	% Nitrogen Content	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NA-LUBE AO-130	3.7%	508 cSt	17 cSt	Nonylated diphenylamine	165°C
NSF **NA-LUBE AO-142**	4.6%	365 cSt	9 cSt	Butylated, octylated diphenylamine	185°C

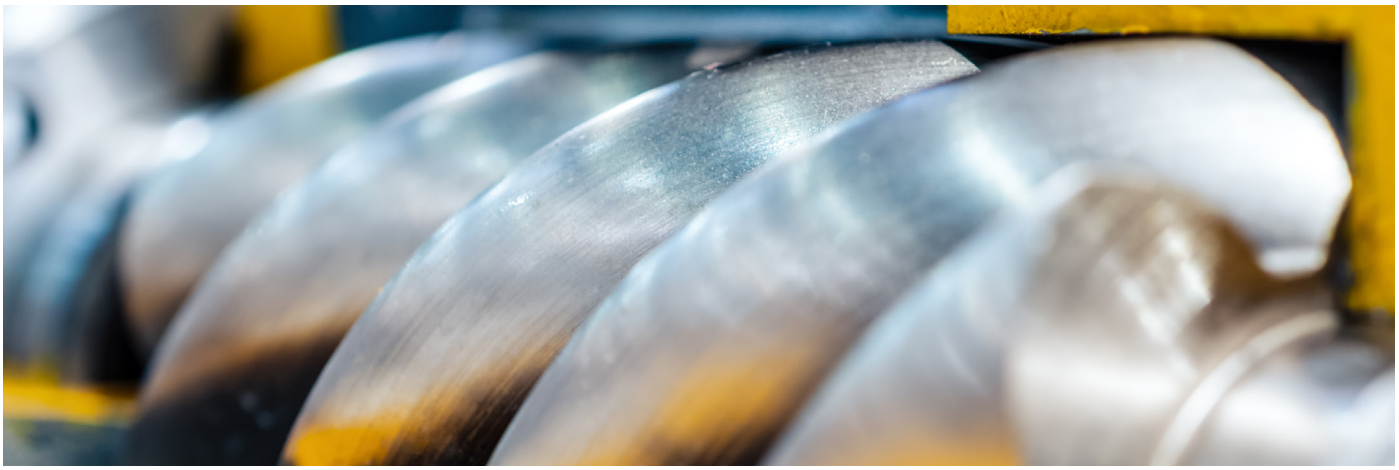
Phenolic

	Viscosity @ 40°C	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NA-LUBE AO-210	-	2 cSt	2,6-di-tert-butylphenol	100°C
NA-LUBE AO-242	117 cSt	5 cSt	Di-tert-butylphenol derivative	148°C

Secondary Antioxidants

King Industries offers multifunctional products with secondary antioxidant properties, **NA-LUBE ADTC** and **NA-LUBE AW-6330**. The primary functions of these products are as extreme pressure and antiwear agents, respectively.

	% Sulfur Content	*% Nitrogen Content*	*Viscosity @ 40°C*	*Viscosity @ 100°C*	*Chemistry*	*Flash Point ASTM D92*
NSF **NA-LUBE ADTC**	30.4%	6.5%	303 cSt	15 cSt	Methylene-bis-dibutyldithiocarbamate	>200°C
NA-LUBE AW-6330	10.6%	-	20 cSt	3 cSt	Sulfur/phosphorus	>150°C



The **NA-LUBE BL** series is comprised of high performance, ashless packages for use in premium industrial lubricants. Ongoing additive technical service and the continued study of interactions have led to the development of packages that incorporate the most desirable features into a single blend.

R&O

	% Sulfur Content	% Phosphorus Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Feature
NA-LUBE BL-1208	7.0%	0.2%	3.7%	132 cSt	9 cSt	General purpose

Hydraulic Oil

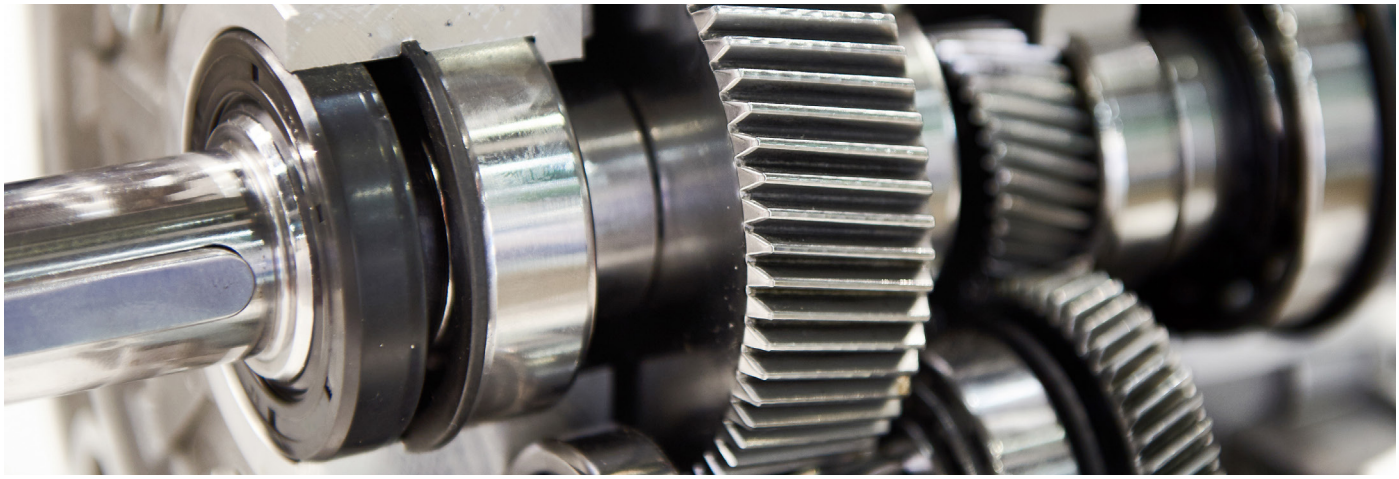
	% Sulfur Content	% Phosphorus Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Feature
NA-LUBE BL-1232 EL	8.3%	0.9%	2.8%	177 cSt	10 cSt	For ester-based lubricants & Ecolabel eligible
NSF **NA-LUBE BL-1300FG**	-	1.0%	1.4%	86 cSt	9 cSt	Food grade package

Compressor / Hydraulic Oil

	% Sulfur Content	% Phosphorus Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Feature
NA-LUBE BL-1200	6.3%	1.0%	4.0%	124 cSt	8 cSt	For premium oils & severe conditions

Industrial Gear Oil

	% Sulfur Content	% Phosphorus Content	% Nitrogen Content	Viscosity @ 40°C	Viscosity @ 100°C	Feature
NA-LUBE BL-1208	7.0%	0.2%	3.7%	132 cSt	9 cSt	Fulfills AGMA 9005-E02 industrial gear oil specifications
+ **NA-LUBE AW-6310**	9.9%	4.1%	3.2%	144 cSt	13 cSt	
KX1323	8.5%	1.4%	2.5%	186 cSt	11 cSt	For ester-based gear oils & Ecolabel eligible



HX-1 Products
Additives, Packages & Synthetic Base Oils for Incidental Food Contact

King Industries offers a range of additives and synthetic base oils compliant with the FDA 21 CFR 178.3570 for use in lubricants with incidental food contact. These **NA-SUL®**, **NA-LUBE®**, and **K-CORR®** products are registered with the **NSF** as HX-1 components for use in H1 lubricants. These additives are Halal and Kosher certified.

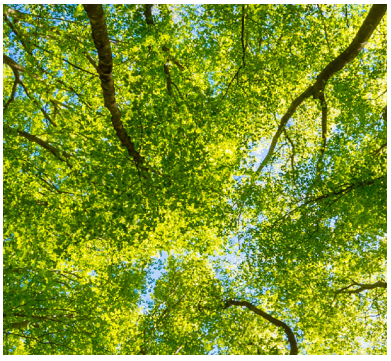
	Function	*Chemistry*	*Appearance*	*Maximum Allowed Treat Rate*
NA-LUBE KR-006FG	Synthetic Base Stock	Alkylated naphthalene	Light amber liquid	Unlimited
NA-LUBE KR-015FG	Synthetic Base Stock	Alkylated naphthalene	Light amber liquid	Unlimited
NA-LUBE KR-029FG	Synthetic Base Stock	Alkylated naphthalene	Light amber liquid	Unlimited
NA-SUL CA-770FG	Rust Preventive	Calcium sulfonate in PAO	Clear brown viscous liquid	10%
K-CORR NF-200	Yellow Metal Deactivator	Tolytriazole derivative	Clear amber viscous liquid	0.1%
NA-LUBE AW-6400FG	Antiwear	Amine phosphate	Light yellow viscous liquid	0.5%
NA-LUBE AW-6509	Antiwear	Triphenyl phosphorothionate	White powder	0.5%
NA-LUBE ADTC	Ashless dithiocarbamate	Ashless dithiocarbamate	Light brown moderately viscous liquid	0.5%
NA-LUBE AO-142	Antioxidant	Butylated, octylated diphenylamine	Yellow to reddish-brown viscous liquid	0.5%
NA-LUBE BL-1300FG	Blend	Proprietary blend	Clear amber low viscous liquid	2.3%

LuSC-list Products
Additives & Packages for the EU Ecolabel

King Industries has several additives and packages on the Lubricant Substance Classification List or LuSC-list to assist in formulating products eligible for the European Ecolabel. This list of substances and brands has been assessed for biodegradation / bioaccumulation, aquatic toxicity, renewability, and exclusion lists of substances by a competent body for environmentally friendly formulations. The following products comply with the revised criteria according to the November 8, 2018 EU Commission decision 2018/1702 and were added to the new LuSC-list through December 31, 2024.

LuSC-list

	Maximum Allowed Treat Rate					
	Cat 1	**Cat 2**	**Cat 3**	**Cat 4**	**Cat 5**	**Cat 6**
NA-SUL CA-770FG	5%	10%	10%	10%	5%	10%
NA-LUBE AW-6330	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
NA-LUBE ADTC	5%	10%	10%	10%	5%	10%
NA-LUBE BL-1232 EL	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
KX1323	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%



Cat 1: ALL (No Grease), **Cat 2:** ALL (Only Grease), **Cat 3**: PLL (No Grease), **Cat 4**: PLL (Only Grease), **Cat 5:** TLL (No Grease) **Cat 6**: TLL (Only Grease)

The technical service that we offer to our customers is an important part of our relationships and value of our business. We maintain a broad range of ASTM, DIN and IP testing capabilities and equipment coupled with committed, experienced personnel to assist you in your formulating endeavors. Our performance testing capabilities in our technical service laboratories include:

Test	Method
1,000 Hour Sludge	ASTM D4310
Acid Atmosphere	In-house
Air Release	ASTM D3427, DIN 51 381
CM Thermal Stability	ASTM D2070
Cone Penetration	ASTM D217, IP 50
Copper Corrosion	ASTM D130 / D4048, DIN 51 759, IP 154
Demulsibility	ASTM D1401 / D2711, DIN 51 599
DKA Oxidation Stability	CEC L-48-A-95 (B)
Dropping Point	ASTM D2265
EMCOR	ASTM D6138, DIN 51 802, IP 220
FE-8	DIN 51819 / 51819-3
Filterability	DIN ISO 13357, A-TP-02100
Foam	ASTM D892, DIN 51 566E, IP 146
Four Ball Wear	ASTM D4172 / D2266, DIN 51350-3 / 51350-5, IP 239
Four Ball Weld	ASTM D2596 / D2783, DIN 51350-2 / 51350-4, IP 239
FZG A/8.3/90	ASTM D5182, DIN 51 354, IP 334
Gear Oil Oxidation	ASTM D2893
Grease Oxidation Stability	ASTM D942
Grease Water Stability	DIN-51807-1
Humidity Cabinet	ASTM D1748, DIN 51 359, IP 366
Hydrolytic Stability	ASTM D2619
Iron Chip Corrosion	ASTM D4627
Kesternich	DIN 50 017
Oil Separation, Wire Mesh Cone, Static	DIN 51817, IP 121
Oxidation Stability	IP 48
Panel Coker	In-house
PDSC	ASTM D5483/ D6186
RPVOT	ASTM D2272
Salt Spray	ASTM B117, DIN 50 021
SRV	ASTM D6425 / D5706/5707, DIN 31 834
Stacked Stain	In-house
Static Rust	ASTM D1743 / D5969
Steel Corrosion	ASTM D665 (A&B), DIN 51 585 (A&B), IP 135
Timken	ASTM D2509 / D2782, DIN 51434, IP 326
TOST	ASTM D943, DIN 51 587
Water Displacement	In-house

Lubricant Additives
2022 Product Range

Data Disclaimer

Properties presented in this brochure are averages derived from typically twenty production lots. Product properties are subject to normal manufacturing and testing tolerances. Further information can be obtained from the certificates of analysis for each product.

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