The W Corporation is

continuing to grow as a lube and chemical company based on industry-leading competitiveness with energy & chemical experts.

TWC provides customer-customized "Total Lube and Chemical Service Solutions" by sharing the experiences of lubricant doctors through research and development and industry-academia cooperation with global large-scale base oil makers.

Vision & Mission

At TWC (The W Corporation), our vision is to make world run smoothly with technology. Our company aims to make high-quality lubricants and chemicals for reducing friction in our devices, reducing noise and saving energy in the world. To this end, we want to develop Korea's cutting-edge chemical technology and become a new standard for Korea.

Vision

To make the world run smoothly with technology.

Mission

Becoming the new Korea lube and chemical standard.

Value

Through state-of-the-art technology, pursuing the highest level of satisfaction and efficiency with our customers' cars and equipment.

Eco-friendly & Clean | Powerful performance | Long life & Fuel economy | Base Oil & Protection

CONTENTS

PRODUCTION FACILITY

ZEUS

A lubricant specialty company, has led the modern lubricant market for 40 years since its founding, providing lubricants products for Toyota Aisin, GM AC Delco, GS Caltex, Hyundai Heavy Industry, Kumho petrochemical, and Korea Electric Power Corporation

1970's

'78 Established Yusung Oil Co.,Ltd

1980's

'84 Joined Korea Lubricating Oil Industrise Association
'84 Registered Pertrolem Refining Industry
'85 Technical Cooperation with FUCHS in Germany
'86 Became a member of korea Industrial Research
'88 Obtained KS M 2126(Machine Oil)
'89 Registered as a supplier of Defense Procurement Agency and KORAIL

Storage Tanks

1990's

'92 Obtained KS M 2129 Hydraulic OilObtained KS M 2162 Hydraulic Oil
'93 Obtained KS M 2301 Electrical Insulating Oil KS M 2173 Cutting Fluid
'94 Registered as a supplier of KEPCOBegan Delivery of goods
'98 Obtained KS M 2121 Internal Combustion Engine Oil
'99 Obtained KS M 2121 Turbine OilKS M 2127 Gear Oil Incorporated Zeus Oil & Chemicals Co., Ltd.

3~6L Package Line

Control Room

Blending Tanks

Reaction Tank

2000's

'02 Completed Incheon Branch
'03 Established R&D Center
'06 Registered Patent No.10-0665093
'07 Registered Patent No.10-0728714
'08 Registered Venture Enterprise

18L, 20L Package Line

1L Package Line

2010's

'11 Completed manufacturing of lubricant facilities in Onsan National Industrial Complex
'13 Introduced Germany ML's Technology
'14 Completed Onsan Plant -Synthetic Chemical Reactors
'15 Obtained KS M 2121 Internal Combustion Engine Oil for ship KS M 2125 Automatic Transmission Fluid
'16 Built additional factories in Onsan Plant

GLOBAL PARTNERS

TWC

is collaborating with Sambo A&T and Bogo AP to pioneer the overseas aftermarket for auto parts with global partners.

SAMBO A&T BOGO AP

TWC is pioneering the overseas A/S market together with Sambo A&T. Sambo A&T is one of the major affiliates of Sambo Motors. Sambo Motors operates a total of 14 branches, including 6 domestically and 6 overseas. Sambo Motors groups mainly produce automotive transmission systems, engine fuel systems, interior and exterior plastic injection, reducers and tuning products for electric vehicle plastic products for Hyundai, Kia, GM and global automakers. In 2023, Sambo Motors Group sales exceeded $1.5 billion.

Handle Parts

Keyset Parts

F/Filler Lid Parts

K1 Lube created by global lubricant experts

Korea Number 1 Lubricants
K1 Lube

Recommended by Asia's top lube doctors

"Korean lubricant products made with world-class Group III, IV, V base oils and additives using the best technology with the confidence that they are world-class lubricants that are superior to and perform better than those of global lubricant companies."

Korean Lube
Dr. Bo-Hoon Kim
University of Texas at Arlington

"A genuine Korean lubricant made with the highest quality base oils and additives, it goes beyond Korea' s technological level and is of the highest quality used in major Japanese automobiles and construction equipment."

Japanese Lube
Dr. Hitoshi Hamaguchi
Diploma of the Membership Imperial College, London

"I used K1 Lube after Hyundai Motor Company's original product and it improved fuel efficiency and noise. Korean lubricants are suitable for Korean cars. I can trust that they are made by a company that makes engine parts for Hyundai/Kia cars."

Hyundai
Car Owner

"Containing the highest quality base oils, Group IV PAO and Group V Ester base oils, the car's quietness and engine oil life are extended and can save $200 in fuel efficiency every quarter."

PAO/Ester
Product User

K1 Lube

The optimal formula with Group III, IV, V base oils

The world's highest quality in base oils and global additives

Made from the best raw materials for OEM such as Hyundai, Kia, Toyota, GM, BMW, and Mercedes-Benz.

K1 Lube

Becoming the new Korea lube Standard

#1 in Korea Consumer Satisfaction Brand Awards

Winner of the
Consumer Satisfaction Brand Award

K1 Lube

KOR
Korea Synthetic Base Oil

K1 Lube

KOREA SYNTHETIC BASE OIL

Korea has full line-up of Group I/II/III base oil products in South Korea and Korean refineries are positioned as one of the world class manufacturers supplying high quality base oils to the global market, including Asia, the Middle East, the EU and North America.

Group I
Group I base oils are solvent-refined – a simpler refining process.
The most cost-effective base oils on the market.

Group II
Manufactured by hydrocracking – a complex refining process. Group II base oils have better antioxidation properties than Group I.
They also have a clearer color. Group II base oils are becoming very common on the market today.

Group III
These oils are greatly hydrocracked. This longer process is designed to achieve a purer base oil.
Although made from crude oil, Group III base oils are sometimes described as synthesized hydrocarbons, or synthetic technology.

Group IV
Group IV base oils are poly-alpha-olefins (PAOs). These synthetic base oils are made through a process called synthesizing.
They have a much broader temperature range and are great for use in extreme cold conditions and high heat applications.

Group V
Group V base oils are classified as all other base oils, including phosphate ester, PAG, polyol ester, bio-lubes. These base oils are at times mixed with other base stocks to enhance the oil's properties.
Esters are common Group V base oils used in different lubricant formulations to improve the properties of the existing base oil.

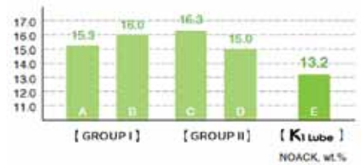
Korea is the world's largest producer of high-quality GIII base oil with three good properties

Excellent Low Temperature Property	High Oxidation Stability	Low Volatility

Preliminary cold property of Korea 6 cSt (Gr-III) compared to others (Gr-I or II)

Korea 6 cSt (Gr-III) shows the better oxidation stability compared to others (Gr-I or II)

Preliminary cold property of Korea 6 cSt (Gr-III) compared to others (Gr-I or II)



Formulating with Korea-Produced base oil

K1 Lube uses the world's best Korea Group & oils and the highest quality of Group, base oil materials that are approved by American Petroleum Institute (API) standards.

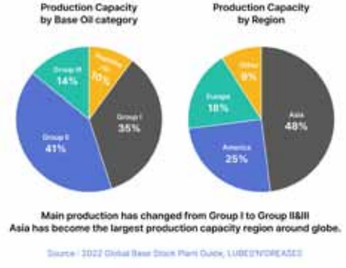
TABLE. API base oil groups

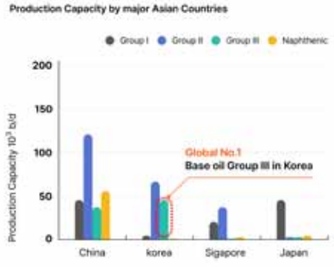
	Group I	Group II	Group III	Group IV	Group V
Saturates	< 90%	≥ 90%	≥ 90%	Polyalpha olefins (PAO)	All base oils not in Groups I, II, III, IV (e,g, esters, vegetable oil, etc.)
	and/or	and	and		
Sulfur	> 0.03%	≤ 0.03%	≤ 0.03%		
	and	and	and		
Viscosity Index	≥ 80 < 120	≥ 80 <120	≥ 120		

Engine oil is formulated with 80-90% base oil and 10-20% additives. K1 Lube is an engine oil made by using Group III base oil purchased by domestic & foreign Automobile OEMs and heavy equipment manufacturers, having many formulations approved by API standards and recommended by European OEM Automobiles.

Global No.1 Base oil manufactures in Korea

Global No.1 Korea Base Oils: GS Kixx LUBO, SK Yubase, S-oil Ultra-S, HD HYUNDAI SHELL Base Oil
Korean base oils are the main base oil products in Korea. It is a base oil with good properties in terms of evaporation amount, low temperature viscosity characteristics, high temperature viscosity characteristics, and oxidation stability.





ESTER-BASED ORGANIC FRICTION MODIFIER

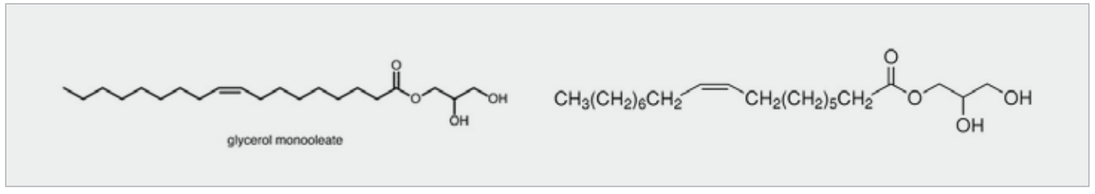
Lower Carbon emission with Ester- based Organic Friction Modifier increases Energy Efficiency in Automotive Vehicles

The friction reduction mechanism of GMO transferred from physisorption to chemisorption, which reduced friction coefficient at both low and high temperature.

Organic Friction Modifier - GMO (Glycerol Monooleate)

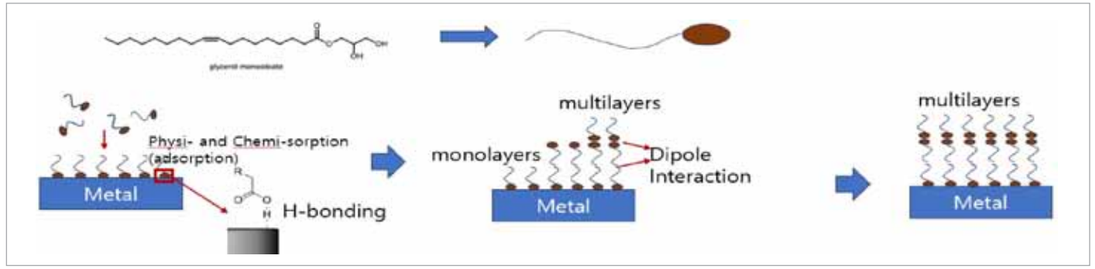
Glycerol monooleate (C21H40O4) is a clear amber or pale yellow liquid. It is an oil-soluble surfactant and is classified as a monoglyceride. It is used as an antifoam in juice processing and as a lipophilic emulsifier for water-in-oil applications. It is a moisturizer, emulsifier, and flavoring agent. Various forms of glycerol oleate are widely used in cosmetics and it is also used as an excipient in antibiotics and other drugs.

However, glycerol monooleate (GMO) has linear molecular structures, which significantly improve the tribological performance. GMO has been widely used in lubricant oils as a friction modifier, and excellent lubricating performances were observed, such as the ultra-low friction obtained between two metal surfaces with oil.

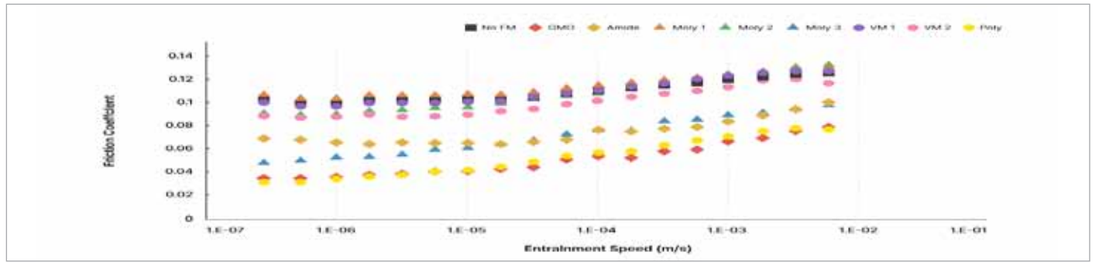


The Role of GMO in Lubricants

The friction reduction mechanism of GMO transferred from physisorption to chemisorption, which reduced friction coefficient at both low and high temperature.

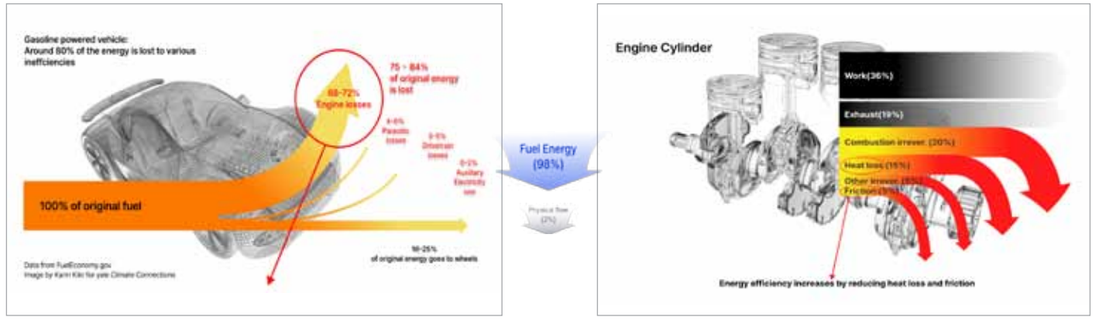


The Role of GMO in Lubricants



Energy Efficiency in Automotive Vehicles

Energy efficiency increases by reducing friction, leading to reduced heat loss by minimizing frictional heat. Reducing friction is a very essential characteristic in engine oil.



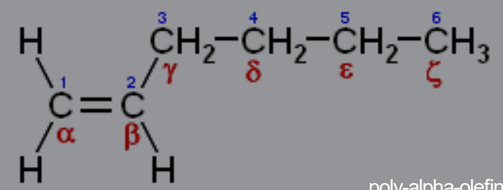
PAO BOOSTING

K1 Lube

PAO BOOSTING TECH

Powerful & Comfort Driving

PAO boosting Technology of K1 Lube PAO provides a Maximum fuel economy, oil drain & protection powered by PAO(Poly Alpha Olefin)



poly-alpha-olefin (or poly-α-olefin) 1-hexane

K1 Lube PAO 1 with PAO Boosting Technology

PAO Boosting Technology of K1 Lube provides a powerful and comfortable driving experience with PAO Strength.K1 Lube helps you enjoy a premium performance by powerful PAO

Strengthening Vicosity Properties	Keeping Engine Power	Extending Drain Interval
It maintains low-temperature viscosity by slowing down crystallization at low temperatures and maintains high-temperature viscosity by increasing the bonding force between molecules at high temperatures.	It has good thermal oxidation stability and shear stability, slowing down thermal oxidation and maintaining viscosity to prevent engine power deterioration and maintain power transmission.	By strengthening the oxidation stability of engine oil, preventing thermal oxidation and suppressing sludge production, it prevents contamination of engine oil and extends drain interval, creating long-life engine oil.

K1 Lube PPODUCT LINE-UP

PASSENGER CAR PREMIUM

K1 Lube PAO 1

K1 Lube PAO A3/B4

K1 Lube PAO C3

PASSENGER CAR

K1 Lube GX SP

K1 Lube GX A3/B4

K1 Lube GX SN PLUS

K1 Lube DX RV

K1 Lube DX C3

COMMERCIAL VEHICLE

K1 Lube HDX PAO

K1 Lube HDX Euro

K1 Lube HD CI-4

K1 Lube HD CH-4

K1 Lube HD CF-4

K1 Lube HD CF

MOTORCYCLE

K1 Lube Scooter 4T SN

K1 Lube Scooter 4T SL

K1 Lube Motorcycle 4T SN

K1 Lube Motorcycle 2T

TRANSMISSION & AXLE

K1 Lube ATF DX-III

K1 Lube ATF DX-VI

K1 Lube ATF Multi

K1 Lube CVTF

K1 Lube DCTF

K1 Lube Gear GL-5

K1 Lube AF Coolant

K1 Lube AF Coolant HD

K1 Lube Brake

SPECIALTIES

K1 Lube Hydraulic HV

K1 Lube Hydraulic HM

K1 Lube Hydraulic HL

K1 Lube Hydraulic Ashless

HYDRAULIC FLUID

K1 Lube Gear EP

K1 Lube Turbine

K1 Lube Compressor P

K1 Lube Compressor S

K1 Lube Transformer I

INDUSTRIAL OIL

K1 Lube Grease Lithium Complex

K1 Lube Grease EP 00

K1 Lube Grease EP 2

K1 Lube Grease 2

GREASE

K1 Lube
Beyond Korea Tech

Passenger Car

K1 Lube PAO 1

K1 Lube PAO A3/B4

K1 Lube PAO C3

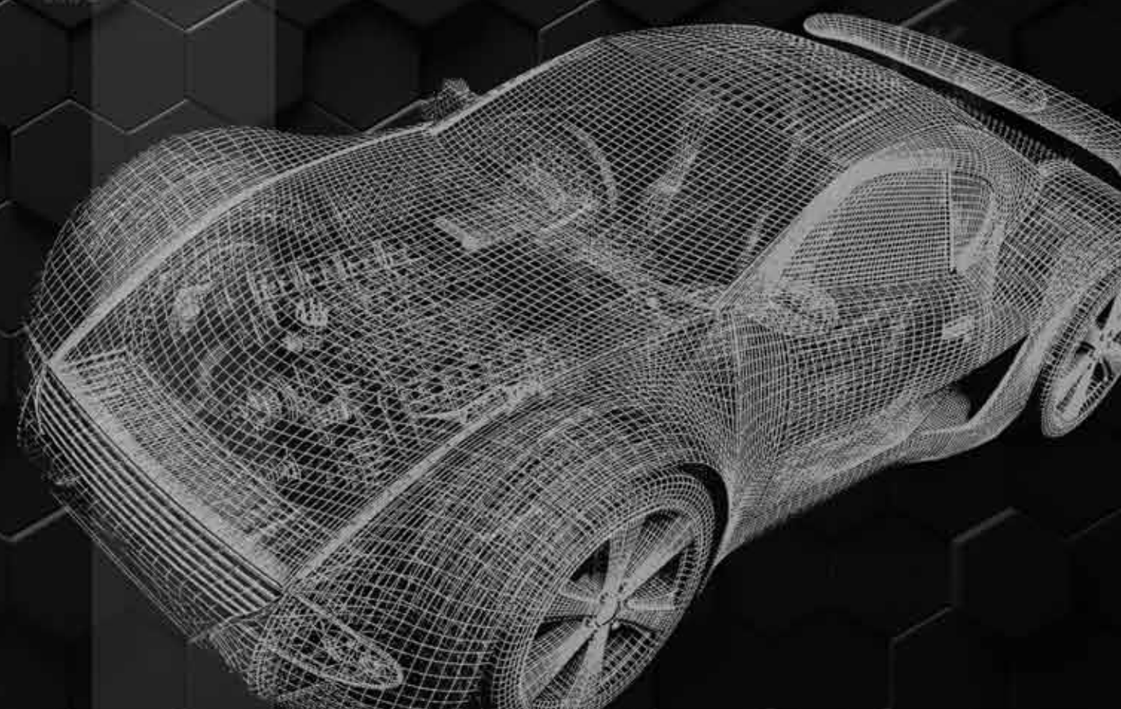
K1 Lube GX SP

K1 Lube GX A3/B4

K1 Lube GX SN PLUS

K1 Lube DX RV

K1 Lube DX C3



Fully Synthetic

K1 Lube PAO 1

Premium gasoline engine oil for Maximum performance by 100% PAO boosting Technology

ACEA C3, API SN/CF, MB 229.31/229.51, BMW Long Life-04, VW 502.00/505.00

DESCRIPTION

K1 Lube PAO 1 is the highest-end grade engine oil consisted of purely synthetic PAO (Poly Alpha Olefin) and advanced additives for motor sports. It can be suitable for passenger cars, SUVs, and light trucks under all driving conditions. It is designed to provide great engine protection and fuel economy performance.

APPLICATIONS

- Naturally aspirated Gasoline engines, LPG and Diesel engines in passenger cars
- Light truck gasoline and diesel engines
- Gasoline and diesel powered RV and SUV
- CRDI engines in passenger cars
- Passenger cars with high speed, four-stroke, turbocharged and EGR, DPF.
- Four-stroke gasoline engines in motorcycles and portable power equipment where the manufacturer recommends conventional passenger car motor oils

PERFORMANCE STANDARDS

- ACEA C3, API SN/CF, MB 229.31/229.51, BMW Long Life-04, VW 504.00/507.00

CUSTOMER BENEFITS

Maximizes engine life

The thermal stability of the synthetic base stock makes low temperature viscosity properties like CCS, and MRV better and provides greater high temperature viscosity property like HTHS. The premium anti-wear and anti-friction additives minimizes wear and friction in all parts of engines.

Maximizes power and performance

The selected detergent and dispersant additives keep performing maximum power and cleanness with superiorly reducing deposits on the ring belt and the piston skirt under severe operating conditions. Special friction modifiers are used to minimize friction on the engine surfaces with great fuel economy property.

Low oil consumption

The high shear stability of engine oil maintains oil viscosity for longer time and reduces the volatility of oil under severe conditions in order to prevent oil consumption.

Longer equipment life

The additives for tribofilm formation (anti-wear, anti-friction, extreme pressure) reduce wears and frictions and protect surfaces of engine parts to use engine longer.

Lower impact emissions

Highly advanced additive formulation makes the SAPS (Sulfated Ash, Phosphorus, Sulfur) lower to reduce harmful exhaust emissions with significantly increasing DPF service life.

KEY PROPERTIES

	100% PAO	Fully Synthetic
SAE Grade	**0W-40**	**5W-40**
Kinematic Viscosity, mm^2/s @ 40°C	79.7	70.8
Kinematic Viscosity, mm^2/s @ 100°C	14.0	12.1
Viscosity Index	182	169
Pour Point °C	-42	-39
Flash Point °C	246	236
Package (Liters)	1, 4T, 200	1, 4T, 200

Fully Synthetic

K1 Lube PAO A3/B4

Premium gasoline engine oil for Maximum performance by PAO boosting

ACEA A3/B4, API SN, MB 229.3/229.5, BMW LongLife-01, VW 502.00/505.00, GM Dexos1 Gen2

DESCRIPTION

K1 Lube PAO A3/B4 is a premium engine oil formulated with PAO and VHVI synthetic base oils and advanced additives formulation. It is good for passenger cars without DPF or GPF with ACEA A3/B4 specification. This engine oil offers long change intervals and excellent performance.

APPLICATIONS

- Gasoline in passenger cars
- Passenger cars where the manufacturers recommend ACEA A3/B4 spec oils
- Portable power equipment where the manufacturer recommends conventional passenger car motor oils

PERFORMANCE STANDARDS

- ACEA A3/B4, API SN, MB 229.3/229.5, BMW LongLife-01, VW 502.00/505.00, GM Dexos1 Gen2

CUSTOMER BENEFITS

Excellent Base Oil Combination

PAO and VHVI Base Stocks based fully synthetic engine oil provides great low temperature and high temperature viscosity properties, oxidation stability, and thermal stability.

Extends Oil Drain Interval

Minimizing viscosity loss during using engine oil extends oil drain interval

Strengthens Engine Durability

The advanced additives for detergents and dispersants strengthen engine durability through reducing some sludge and combustion deposits inside engine.

KEY PROPERTIES

SAE Grade	0W-40
Kinematic Viscosity, mm^2/s @ 40°C	77.6
Kinematic Viscosity, mm^2/s @ 100°C	13.7
Viscosity Index	182 L
Pour Point °C	-40.0
Package (Liters)	1,4T,200

Fully Synthetic

K1 Lube PAO C3

Premium gasoline engine oil for Maximum performance by PAO boosting

ACEA C3-16, API SN/CF, MB 229.51/229.52, BMW Long Life-04, VW 502.00/505.00/505.01

DESCRIPTION

K1 Lube PAO C3 is a premium engine oil formulated with PAO Group IV and VHVI Group III synthetic base oils and advanced additives formulation. It is good for gasoline or diesel passenger cars installed with GPF or DPF with ACEA C3 and the latest API SP Specification. By providing outstanding engine protection, the life of engine becomes longer.

APPLICATIONS

- Diesel engines equipped with DPF in passenger cars
- Passenger cars where the manufacturers recommend ACEA C3 spec oils

PERFORMANCE STANDARDS

- ACEA C3, API SN/CF, MB 229.31/229.51, BMW Long Life-04, VW 502.00/505.00

CUSTOMER BENEFITS

- High performance fully synthetic engine oil made from PAO and VHVI base oil
- Meets the latest ACEA C3 specification and exceeds global car OEM requirements
- Prevents engine's camshaft wear
- Prolongs engine's life with exceptional anti-oxidation stability

KEY PROPERTIES

SAE Grade	5W-30	5W-40
Kinematic Viscosity, mm^2/s @ 40°C	68.0	79.2
Kinematic Viscosity, mm^2/s @ 100°C	11.9	13.6
Viscosity Index	172 -	176
Pour Point °C	36	-39
Flash Point °C	236	246
Package (Liters)	1,4T,200	1,4T,200

Fully Synthetic

K1 Lube GX SP

Superior grade gasoline engine oil for Maximum performance

- 0W-16 : API SP-RC, ILSAC GF-6B
- 0W-20, 0W-30, 5W-20, 5W-30, 10W-30: API SP-RC, ILSAC GF-6A
- 5W-40 : API SP

DESCRIPTION

K1 Lube GX SP is a top-tier engine oil with the latest API SP grade which is formulated from VHVI base oils, high performance additive systems and progressed viscosity index improver. It has complete engine oil performance, especially enhanced durability and fuel efficiency improvement with wear protection and friction reduction. It is also designed to protect Timing Chain from wear and to prevent LSPI phenomena of GDI engines.

APPLICATIONS

- All gasoline fueled vehicles
- High performance cars equipped with T-GDI, GDI, DOHC, EFI and VVT
- Four-stroke gasoline engines in motorcycles (except for motorcycles with wet clutch gearbox) • Sports vehicles

PERFORMANCE STANDARDS

- 0W-16 : API SP-RC, ILSAC GF-6B
- 0W-20, 0W-30, 5W-20, 5W-30, 10W-30: API SP-RC, ILSAC GF-6A
- 5W-40 : API SP

CUSTOMER BENEFITS

Timing Chain Wear Protection
Advanced additives protect timing chain against wear so that they may reduce power loss of engine and increase the life time of engine parts.

LSPI Prevention
Detergent additives containing magnesium efficiently restrain LSPI (Low Speed Pre-Ignition) that could damage T-GDI engines.

Enhanced Fuel Efficiency
Specifically designed anti friction additives minimize engine friction losses and improve fuel efficiency.

High Quality VHVI Base Stock
Superior low temperature properties of Group III base oil make the start-up of engines easy at low temperature. Excellent thermal stability and oxidation stability of VHVI base oil protect suppress oil degradation and sludge formation inside engine.

KEY PROPERTIES

SAE Viscosity	0W-16	0W-20	0W-30	5W-20
Kinematic Viscosity, mm^2/s @ 40℃	37.8	44.9	55.9	49.2
Kinematic Viscosity, mm^2/s @ 100℃	7.3	8.5	10.3	8.7
Viscosity Index	162	170	175	155
Pour Point, ℃	-40	-40	-40	-37
Flash Point, COC, ℃	228	226	226	242
Package (Liters)	1, 4T, 200	1, 4T, 200	1, 4T, 200	1, 4, 4T, 200

SAE Viscosity	5W-30	5W-40	10W-30	20W-50
Kinematic Viscosity, mm^2/s @ 40℃	64.8	87.2	69.6	167.0
Kinematic Viscosity, mm^2/s @ 100℃	11.1	14.1	11.0	11.0
Viscosity Index	164	167	149	149
Pour Point, ℃	-37	-37	-31	-31
Flash Point, COC, ℃	234	234	256	256
Package (Liters)	1,3,4,4T,5,200	1, 4, 4T, 200	1, 4T, 18, 200	1, 4T, 18, 200

K1 Lube
Beyond Korea Tech

KOREA SYNTHETIC BASE OIL

Korea has full line-up of Group I/II/III base oil products in South Korea and Korean refineries are positioned as one of the world class manufacturers supplying high quality base oils to the global market, including Asia, the Middle East, the EU and North America.

KOR
Korea Synthetic Base Oil

Fully Synthetic

K1 Lube GX A3/B4

Superior grade gasoline engine oil for Maximum performance

ACEA A3/B4, API SL (5W-30),
API SN (0W-40, 5W-40, 10W-40),
VW 502.00/505.00

DESCRIPTION

K1 Lube GX A3/B4 is a premium engine oil formulated with VHVI Group III base oils and high-quality and high-tech additives formulation. It is good for passenger cars without DPF or GPF with ACEA A3/B4. This engine oil provides long drain interval as well as good performance.

APPLICATIONS

- Naturally aspirated and turbocharged gasoline engines in passenger cars.
- Light truck gasoline engines.
- Gas-fuelled (natural gas and LPG) spark ignition engines where conventional passenger car motor oils are recommended
- Four-stroke gasoline engines in motorcycles and portable power equipment where the manufacturer recommends conventional passenger car motor oils.

PERFORMANCE STANDARDS

ACEA A3/B4, API SL (5W-30), API SN (0W-40, 5W-40, 10W-40), VW 502.00/505.00

CUSTOMER BENEFITS

Extended Oil Drainage Interval

Outstanding oxidation property prevents the engine oil from losing its viscosity and allows engine oil to be used for a long time.

Maximum engine life

Excellent detergent additives provide noticeable piston cleanliness and better sludge control, providing necessary engine protection and extend engine service life.

High Quality VHVI Base Stock

Superior low temperature properties of Group III base oil make the start-up of engines easy at low temperature. Excellent thermal stability and oxidation stability of VHVI base oil protect suppress oil degradation and sludge formation inside engine.

KEY PROPERTIES

SAE Viscosity	0W-40	5W-30	5W-40	10W-40
Kinematic Viscosity, mm^2/s @ 40°C	76.3	71.2	91.7	86.4
Kinematic Viscosity, mm^2/s @ 100°C	13.3	12.0	15.1	13.1
Viscosity Index	178	166	174	151
Pour Point, °C	-43	-38	-39	-32
Flash Point, COC, °C	226	240	232	250
Package (Liters)	1, 4T, 200	1, 4T, 200	1, 4T, 200	1, 4, 4T, 200

Fully Synthetic

K1 Lube GX SN PLUS

Superior grade gasoline engine oil for Maximum performance

API SN PLUS/CF, ILSAC GF-5

DESCRIPTION

K1 Lube GX SN Plus is comprised of VHVI base oils, a high-performance additive system and state-of-the-art viscosity index improvers. It is optimized to provide fuel efficiency, by reducing friction and enhancing durability. It also prevents the LSPI (Low Speed Pre-Ignition) of the GDI engine, minimizing some damage to main engine parts.

APPLICATIONS

- All gasoline fueled vehicles
- High performance cars equipped with T-GDI, GDI, DOHC, EFI and VVT
- Four-stroke gasoline engines in motorcycles
- Sports vehicles

PERFORMANCE STANDARDS

API SN PLUS/CF, ILSAC GF-5

CUSTOMER BENEFITS

Superior Low Temperature Performance

Using high quality Group III Base oil, it provides excellent low-temperature properties such as CCS(Cold Crank Simulator), MRV (Mini-Rotary Viscometer), and Pour Point, as making engine starting easily at extremely low temperature.

Outstanding thermal and Oxidation Stability

Good thermal resistance and oxidation stability provide excellent protection against oil degradation, which contributes to filter clogging and sludge formation inside engine.

LSPI Prevention

Detergent technology containing magnesium additive actively reduces LSPI (Low Speed Pre-Ignition) that could damage T-GDI engines.

KEY PROPERTIES

SAE Viscosity	0W-16	0W-20	5W-30	10W-30
Kinematic Viscosity, mm^2/s @ 40°C	37.8	44.9	64.8	69.6
Kinematic Viscosity, mm^2/s @ 100°C	7.3	8.5	11.1	11.0
Viscosity Index	162	170	164	149
Pour Point, °C	-40	-40	-37	-31
Flash Point, COC, °C	228	226	234	256
Package (Liters)	1, 4T, 200	1, 4T, 200	1, 4T, 200	1, 4, 4T, 200

Fully Synthetic

K1 Lube DX RV

Premium diesel engine oil
for Ultimate performance

ACEA C3, API SP

DESCRIPTION

K1 Lube DX RV is a fully synthetic engine oil with Low SAPS designed to comply with the latest ACEA C3 and API SP international standards. It provides excellent lubrication over a wide temperature range under harsh conditions.

APPLICATIONS

- Diesel-powered vehicles with DPF/CPF/EGR, etc.
- Gasoline and LPG engine vehicles equipped with GDI/T-GDI/ DOHC/EFI/VVT, etc.
- Recommended engine oils for vehicles with the following "Performance Specifications"

PERFORMANCE STANDARDS

ACEA C3, API SP

CUSTOMER BENEFITS

Anti-Wear Property
Excellent wear protection maximizes the life time of engine and all its components.

Protection of After Treatment System
Advanced low SAPS additive technology extends the lifespan of the exhaust gas after-treatment system by preventing clogging of DPF.

Superior Low Temperature Performance
Using high quality Group III Base oil, it provides excellent low-temperature properties as producing quick and easy start-ups in cold weather.

Clean Technology
Outstanding detergent and dispersant additives provide prominent resistance for varnish at high temperature and for sludge deposit at low temperature.

KEY PROPERTIES

SAE Grade	5W-30
Kinematic Viscosity, mm^2/s @ 40°C	72.9
Kinematic Viscosity, mm^2/s @ 100°C	11.8
Viscosity Index	158
Pour Point °C	-38
Flash Point °C	234
Package (Liters)	1,4T, 5, 200

Fully Synthetic

K1 Lube DX C3

Premium diesel engine oil
for Ultimate performance

ACEA C3-16, API SN/CF, MB 229.51/229.52,
BMW Long Life-04, VW 502.00/505.00/505.01

DESCRIPTION

K1 Lube DX C3 is an engine oil using the latest VHVI base oil and Low SAPS additive technology for engine oils included in the ACEA C category. It is suitable for passenger car, as well as SUV and RV.
Its additive technology minimizes the sulfated ash content to help extend the life of the DPF and helps improve DPF performance without reducing engine durability.

APPLICATIONS

- SUV and RV equipped with DPF, SCR and other emission after-treatment system where an ACEA C3 performance engine oil is required.
- Light duty diesel engines and gasoline direct injection engines.
- Passenger cars where the manufacturers recommend API SN spec oils.
- Vehicles that requires MB, BMW specification performance.

PERFORMANCE STANDARDS

ACEA C3, API SN/CF, MB 229.51/229.52, BMW Long Life-04,
VW 502.00/505.00/505.01

CUSTOMER BENEFITS

Protection of After Treatment System
Advanced low SAPS additive technology extends the lifespan of the exhaust gas after-treatment system by preventing clogging of DPF..

Anti-Wear Property
Excellent wear protection maximizes the life time of engine and all its components.

Superior Low Temperature Performance
Using high quality Group III Base oil, it provides excellent low-temperature properties as producing quick and easy start-ups in cold weather.

Clean Technology
Outstanding detergent and dispersant additives provide prominent resistance for varnish at high temperature and for sludge deposit at low temperature.

KEY PROPERTIES

SAE Grade	5W-30	5W-40
Kinematic Viscosity, mm^2/s @ 40°C	68.0	79.2
Kinematic Viscosity, mm^2/s @ 100°C	11.9	13.6
Viscosity Index	172	176
Pour Point °C	-36	-39
Flash Point °C	236	246
Package (Liters)	1,4T, 5, 200	1,4T, 5, 200

K1 Lube
Beyond Korea Tech

Commercial Vehicle

K1 Lube HDX PAO

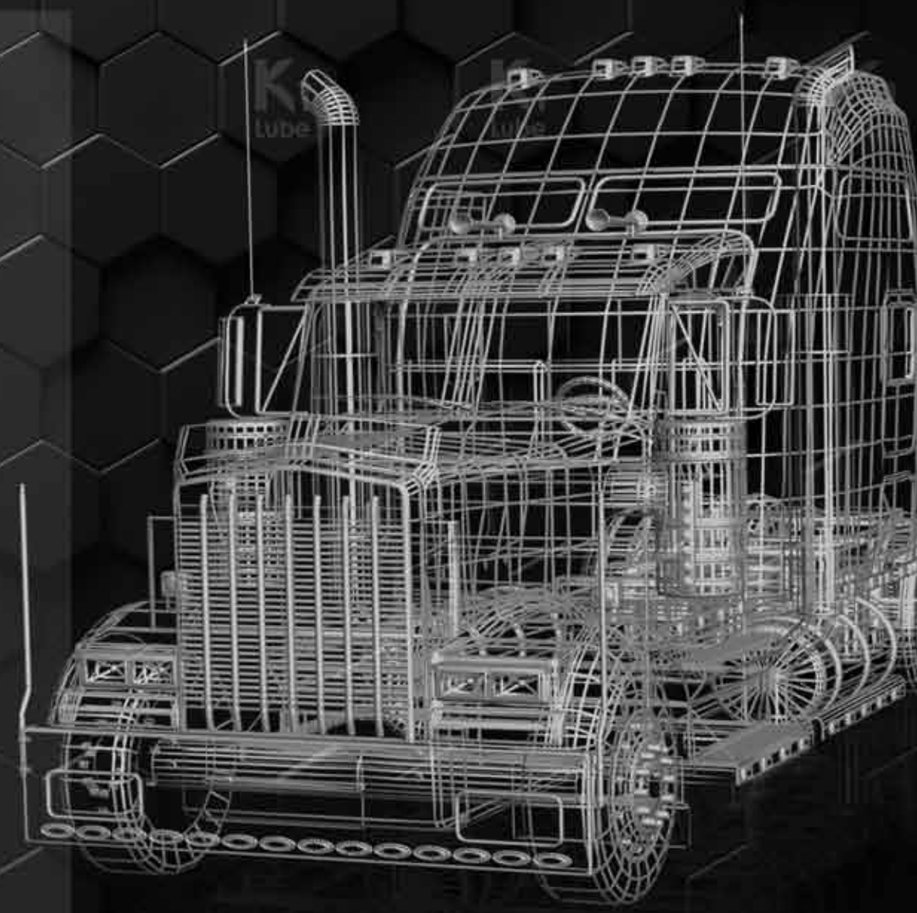
K1 Lube HDX Euro

K1 Lube HD CH-4

K1 Lube HD CI-4

K1 Lube HD CF-4

K1 Lube HD CF



Fully Synthetic

K1 Lube HDX PAO

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance by PAO Boosting

API CK-4/CJ-4,, ACEA E9

DESCRIPTION

K1 Lube HDX PAO is a PAO based premium synthetic heavy-duty diesel engine oil specifically designed for new low-emission engines with ULSD (Ultra Low Sulfur Diesel). It is manufactured using the most advantageous additive technologies to provide excellent engine protection against the EURO VI emission regulation for highway diesel trucks. It meets the latest EGR soot control and particulate requirements requiring API CK-4, ACEA E9, and many OEM specifications.

APPLICATIONS

- K1 Lube HDX PAO 15W-40 is a mixed fleets motor oil recommended for all naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CJ-4 grade is recommended.
- It is developed in response to EURO VI emissions standard
- It is formulated for superior performance with ULSD but also with both normal and low sulfur diesel fuels
- It is recommended for use in off-highway and construction applications which require an API CJ-4 Service Category.
- Meets major diesel engine manufacturers requirements
- Mixed fleets of both diesel and gasoline engines
- Mixed fleets including both old and new equipment
- Commercial road transport, including the latest electronic controlled engines.
- Stop-and-go vehicles in high soot loading service such as buses and waste collection trucks

PERFORMANCE STANDARDS

API CK-4/CJ-4, Volvo VDS-4.5, Cummins CES 20086, ACEA E9-16, Mack EO-S-4.5, Caterpillar ECF-3, MB 228.31, Renault RLD-4, Deutz DQC III-10 LA, Category 2.1 Detroit Diesel 93K222, Ford WSS-M2C171-F1

CUSTOMER BENEFITS

Enhanced Emission Control System Life

Advanced Low SAPS additive technology prevents DPF clogging, extending the life of the exhaust gas aftertreatment system and saving costs and time for maintenance.

Reduced Maintenance and Operating Costs

By using excellent soot dispersant and anti-wear additives, cylinder, piston, rings and injectors are well protected from wear and corrosion, resulting in longer service life and less maintenance.

Extends Engine Life to Overhaul

High levels of anti-wear additives prevent all kinds of wear and scratching in highly loaded components operating under harsh conditions inside engine.

KEY PROPERTIES

SAE Grade	10W-40	15W-40
Kinematic Viscosity, mm^2/s @ 40°C	78.1	103.4
Kinematic Viscosity, mm^2/s @ 100°C	12	15.1
Viscosity Index	148	153
Pour Point °C	-34	-34
Flash Point °C	244	247
Package (Liters)	20, 200	20, 200

Semi Synthetic

K1 Lube HDX Euro

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance

API CK-4/CJ-4, ACEA E9

DESCRIPTION

K1 Lube HDX Euro is an excellent VHVI synthetic heavy-duty diesel engine oil specifically designed for new low-emission engines with ULSD (Ultra Low Sulfur Diesel). It is formulated using the most advantageous additive technologies to provide excellent engine protection against the EURO VI emission regulation for highway diesel trucks. It meets the latest EGR soot control and particulate requirements requiring API CK-4, ACEA E9, and many OEM specifications.

APPLICATIONS

- K1 Lube HDX Euro is a mixed fleets motor oil recommended for all naturally aspirated and turbocharged four-stroke diesel engines and four-stroke gasoline engines in which the API CJ-4 grade is recommended.
- It is developed in response to EURO VI emissions standard
- It is formulated for superior performance with ULSD but also with both normal and low sulfur diesel fuels
- It is recommended for use in off-highway and construction applications witch require an API CJ-4 Service Category.
- Meets major diesel engine manufacturers requirements.
- Mixed fleets of both diesel and gasoline engines
- Mixed fleets including both old and new equipment
- Commercial road transport, including the latest electronic controlled engines.
- Stop-and-go vehicles in high soot loading service such as buses and waste collection trucks

PERFORMANCE STANDARDS

API CK-4/CJ-4, Volvo VDS-4.5, Cummins CES 20086, ACEA E9-16, Mack EO-S-4.5, Caterpillar ECF-3, MB 228.31, Renault RLD-4, Deutz DQC III-10 LA, Category 2.1 Detroit Diesel 93K222, Ford WSS-M2C171-F1

CUSTOMER BENEFITS

Enhanced Emission Control System Life

Advanced Low SAPS additive technology prevents DPF clogging, extending the life of the exhaust gas aftertreatment system and saving costs and time for maintenance.

Reduced Maintenance and Operating Costs

By using excellent soot dispersant and anti-wear additives, cylinder, piston, rings and injectors are well protected from wear and corrosion, resulting in longer service life and less maintenance.

Extends Engine Life to Overhaul

High levels of anti-wear additives prevent all kinds of wear and scratching in highly loaded components operating under harsh conditions inside engine.

KEY PROPERTIES

SAE Grade	15W-40
Kinematic Viscosity, mm^2/s @ 40°C	112.4
Kinematic Viscosity, mm^2/s @ 100°C	14.5
Viscosity Index	132
Pour Point °C	L-40
Flash Point °C	236
Package (Liters)	20, 200

Fully Synthetic

K1 Lube HD CI-4

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance

API CI-4/SL, ACEA E7

DESCRIPTION

K1 Lube HD CI-4 is a premium performance, multigrade, highly intensive heavy duty diesel engine oil specifically formulated to lubricate a wide range of heavy-duty diesel engines requiring API CI-4, ACEA E7 performance operating in the severe environment.

APPLICATIONS

- Mixed fleets of diesel engines (high speed, four-stroke, turbo-charged or naturally aspirated)
- Commercial road transport
- Off-highway vehicles and plant
- Agricultural tractors and farm machinery
- High speed diesel engines in marine service (e.g. fishing, river transport, etc.)
- Generator sets
- Mobile hydraulic systems (where oil type and viscosity are appropriate)

PERFORMANCE STANDARDS

- ACEA E7, Volvo VDS-3, Cummins CES 20076/77/78, API CI-4/SL, Mack EO-M Plus, Caterpillar ECF-2/ECF-1-a, MB 228.3/229.1, Renault Truck RLD/RLD-2, DEUTZ DQC III-10, MTU 2, MAN M3275, Detroit Diesel 93K215/DHD-1

CUSTOMER BENEFITS

Minimizes Fleet Maintenance Costs

Exceptional soot dispersion keeps fuel soot in suspension, avoiding filter plugging, cylinder head sludge, abrasive polishing wear and oil thickening.

Minimizes Fleet Operating Costs

Excellent deposit control technology on valves and piston heads reduces oil consumption. Exceptional oxidation stability and soot-control extends oil drain interval and makes the components of the engine use longer.

Extends Engine Life to Overhaul

High level of anti-wear additive protects engine against wear, scratch, and scuffing of highly loaded parts operating under boundary lubrication conditions.

KEY PROPERTIES

SAE Grade	10W-30	10W-40	15W-40	20W-50
Kinematic Viscosity, mm²/s @ 40°C	82.9	106.8	107.2	158.6
Kinematic Viscosity, mm²/s @ 100°C	12.5	15.6	14.5	19.1
Viscosity Index	147	155	139	137
Pour Point °C	-37	L-40	-29	-38
Flash Point °C	222	230	238	246
Package (Liters)	4,18, 200	1,4T,20,200	1,4,4T,6,18,20,200	4,18,20,200

Fully Synthetic

K1 Lube HD CH-4

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance

API CH-4/SJ, ACEA E5

DESCRIPTION

K1 Lube HD CH-4 is a premium performance, multigrade, highly intensive heavy duty diesel engine oil specifically formulated to lubricate a wide range of heavy-duty diesel engines requiring API CH-4, ACEA E5 performance operating in the severe environment.

APPLICATIONS

- Mixed fleets of European, North American diesel engines (high speed, four-stroke, turbocharged or naturally aspirated)
- Mixed fleets of both diesel and gasoline engines
- Mixed fleets including both old and new equipment
- Commercial road transport, including the latest electronic controlled engines.
- It meets the major diesel engine manufacturers requirements
- Stop-and-go vehicles in high soot loading service such as buses and waste collection trucks
- Off-highway vehicles and plant

PERFORMANCE STANDARDS

- API CH-4/SJ, CI-4/SL, VOLVO VDS-3, Mack EO-N, Renault VI RLD-2, Cummins CES 20078, ACEA E7, MB 228.3, MAN 3275, Cummins CES 20076/77, CAT ECF-2/ECF-1-A, Global DHD-1

CUSTOMER BENEFITS

Minimizes Fleet Maintenance Costs

Exceptional soot dispersion keeps fuel soot in suspension, avoiding filter plugging, cylinder head sludge, abrasive polishing wear and oil thickening.

Minimizes Fleet Operating Costs

Excellent deposit control technology on valves and piston heads reduces oil consumption. Exceptional oxidation stability and soot-control extends oil drain interval and makes the components of the engine use longer.

Extends Engine Life to Overhaul

High level of anti-wear additive protects engine against wear, scratch, and scuffing of highly loaded parts operating under boundary lubrication conditions.

KEY PROPERTIES

SAE Grade	10W-30	15W-40	20W-40	20W-50
Kinematic Viscosity, mm²/s @ 40°C	82.9	117.7	131.3	178.8
Kinematic Viscosity, mm²/s @ 100°C	12.5	15.8	15	20.3
Viscosity Index	147	142	116	133
Pour Point °C	-38	-40	-35	-33
Flash Point °C	222	226	244	232
Package (Liters)	4, 18, 200	20, 200	4,5,18,20,25,200	4,18,20,200

Semi Synthetic

K1 Lube HD CF-4

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance

API CF-4

DESCRIPTION

K1 Lube HD CF-4 is a high performance, multigrade heavy duty diesel engine oil specifically formulated to lubricate a wide range of heavy-duty diesel engines requiring API CF-4 performance operating in the severe environment.

APPLICATIONS

- Mixed fleets of diesel engines (high-speed, four-stroke, turbocharged or naturally aspirated)
- Mixed fleets of both diesel and gasoline engines
- Commercial road transport
- Off-highway vehicles and plant
- Small diesel engines in marine service(e.g. fishing, river transport, etc)
- Generator sets
- Powershift transmissions(where oil type and viscosity are appropriate)

PERFORMANCE STANDARDS

- API CF-4

CUSTOMER BENEFITS

Excellent Deposit Control

An advanced detergent/dispersant additive technology provides excellent deposit control to maintain power under the high temperature conditions.

Protects Surfaces of Engine Components

Highly effective detergent additive technology minimizes piston skirt deposits that can lead to bore grinding damage. An organometallic anti-wear additive technology forms a protective layer, named as tribofilm, on all metal contact surfaces, reducing engine wear in severe operating conditions.

Multi-Purpose Usage

The Mid SAPS heavy duty engine oil formulation is suitable to all turbocharged or normally aspirated diesel engines of civil works machines, trucks, fishing boats and locomotives.

KEY PROPERTIES

SAE Grade	10W-30	10W-40	15W-40	20W-50
Kinematic Viscosity, mm^2/s @ 40°C	69.75	91.45	103.3	163.4
Kinematic Viscosity, mm^2/s @ 100°C	10.34	13.31	13.57	18.16
Viscosity Index	134	146	131	124
Pour Point °C	-42.0	-41.0	-37.0	-37.0
Flash Point °C	238	236	246	269
Package (Liters)	1,4,6,20,200	1,4,4T,6,18,20,200	1,4,4T,5,6,18,20,25,200	1,4,6,8,18,20,25,200

Semi Synthetic

K1 Lube HD CF

Premium diesel engine oil for heavy duty vehicles, Providing Ultimate performance

API CF

DESCRIPTION

K1 Lube HD CF is a high performance, multigrade heavy duty diesel engine oil specifically formulated to lubricate a wide range of heavy-duty diesel engines requiring API CF performance operating in the severe environment.

APPLICATIONS

- Mixed fleets of diesel engines (high speed, four-stroke, turbocharged or naturally aspirated)
- Mixed fleets of both diesel and gasoline engines
- Commercial road transport
- Off-highway vehicles and plant
- Small diesel engines in marine service(e.g. fishing, river transport, etc)
- Generator sets

PERFORMANCE STANDARDS

- API CF

CUSTOMER BENEFITS

Excellent Deposit Control

An advanced detergent/dispersant additive technology provides excellent deposit control to maintain power under the high temperature conditions.

Protects Surfaces of Engine Components

Highly effective detergent additive technology minimizes piston skirt deposits that can lead to bore grinding damage. An organometallic anti-wear additive technology forms a protective layer, named as tribofilm, on all metal contact surfaces, reducing engine wear in severe operating conditions.

Multi-Purpose Usage

The Mid SAPS heavy duty engine oil formulation is suitable to all turbocharged or normally aspirated diesel engines of civil works machines, trucks, fishing boats and locomotives.

KEY PROPERTIES

SAE Grade	50	70
Kinematic Viscosity, mm^2/s @ 40°C	228.6	335.5
Kinematic Viscosity, mm^2/s @ 100°C	20.1	25.7
Viscosity Index	102	100
Pour Point °C	-15	-12
Flash Point °C	282	288
Package (Liters)	6, 20	6, 20

K1 Lube
Beyond Korea Tech

Motorcycle

K1 Lube Scooter 4T SN

K1 Lube Scooter 4T SL

K1 Lube Motorcycle 4T SN

K1 Lube Motorcycle 2T

Fully Synthetic

K1 Lube Scooter 4T SN

Superior grade engine oil for four-stroke motorcycles

API SN PLUS
JASO MB

DESCRIPTION

The K1 Lube Scooter 4T SN is manufactured with advanced synthetic technology that meets the requirements of the top-grade specifications, like API SN PLUS and JASO MB. It is optimized to provide perfect scooter engine oil performance, especially in terms of fuel efficiency, reducing friction losses without the loss of durability.

APPLICATIONS

- All gasoline fueled vehicles
- High performance cars equipped with DOHC, EFI and VVT
- Four-stroke gasoline engines in motorcycles
- Sports Vehicles

PERFORMANCE STANDARDS

- API SN PLUS
- JASO MB

CUSTOMER BENEFITS

Fuel Economy

The wide temperature range capabilities of VHVI Group III base oils ensure the proper oil viscosity that reduces friction during start-up and provides maximum lubrication during high-temperature operation.

Engine Power and Maintainability

The reduction of blow-by gases by reducing sludge formation, helps maintain engine power and cleanliness, ultimately prolonging the life of the engine.

Oil Drainage Interval

Outstanding oxidation stability and low volatility extend oil drain intervals.

All-temperature Wear Resistance

Advanced base oil and high-performance additives formulation leads excellent shear stability and maximum wear protection in high speed, high temperature driving conditions as well as provides component wear resistance during very low temperature cold starts.

KEY PROPERTIES

SAE Grade	10W-40
Kinematic Viscosity, mm^2/s @ 40°C	97.3
Kinematic Viscosity, mm^2/s @ 100°C	14.4
Viscosity Index	152
Pour Point °C	-33
Flash Point °C	254
Package (Liters)	0.8, 1, 200

Fully Synthetic

K1 Lube Scooter 4T SL

Superior grade engine oil for four-stroke motorcycles

API SL
JASO MB

DESCRIPTION

The K1 Lube Scooter 4T SL is formulated with advanced synthetic technology that meets the requirements of the top-grade specifications, like API SL and JASO MB. It is optimized to provide great scooter engine oil performance, especially in terms of fuel efficiency, reducing friction losses without the loss of durability.

APPLICATIONS

- All gasoline fueled vehicles
- High performance cars equipped with DOHC, EFI and VVT
- Four-stroke gasoline engines in motorcycles
- Sports Vehicles

PERFORMANCE STANDARDS

- API SL
- JASO MB

CUSTOMER BENEFITS

Fuel Economy

The wide temperature range capabilities of VHVI Group III base oils ensure the proper oil viscosity that reduces friction during start-up and provides maximum lubrication during high-temperature operation.

Engine Power and Maintainability

The reduction of blow-by gases by reducing sludge formation, helps maintain engine power and cleanliness, ultimately prolonging the life of the engine.

Oil Drainage Interval

Outstanding oxidation stability and low volatility extend oil drain intervals.

All-temperature Wear Resistance

Advanced base oil and high-performance additives formulation leads excellent shear stability and maximum wear protection in high speed, high temperature driving conditions as well as provides component wear resistance during very low temperature cold starts.

KEY PROPERTIES

SAE Grade	10W-30
Kinematic Viscosity, mm^2/s @ 40°C	77.0
Kinematic Viscosity, mm^2/s @ 100°C	11.9
Viscosity Index	150
Pour Point °C	-33
Flash Point °C	254
Package (Liters)	0.8, 1, 200

Fully Synthetic

K1 Lube Motorcycle 4T SN

Superior grade engine oil for four-stroke motorcycles

API SN PLUS
JASO MA2

DESCRIPTION

K1 Lube Motorcycle 4T SN is a premium performing, shear-stable, multigrade motorcycle engine oil specifically designed for use in four-stroke motorcycles and portable power equipment requiring API SN Plus and JASO MA/MA2 standards, including high-output engines operating in harsh service conditions.

APPLICATIONS

- Air and liquid-cooled four-stroke motorcycle engines
- Particularly suitable for Japanese high performance motorcycle engines
- Motorcycles with and without oil immersed clutches
- Motorcycles with combined engine/transmission units or separate gear boxes where a multi-grade engine oil is specified
- Motorcycles with back torque limiters
- Motorcycles with exhaust catalytic converters
- Latest generation, four-stroke scooter engines
- Four-stroke gasoline engines fitted to portable power equipment, such as generators, mowers, etc.

PERFORMANCE STANDARDS

- API SN PLUS
- JASO MA2

CUSTOMER BENEFITS

Prolongs Engine Life

Advanced organo-metallic anti-wear additives reduce wear on highly stressed engine components under severe operating conditions. This extends the life of the engine and engine parts.

Saves on Maintenance

High oxidation stability prevents oil breakdown under the extreme thermal stresses found in modern engines, allowing the lubricant to perform its key role in effectively protecting stressed components.

Lively Throttle Response

The highly effective detergent/dispersant additive technology controls the deposit of piston ring belt to release and accelerate effectively.

Good all-temperature protection

The viscosity index improver with high shear stability provides the robust viscosity to protect the bearing and the surface of engine components at the high temperature and the low temperature operation conditions with high rotational speeds.

KEY PROPERTIES

Fully Synthetic

SAE Grade	10W-40	20W-50
Kinematic Viscosity, mm^2/s @ 40°C	97.5	146.2
Kinematic Viscosity, mm^2/s @ 100°C	14.3	18.1
Viscosity Index	151	138
Pour Point °C	-36	-30
Flash Point °C	236	238
Package (Liters)	0.8, 1	0.8, 1

K1 Lube Motorcycle 2T

Superior grade engine oil for two-stroke motorcycles

JASO FC, API TC

DESCRIPTION

K1 Lube Motorcycle 2T is a high-performance two-stroke motorcycle oil formulated with low ash additives. It is pre-diluted with special solvents to ensure easy mixing with gasoline over a wide temperature range. It is clearly stained to help identify their presence in fuel/oil mixtures.

APPLICATIONS

- Satisfies the performance needs of those manufacturers of two-stroke engines who allow the use of JASO FB oils.
- Recommended for over-the-road service in all two-stroke motorcycle engines, either oil-injected or using a premix of gasoline and oil.
- Manufacturers recommended gasoline-to-oil ratios, up to 50:1, should be used for premixes of gasoline and oil.
- Suitable for use in two-stroke portable power equipment except the most severe chainsaw applications.
- Not recommended for use in ash-sensitive, water-cooled. two-stroke outboard engines.
- Should not be used in with small air-cooled engines which operate at gasoline-to-oil ratios below 25:1
- Should not be used in any four-stroke engines.

PERFORMANCE STANDARDS

JASO FC, API TC

CUSTOMER BENEFITS

Prolongs Engine Life

Special organic anti-wear additives reduce wear and scuffing on the surface of the engine parts as maximizing time between overhauls. The strong and efficient detergent additives ensure that they maximize engine life by controlling the deposits which lead to ring sticking.

Fluidity and Miscibility

It is pre-diluted to ensure a stable and homogeneous mixture with gasoline.

Complete Combustion

The advanced detergent additives ensure that the distribution system remains clean and engine retains its initial efficiency. The fuel/oil mixtures completely burn without leaving any sticky deposits. The special solvents and polymers additives help reduce exhaust smoke and emissions.

KEY PROPERTIES

SAE Grade	20
Kinematic Viscosity, mm^2/s @ 40°C	47.6
Kinematic Viscosity, mm^2/s @ 100°C	8.1
Viscosity Index	142
Pour Point °C	-35
Flash Point °C	114
Package (Liters)	1

K1 Lube
Beyond Korea Tech

Transmission & Axle

K1 Lube ATF DX-III

K1 Lube ATF DX-VI

K1 Lube ATF Multi

K1 Lube CVTF

K1 Lube DCTF

K1 Lube Gear GL-5

Synthetic

K1 Lube ATF DX-III

Premium Performance
Automatic Transmission Fluid

GM DEXRON®-III, MERCON®,
ALLISON C-4

DESCRIPTION

K1 Lube ATF DX-III is an excellent automatic transmission fluid used in passenger cars equipped with automatic transmissions compared to other ATFs. It can also be recommended for automatic transmissions equipped with a lock-up clutch. It offers higher quality performance in part due to its oxidation stability, low temperature fluidity, adequate tribological performance and high shear stability.

APPLICATIONS

In accordance with the GM powertrain licensing requirements for the use of the DEXRON trademark, ATF DX-III may be recommended for use in automatic transmissions or other units, such as power-steering systems, industrial hydraulic systems and air compressors for which the service-fill product is specified as DEXRON®-II, DEXRON®-III or DEXRON fluid.

PERFORMANCE STANDARDS

GM TASA, DEXRON II(D/E), DEXRON III(G/H), Mazda ATF F-1, CAT TO-2, Ford MERCON, ALLISON C-3/C-4/TES 389, Volvo CE97340, Vickers M2950-S, I-268-S

CUSTOMER BENEFITS

Excellent Viscosity Performance
The very high viscosity index coupled with excellent viscosity stability during operation ensures no viscosity changes and thus prolongs the service life of the device.

Great Combination of Components
Oxidation stability and cleaning performance of base oils and additives prevent corrosion, rust, and sludge formation. High-quality base oils provide high foam stability, excellent low-temperature fluidity, good start operation in cold weather and high oxidation stability. The advanced friction modifiers provide more stable friction property.

KEY PROPERTIES

Kinematic Viscosity, mm^2/s @ 40°C	35.1
Kinematic Viscosity, mm^2/s @ 100°C	7.48
Viscosity Index	228
Pour Point °C	-49
Flash Point °C	188
Package (Liters)	1, 4T, 20, 200

Fully Synthetic

K1 Lube ATF DX-VI

Premium Performance Low Viscosity
Automatic Transmission Fluid

GM DEXRON®-VI, FORD MERCON LV,
JASO 1A-LV

DESCRIPTION

K1 Lube ATF DX-VI is a premium performance automatic transmission fluid for Hyundai automatic transmissions blended with synthetic base oils and advanced high-performance additives. Specially, it is designed to provide improved fuel efficiency and superior shudder control performance. It meets or exceeds the requirements of the latest OEM specifications such as Ford MERCON LV, Toyota WS, Nissan Matic S and Hyundai SP-IV/SP-IV-RR. It also fits most modern 6-speed automatic transmissions.

PERFORMANCE STANDARDS

GM DEXRON®-VI/II/III, HYUNDAI KIA SP-VI, FORD MERCON®, FORD M2C 138CJ, 166H, Mazda ATF FZ, F-1, S-1m Mitsubishi Diaqueen J2,3,ATF PA, MB 236.6,7,9, NISSAN Matic K, S, JASO 1A-LV, TOYOTA ATF T-IV, WS, Honda DW-1, ZF TE-ML 09, 09X, 11A 11B

CUSTOMER BENEFITS

Excellent Viscosity Performance
The very high viscosity index coupled with excellent viscosity stability during operation ensures no viscosity changes and thus prolongs the service life of the device.

Great Combination of Components
Oxidation stability and cleaning performance of base oils and additives prevent corrosion, rust, and sludge formation. High-quality base oils provide high foam stability, excellent low-temperature fluidity, good start operation in cold weather and high oxidation and shear stability. The advanced friction modifiers provide more stable friction property. Exceptional wear and corrosion performance make equipment life longer.

Smooth Shifting and Driving
Excellent friction performance which improves fuel efficiency and shudder control performance provides drivers with a comfort transmission shifting feeling.

KEY PROPERTIES

Kinematic Viscosity, mm^2/s @ 40°C	29.5
Kinematic Viscosity, mm^2/s @ 100°C	6.0
Viscosity Index	159
Pour Point °C	-45
Flash Point °C	222
Package (Liters)	1, 4T, 20, 200

Fully Synthetic

K1 Lube ATF Multi

Premium Performance Multi-vehicle Automatic Transmission Fluid

JASO 1A, GM DEXRON®-III, TOYOTA T-IV, HYUNDAI SP-III/SP-IV

DESCRIPTION

K1 Lube ATF Multi Plus is a high-performance, high-quality automatic transmission fluid blended of high-quality base oils with an advanced additive system. (Applicable to slip controlled locking clutches). It meets the requirements of a wide range of automatic transmission specifications requiring Hyundai SP-III, SP-IV, GM DEXRON® III, Ford MERCON®, Toyota T-IV and WS as well as the requirements of European OEMs such as Volvo CE 97340 and MB, BMW, VW, ZF. It also fits 4, 5, 6 and 8-speed automatic transmission specifications.

PERFORMANCE STANDARDS

GM Dexron II/IID/IIE/IIIG/IIIH/VI, FORD Mercon,
MB 236.5/6/7/8/9/91/10/11, HYUNDAI KIA SP-II/SP-III,
NISSAN Matic D/J/K, JASO M315 1A, TOYOTA D-II/T/T-III/T-IV/WS,
ZF TE-ML 11A/B

CUSTOMER BENEFITS

Excellent Viscosity Performance
The very high viscosity index coupled with excellent viscosity stability during operation ensures no viscosity changes and thus prolongs the service life of the device.

Great Combination of Components
Oxidation stability and cleaning performance of base oils and additives prevent corrosion, rust, and sludge formation. High-quality base oils provide high foam stability, excellent low-temperature fluidity, good start operation in cold weather and high oxidation and shear stability. The advanced friction modifiers provide more stable friction property. Exceptional wear and corrosion performance make equipment life longer.

Smooth Shifting and Driving
Excellent friction performance which improves fuel efficiency and shudder control performance provides drivers with a comfort transmission shifting feeling.

KEY PROPERTIES

Kinematic Viscosity, mm^2/s @ 40°C	36.8
Kinematic Viscosity, mm^2/s @ 100°C	7.0
Viscosity Index	153
Pour Point °C	-46
Flash Point °C	232
Package (Liters)	1, 4T, 20, 200

Fully Synthetic

K1 Lube CVTF

Premium Performance Continuously Variable Transmission Fluid

TOYOTA TC/FE, NISSAN NS-3, MITSUBISHI SP-III

DESCRIPTION

K1 Lube CVTF is a premium quality continuously variable transmission fluid designed to meet all kinds of CVTs like push belt type CVTs and chain type CVTs. It is specifically designed to provide superior driving comfort, extended transmission life, longer service intervals, superior wear control and durability between belts and pulleys.

PERFORMANCE STANDARDS

Recommended for use where the following specifications are called for :
Audi Multitronic, Daihatsu Ammix CVT,
Dodge/Jeep/Chrysler Jeep NS-2 / CVTF +4,
GM / Saturn DEX CVT, Honda HCF2 *1), Honda HMMF *1),
Honda Z-1 (CVT Model) *1), Hyundai / Kia SP-III (CVT Model,
Hyundai / Kia CVT J1, Mitsubishi SP-III, Mitsubishi CVTF-J1,
CVTF-J4, Mazda JWS 3320, Mini Cooper EZL 799,
Nissan NS-1,2,3, Punch CVT, Subaru ECVT, iCVT, iCVT FG,
Subaru Lineartronics Chain CVT, CVT II,
Subaru Lineartronics HT Chain CVT, Suzuki CVTF TC / 3320,
Suzuki CVT Green 1 & 2, Suzuki NS-2, Toyota CVTF TC, FE,
VW / Audi TL 521 16 (G052 516), VW / Audi TL 521 80 (G052 180)

CUSTOMER BENEFITS

Excellent Viscosity Performance
The very high viscosity index coupled with excellent viscosity stability during operation ensures no viscosity changes and thus prolongs the service life of the device.

Great Combination of Components
Oxidation stability and cleaning performance of base oils and additives prevent corrosion, rust, and sludge formation. High-quality base oils provide high foam stability, excellent low-temperature fluidity, good start operation in cold weather and high oxidation and shear stability. The advanced friction modifiers provide more stable friction property. Exceptional wear and corrosion performance make equipment life longer.

Smooth Shifting and Driving
Excellent friction performance which improves fuel efficiency and shudder control performance provides drivers with a comfort transmission shifting feeling.

KEY PROPERTIES

Kinematic Viscosity, mm^2/s @ 40°C	33. 68
Kinematic Viscosity, mm^2/s @ 100°C	7.08
Viscosity Index	180
Pour Point °C	-54
Flash Point °C	210
Package (Liters)	1, 4T, 20, 200

Fully Synthetic

K1 Lube DCTF

Premium Performance Dual Clutch Transmission Fluid

VW 6-SPEED DCT, BMW 6&7-SPEED DCT

DESCRIPTION

K1 Lube DCTF is a high-performance premium Dual Clutch Transmission fluid to be used in a wide range of OEM vehicles equipped with European, Asian and American wet dual-clutch transmissions. It is formulated with synthetic base oils and advanced additive technologies in order to provide shudder free driving experience, longer fluid life, and fluid durability.

PERFORMANCE STANDARDS

VW/Audi/Skoda/SEAT(TL 052 182/052 529), MB(236.21), Volvo(1161838/1161839), BMW(83 22 2 148 579/ 83 22 2 147 477/83 22 0 440 214/83 22 2 148 579), Ford/Getrag(M2C936A), Mitsubishi(MZ320065 DIAGUEEN SSTF-I), Porsche(999.917.080.00), Citroen(Peugeot/Citroen 9734.S2)

CUSTOMER BENEFITS

Excellent Viscosity Performance

The very high viscosity index coupled with excellent viscosity stability during operation ensures no viscosity changes and thus prolongs the service life of the device.

Great Combination of Components

Oxidation stability and cleaning performance of base oils and additives prevent corrosion, rust, and sludge formation. High-quality base oils provide high foam stability, excellent low-temperature fluidity, good start operation in cold weather and high oxidation and shear stability. The advanced friction modifiers provide more stable friction property. Exceptional wear and corrosion performance make equipment life longer.

Smooth Shifting and Driving

Excellent friction performance which improves fuel efficiency and shudder control performance provides drivers with a comfort transmission shifting feeling.

KEY PROPERTIES

Kinematic Viscosity, mm^2/s @ 40°C	34.7
Kinematic Viscosity, mm^2/s @ 100°C	7.1
Viscosity Index	171
Pour Point °C	L-40
Flash Point °C	214
Package (Liters)	1, 4T, 20, 200

Synthetic

K1 Lube Gear GL-5

Premium Performance Manual Transmission and Axle Fluid

API GL-5, US MIL-L-2105D
ZF TE-ML 07A(75W-90)

DESCRIPTION

K1 Lube Gear GL-5 is a high-performance, multipurpose, thermally stable automotive gear oil, that is, manual transmission fluid. It is suitable to all highly loaded gears (hypoid type gear applications, axles,final drivers, transfer cases and gearboxes) requiring API GL-5 specification.

APPLICATIONS

- Recommended for automotive hypoid gear applications requiring lubricants meeting MIL-L-2105D, MIL-L-2105C, MIL-L-2105B, API Service GL-5 or where EP, multi-purpose or hypoid type gear oils are specified.
- Recommended where loading is severe and maximum gear protection is required. "Clean gear" technology makes it particularly suitable where gear oil temperatures are high.
- Not recommended for manual transmissions and transaxles where the manufacturer specifies API GL-4(mild-EP) lubricants, or where the manufacturer advises against the use of API GL-5(multipurpose, hypoid) lubricants.

PERFORMANCE STANDARDS

- API GL-5
- US MIL-L-2105D
- ZF TE-ML 07A(75W-90)

CUSTOMER BENEFITS

Prolongs Equipment Life

Excellent wear and friction properties prevent wears and scratches on the surface of gear, extending equipment life. The combination of superior base oil and noticeable additives pprovide long oil service life by resisting oxidation and oil thickening as well as provide against corrosion of ferrous and non-ferrous components.

Less Deposit and Sludge Formation

Advanced detergent and anti-oxidant additives provide excellent equipment availability by avoiding failure due to deposit-induced seal wear and leakage.

Smooth Shifting

High-quality friction modifiers offer smooth shifting in manual transmissions by controlling glazing and coking of friction surfaces in synchronizing mechanisms.

KEY PROPERTIES

SAE Grade	75W-90	80W-90	85W-90	85W-140
Kinematic Viscosity, mm^2/s @ 40°C	98.1	131.6	141.2	338.4
Kinematic Viscosity, mm^2/s @ 100°C	15.68	14.2	14.2	25.5
Viscosity Index	171	106	97	98
Pour Point °C	-45	-35	-26	-25
Flash Point °C	188	226	230	238
Package (Liters)	1, 4, 4T, 20, 200	1, 4, 4T, 20, 200	1, 4, 4T, 20, 200	1, 4, 4T, 20, 200

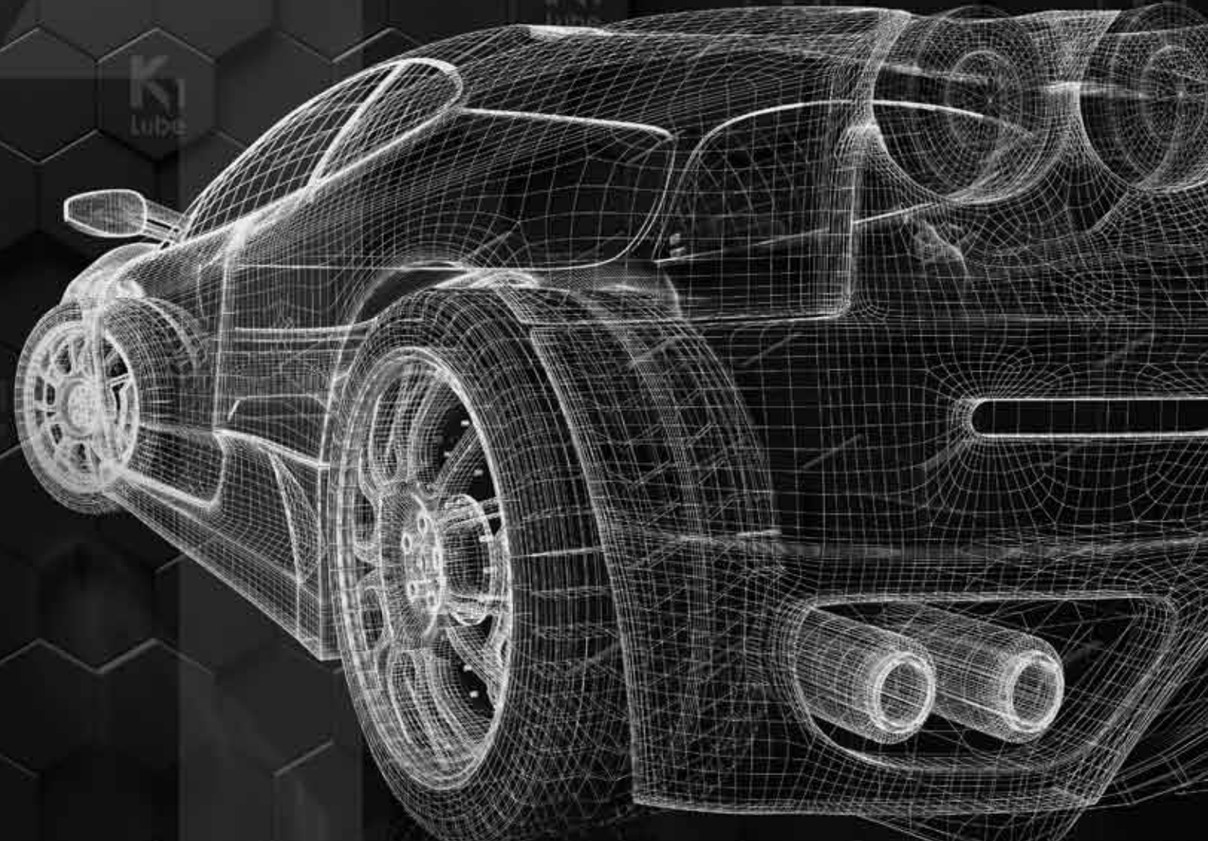
K1 Lube
Beyond Korea Tech

Specialties

K1 Lube AF Coolant

K1 Lube AF Coolant HD

K1 Lube Brake



K1 Lube Coolant

Premium Performance
Antifreeze / Coolant

KS M 2142, ASTM D3306,
GB 29743, JIS K 2234

DESCRIPTION

K1 Lubricant Coolant is a premium quality ethylene glycol-based antifreeze coolant concentrate. It is primarily designed to meet the stringent corrosion protection requirements of late-model automobile engines where significant amounts of aluminum are used in automotive components. It is dyed in unique colors for easy identification.

APPLICATIONS

- Primarily recommended for late model passenger car and light commercial vehicle engines where enhanced protection of aluminum heat-rejecting surfaces is required. It can also be used in certain cast iron, heavy-duty diesel engines, particularly, European dry-liner and "no-liner" designs, which operate without supplemental coolant additives(SCAs).
- K1 Lube Coolant is a coolant concentrate designed to be mixed with clean water. It is not a pre-diluted product. For optimum year-round protection a concentration of 50 percent solution of K1 Lube Coolant in water is recommended.
- Freezing and boiling protection provided by various concentrations of K1 Lube AF Coolant are as follows:

PERFORMANCE STANDARDS

KS M 2142, ASTM D3306, GB 29743, JIS K 2234

CUSTOMER BENEFITS

Excellent Corrosion Protection

Advanced additives protect cooling systems from corrosion and deposits and maximize aluminum engine component life.

Stable Base Performance

A premium ethylene glycol-based coolant provides a higher boiling point for protection against engine overheating and prevents coolant freezing. It is compatible with hard water.

FREEZING TEMP (MIXTURE RATIO)

Antifreeze, vol%	30	40	50	60
Water, vol%	70	60	50	40
Freezing Temp,℃	-16	-25	-36	-50

KEY PROPERTIES

Test Item	Unit	K1 Lube AF Coolant
Color	Color	Blue / Red / Green
pH, 33 vol% in distilled water	pH	8.0
Specific Gravity, 20℃	.	1.132
Water Content	Mass %	4.0
Boiling Point	℃	170
Flash Point	℃	124

K1 Lube AF Coolant HD

Premium Performance
Antifreeze / Coolant

HYUNDAI KIA Motors MS 591-08,
MM ES-X64217, Mazda Motors MES MN 121K,
GB 29743, KS M 2142, JIS K 2234, ASTM D3306

DESCRIPTION

K1 Lube AF Coolant HD is a long-life antifreeze coolant based on ethylene glycol and phosphate using HOAT (Hybrid Organic Acid Technology), which contains no amines, borates, nitrates or silicates. It is designed for all models of foreign and domestic passenger vehicles, light duty and heavy-duty diesel applications especially for heavy duty use. When used in accordance with the OEM and product manufacturer's instructions for product dilution, it prevents freezing and boil-over at the extreme range of temperature.

APPLICATIONS

- Large trucks and buses, automotive vehicles, cars, such as for filling and supplement.
- Industrial vehicles, machinery and equipment, filling and cooling system supplement.
- Marine institutions of cooling device filling and supplement.
- Aircraft de-ice for the filling and supplement.

PERFORMANCE STANDARDS

- HYUNDAI KIA Motors MS 591-08, MM ES-X64217, Mazda Motors MES MN 121K, GB 29743, KS M 2142, JIS K 2234, ASTM D3306

CUSTOMER BENEFITS

longer Equipment Life

The outstanding performance and reliability of this premium extended life corrosion inhibitor package provide operate significantly longer than the life of conventional products.

Excellent Corrosion Protection

The marvelous formulation provides extended protection against rust, erosion, galvanization corrosion and pitting due to cavitation of all coolant system metals, including aluminum.

Various Advantages

When used as a 50% coolant in softened or de-ionized water, K1 Lube AF Coolant HD provides extended lifetime of components, excellent liner cavitation protection, excellent high temperature aluminum protection. It is not required of the use of traditional SCAs (Supplemental Coolant Additives). It is compatible with hard water.

FREEZING TEMP (MIXTURE RATIO)

Antifreeze, vol%	30	40	50	60
Water, vol%	70	60	50	40
Freezing Temp,℃	-16	-25	-36	-50

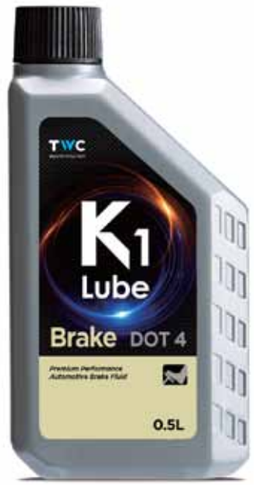
KEY PROPERTIES

Test Item	Unit	K1 Lube AF Coolant
Color	Color	Pink
pH, 33 vol% in distilled water	pH	8.2
Specific Gravity, 20℃	.	1.135
Water Content	Mass %	4.6
Boiling Point	℃	168
Flash Point	℃	124

K1 Lube Brake

Premium Performance
Automotive Brake Fluid

DOT 3, DOT 4



DESCRIPTION

K1 Lubricant Brake is a premium non-petroleum automotive brake fluid designed for use in severe service conditions or in a wide range of conventional hydraulic brake and clutch systems where DOT fluids are recommended. It is designed for use where a Class3 and 4 motor vehicle brake fluid is recommended by the motor vehicle manufacturer. Because It is hygroscopic, the containers should be kept sealed to prevent moisture absorption.

PERFORMANCE STANDARDS

K1 Lube Brake meets and exceeds the requirements of the following specifications for DOT brake fluid. ISO 4925, FMVSS 116, SAE J1704

CUSTOMER BENEFITS

Excellent Braking Response
Low volatility minimizes vapor formation over a wide temperature range, ensuring excellent braking performance and providing an additional safety margin for vapor locking in harsher service conditions.

Reliable Operation in Severe Service
High thermal and oxidation stability provides resistance to fluid deterioration and formation of harmful deposits even under harsh service conditions.

Saves on Maintenance
The excellent formulation provides continuous corrosion protection and lubrication throughout the brake/clutch system. It is compatible with all metal, plastic and elastomeric components

Reduces inventory Costs
K1 Lube brake is widely suitable for various automotives of DOT 3 and DOT 4.

KEY PROPERTIES

FMVSS Grade	DOT 3	DOT 4
Boiling Point-Dry	240ºC/464ºF	262ºC/500ºF
Boiling Point-Wet	146ºC/295°F	173ºC/320°F
Kinematic Viscosity, cSt @ 40˚C	1,300	1,100
Kinematic Viscosity, cSt @ 100°C	2.0	2.0
pH	8.8	8.0
Color	Amber	Amber
Package (Liters)	0 .5, 200	0.5, 200

ESTER
Organic Friction Modifier

ORGANIC FRICTION MODIFIER

K1 Lube
Beyond Korea Tech

K1 Lube
Beyond Korea Tech

Hydraulic Fluid

K1 Lube Hydraulic HV

K1 Lube Hydraulic HM

K1 Lube Hydraulic HL

K1 Lube Hydraulic Ashless

K1 Lube Hydraulic HV

Top Performance Wide Temperature Range Antiwear Hydraulic Fluid

ISO VG 15, 22, 32, 46, 68, 100

DESCRIPTION

K1 Lube Hydraulic HV is a premium quality, shear stable, multi-K1 Lube Hydraulic HV is a premium quality, shear-stable, anti-wear hydraulic fluid designed for use under a wide temperature range because it has a high viscosity index. It is suitable for a variety of hydraulic power applications such as mobile and exterior equipment operating in harsh conditions where the contamination and the water may enter.

APPLICATIONS

- Industrial hydraulic equipment subject to wide variation in temperatures
- Hydraulic Systems in mobile, construction and agricultural equipment
- Industrial Hydraulic systems with vane, gear or piston pumps
- Fork-lift trucks
- Enclosed gears operating under moderate load conditions
- Industrial circulating systems where a rust and oxidation inhibitor or antiwear oil is required

PERFORMANCE STANDARDS

- Bosch Rexroth RDE 90235
- Parker HF-0/1/2
- Eaton E-FDGN-TB002-E
- Fives P68/P69/P70
- DIN 51524-2/3
- ISO 11158
- GB 11118.1
- ASTM D6158
- SAE MS 1004
- JCMAS P041 HK
- GM LS-2
- AIST 126/127
- SEB 181222

CUSTOMER BENEFITS

Wide Temperature Application

The properties about high shear stability and oxidation stability reduce the failure in high pressure and highly loaded hydraulic systems operating over a wide temperature range.

Longer Equipment Life

Special anti-wear additives keep the tribofilm strong even under high loads, protecting the surface and reducing wear.

Reduced Downtime

Effective rust and oxidation inhibitors prevent varnishes and sludges from oil breakdown which can damage equipment surfaces & seals and the filter from clogging prematurely. In addition, high oxidation stability prevents oil thickening and deposit formation during use.

Trouble-Free Operation

Excellent hydrolytic stability and water separation properties provide excellent filterability even in the presence of water contamination. Excellent anti-foam and air release properties ensure smooth operation and system efficiency.

KEY PROPERTIES

ISO VG	15	32	46	68
Kinematic Viscosity, mm^2/s @ 40°C	15.8	32.3	46.6	69.3
Kinematic Viscosity, mm^2/s @ 100°C	3.9	6.4	8.2	11.1
Viscosity Index	148	150	152	151
Pour Point °C	-54	-40	-33	-39
Flash Point °C	208	244	250	256
Specific gravity	0.835	0.843	0.849	0.858
Package (Liters)	20	20	20	20

K1 Lube Hydraulic HM

Premium Performance Antiwear Hydraulic Fluid

ISO VG 10, 32, 46, 68, 100, 150, 220

DESCRIPTION

K1 Lube Hydraulic HM is a high-performance anti-wear hydraulic fluid formulated with high quality base fluids and additives. It can be used for a relatively long period of time compared to other anti-wear hydraulic oils because the system can be efficiently maintained with excellent cleanliness and excellent filtration.

APPLICATIONS

- Industrial hydraulic equipments (especially, specified to use hydraulic fluid whose flash temperature exceeds 250 degree of Celsius)
- Plastic injection molding machines
- Marine deck equipment, steering gears, bow thrusters and automatic controls
- Enclosed gears operating under moderate load conditions
- Industrial circulating systems where a rust and oxidation inhibitor or anti-wear oil is required

PERFORMANCE STANDARDS

- ISO 11158 (HM),
- Eaton Vickers M-2950-S/I-286-S,
- JCMAS HK
- US Steel 127
- Denison HF-0 (Hybrid Pump)
- GM LS-2/LH-03/LH-04/LH-06
- DIN 51524 PART II
- Cincinnati Machine P68/P69/P70

CUSTOMER BENEFITS

Wide Temperature Application

Excellent oxidation stability prevents oil thickening and deposit formation in service period without the unscheduled hydraulic oil changes.

Longer Equipment Life

Special anti-wear additives keep the tribofilm strong even under high loads, protecting the surface and reducing wear.

Reduced Downtime

Effective rust and oxidation inhibitors prevent varnishes and sludges from oil breakdown which can damage equipment surfaces & seals and the filter from clogging prematurely. In addition, high oxidation stability prevents oil thickening and deposit formation during use.

Trouble-Free Operation

Excellent hydrolytic stability and water separation properties provide excellent filterability even in the presence of water contamination. Excellent anti-foam and air release properties ensure smooth operation and system efficiency.

KEY PROPERTIES

ISO VG	10	32	46	68	100	150	220
Kinematic Viscosity, mm^2/s@40°C	10	32	46	68	100	155	220
Kinematic Viscosity, mm^2/s@100°C	2.7	5.4	6.8	8.8	11.5	15.4	19.2
Viscosity Index	104	104	99	102	102	100	98
Pour Point °C	-57	-35	-37	-35	-28	-24	-20
Flash Point °C	178	218	228	238	258	266	266
Specific gravity	0.838	0.863	0.868	0.874	0.878	0.883	0.887
Package (Liters)	18,20,200	18,20,200	18,20,200	20,200	200	200	200

K1 Lube Hydraulic HL

Rust & Oxidation Inhibited Hydraulic Oil

ISO VG 32, 46, 68

DESCRIPTION

K1 Lube Hydraulic HL is a premium-quality hydraulic fluid comprised of purely refined base oil and additives for oxidation and corrosion protection, without any special additives to prevent wear in mixed friction. It is suitable for industrial equipment and circulatory machines that require corrosion protection, such as electric motor bearings, blowers, and compressors, as well as decelerators that do not require wear resistance or extreme pressure performance, and pumps that require rust and oxidation prevention performance.

APPLICATIONS

- Industrial hydraulic equipment operated in plants and factory
- Industrial Hydraulic systems with vane, gear or piston pumps
- Enclosed gears operating under moderate load conditions
- Industrial circulating systems where a rust and oxidation inhibitor or antiwear oil is required

PERFORMANCE STANDARDS

- DIN 51524 PART I (HL),
- ISO 11158 (HL Fluids),
- Cincinnati Machine P38/P54/P55

CUSTOMER BENEFITS

Longer Equipment Life

The properties about high shear stability and oxidation stability reduce the failure in high pressure and highly loaded hydraulic systems operating over a wide temperature range.

Reduced Downtime

Effective rust and oxidation inhibitors prevent varnishes and sludges from oil breakdown which can damage equipment surfaces & seals and the filter from clogging prematurely. In addition, high oxidation stability prevents oil thickening and deposit formation during use.

Trouble-Free Operation

Excellent hydrolytic stability and water separation properties provide excellent filterability even in the presence of water contamination. Excellent anti-foam and air release properties ensure smooth operation and system efficiency.

KEY PROPERTIES

ISO VG	32	46	68
Kinematic Viscosity, mm^2/s @ 40°C	31.8	45.9	66.3
Kinematic Viscosity, mm^2/s @ 100°C	5.4	6.8	8.7
Viscosity Index	104	103	102
Pour Point °C	-38	-40	-38
Flash Point °C	216	228	238
Specific gravity	0.862	0.868	0.873
Package (Liters)	20	20	20

K1 Lube Hydraulic Ashless

Top Performance Ash Free AntiWear Hydraulic Fluid

ISO VG 15, 22, 32, 46, 68, 100

DESCRIPTION

K1 Lube Hydraulic Ashless is

- Suitable for a wide range of hydraulic power mobile applications under wide temperature range
- Any hydraulic system where risk of contamination of the environment and water exist
- Any application where an anti-wear, high VI and high performance oil is necessary
- Low toxicity towards the environment

APPLICATIONS

- Outstanding wear protection: Advanced Zinc-free additives ensure protection of machine parts
- Long fluid life: Reducing maintenance costs
- Maintaining system efficiency: Superior cleanliness and excellent filterability
- Environmentally friendly formulation: Prevent formation of deposit
- Extended temperature range capability

PERFORMANCE STANDARDS

- ISO 11158 (HV)
- Cincinnati Machine P68/P69/P70
- AFNOR NFE 48603 (HM)
- ASTM D6158 (HV)
- GM LH-04-1/LH-06-1/LH-15-1
- US Steel 127/136
- SAE MS 1004 (HV)
- Eaton Vickers I-286-S/M-2950-S
- Denison HF-0/HF-1/HF-2
- DIN 51524 PART II (HLP)/III (HVLP)
- Bosch Rexroth RE 90220

PRODUCT PERFORMANCE

- Outstanding wear protection: Advanced Zinc-free additives ensure protection of machine parts
- Long fluid life: Reducing maintenance costs
- Maintaining system efficiency: Superior cleanliness and excellent filterability
- Environmentally friendly formulation: Prevent formation of deposit
- Extended temperature range capability

KEY PROPERTIES

ISO VG	15	22	32	46	68	100
Kinematic Viscosity, mm^2/s@40°C	15.6	22.3	32.6	46.2	67.7	98.9
Kinematic Viscosity, mm^2/s@100°C	4	4.9	6.4	8.2	10.9	14.5
Viscosity Index	161	153	151	153	150	152
Pour Point °C	-50	L-40	-45	-40	-40	-37
Flash Point °C	206	230	244	250	252	256
Specific gravity	0.837	0.836	0.846	0.848	0.864	0.873
Package (Liters)	18,20,200	18,20,200	18,20,200	20,200	200	200

K1 Lube
Beyond Korea Tech

Industrial Oil

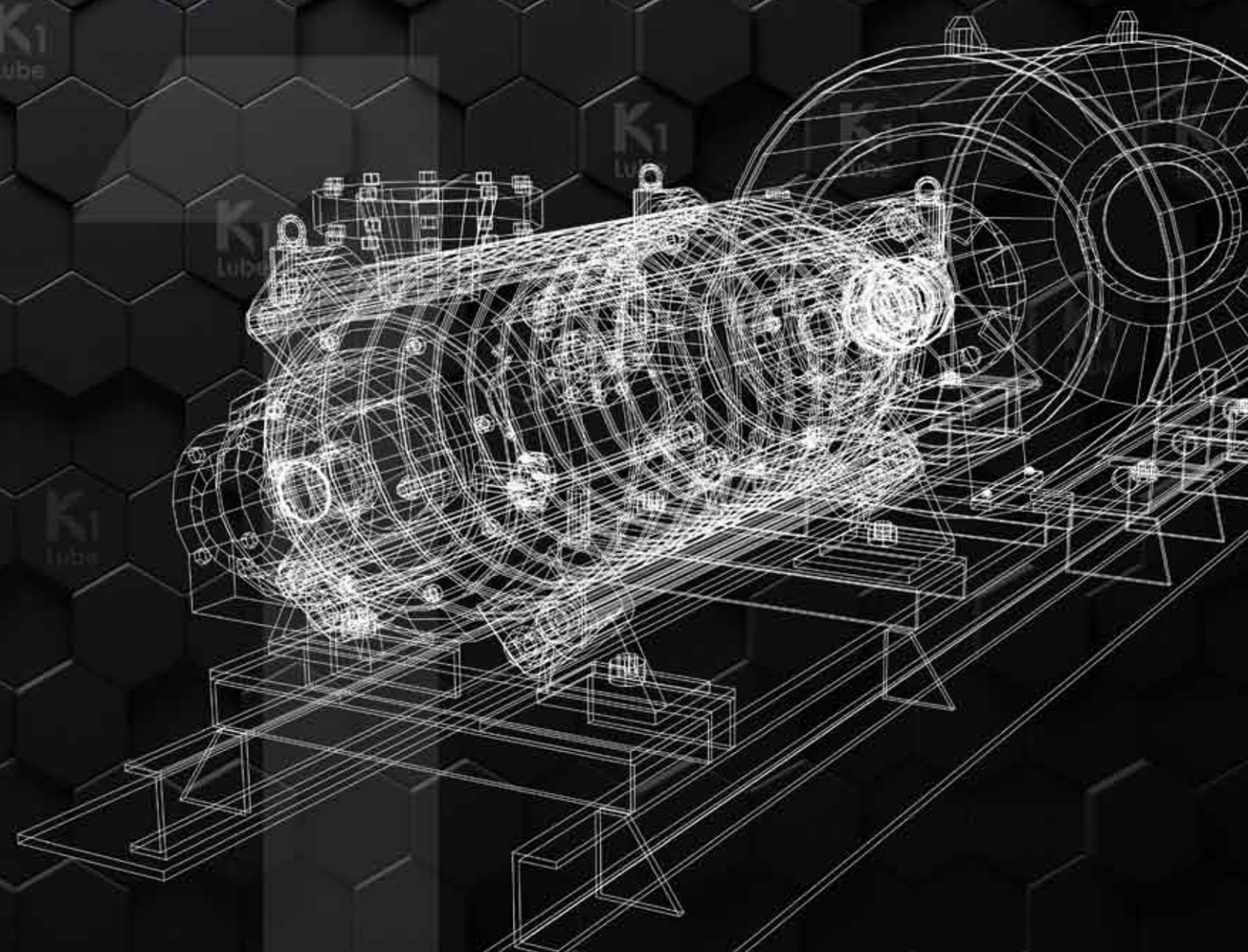
K1 Lube Gear EP

K1 Lube Turbine

K1 Lube Compressor P

K1 Lube Compressor S

K1 Lube Transformer I



K1 Lube Gear EP

Extreme Pressure
Industrial Gear Oil

ISO VG 100, 150, 220, 320, 460

DESCRIPTION

K1 Lube Gear EP is a high-performance industrial gear oil that complies with DIN 51517 Part 3 CLP standards. Optimized for oxidation stability, moisture separation, and extreme pressure properties, it is recommended for industrial gear and vehicle equipment requiring extreme pressure resistance.

APPLICATIONS

- Recommended for all types of industrial and mobile equipment requiring mild EP gear lubricants. Particularly recommended for enclosed gear drives and speed reducers, ranging from small gearboxes to large, high-power units such as metal rolling mills, cement mills, sugar mills and mine hoists.
- Also suitable for chain cases, sprockets, slide guides, flexible couplings, and plain and rolling element bearings.

PERFORMANCE STANDARDS

- U.S. Steel 224
- DIN 51517 PART 3
- AGMA 9005-EO2
- David Brown S1.53.101
- Fives Cincinnati Gear Oils
- ISO 12925-1 CKC/CKD

CUSTOMER BENEFITS

Anti-Wear and EP Properties

A strong, long-lasting tribofilm minimizes wear and scuffing and maintains power transmission efficiency. Excellent extreme pressure and wear resistance protects gears from shock loads and heavy loads. High load carrying capacity extends gear life and provides excellent ability to keep gear surfaces free of deposits.

High Thermal and Oxidation Stability

Excellent oxidation stability prevents viscosity increase at normal operating temperature and prevents energy loss. High thermal stability maintains an efficient lubrication system by minimizing adhesion to gears and bearing surfaces.

Anti-Rust and Corrosion

Excellent rust and corrosion resistance prevents steel, copper, bronze, cadmium and nickel materials from corroding.

KEY PROPERTIES

SAE Grade	100	150	220	320	460
Kinematic Viscosity, mm^2/s @ 40°C	100.1	150.3	218.9	316.6	456.9
Kinematic Viscosity, mm^2/s @ 100°C	11.6	15.1	19.2	24.3	30.5
Viscosity Index	104	100	100	97	96
Pour Point °C	25	-19	-17	-16	-15
Flash Point °C	260	268	264	260	306
Package (Liters)	20, 200	20, 200	20, 200	20, 200	20, 200

K1 Lube Turbine

High Performance Turbine Oil

ISO VG 32, 46

DESCRIPTION

K1 Lube Turbine is a high-performance turbine oil that satisfies various international specifications and turbine manufacturers' specifications. By using an optimal combination of high-quality base oil, antioxidants, rust inhibitors, corrosion inhibitors, and anti-foaming agents, it provides stable and efficient operation in the general circulation and lubrication systems of various turbines (power plant, manufacturing plant, large vessels, etc.), turbo compressors, and machines.

APPLICATIONS

- Various steam, gas and hydraulic turbines operated under moderate operating conditions
- Various turbo machineries operated under moderate operating conditions
- Machines and lubrication systems which face problems due to sludge and varnish under high temperature conditions
- Machines and lubrication systems designed to use oils which meet the following performance specifications

PERFORMANCE STANDARDS

- DIN 51515, PART I (L-TD), PART II (L-TG),
- CEGB Standard 207001
- Siemens TLV 9013 04/01
- Brown Boveri HTGD 90117
- British Standard BS489, U.S. Steel 120
- General Electric GEK 32568 A/C
- Westinghouse Electric Corp
- MIL-L-17672D
- Alstom HTGD 90 117 V0001 S

CUSTOMER BENEFITS

Extended Oil Service Life

High oxidation stability prevents oil thickening and deposit formation during use without the need for unscheduled turbine oil changes.

Longer Equipment Life

Good air release minimizes lubrication film breakdown and malfunction in oil circulation pumps.

Trouble-Free Operation

Good water separtion characteristic ensures smooth operation and system efficiency by preventing rust and corrosion in key machine elements.

KEY PROPERTIES

SAE Grade	32	46
Kinematic Viscosity, mm^2/s @ 40°C	33.2	46.5
Kinematic Viscosity, mm^2/s @ 100°C	5.8	7.8
Viscosity Index	129 -	129
Pour Point °C	37	-31
Flash Point °C	242	245
Package (Liters)	200	200

K1 Lube Compressor P

High Performance Reciprocating Compressor Oil

DIN 51506 VDL

DESCRIPTION

K1 Lube Compressor P is a high quality reciprocating compressor oil with DIN 51506 class VDL specifications which is blended with high quality base oils and advanced additives. Advanced additives provide excellent oxidation resistance, corrosion resistance and excellent EP properties. It provides smooth and economical compressor operation and high load carrying capacity, especially in harsh conditions.

APPLICATIONS

K1 Lube Compressor P is recommended for stationary and portable compressors, operating at compression temperatures up to 220°C including compressors with oil lubricated pressure space, e.g. single and multistage reciprocating compressors or single or multistage centrifugal compressors.
The 46 grade is primarily recommended for use in oil-flooded screw compressors as well as centrifugal compressors. At high compression pressures, such as in multistage reciprocating compressors, the higher viscosity grade may be used.
K1 Lube Compressor P meets the spec of "Rheinische-Westfälischer Uberwachungsverein e.V." in Germany and it meets DIN 51 506 VDL.

PERFORMANCE STANDARDS

- DIN 51506 VDL

CUSTOMER BENEFITS

Oxidation Stability
Oxidation resistance at high temperatures prevents carbon formation in air compressor chambers, discharge lines and air vessels. It provides longer oil life and reduction of maintenance cost.
Rust Protection
Excellent rust and copper corrosion control protect the parts of equipment and prevents oil deterioration with longer oil life.
Water Separation Properties
Excellent water separation performance helps maintain normal operation condition and reliable operation.
Wear Protection
Outstanding wear protection minimizes wear of metal surfaces such as valve, ring and cylinders.

KEY PROPERTIES

ISO Viscosity Grade	46	68	100
Density, kg/L @15˚C	0.86	0.86	0.87
Viscosity Index	120	120	120
Pour Point ˚C	-20	-20	-20
Flash Point ˚C	240	240	250
Copper Corrosion	1a	1a	1a
Package (Liters)	20,200	20,200	20,200

K1 Lube Compressor S

High Performance Rotary Screw Compressor Oil

DIN 51506 VDL ISO DP 6521/6743 L-DAG/6743 L-DAH

DESCRIPTION

K1 Lube Compressor S is a premium performance rotary and screw type compressor oil containing high quality base oil and special antioxidants and rust inhibitors. It is specifically designed for use in oil flood lubricated positive displacement rotary compressors.

APPLICATIONS

- Oil flood lubricated rotary screw air compressors.
- Oil flood lubricated sliding vane air compressors.
  (Not recommended for use in breathing air compressors.)

PERFORMANCE STANDARDS

- DIN 51506 VDL ISO DP 6521/6743 L-DAG/6743 L-DAH

CUSTOMER BENEFITS

Extended Oil Service Life
The excellent oxidation stability of the base oil and special inhibitor additives prevents oil decomposition at the high temperatures that occur during the intimate mixing of oil and air in rotary compressor service.
Minimum Maintenance and Downtime
Excellent oxidation stability also prevents the formation of harmful varnish and sludge deposits promoted by contact with condensed water vapor, dust and other particulate contaminants. Highly effective film-forming corrosion inhibitors protect your system from rusting on metal surfaces.

Trouble-Free Operation
The excellent air release and anti-foam properties minimize lubricant carryover, prevent lubrication disruption due to air entrained in the oil, and minimize the potential for foaming and overflow in tanks and reservoirs. Excellent water separating characteristics easily remove water during draining.

KEY PROPERTIES

ISO Viscosity Grade	32	46
Density, kg/L @15˚C	0.85	0.85
Viscosity Index	120	120
Pour Point ˚C	-20	-20
Flash Point ˚C	240	250
Copper Corrosion	1a	1a
Package (Liters)	20,200	20,200

K1 Lube Transformer I

Inhibited Transformer Oil

IEC 60296:2012, KS C 2301 Class 1

DESCRIPTION

K1 Lube Transformer I is a highly refined and inhibited transformer oil that meets the IEC 60296:2012 transformer oil specification for use in harsh conditions such as high ambient temperatures. It should also be used where insulating oils that require oxidation resistance and thermal stability are required. It has no impurities such as water, dissolved gas, DBDS, suspended solid and PCB.

APPLICATIONS

- Transformers
- Oil-immersed switchgear
- Circuit breakers
- Oil-filled capacitors
- Tap changers
- Electrical reclosures
- Fuses

PERFORMANCE STANDARDS

- IEC 60296:2012, KS C 2301 Class 1

CUSTOMER BENEFITS

Extended Service Life

Effective anti-oxidants limit the formation of sludge, deposits and soluble compounds that degrade the electrical properties of oils under harsh, high ambient temperatures or long-term conditions of use.

Prolongs Transformer Life

Excellent conductive heat transfer properties improve cooling of transformer components. Low solvency protects electrical wire enamels.

Maximizes Life of Oil-immersed Switches

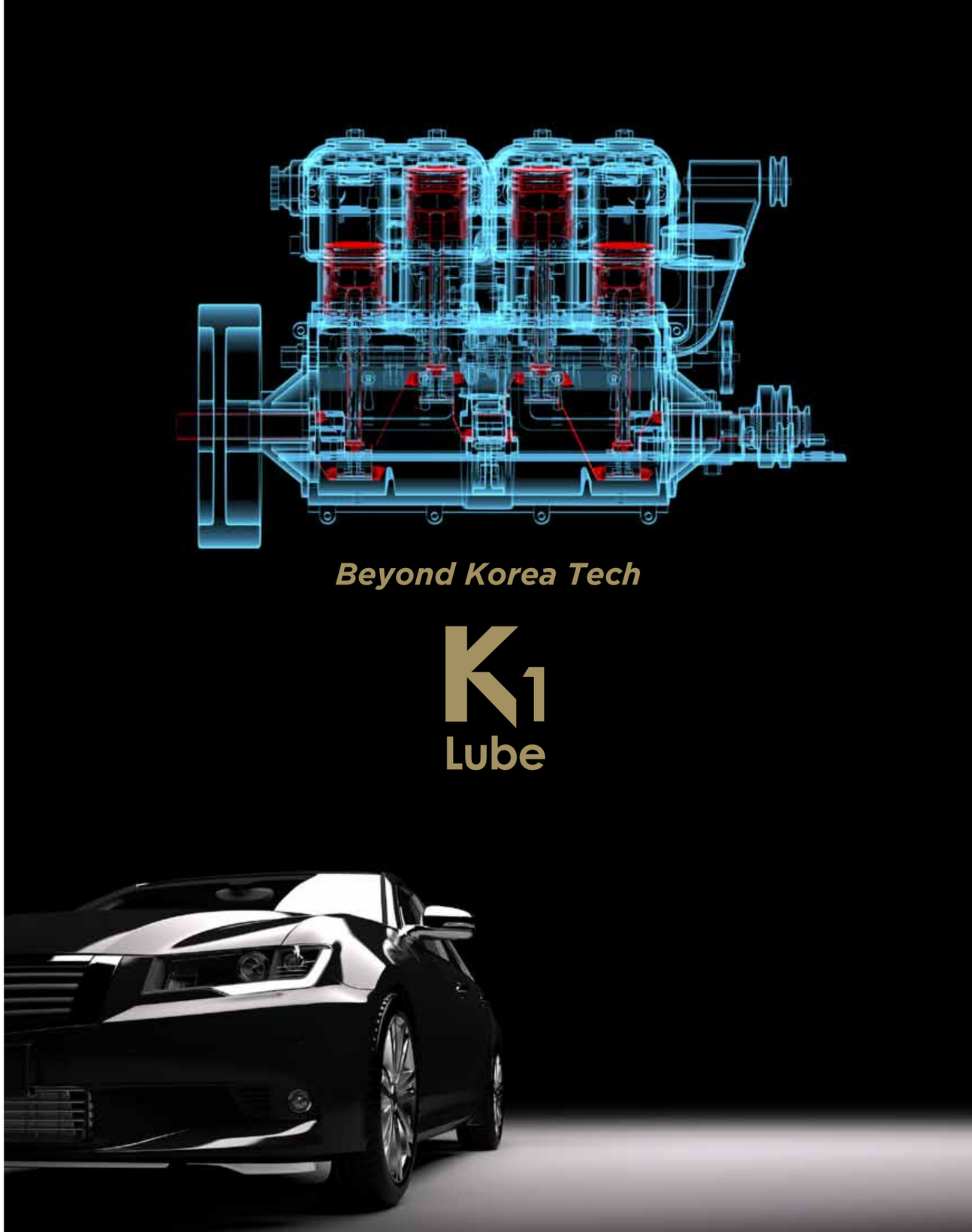
Rapid cooling of the arc reduces contact erosion.

Maintains transformer efficiency

High dielectric strength and low dielectric permittivity provide excellent insulating properties.

KEY PROPERTIES

PROPERTIES	UNITS	TRANSFORMER I
Appearance	Clear	Clear
Density @ 15˚C	g/cm3	0.8225
Viscosity at -30˚C	cSt	269
Viscosity at 40˚C	cSt	7.483
Viscosity at 100˚C	˚C	2.218
Pour Point ˚C	˚C	-55
Flash Point ˚C	mg KOH/g	151
Acidity	-	< 0.01
Oxidation Stability	mg KOH/g	-
Total Acidity	-	< 0.01
Sludg	wt%	< 0.01
DDF @ 90 ˚C	-	0.0057
Inhibitors of IEC 60666	wt%	0.3
Water Content	mg/kg	17
Breakdown Voltage	kV	81 / 81
Dissipation Factor at 90˚C	-	0.0003
Corrosive Sulfur	-	Non Corrosive
Potentially Corrosive Sulfur	-	Non Corrosive
PCBs	mg/kg	Undetectable
DBDS	mg/kg	Undetectable
Metal Passivator additives	mg/kg	Undetectable
Furfural and related compounds	mg/kg	Undetectable
Package	Liters	200



K1 Lube
Beyond Korea Tech

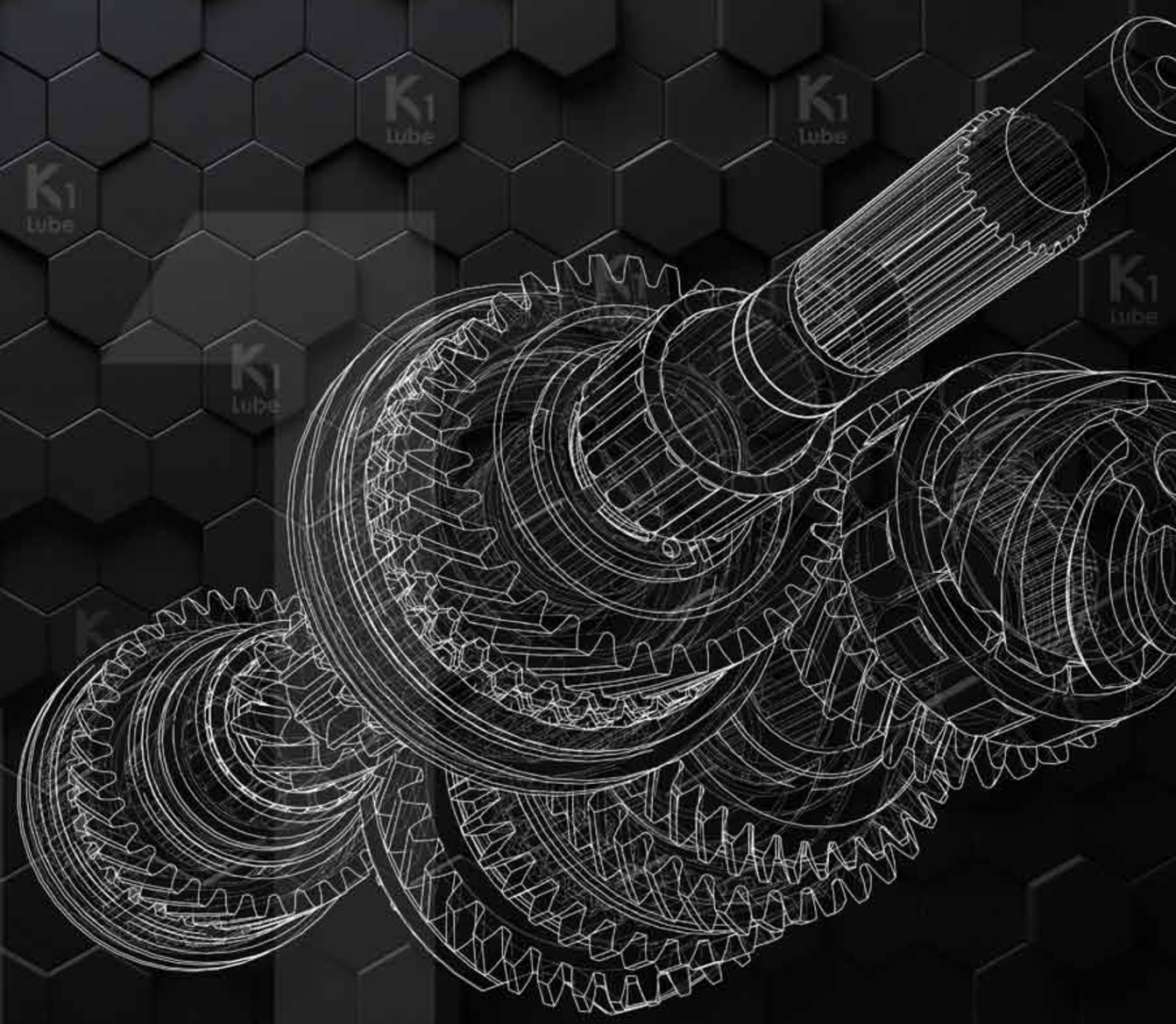
Grease

K1 Lube Grease Lithium Complex

K1 Lube Grease EP 00

K1 Lube Grease EP 2

K1 Lube Grease 2



K1 Lube Grease Lithium Complex

Automotive Wheel Bearing & Chassis Grease

NLGI 2

DESCRIPTION

K1 Lube Grease Lithium Complex is a premium multi-purpose EP automotive wheel bearing and chassis grease with red color containing lithium complex thickener, EP additives, rust and oxidation inhibitors, and adhesion additives.

APPLICATIONS

- Automotive wheel bearings
- Chassis lubrication
- Highway and off-highway applications
- Construction equipment
- Agricultural tractors
- Heavy-duty transport
- General industrial greasing

Usable temperature range in continuous service: -30 to 165°C
Maximum temperature for short term exposure is 220°C.

PERFORMANCE STANDARD

- NLGI Service Category GC-LB

CUSTOMER BENEFITS

Saves Maintenance Costs

Effective EP additives prevent bearing wear under harsh conditions and shock loads. Effective rust and corrosion inhibitors protect metal surfaces even under severe water exposure conditions.

Minimizes Downtime

The high dropping point minimizes bearing leakage at high temperatures and provides long grease life due to excellent oxidation resistance. The natural water resistance of lithium complex thickeners combined with additional adhesion additives prevents water washing out.

Minimizes Inventory Costs

Multipurpose capability makes it use in a wide range of automotive and industrial applications, reducing the number of greases required and preventing product misuse.

KEY PROPERTIES

NLGI Grade	2
Dropping Point,°C	263
Oil Viscosity, mm^2/s @ 40°C	200
Penetration, Worked @ 25°C	280
Thickener Type	Lithium Complex
Thickener (Lithium Complex), m %	11
Water Washout @ 79°C, 1hr	0.65
4 ball EP, kgf	250
Package (kg)	15, 180

K1 Lube Grease EP

Multipurpose EP Grease

NLGI 000 / 00

DESCRIPTION

K1 Lube Grease EP is a semi-fluid type grease containing lithium thickener, mineral base oil, EP additives, rust and oxidation inhibitors, for use in centralized lubrication systems and concrete pump cars.

APPLICATIONS

- Concrete pump cars
- Centralized lubricating systems
- Application where EP semi-fluid grease is required

Usable temperature range in continuous service is : -30 to 120°C

CUSTOMER BENEFITS

Long Service Life

Excellent oxidation stability makes long service life.

Anti-wear Property

Good anti-wear property prevents from wear and tear on equipment.

Good Pumpability

Good pumping properties allow pumping even at low temperatures.

Rust and Corrosion Protection

Rust and corrosion inhibitors protect equipment from rust and corrosion..

KEY PROPERTIES

NLGI Grade	000	00
Dropping Point, °C	164	183
Oxidation stability, kgf/cm^2	0.35	0.35
Copper Corrosion @ 100°C, 24h	No Tarnish	No Tarnish
Penetration, Worked @ 25°C	460	417
Evaporation loss, wt%	0.30	0.35
Package (kg)	15	15

K1 Lube Grease EP

Centralized Lubrication System Grease

NLGI Grade 1, 2, 3

DESCRIPTION

K1 Lube Grease EP (consistency 0,1,2,3) is a multi-purpose EP grease containing highly refined base oil, lithium thickener, extreme pressure (EP) additives, and rust and anti-oxidant inhibitors. It is suitable for various automotive parts and industrial equipment parts with general purpose or multi-purpose.

APPLICATIONS

- Automotive wheel bearings
- Chassis grease point lubrication
- Industrial plain and rolling element bearings
- General plant lubrication
- Centralized lubrication systems (NLGI 0 and 1)
- Construction equipment bearings
- Earthmoving, quarrying and mining
- Agricultural equipment

Usable temperature range in continuous service is:
NLGI 1 -30 to 130°C
NLGI 2 -30 to 130°C
NLGI 3 -20 to 130°C
Maximum temperature for short term exposure is 175°C (NLGI 1, 2 and 3).

CUSTOMER BENEFITS

Saves Maintenance Costs

Effective EP additives prevent component wear under high load conditions. Rust and corrosion inhibitors protect metal surfaces.

Long Service Life

Excellent oxidation stability improves grease condition and extends service life.

Good Pumpability

The excellent pumping properties of lithium thickeners provide suitable flow characteristics for grease pump application systems.

KEY PROPERTIES

NLGI Grade	1	2	3
Thickener	Lithium	Lithium	Lithium
Base Oil	Mineral oil	Mineral oil	Mineral oil
Penetration(mm)	320	280	235
Dropping Point,°C	240	250	260
Oil Separation (%)	3.0	2.2	1.8
Copper Strip Corrosion	1b	1b	1b
Oxidation Stability	0.3	0.3	0.3
Package (kg)	15, 180	15, 180	15, 180

K1 Lube Grease

General Purpose Automotive and Industrial Grease

NLGI Grade 2, 3

DESCRIPTION

K1 Lube Grease is a yellow, translucent, general-purpose automotive and industrial grease with a soft, buttery texture, formulated with lithium soaps with adhesive properties and anti-oxidant additives.

APPLICATIONS

- Most automotive grease applications including wheel bearings, ball joints, universal joints and linkages.
- Industrial ball and roller bearing, plain bearing, niddle bearing.
- General industrial applications where EP characteristics are not needed.

CUSTOMER BENEFITS

Load Carry Capacity

Advanced lithium soaps and additives protect bearings from damage under light-load or shock-load conditions.

Minimizes Downtime

Resistance to wash-off helps ensure components of equipment effective lubrication even in wet environments. Excellent adhesion prevents dripping and allows continuous lubrication. Excellent mechanical stability prevents leakage from bearings.

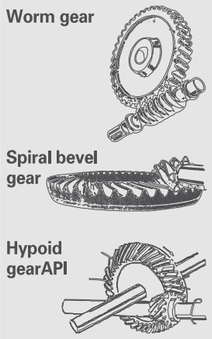
Long Service Life

Excellent oxidation stability improves grease condition and extends service life.

KEY PROPERTIES

NLGI Grade	2	3
Dropping Point, °C	235	263
Penetration, Worked @ 25 °C	272	236
Thickener Type	Lithium	Lithium
Thickener Content, mass %	8.5	10
Water Washout @ 79°C, 1hr	2.49	1.27
4 ball EP, kgf	200	200
Life Performance, hrs @ 165 °C	80	80
Usable Temperature Range	-30 to 150	-20 to 160
Package (kg)	0.5, 1, 3, 15, 180	0.5, 1, 3, 15, 180

■ Performance Classification Gear Oil



GRADE	Type	APPLICATION
GL-1	Straight Mineral Oil	Truck manual transmissions
GL-2	Usually contains fatty materials	Worm gear drives, industrial gear oils
GL-3	Contains mild EP additives.	Manual Transmission and spiral bevel final drives
GL-4	Equivalent to obsolete Mil-L-2105 specification, usually satisfied with 50% of GL-5 additive level	Manual Transmissions, and Spiral bevel and hypoid gears in moderate service.
GL-5	Virtually equivalent to present Mil-L-2105D, Primary field service recommendation of most passenger	Moderate and severe service in hypoid and other types of gears. May also be used in manual transmissions car and truck builders worldwide

■ Viscosity Grades : SEA-Engine Oil

SAE J300 Jan. 2015 (SAE: Society of Automotive Engineers)

SAE Viscosity Grade	Low Temp. Cranking Vis., Max at Temp, cP at ℃	Low Temp. Pumping Vis., Max with no yield stress at Temp, cP at ℃	High Temp. Vis. cSt at 100℃		High Temp. High Shear Vis. At 150℃, cP
			Min.	Max.	
0W	6,200 at -35	60,000 at -40	3.8	-	-
5W	6,600 at -30	60,000 at -35	3.8	-	-
10W	7,000 at -25	60,000 at -30	4.1	-	-
15W	7,000 at -20	60,000 at -25	5.6	-	-
20W	9,500 at -15	60,000 at -20	5.6	-	-
25W	13,000 at -10	60,000 at -15	9.3	-	-
20	-	-	5.6	< 9.3	2.6
30	-	-	9.3	< 12.5	2.9
40	-	-	12.5	< 16.3	3.5 / 3.7
50	-	-	16.3	< 21.9	3.7
60	-	-	21.9	< 26.1	3.7

5W-30 is satisfied with the specification of 5W and 30 simultaneously.

■ Viscosity Grades : SEA-Gear Oil

(SAE J306 Feb. 2019)

SAE Viscosity Grade	Maximum Temperature for Viscosity of 150,000cP	Viscosity at 100℃, cSt	
		Min.	Max.
70W	-55	4.1	-
75W	-40	4.1	-
80W	-26	7.0	-
85W	-12	11.0	-
80	-	7.0	11.0
85	-	11.0	13.5
90	-	13.5	< 24.0
140	-	24.0	< 41.0
250	-	41.0	-

Multigrade: 75W-85W, 80W-90, 85W-140 etc.

■ Viscosity Grades :ISO-Industrial Oil

(ISO: International Organization for Standardization)

ISO Viscosity Grade	Viscosity at 40℃, cSt	
	Min.(-10%)	Max.(+10%)
32	28.8	35.2
46	41.4	50.6
68	61.2	74.8
100	90.0	110
150	135.0	165
220	198.0	242
~	~	~
1500	1350.0	1650
3200	2880.0	3520.0

API

The current and previous API Service Categories are listed below. Vehicle owners should refer to their owner's manuals before consulting these charts. Oils may have more than one performance level. For automotive gasoline engines, the latest engine oil service category includes the performance properties of each earlier category. If an automotive owner's manual calls for an API SJ or SL oil, an API SN oil will provide full protection. For diesel engines, the latest category usually - but not always - includes the performance properties of an earlier category.

■ Gasoline Engines

Catagory	Status	Service
SP	Current	Introduced in May 2020, designed to provide protection against lowspeed pre-ignition(LSPI), timing chain wear protection, improved high temperature deposit protection for pistons and turbochargers, and more stringent sludge and varnish control. API SP with Resource Conserving matches ILSAC GF-6A by combining API SP performance with improved fuel economy, emission control system protection and protection of engines operating on ethanol-containing fuels up to E85.
SN	Current	For 2020 and older automotive engines.
SM	Current	For 2010 and older automotive engines.
SL	Current	For 2004 and older automotive engines.
SJ	Current	For 2001 and older automotive engines.
SH	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1996. May not provide adequate protection against build-up of engine sludge, oxidation, or wear.
SG	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1993. May not provide adequate protection against build-up of engine sludge, oxidation, or wear.
SF	Obsolete	CAUTION: Not suitable for use in most gasoline-powered automotive engines built after 1988. May not provide adequate protection against build-up of engine sludge.
SA - SE	Obsolete	WE do not produce this grade.

■ Diesel Engines

Catagory	Status	Service
CK-4	Current	API Service Category CK-4 describes oils for use in high-speed four-stroke cycle diesel engines designed to meet 2017 model year on-highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0.05% by weight). However, the use of these oils with greater than 15 ppm (0.0015% by weight) sulfur fuel may impact exhaust aftertreatment system durability and/or oil drain interval. These oils are especially effective at sustaining emission control system durability where particulate filters and other advanced aftertreatment systems are used. API CK-4 oils are designed to provide enhanced protection against oil oxidation, viscosity loss due to shear, and oil aeration as well as protection against catalyst poisoning, particulate filter blocking, engine wear, piston deposits, degradation of low- and high-temperature properties, and soot-related viscosity increase. API CK-4 oils exceed the performance criteria of API CJ-4, CI-4 with CI-4 PLUS, CI-4, and CH-4 and can effectively lubricate engines calling for those API Service Categories. When using CK-4 oil with higher than 15 ppm sulfur fuel, consult the engine manufacturer for service interval recommendations.
CJ-4	Current	For high-speed four-stroke cycle diesel engines designed to meet 2010 model year on-highway and Tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0.05% by weight). However, the use of these oils with greater than 15 ppm (0.0015% by weight) sulfur fuel may impact exhaust aftertreatment system durability and/or drain interval. API CJ-4 oils exceed the performance criteria of API CI-4 with CI-4 PLUS, CI-4, CH-4, CG-4 and CF-4 and can effectively lubricate engines calling for those API Service Categories. When using CJ-4 oil with higher than 15 ppm sulfur fuel, consult the engine manufacturer for service interval.
CI-4	Current	Introduced in 2002. For high-speed, four-stroke engines designed to meet 2004 exhaust emission standards implemented in 2002. CI-4 oils are formulated to sustain engine durability where exhaust gas recirculation (EGR) is used and are intended for use with diesel fuels ranging in sulfur content up to 0.5% weight. Can be used in place of CD, CE, CF-4, CG-4, and CH-4 oils. Some CI-4 oils may also qualify for the CI-4 PLUS designation.
CH-4	Current	Introduced in 1998. For high-speed, four-stroke engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0.5% weight. Can be used in place of CD, CE, CF-4, and CG-4 oils.
CG-4	Current	Introduced in 1995. For Severe duty, high-speed, four-stroke engines using fuel with less than 0.5% weight sulfur. CG-4 oils are required for engines meeting 1994 emission standards. Can be used in place of CD, CE, and CF-4 oils.
CF-4	Current	Introduced in 1990. For high-speed, four-stroke, naturally aspirated and turbocharged engines. Can be used in place of CD, CE oils.
CF-2	Current	Introduced in 1994. For severe duty, two-stroke cycle engines. Can be used in place of CD-II oils.
CF	Current	Introduced in 1994. For off-road, indirect-injected and other diesel engines including those using fuel with over 0.5% weight sulfur. Can be used in place of CD oils.
CA - CE	Current	WE do not produce this grade.

Note: API intentionally omitted "SI" and "SK" from the sequence of categories. For more information about API's Engine Oil Program, visit our website at www.api.org/eolcs.

American Petroleum Institute

ACEA

The European Automobile Manufacturers' Association (or Association des Constructeurs Européens d'Automobiles in French, hence the ACEA abbreviation) is an organization that represents the 15 most important European motor vehicle manufacturers. According to their statement, ACEA is an advocate for the automobile industry in Europe, representing manufacturers of passenger cars, vans, trucks and buses with production sites in the EU.

Among many other activities ACEA defines specifications for engine oils so called ACEA Oil Sequences. The sequences are usually updated every few years to include the latest developments in engine and lubricant technology. ACEA itself does not approve the oils, they set the standards and oil manufacturers may make performance claims for their products if those satisfy the relevant requirements.

Each set of Oil Sequences is designated for consumer use by a 2-part code comprising a letter to define the CLASS (e.g. C), and a number to define the CATEGORY (e.g. C1).
In addition, for industry use, each sequence has a two-digit number to identify the YEAR of implementation of that severity level (e.g. A3/B4-16)

The CLASS indicates oil intended for a general type of engines - currently there are:

- **A/B** : Gasoline and Light Duty Diesel Engines
- **C**: Catalyst compatible oils for Gasoline and Light Duty Diesel Engines with After treatment devices
- **E**: Heavy Duty Diesel Engines

Other classes may be added in future if, for example, Natural Gas Engines may prove to require oil characteristics which cannot readily be incorporated into existing classes.

■ A/B: Gasoline and Diesel Engine Oils - "High SAPS"

Catagory	Service
A3 / B3	Stable, stay-in-grade Engine Oil intended for use in Passenger Car & Light Duty Van Gasoline & Diesel Engines with extended drain intervals where specified by the Engine Manufacturer, and for severe operating conditions as defined by the Engine Manufacturer.
A3/B4	Stable, stay-in-grade Engine Oil intended for use at extended Drain Intervals in Passenger Car & Light Duty Van Gasoline & DI Diesel Engines, but also suitable for applications described under A3/B3.
A5/B5	Stable, stay-in-grade Engine Oil intended for use at extended Drain Intervals in Passenger Car & Light Duty Van Gasoline & Diesel Engines designed to be capable of using Low Viscosity Oils with HTHS Viscosity of 2.9 to 3.5 mPa s. These Oils are unsuitable for use in certain Engines - consult vehicle-OEM's owner's manual/ handbook in case of doubt.
A5/B5	Stable, stay-in-grade engine oil intended for use at extended oil drain intervals in passenger car and light-duty gasoline and DI diesel engines designed for low viscosity engine oils with HTHS viscosity of 2.9 to 3.5 mPa-s. Relative to A5/B5, these engine oils provide also low-speed pre-ignition and wear protection for turbocharged gasoline DI engines, as well as turbocharger compressor deposit (TCCD) protection for modem DI diesel engines. These engine oils are unsuitable for use in certain engines-consult manufacturers' owner manual/handbook in case of doubt.

■ C: Catalyst & GPF/DPF compatible Engine Oils for Gasoline & Diesel Engines - "Low SAPS"

Note: These Oils will increase the DPF/GPF and TWC life and maintain the Vehicle's Fuel Economy.
Warning: Some of these Categories may be unsuitable for use in certain Engine Types-consult the vehicle-OEM's owner's manual/handbook in case of doubt.

Catagory	Service
C1	Category is withdrawn with these ACEA Oil Sequences.
C2	Stable, stay-in-grade engine oil with mid-SAPS level, for aftertreatment system compatibility. Intended for use at extended oil drain intervals in passenger car and lightduty gasoline, and DI diesel engines designed for low-viscosity engine oils with a minimum HTHS viscosity of 2.9 mPa·s.
C3	Stable, stay-in-grade engine oil with mid-SAPS level, for aftertreatment system compatibility. Intended for use at extended oil drain intervals in passenger car and lightduty gasoline, and DI diesel engines designed for engine oils with HTHS viscosity of minimum 3.5 mPa·s.
C4	Stable, stay-in-grade engine oil with low-SAPS level, for aftertreatment system compatibility. Intended for use at extended oil drain intervals in passenger car and lightduty gasoline, and DI diesel engines designed for engine oils with HTHS viscosity of minimum 3.5 mPa.s.
C5	Stable, stay-in-grade engine oil for improved fuel economy, with mid-SAPS level, for aftertreatment system compatibility. Intended for use at extended oil drain intervals in passenger car and light-duty gasoline, and DI diesel engines designed and OEMapproved for engine oils with HTHS viscosity of minimum 2.6 mPa·s.
C6	Stable, stay-in-grade engine oil for improved fuel economy, with mid-SAPS level, for aftertreatment system compatibility. Intended for use at extended oil drain intervals in passenger car and light-duty gasoline, and DI diesel engines designed and OEMapproved for engine oils with HTHS viscosity of minimum 2.6 mPa·s. Relative to C5 these engine oils also provide low speed pre-ignition and wear protection for turbocharged gasoline DI engines as well as turbocharger compressor deposit (TCCD) protection for modern DI diesel engines.

• SAPS: Sulphated Ash, Phosphorus, Sulphur • HTHS: High Temperature High Shear Viscosity • DI: Direct Injection • DPF: Diesel Particle Filter
• GPF: Gasoline Particle Filter • TWC: Three-Way Catalyst

■ E: Heavy Duty Diesel Engine Oils Category

Catagory	Service
E4	Stable, stay-in-grade oil providing excellent control of piston cleanliness, wear, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under very severe conditions, e.g. significantly extended oil drain intervals according to the manufacturer's recommendations. It is suitable for engines without particulate filters, and for some EGR engines and some engines fitted with SCR NOX reduction systems. However, recommendations may differ between engine manufacturers so driver manuals and/or dealers shall be consulted if in doubt.
E6	Stable, stay-in-grade oil providing excellent control of piston cleanliness, wear, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV, Euro V and Euro VI emission requirements and running under very severe conditions, e.g. significantly extended oil drain intervals according to the manufacturer's recommendations. It is suitable for EGR engines, with or without particulate filters, and for engines fitted with SCR NOX reduction systems. E6 quality is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulphur diesel fuel. However, recommendations may differ between engine manufacturers so driver manuals and/or dealers shall be consulted if in doubt.
E7	Stable, stay-in-grade oil providing effective control with respect to piston cleanliness and bore polishing. It further provides excellent wear control, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under severe conditions, e.g. extended oil drain intervals according to the manufacturer's recommendations. It is suitable for engines without particulate filters, and for most EGR engines and most engines fitted with SCR NOx reduction systems. However, recommendations may differ between engine manufacturers so driver manuals and/or dealers shall be consulted if in doubt.
E11	Stable, stay-in-grade oil providing effective control with respect to piston cleanliness and bore polishing. It further provides excellent wear control, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV, Euro V and Euro VI emission requirements and running under severe conditions, e.g. extended oil drain intervals according to the manufacturer's recommendations. It is suitable for engines with or without particulate filters, and for most EGR engines and for most engines fitted with SCR NOX reduction systems. E11 is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low Sulphur diesel fuel. However, recommendations may differ between engine manufacturers so driver manuals and/or dealers should be consulted if in doubt

*** Source** : 1) ACEA EUROPEAN OIL SEQUENCES 2016, https://www.acea.be/
2) Introduction part: https://www.oilspecifications.org/acea.php