GS Oil

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Kixx

Let's Kixx

GS Oil

Leaping forward as a global leader in total energy service.

Over the past 40 years GS Caltex, which aims to be a total energy service leader, has excelled in the petroleum and petrochemical businesses, but has also diversified its energy business, to become the leader in the energy industry.
Furthermore, GS Caltex has expanded into many business areas such as city gas, LNG, electric power, exploration & production, convenience retail, e-business, and new & renewable energy, thereby covering all energy fields and becoming a total energy service provider with global competitiveness.
Through our products and services which differentiate us from our competitors, we will continue to strive towards our vision:
“The Leader in Providing Total Energy Service.”

ENERGY BIZ

-Petroleum
-Petrochemicals
-City Gas
-LNG
-Electric Power
-Oil Exploration & Production
-New&Renewable Energy
-Convenience Retail
-E-Biz

GS Caltex has firmly established the position as the leader in energy with a stable business portfolio including the refining, lubricants, base oil and petrochemical businesses as well as actively participating in new business opportunities in LNG and electric power.

Moving forward for over forty years leading
Korea's energy industry

2010. Jun Completed No.3 HOU Facilities-VR HCR (60,000BPSD)

2010. Apr Aquired GS Platech

2010. Mar Completed Power Carbon Technology

2010. Feb Established GS Caltex India, acquired Samil Polymer Co., Ltd.

2009. Nov Increase in No.2,3 CDU production capacity (total 760,000BPSD) / Increase in KD-HDS capacity(total 272,000BPSD)

2009. Jul Lube Oil Plant (LOP) capacity expanded from 19,000 BPSD to 23,000BPSD

2008. Apr Heavy Oil Upgrade (HOU) capacity expanded to 153,000 BPSD (Residue Fluidized Catalytic Cracking (RFCC) capacity expanded from 90,000 BPSD to 93,000 BPSD, Hydrocracker (HCR) capacity expanded from55,000 BPSD to 60,000 BPSD)

2007. Dec Beijing Representative Office established

2007. Nov Aromatics plant capacity expanded from 2,200,000 Ton/Year to 2,800,000 Ton/Year

Refinery capacity expanded from 722,500 BPSD to 770,000 BPSD

2007. Aug Vacuum Distillation Unit (VDU) completed (150,000BPSD) / Hydrocracker (HCR) completed (55,000 BPSD) / Lube Oil Plant (LOP) completed (19,000 BPSD)

2006. Jul WSR Splitter unit completed (Refinery capacity expanded to 722,500 BPSD)

2005. Nov Heavy Oil Upgrade (HOU) capacity expanded (Residue Fluidized Catalytic Cracking (RFCC) capacity expanded from 70,000BPSD to 90,000BPSD)

2005. Mar Name changed to GS Caltex Corporation and new CI announced new gasoline brand 'Kixx' launched

2003. Sep Selected to provide technical services to the Sohar Refinery in Oman

2003. Apr Third Paraxylene Plant completed (P-X : 1,200,000 Ton/Year, Aromatics : 2,200,000 Ton/Year)

2003. Jan Acquired participating interest in the exploration and development project of the Cambodia Block A Area

2000. Jan "The Leader in Providing Total Energy Service" proclaimed as new corporate vision

1998. Nov Construction of Central Technology R&D Center completed

1998. Sep Third Kero-Diesel Hydrodesulfurizing Unit completed (70,000 BPSD, Total 190,000 BPSD)

1997. Oct Continuous Catalytic Reforming Unit expanded (30,000 BPSD)

1996. Dec Refinery capacity expanded to 650,000 BPSD

1996. Oct Second Kero-Diesel Hydrodesulfurizing Unit completed(70,000 BPSD)

1996. May Name Changed to LG-Caltex Oil Corporation and new CI announced

1995. Sep Heavy Oil Upgrade (HOU) completed (Residue Fluidized Catalytic Cracking (RFCC) 70,000BPSD)

1991. Oct First Kero-Diesel Hydrodesulfurizing Unit completed (50,000 BPSD)

1990. Sep Aromatics plant (500,000 Ton/Year) completed including P-X plant (200,000 Ton/Year)

1989. Dec Polypropylene plant capacity expanded from 120,000 to 180,000 Ton/Year

1988. Apr Polypropylene plant completed (120,000 Ton/Year)

1969. Nov Lubricant plant in Incheon completed

1969. Jun Yeosu Refinery completed (60,000 BPSD)

1967. May Honam Oil Refinery Company, Limited, incorporated in Seoul, Korea

1966. Dec Joint venture agreement signed

Manufacturer

PREMIUM LUBRICANTS PRODUCTS AND TECHNOLOGY

GS Caltex produces 9,000 barrels per day of lubricants and 8,000 MT of grease products. Underpinned by premium products and technology, we are ranked first in the Korean finished lubricant products market based on market share and sales volume. With Kixx Engine Oil as the leading brand in our lubricant line-up, GS Caltex offers 180 kinds of products which are classified according to their usage such as automobiles, industrial equipment, vessels and special purposes.

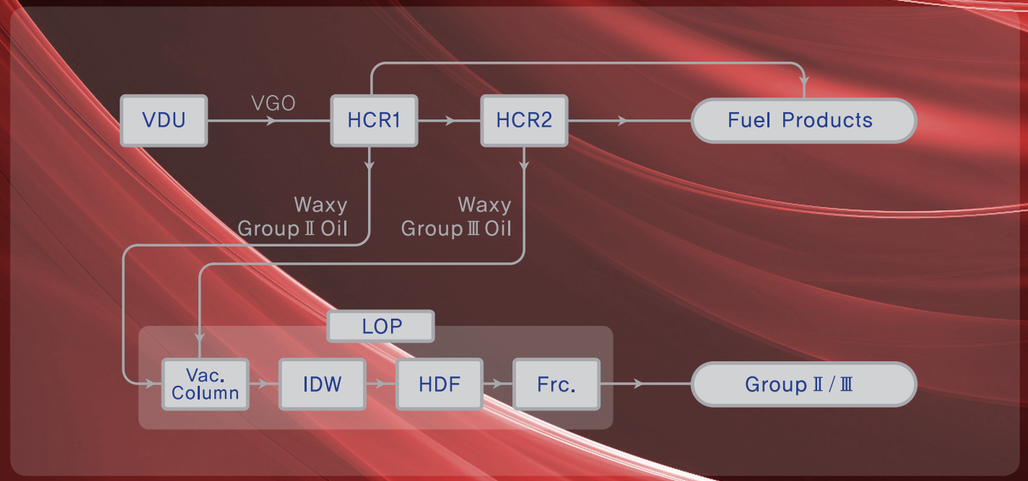
TRULY A HIGH PERFORMANCE AND ENVIRONMENTALLY FRIENDLY BASE OIL THROUGH THE CUTTING EDGE HYDROCRACKING TECHNOLOGY

In November 2007, GS Caltex began base oil production with 16,000 barrels per day capacity. As of 2010, its production capacity has increased to 23,000 barrels per day; GS Caltex plans to expand its base oil production capacity to 26,000 barrels per day through a revamping of its Lube Oil Plant which is scheduled to finish in 2011. By using the latest cutting edge hydrocracking technology, GS Caltex produces high quality environment-friendly base oil which satisfies the strict specifications of lubricant manufacturers.

AIMING FOR THE WORLD TOP LUBRICANTS

Exporting to more than 30 countries world-wide, GS Caltex has emerged as world-class lubricants products manufacturer. As part of the effort to provide premium quality lubricants products, GS Caltex built many state-of-art lubricant blending plants as well as introduced quality control systems such as ISO 9001/14001, QS 9000 and ISO/TS 16949. GS Caltex provides premium quality products to Korean government and various global companies including Volvo Construction Equipment, Samsung Electronics, Hyundai & Kia Motors, LG Electronics, LG Chemicals, POSCO, Hyundai Heavy Industries, Doosan Infracore as OEMs.

Flexible production of Group Ⅱ and Group Ⅲ base oils through a cutting edge two-stage **HCR production process.**



Team

- CDU (Crude Distillation Unit)
- HCR (Hydrocracker)
- AR (Atmospheric Residue)
- LOP (Lube Oil Plant)
- VDU (Vacuum Distillation Unit)
- IDW (Iso Dewaxing)
- VGO (Vacuum Gas Oil)
- HDF (Hydro Finishing)
- VR (Vacuum Residue)

KixxLUBO, Providing the optimal solutions to engineer the **premium quality lubricants.**

The launch of a new era in high performance base oil.

GS Caltex invested 1.5 trillion won ($1.6 billion) in its Heavy Oil Upgrade (No.2 HOU) facility and Lube Oil Plant (LOP) located in Yeosu, South Korea in order to produce its ultralight sulfur kerosene, light oil, and lube base oil. LOP, with production capacity of 23,000 BPSD, started production of lube base oil in early November 2007.

Truly a high performance base oil which meet your stringent requirements.

The need for lubricant marketers to meet more stringent regulatory standards and challenging specifications is growing. The ongoing shift to higher quality automotive lubricants is driven mainly by the automobile industry's increasingly strict requirements such as severe vehicle emission standards. Industrial demand is also moving towards hydraulic fluids with a High Vis-cosity Index (HVI) and high oxidation stability turbine oils. Since more than 80% of the content of lubricants consists of base oils, higher quality base oil is essential in producing higher quality lubricants. GS Caltex Group Ⅱ / Ⅲ base oil can give the optimal solution for top quality lubricants which conventional base oils are not able to provide.

Environmentally friendly base oil produced with the latest HCR technology.

Through the ingenuity of its facility, GS Caltex has the flexibility to control the desired amount of production of both Group Ⅱ and Group Ⅲ base oil. GS Caltex can also produce high quality heavy grade base oil to replace white oil and bright stock. GS Caltex Group Ⅱ / Ⅲ base oil has excellent low temperature properties and exceptionally bright white clear transparent qualities. The Group Ⅱ / Ⅲ base oil produced by GS Caltex is environment-friendly, it has a low volatility, it will reduce oil consumption and improve fuel economy. Furthermore GS Caltex offers high thermal and oxidation stability to support drain interval extension. All these advan-tages are the result of the latest cutting edge hydrocracking technology. These benefits will help GS Caltex adapt more efficiently to changing market conditions and generate greater customer satisfaction.

Realizing strategic partnerships by matching various customer needs.

Kixx LUBO, the new name in base oil, is a combination of the GS Caltex family brand Kixx and lube base oil. The Kixx name originates from the etymology of "kick" to describe speed, strength, and dynamism. With the launching of Kixx LUBO, GS Caltex will focus on commu-nicating with customers and establishing strategic partnerships.

Premium Lubricants Products And Technology

GS Caltex produces 9,000 barrels per day of lubricants and 8,000 MT of grease products. Underpinned by premium products and technology, we are ranked first in the Korean finished lubricant products market based on market share and sales volume. With Kixx Engine Oil as the leading brand in our lubricant line-up, GS Caltex offers 180 kinds of products which are classified according to their usage such as automobiles, industrial equipment, vessels and special purposes.

1969
1st Lubricants Oil Blending Plant Operation

1972
KS(Korean Standard) Mark Certification

1986
Grease Manufacturing Plant Foundation (3,000 Ton/yr)

1991
2nd LOBP Completion

1994
New Packing Plant Foundation (2,600DM/day)

1997
Grease Plant Expanded (6,000 Ton/yr)

2000
ERP(SAP) Commence

Lube Plant Certification (ISO 14001, QS 2000)

2001
ISO 9001 Certification

Completed VDF Factory

2005
TS16949 Certification

Company name changed from "LG" to "GS"

Kixx Engine Oil Launching

2007
Base Oil Kixx LUBO Production (23,000 B/D)

2008
LOBP Unification (9,000 B/D)

2009
Grease Plant Expanded (8,000 Ton/yr)











GS Oil Products Tree

Premium


Kixx PAO1 0W-30, 0W-40


Kixx PAO 5W-30


Kixx PAO 5W-40

Gasoline


Kixx Neo


Kixx G1


Kixx Gold SL


Kixx Gold SJ


Kixx Gold SF/CF

Diesel


Kixx PAO DX


Kixx DX


Kixx D1


Kixx Dynamic CH-4


Kixx Dynamic CG-4


Kixx Dynamic CF-4

Mission / Gear


Kixx ATF Multi


ATF DX-III


Geartec GL-5


Geartec GL-4


Gear Oil HD GL-4


GS PSF 4

Others


Brake Oil SHD DOT 4, DOT 3


GS AF/Coolant


GS Oil Treatment


Kixx Clean

Motor Cycle Oil


Kixx Ultra 4T SL


Kixx Ultra 4T SJ


Kixx Ultra 2T

Hydraulic Oil


GS Hydro HDCZ


GS Hydro HDZ


GS Hydro HD


GS Hydro

Gear / Turbine / Compressor


GS Gear EP


GS Turbine


GS Compressor EP-VDL


GS Compressor RA-X


GS Trans-I


GS Process Oil

Grease


GS Liplex 2


New Golden Pearl EP


New Golden Pearl

GS Therma EP

GS Moly EP

Marine

GS Cylinder

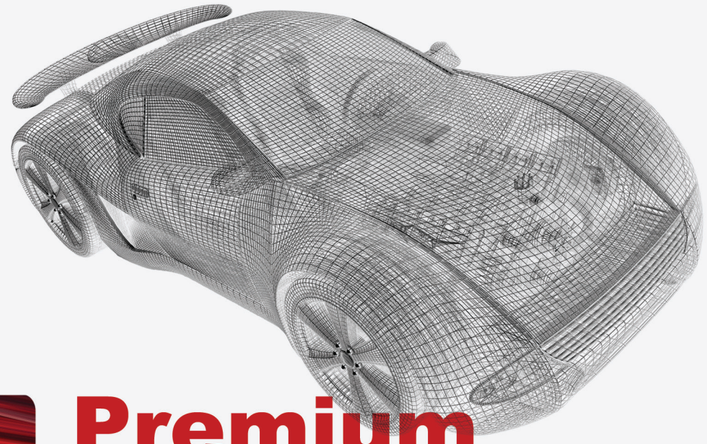
GS System

GS 1000 Marine

GS 2000 Marine

GS 3000 Marine

GS 4000 Marine



Premium

Premium Performance Synthetic Engine Oil

Premium performance, multi-grade motor oil formulated from selected synthetic base fluids and race-proven additive technology.

GS Oil

KixxKixxKixx

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PAO 100% Synthetic Engine Oil

Kixx PAO 1

100% PAO SYNTHETIC ENGINE OIL

API SN RECOMMENDED, ACEA A1/B1-08, A5/B5-08,C2-08 RECOMMENDED

DESCRIPTION

Premium performance, multi-grade motor oil formulated from selected synthetic base fluids and race-proven additive technology for use in passenger car and light truck gasoline engines and passenger car diesel engines under all operating conditions. It is optimized to provide complete engine protection plus ultimate performance.

APPLICATIONS

- Naturally aspirated Gasoline engines, LPG and Diesel engines in passenger cars
- Light truck gasoline and diesel engines
- Recommended for use in gasoline and diesel powered RV and SUVs(Sport Utility Vehicles)
- Common Rail Direct Injection engine 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

- 0W-30 : SN Recommended A1/B1-08, A5/B5-08, C2-08 Recommended MB, VW, BMW, Porsche recommended
- 0W-40 : SN Recommended A3/B3-08, A3/B4-08, C3-08 Recommended MB, VW, BMW, Porsche recommended
- 5W-30 : SN/CF A3/B3-08, A3/B4-08, C3-08 Recommended BMW LL-01, LL-04, MB 229.51/229.31, VW 502.00/505.00
- 5W-40 : SN/CF A3/B3-08, A3/B4-08, C3-08 BMW LL-01/ LL-04, MB229.51 /229.31, VW 502.00/505.00, Porsche

CUSTOMER BENEFITS

Maximizes engine life

The wider temperature range capability of the synthetic base fluid ensures correct oil viscosity which reduces friction at start-up, and provides maximum lubrification during high temperature operation. The effective anti-wear additive system minimizes wear in even the most sophisticated valve train mechanisms, including those with variable valve timing.

Maximizes power and performance

Metallic detergent and ashless dispersant additive system ensures maximum power and performance by providing superior control of the ring belt and the piston skirt deposits, even under the most severe operating conditions. Special friction modifiers assist in reducing friction resulting in maximum fuel economy.

Low oil consumption

Synthetic, highly shear-stable formulation provides superior control of oil flow through the ring belt area by maintaining oil viscosity, and reduces oil evaporation at the elevated ring zone temperatures experienced under all operating conditions.

Longer equipment life

Special anti-wear additive package reduces wear by protecting surfaces when load causes breakdown of the lubricant film.

Lower impact emissions

Highly advanced additive technology delivers reduction in harmful exhaust emissions. This advanced technology performance, enhanced by low phosphorus and sulfur formulation (low SAPS) reduces ash formation and delivers a significant increase in DPF service life.

KEY PROPERTIES

SAE Grade	0W-30	0W-40	5W-30	5W-40
Density @15℃	0.847	0.847	0.854	0.855
Viscosity, ㎟/s @ 40℃	61.2	90.1	69.23	92.0
Viscosity, ㎟/s @ 100℃	10.8	15.2	11.45	14.8
Viscosity Index	170	175	160	169
Pour Point ℃	-51	-51	-45	-43
Flash Point ℃	232	232	232	232
PKG	1,4T,200	1,4T,200	1,4T,200	1,4T,200

100% Synthetic Engine Oil

Kixx PAO

100% SYNTHETIC ENGINE OIL

API SN/CF, ACEA A3/B3-08, A3/B4-08,C3-08 RECOMMENDED

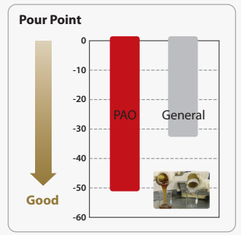
USP(Unique Selling Point)

PAO (Poly Alpha Olefin)

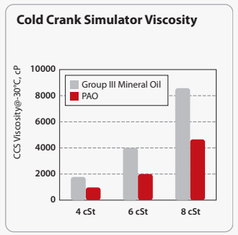
PAOs, synthetic base fluids manufactured by carefully controlled chemical reaction of alphaolefin, have extreme stability and high performance in cold property and robustness, mainly used for the most premium lubricant products.

Cold Property

With their excellent cold property, PAOs can be used in extremely cold ambient temperature without oil change



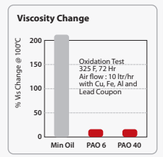
Pour point of PAOs is much lower than general mineral oil, which means better fluidity in low temperature.



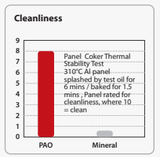
Low temperature viscosity of PAO is much lower than mineral oil, which enable excellent start-up in low temperature.

Robustness

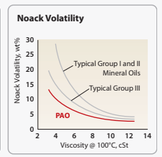
PAOs have excellent anti-oxidation stability and low volatility, which allows the oil to maintain its original properties longer and significantly reduced sludge extending the oil drain interval.



Viscosity increased at high temperature is significantly less



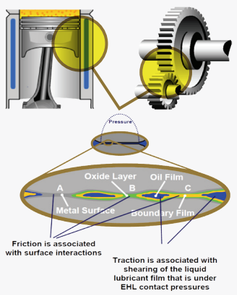
Cleanliness in high temperature is much higher than others.

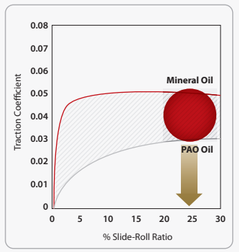


Low volatility makes oil to be used in longer time.

Anti-Wear

PAOs have excellent anti-wear performance in extreme pressurized friction thanks to their solid molecular structure





Low Traction Coefficient means better anti-wear performance.

Field Test

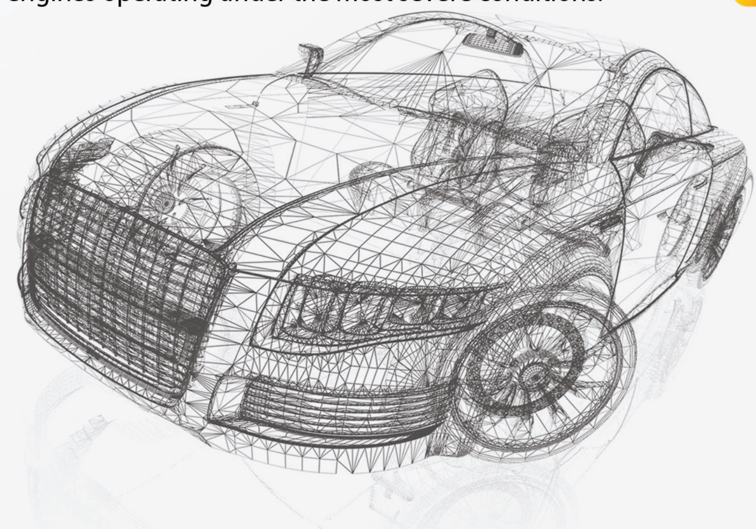
Field test results shows that Kixx PAO products, formulated with premium additives approved from API, ACEA and OEM recent specification, have excellent performance in low sludge and anti-wear characteristics

GS Oil

Speed

Advanced Technology Gasoline Engine Oil

High-performance, highly shear-stable, multigrade passenger car motor oil formulated from select base fluids. It is optimized to provide outstanding protection in all passenger car and light truck gasoline engines operating under the most severe conditions.



Kixx Neo

CUTTING-EDGE TECHNOLOGY GASOLINE ENGINE OIL

API SN/GF-5/RC/CF

DESCRIPTION

Kixx Neo is formulated from Synthetic Technology base oil, high performance additive systems and leading edge viscosity index improver, which meet the requirement of current advanced Top-tier engine oil grade of API SN and ILSAC GF-5. It is optimized to provide complete engine oil performance especially for fuel efficiency, reducing friction loss and durability.

APPLICATIONS

- Naturally aspirated and turbocharged gasoline engines in passenger cars including SUV gasoline engines and sports vehicles.
- 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

- 0W-20 : API SN/GF-5/RC/CF, Ford, Chrysler FF
- 0W-30 : API SN/GF-5/RC/CF, Ford, Chrysler FF

CUSTOMER BENEFITS

Superior Cold Performance

Superior low temperature properties with proven metal-organic anti-wear additives provide easy start-up of engine at extremely low temperature and excellent wear control in even the most sophisticated valve train mechanisms, including those with variable valve timing.

Fuel Efficiency

Specifically tailored viscosity characteristics and effective friction modifier minimize internal engine frictional losses, which reduces oil fuel consumption.

Saves on maintenance costs

High thermal stability and excellent oxidation resistance provides outstanding protection against in-service oil degradation that contributes to filter blocking and sludge formation in the oil galleries, crankcase and valve train.

KEY PROPERTIES

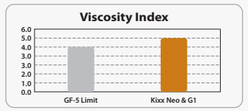
SAE Viscosity	0W-20	0W-30
Density @15℃	0.855	0.855
Kinematic Viscosity, ㎟/s @ 40℃	48.2	54.5
Kinematic Viscosity, ㎟/s @ 100℃	8.8	9.9
Viscosity Index	164	170
Pour Point, ℃	-42	-42
Flash Point, ℃	238	240
PKG	200	1,4T,200

USP(Unique Selling Point)

Kixx Neo / Kixx G1

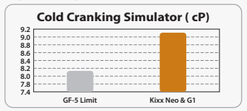
Kixx G1 / Kixx Neo, made of 100% synthetic VHVI(Very High Viscosity Index) base oil formulated with premium additives meeting the requirements of API SN grade specification. They have excellent cold temperature performance and fuel efficiency thanks to their enhanced anti-oxidation, cleanliness and catalyst protection properties.

Piston Cleanliness



Improved piston cleanliness protects blow-by gas to increase engine power

Engine Sludge



High performance in engine sludge increase engine durability and anti-wear, which provides benefits in car maintenance.

Kixx G1

ULTRA PREMIUM PERFORMANCE GASOLINE ENGINE OIL

API SN/GF-5/RC/CF

DESCRIPTION

Kixx G1 is formulated from Synthetic Technology base oil, high performance additive systems and leading edge viscosity index improver, which meet the requirement of current advanced top-tier engine oil grade of API SN and ILSAC GF-5. It is optimized to provide complete engine oil performance especially for fuel efficiency, reducing friction loss and 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

- 5W-30 : SN/GF-5/RC/CF, Environment Friendly Mark Ford, Chrysler FF
- 5W-40 : SN/CF
- 5W-50 : SM/CF
- 10W-30 : SN/GF-5/RC/CF, Ford, Chrysler FF
- 10W-40 : SN/CF, Ford, Chrysler FF

CUSTOMER BENEFITS

Fuel economy

The wide temperature range capability of the synthetic technology base fluid ensures correct oil viscosity which reduces friction at start-up, and provides maximum lubrification during high temperature operation.

Engine power and maintainability

A reduction in the piston blow-by gas coupled with the oil's anti-sludge characteristics help maintain engine power and cleanliness, which in turn extends the engine's service life.

Oil drainage interval

Excellent oxidation resistance and low volatility will extend oil drainage interval.

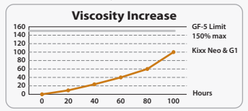
All-temperature wear resistance

Advanced non-conventional base oil formula coupled with high performance additive systems and leading edge viscosity index improver delivers excellent shear stability and maximum wear protection in high speed, high temperature driving conditions as well as a rapid, highly effective oil film protection. It also provides component wear resistance during very low temperature cold starts.

KEY PROPERTIES

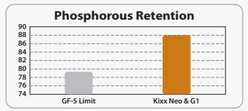
SAE Viscosity	5W-30	5W-40	5W-50	10W-30	10W-40
Density, @ 15℃	0.853	0.853	0.851	0.867	0.866
Kinematic Viscosity, ㎟/s @ 40℃	62.3	92.9	117.0	68.0	103
Kinematic Viscosity, ㎟/s @ 100℃	10.3	14.8	18.3	10.2	15.1
Viscosity Index	153	168	176	134	153
Pour Point, ℃	-34	-33	-33	-33	-33
Flash Point, COC, ℃	238	238	238	238	222
PKG	4,4T,200	1,3,4,4T,200	1,4T,200	1,4T,200	1,3,4,4T,18,200

Oxidation Stability



Viscosity increase on hours is much lower than specification limit, which means excellent anti-oxidation stability and extended oil drain interval.

Protection of SCR



Higher phosphorous retention in engine protects selective catalyst reduction system for emission gas control.

Kixx Neo & G1 – Field Test

	Oil Sump Sluge	Bearing Wear	Piston Deposit
Kixx Neo /G1			
SM			

Kixx Gold SL

PREMIUM PERFORMANCE GASOLINE ENGINE OIL

API SL/CF

DESCRIPTION

Formulated with synthetic technology base oil and high performance additives, it is optimized to provide outstanding protection and lubricity in all passenger car and light truck gasoline engines.

APPLICATIONS

- Recommended for all passenger car and light truck four-cycle gasoline engines, both naturally aspirated and turbocharged, including those featuring the most recent valve train and emission control technologies.
- Suitable for small four-cycle gasoline engines in motorcycle and portable power equipment where engine manufacturers allow the use of conventional passenger car motor oils and do not require a purpose-design lubricant.
- Pour Point can be adjusted to your local requirement.

PERFORMANCE STANDARDS

- API SL/CF

CUSTOMER BENEFITS

Maximizes engine life through superior wear and deposit control under all operating conditions.
Provides significant fuel savings by reducing frictional losses.
Protects against start-up wear in cold conditions through excellent low-temperature fluidity.
Maintains power and economy by minimizing wear in even the most sophisticated valve train mechanisms, including those with variable valve timing.

KEY PROPERTIES

SAE Viscosity	10W-30	10W-40
Density, @ 15℃	0.867	0.867
Kinematic Viscosity, ㎟/s @ 40℃	71.6	108.4
Kinematic Viscosity, ㎟/s @ 100℃	10.4	15.3
Viscosity Index	130	148
Pour Point, ℃	-42	-39
Flash Point, ℃	228	246
PKG	200	1,4,4T,20,200

Kixx Gold SJ

PREMIUM PERFORMANCE GASOLINE ENGINE OIL

API SJ/CF

DESCRIPTION

High quality engine oil designed to meet the requirements of passenger car and light truck engines where API SJ performance is required.

PERFORMANCE STANDARDS

- API SJ/CF

APPLICATIONS

- Gasoline engines (four-stroke)
- Gasoline engines equipped with emissions control equipment
- Industrial and marine applications of passenger car type gasoline engines
- Diesel Engines (high speed, four-stroke, naturally aspirated)

CUSTOMER BENEFITS

Provides good engine protection

Proven metallo-organic anti-wear additive system forms a protective layer on contact surfaces to control wear. Effective corrosion inhibitors protect against rust and corrosion.

Trouble-free operation

Special combination of detergent and dispersant additives controls piston and ring deposits that can adversely effect power and performance.

Long periods between overhauls

Good thermal stability and oxidation resistance combats in-service oil degradation that contributes to filter blocking and sludge formation.

KEY PROPERTIES

SAE Viscosity	5W-30	10W-30	10W-40
Density,@ 15℃	0.857	0.866	0.866
Kinematic Viscosity, ㎟/s @ 40℃	62.2	70.3	106.9
Kinematic Viscosity, ㎟/s @ 100℃	10.4	10.25	15.1
Viscosity Index	153	131	147
Pour Point, ℃	-42	-39	-42
Flash Point, COC, ℃	230	232	234
PKG	1,4,4T,200	1,4,4T,200	1,3,4,200

Semi Synthetic

Kixx Gold SF/CF

PREMIUM PERFORMANCE GASOLINE ENGINE OIL

API SF/CF

DESCRIPTION

High quality engine oil designed to meet the requirements of passenger car and light truck engines where API SF/CF performance is required.

PERFORMANCE STANDARDS

- API SF/CF

APPLICATIONS

- Gasoline engines (four-stroke)
- Gasoline engines equipped with emissions control equipment
- Industrial and marine applications of passenger car type gasoline engines
- Diesel Engines (high speed, four-stroke, naturally aspirated)

CUSTOMER BENEFITS

Provides good engine protection

Proven metallo-organic anti-wear additive system forms a protective layer on contact surfaces to control wear. Effective corrosion inhibitors protect against rust and corrosion.

Trouble-free operation

Special combination of detergent and dispersant additives controls piston and ring deposits that can adversely effect power and performance.

Long periods between overhauls

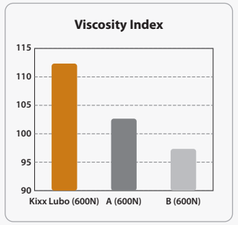
Good thermal stability and oxidation resistance combats in-service oil degradation that contributes to filter blocking and sludge formation.

KEY PROPERTIES

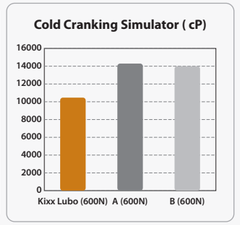
SAE Viscosity	5W-30	15W-40	20W-50
Density, kg/liter @ 15℃	0.858	0.867	0.874
Kinematic Viscosity, ㎟/s @ 40℃	62.1	116.2	180.5
Kinematic Viscosity, ㎟/s @ 100℃	10.3	15.0	19.3
Viscosity Index	154	134	121
Pour Point, ℃	-42	-39	-36
Flash Point, ℃	230	250	236
PKG	200	1,20,200	1,3,4,6,18,20,25,200

USP(Unique Selling Point)

- Kixx Gold uses high performance lube base oil, Kixx Lubo 600 N.
- Viscosity index and cold properties of Kixx lubo 600 N are superior than other grade base oil.



High VI means maintaining of stable viscosity against the temperature change.



Low CCS means good performance at low temperature.

Power

High Performance Diesel Engine Oil

Premium performance, multigrade, heavy-duty diesel engine oil specifically designed to lubricate a wide range of diesel and gasoline engines under the most severe service conditions.

Kixx PAO DX

CUTTING-EDGE TECHNOLOGY ENGINE OIL

API CJ-4/SM, ACEA E9-08

DESCRIPTION

Super premium performance, synthetic heavy-duty diesel engine oil is specifically designed for new low emission engine with ULSD(Ultra Low Sulfur Diesel). It is formulated using the most advantaged additive technology available to provide outstanding engine protection for 2007 EPA exhaust particulate emissions standards for on highway diesel trucks. Kixx PAO DX 15W-40 meets the latest stringent EGR soot control and particulate requirements. It is also recommended for a wide range of diesel and gasoline engines requiring API CJ-4, CL-4 PLUS, CI-4, SM, ACEA E9-08 performance lubricants operating under the most severe service conditions.

APPLICATIONS

- Kixx PAO DX 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 the 2007 emissions standards
- 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.
- It meets the 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 CJ-4/SM, ACEA E9-08, VDS-4, MB 228.31, MAN 3275, MTU 2.1, DDC 93K218, Mack EO-M Premium Plus, RLD-3, Cummins 20081, Cat ECF 3, ECF-2, ECF-1a

CUSTOMER BENEFITS

Enhaced emission control system life

Extends Diesel Particulate Filter(DPF) life for less frequent downtime and cleaning, thus decreasing your maintenace.

Minimizes Inventory costs

Backwards compatible with all previous API Oil Service Categories and engine models. One oil for all services, in four-stroke gasoline and all naturally aspirated turbocharged and modern electronically controlled/low emission diesel engines. One oil that allows users with a wide mix of engine brands to enjoy simplified inventory and dispensing systems that help save money, space, handling time, and avoid product misapplication.

Reduced Maintenance and Operating costs

Excellent soot dispersion and wear control. Cylinders, pistons, rings, and injectors are well protected against wear and corrosion, lasting longer in service and requiring less maintenance. Contributes to maximum vehicle utilization and minimum downtime.

Extends engine life to overhaul

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

KEY PROPERTIES

SAE Grade	15W-40
Kinematic Viscosity, ㎟/s @ 40℃	121.4
Kinematic Viscosity, ㎟/s @ 100℃	16.0
Viscosity Index	142
Pour Point, ℃	-39
Base Number,mg KOH/g	8.5
Flash Point, COC, ℃	248
PKG	20,200

Kixx DX

SUPER PREMIUM HEAVY DUTY DIESEL ENGINE OIL

API CI-4/SL, ACEA E7/B3/A3-07

DESCRIPTION

Kixx DX 15W-40 is an API CI-4, ACEA E7 heavy duty engine oil specifically formulated utilizing advanced technology which help provide outstanding engine protection for turbocharged four-stroke diesel engine. It is an optimal blend of the latest dispersant, detergent, oxidation inhibitor, anti-wear, corrosion inhibitor, and defoaming additive technology.

APPLICATIONS

- Mixed fleets of European, North American diesel engines (high speed, four-stroke, turbocharged or naturally aspirated)
- It meets the major heavy duty diesel engine manufacturers requirements.
- Mixed fleets including both old and new equipment
- It is recommended for Exhaust Gas Recirculation(EGR) System
- Commercial road transport, including the heavy trucks, buses.
- Stop-and-go vehicles in high soot loading service such as buses and waste collection trucks
- Off-highway vehicles and plant

PERFORMANCE STANDARDS

- API CI-4/SL E7/B3/A3-07 VDS-3, MB 228.3, MAN 3275, Mack EO-M Plus, RLD/RLD-2, Cummins 20071,72,76,78, Cat ECF 2, ECF 1-a

CUSTOMER BENEFITS

Minimizes fleet maintenance costs

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

Minimizes fleet operating costs

Excellent deposit control on valves and piston crownlands reduces oil consumption. Exceptional oxidation stability and soot control extends oil drain capability so that equipment is in service longer generating revenue. Outstanding valve train wear protection maintains fuel economy

Extends engine life to overhaul

High level of anti-wear additive protects against valve train wear and scuffing of highly loaded parts operating under boundary lubrication conditions

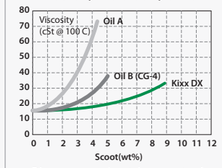
KEY PROPERTIES

SAE Grade	15W-40
Viscosity, ㎟/s @ 40℃	120.1
Viscosity, ㎟/s @ 100℃	16.8
Viscosity Index	140
Pour Point, ℃	-36
Base Number,mg KOH/g	10.8
Flash Point, COC, ℃	245
PKG	20,200

USP(Unique Selling Point)

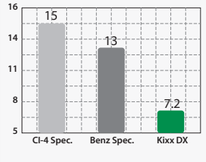
- Kixx DX 15W-40 is a premium performance engine oil to lubricate a wide range of diesel engines requiring API CI-4, SL or ACEA E7, including those fitted with EGR, and/or SCR systems.
- Kixx DX has very good performance and lower volatility, Reduces Oil Consumption and Emissions.

Viscosity increase by Soot



Dispersancy and sustain property of oil viscosity increase .

Volatility (250°C, 1Hr)



Volatility causes high oil consumption and emissions under high temperature.

Kixx D1

ULTRA PREMIUM PERFORMANCE DIESEL ENGINE OIL

API CI-4/SL, ACEA E7/E2-07/B3/A2-02

DESCRIPTION

Premium performance, multigrade, heavy-duty diesel engine oil specifically designed to lubricate a wide range of diesel and gasoline engines requiring API CI-4, SJ, ACEA E7 performance lubricants operating under the most severe service conditions.

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

- 10W-40 : API CI-4/SJ, ACEA E7/B3/A2-02, VDS-3, MB 228.3, MAN 3275, Mack EO-M Plus, RD/RD-2, Cummins 20071,72,76, Cat ECF 1-a Environment Friendly Mark
- 15W-40 : API CI-4/SL ACEA E7-08, MB 228.1/229.1, VDS-3, MAN 3275 Renault RLD/RLD-2, MTU Type 2, Mack EO-M Plus, Cummins 20071,72,76,77, CAT ECF 2, ECF-1-a

CUSTOMER BENEFITS

Minimizes fleet maintenance costs

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

Minimizes fleet operating costs

Excellent deposit control on valves and piston crownlands reduces oil consumption. Exceptional oxidation stability and soot control extends oil drain capability so that equipment is in service longer generating revenue. Outstanding valve train wear protection maintains fuel economy.

Extends engine life to overhaul

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

KEY PROPERTIES

SAE Grade	10W-40	15W-40
Viscosity, ㎟/s @ 40℃	100.6	114.8
Viscosity, ㎟/s @ 100℃	15.3	15.1
Viscosity Index	160	136
Pour Point, ℃	-42	-36
Base Number,mg KOH/g	9.4	9.0
Flash Point, COC, ℃	226	240
PKG	1,4,4T,6,20,200	1,4,4T,6,20,200

USP(Unique Selling Point)

- Kixx D1 15W-40 has excellent performance for sustaining durability with EGR system.
- Kixx D1 15W-40 protects sludge formed by sulfur and fuel combustion without the need for overly shortened drain intervals.

Cummins N14 Field Test Rocker Cover Sludge Results

Kixx D1 15W-40 81,000 Km Oil Drains | A : 81,000 Km Oil Drains | B : 48,000 Km Oil Drains

Kixx Dynamic CH-4

PREMIUM PERFORMANCE DIESEL ENGINE OIL

API CH-4/SJ, ACEA E2

DESCRIPTION

Premium performance, multigrade, heavy-duty diesel engine oil specifically designed to lubricate a wide range of diesel and gasoline engines requiring API CH-4, SJ, ACEA E2 performance lubricants operating under the most severe service conditions.

PERFORMANCE STANDARDS

- API CH-4/SJ ACEA E2, VDS-2, MB 228.1/229.1, MAN 271, Mack EO-M Plus, RD/RD-2, Cummins 20071,76,78, Cat ECF 1-a, C-4

CUSTOMER BENEFITS

Minimizes fleet maintenance costs

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

Minimizes fleet operating costs

Excellent deposit control on valves and piston crownlands reduces oil consumption. Exceptional oxidation stability and soot control extends oil drain capability so that equipment is in service longer generating revenue. Outstanding valve train wear protection maintains fuel economy.

Extends engine life to overhaul

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

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

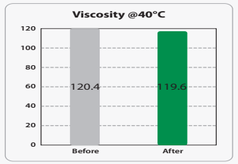
KEY PROPERTIES

SAE Grade	10W-40	15W-40
Density, kg/liter @ 15℃	0.858	0.874
Kinematic Viscosity, ㎟/s @ 40℃	99.5	111.1
Kinematic Viscosity, ㎟/s @ 100℃	14.7	15.1
Viscosity Index	154	140
Pour Point, ℃	-39	-36
Flash Point, COC, ℃	230	234
TBN, mgKOH/g	9.0	9.1
PKG	200	200

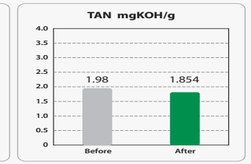
USP(Unique Selling Point)

- Kixx Dynamic CH-4 15W-40 prolongs engine life and extends oil drain intervals
- Exceptional oxidation stability and soot control extends oil drain capability so that equipment can be in service with longer generating revenue

ISOT (165.5°C, 24Hr)



Oxidation stability test, ISOT, shows the viscosity of before test and after are almost the same .



Total acid number is almost the same. It means that the oil is strong against to oxidation.

Kixx Dynamic CG-4

PREMIUM PERFORMANCE DIESEL ENGINE OIL

API CG-4

DESCRIPTION

High performance, multigrade, heavy-duty diesel engine oil specifically designed to lubricate a wide range of diesel engines requiring API CG-4 performance lubricants.

APPLICATIONS

- Mixed fleets of diesel engines (high speed, four-stroke, turbocharged 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

- API CG-4, Allison C-4, CAT TO-4

CUSTOMER BENEFITS

Reduces fleet maintenance costs

Specially balanced metallic detergent and ashless dispersant additive system provides excellent overall engine cleanliness in all service conditions, particularly the higher soot dispersancy required to maintain oil drain intervals in modern engine designs. Excellent oxidation stability protects against the formation of gums and varnish at elevated temperatures.

Prolongs engine life

Proven metallo-organic anti-wear additive system provides excellent protection against wear of critically loaded components under all operating conditions. Multigrade viscosity provides additional protection against wear at start-up and under high temperature operating conditions.

Preserves full power and performance

Metallic detergent and ashless dispersant additive system preserves full power and performance by providing excellent upper-ring-belt deposit control under the high temperatures encountered in turbocharged diesel engines.

Saves on inventory costs

Mid-ash, higher dispersancy formulation provides excellent overall performance in mixed fleets of different engine designs, allowing fewer oils to be stored and reducing the chance of problems arising through product misapplication.

KEY PROPERTIES

SAE Grade	10W-40	15W-40
Base No.,D2896, mg KOH/g	8.9	9.3
Viscosity, ㎟/s @ 40℃	110.4	114.4
Viscosity, ㎟/s @ 100℃	15.7	15.1
Viscosity Index	154	137
Pour Point, ℃	-33	-30
Flash Point, ℃	236	236
PKG	1,4T,6,20,200	1,4,4T,6,20,200

Kixx Dynamic CF-4

PREMIUM PERFORMANCE DIESEL ENGINE OIL

API CF-4/SG

DESCRIPTION

Kixx Dynamic CF-4 is high performance, multigrade diesel engine oil specially designed to lubricate a wide range of diesel and gasoline engines requiring API CF-4 performance lubricants.

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

- 5W-30, 10W-30, 15W-40, 15W-50 : API CF-4/SG, Allison C-4, CAT TO-2
- 20W-50 : API CF-4/SG, CAT TO-2

CUSTOMER BENEFITS

Maximum power output

Advanced detergent/dispersant additive system maintains power output by providing outstanding deposit control under the high temperature conditions encountered in turbocharged engines.

Reduced maintenance costs

Highly effective detergent additive system minimizes piston crown land deposits which can lead to damaged bore polishing. The proven metallo-organic anti-wear additive system reduces wear in engines under severe service by forming a protective layer on all metal contact surfaces.

Saves on inventory costs

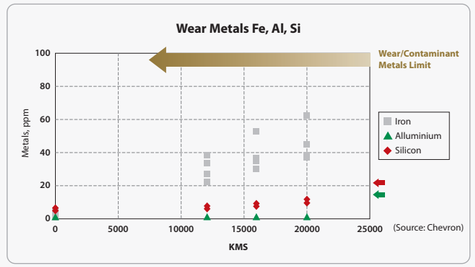
The mid-ash, medium dispersant formulation provides very good overall performance in mixed fleets of different engine designs, allowing fewer oils to be stored and reducing the chance of problems arising through product misapplication.

KEY PROPERTIES

SAE Grade	5W-30	10W-30	15W-40	15W-50	20W-50
Viscosity, ㎟/s @ 40℃	63.9	66.0	118.8	155.0	170.3
Viscosity, ㎟/s @ 100℃	10.6	9.8	15.2	19.1	19.7
Viscosity Index	154	130	133	140	133
Pour Point, ℃	-39	-33	-33	-31	-27
Flash Point, COC, ℃	-	220	252	246	-
D2896, mg KOH/g	13.0	9.9	9.1	9.0	8.2
PKG	1,4,6,20,200	1,4,4T,6,20,200	1,4,4T,6,20,200	200	18,200

USP(Unique Selling Point)

- Kixx Dynamic CF-4 20W-40 maintains power output by providing outstanding deposit control.
- With the anti-wear additive system, Kixx Dynamic CF-4 20W-40 reduces wear in severe service by forming a protective layer on all metal contact surfaces.




GS Oil
Kixx
Hightech
ATF DX-III
1 Liter
AUTOMATIC TRANSMISSION FLUID
Gear Oil HD 75W-85W GL-4
1 Liter
TRANSMISSION AND TRANSAXLE OIL
Geartec GL-5
1 Liter
MULTI PURPOSE GEAR OIL
Top Quality Automotive Oil
High Performance, Premium Automotive Oil
formulated with high quality base oil and additives.

Kixx ATF Multi

MULTI PURPOSE AUTOMATIC TRANSMISSION FLUID

GM, FORD, TOYOTA, HYUNDAI

DESCRIPTION

High-performance, High-quality Multi-Vehicle Fluid for Automatic Transmissions.
Kixx ATF Multi is a specially formulated fluid designed to meet the requirements of a wide range of Automatic Transmission Specifications requiring SP-II, SP-III, DEXRON III, MERCON V, Allison C-4, Toyota T-III and IV. In addition, it meets the requirements of European OEM's like ZF-TE-ML-14A, Voith 55.6335, MAN 339 Type Z-1, and MB, VW, BMW 4- and 5-speed automatic transmission specifications.
Kixx ATF Multi is a special blend of high quality base stocks with an advanced additives system for use as a Service-Fill.

PERFORMANCE STANDARDS

- JASO M315 Type 1A
- Toyota Type T, T-II, T-III, T-IV and D-2
- Hyundai, Kia SP-III
- Mitsubishi SP-II, SP-III
- GM DEXRON III
- Ford MERCON
- Nissan Matic Fluid C, D, J
- Subaru ATF
- Isuzu BESCO ATF-II, III
- Suzuki ATF Oil, ATF Oil Special
- Mazda ATF D-III, ATF M-3
- Allison C-4
- 4, 5 Speed European(BMW,MB,VW)
- ZF Commercial ATs(TE-ML 14A)
- Voith Commercial ATs(55.6335)
- MAN Commercial ATs(MAN339 Type Z-1)

CUSTOMER BENEFITS

- Anti shudder protection.
- Oxidation and thermal stability
- Provides high foam stability.
- Provides good start operation in cold climates thanks to its excellent low-temperature fluidity.
- Provides more stable friction property.
- Use for most vehicles

KEY PROPERTIES

Appearance	red
Density, kg/liter @ 15℃	0.843
Kinematic Viscosity, ㎟/s @ 40℃	37.0
Kinematic Viscosity, ㎟/s @ 100℃	7.6
Pour Point, ℃	-51
Flash Point, COC, ℃	225
Brookfield Viscosity, cP @-20˚C	1300
Brookfield Viscosity, cP @-40˚C	13800
PKG	1,4,4T,200

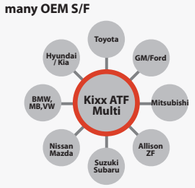
USP(Unique Selling Point)

High Quality Multi-Vehicle Fluid for Automatic Transmissions

Specially formulated fluid designed to meet the requirements of a wide range of Automatic Transmission Specifications

- Hyundai/Kia/Mitsubishi SP-II, SP-III
- GM DEXRON III, Ford MERCON,
- Toyota T, T-II, T-III, T-IV
- 4,5 Speed BMW, MB,VW,
- Allison C-4, JASO M315 Type 1A
- Voith/MAN Commercial ATs,
- Nissan Matic C,D,J
- Suzuki/Subaru ATF Oil, ZF TE-ML-14A
- Mazda ATF D-III, ATF M-3

Kixx ATF Multi is suitable for many OEM S/F



Kixx ATF Multi is a special blend of high quality base stocks with an advanced additives system

ATF DX-Ⅲ

AUTOMATIC TRANSMISSION FLUID

GM DEXRON III , MERCON, ALLISON C4

DESCRIPTION

Modern vehicle and transmission designs place increased stress on the automatic transmission fluid.
ATF DX-III is superior to any other past or currently ATF for uses in passenger car with automatic transmission. It provides a higher quality performance due in part by its oxidation resistance, low temperature fluidity, appropriate friction performance, high shear stability, and near sludge free operation.

PERFORMANCE STANDARDS

- General Motors DEXRON III
- Ford MERCON
- Allison C4

CUSTOMER BENEFITS

- Ensures long life-time
- Porvides high foam stability.
- Provides high antirusting performance and lower sludge formation.
- Provides good start operation in cold climates thanks to its excellent low-temperature fluidity.
- Provides more stable friction property.

APPLICATIONS

In accordance with the GM powertrain licensing requirememts 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 E, DEXRON II or DEXRON fluid.

KEY PROPERTIES

Appearance	red
Density, kg/liter @ 15℃	0.843
Kinematic Viscosity, ㎟/s @ 40℃	32.6
Kinematic Viscosity, ㎟/s @ 100℃	7.1
Pour Point, ℃	-45
Flash Point, COC, ℃	208
Brookfield Viscosity, mPa¡¤s @-20˚C	1,250
Brookfield Viscosity, mPa¡¤s @-40˚C	9,386
PKG	1,4T,18,20,200

Semi Synthetic

Geartec GL-4

MANUAL TRANSMISSION OIL

API GL-4, MIL-L-2105

DESCRIPTION

High quality, mild-EP automotive gear lubricant designed for applications where API GL-4 performance is required.

APPLICATIONS

- Automotive manual synchromesh transmissions and transaxles, particularly where the manufacturer specifically advises against the use of API GL-5 lubricants
- Automotive spiral-bevel and worm gear differentials
- Automotive steering gears
- Tractor and agricultural gear sets, and oil-lubricated track rollers of crawler tractors
- Industrial applications for which API GL-4 lubricants are suitable

PERFORMANCE STANDARDS

- API GL-4
- MIL-L-2105

CUSTOMER BENEFITS

Lower maintenance

The special mild-EP additive and corrosion inhibitor system are non-corrosive towards sensitive copper alloy components and protects ferrous metals against rusting in the presence of moisture. Good thermal stability keeps gear cases and bearings clean and free from harmful deposits.

Longer gear equipment life

The special sulfur-phosphorus mild-EP additive system provides good load carrying capacity which also helps resist gear tooth wear and scoring.

Long oil service life

The highly refined base oil and special inhibitor system provide good oxidation stability which help resist oil degradation and thickening in service.

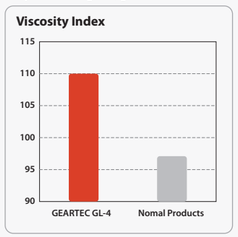
KEY PROPERTIES

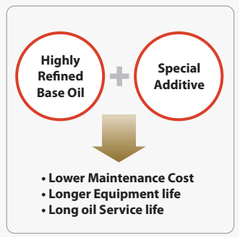
SAE Viscosity Grade	80W-90
Viscosity,mm²/s @ 40℃	142.0
Viscosity,mm²/s @ 100℃	15.01
Viscosity Index	107
Pour Point, ℃	-30
Flash Point, ℃	225
PKG	200

USP(Unique Selling Point)

High Quality, mild-EP automotive gear lubricant
(API GL-4, MIL-L-2105, SAE 90, 80W-90, 85W-140)

- GEARTEC GL-4 is formulated from highly refined base oil and special additive.
- It provides high VI, good oxidation and thermal stability.





Semi Synthetic

Geartec GL-5

MULTI PURPOSE EP GEAR OIL

API GL-5, MIL-L-2105D

DESCRIPTION

High-performance, multipurpose, thermally stable, EP automotive gear lubricant.

PERFORMANCE STANDARDS

- API GL-5
- MIL-L-2105D

CUSTOMER BENEFITS

Provides long equipment life by resisting gear wear and scuffing. Maximizes equipment availability by avoiding premature failure or need for overhaul due to deposit-induced seal wear and leakage. Assists smooth shifting in manual transmissions by controlling glazing and coking of friction surfaces in synchronizing mechanisms. Provides long oil service life by resisting oxidation and oil thickening. Provides against corrosion of ferrous and nonferrous components.

APPLICATIONS

- Recommended for automotive hypoid gear applications requiring lubricants meeting MIL-PRF-2105E, 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.

KEY PROPERTIES

SAE Grade	75W-90	80W-90	85W-140
Density, kg/liter @ 15℃	0.8753	0.8766	0.8910
Kinematic Viscosity, ㎟/s @ 40℃	92.01	132.6	324.4
Kinematic Viscosity, ㎟/s @ 100℃	14.86	14.68	25.5
Viscosity Index	170	111	102
Pour Point, ℃	-42	-30	-18
Flash Point, COC, ℃	225	225	228
PKG	1,4,4T,20,200	4,4T,18,20,200	1,4,18,20,200

USP(Unique Selling Point)

High performance, thermally stable, EP automotive gear lubricant
(API GL-5, MIL-L-2105D, SAE 80W-90, 85W-140)

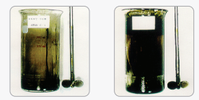
Very Good Anti-wear Performance

High quality base oil and additive provide good resisting gear wear and scuffing under severe conditions

GSC other

Outstanding thermal & oxidation stability

GSC product is superior to other products in oxidation test under 150℃, 96 hours. (Oxidation Test Method : JIS K2514)



GSC other

Semi Synthetic

Gear Oil HD GL-4

TRANSMISSION AND GEAR OIL

API GL-4, MIL-L-2105D

DESCRIPTION

Gear Oil HD GL-4 is a high -performance gear lubricant suitable for transaxle of FF vehicles(front engine front wheel drive). Especially, transaxle of FF vehicles that needs high quality gear lubricant which provides outstanding oxidation resistance under extremely high temperature condition as well as excellent shear stability.
Gear Oil HD GL-4 is made from high quality base oils and additives which provide wear resistance, oxidation stability, anti-rust and anticorrosion qualities as well as excellent shear stability.

PERFORMANCE STANDARDS

- API GL-4, MIL-L-2105D

CUSTOMER BENEFITS

- Reduces operating costs by minimizing wear and extending equipment life.
- Long service life by resisting oxidation and oil thickening.
- Protects against corrosion of ferrous and non-ferrous component.
- Protects gears in severe service through its excellent load-carrying and EP properties.
- Lubricates effectively over a wide temperature range.

KEY PROPERTIES

SAE Grade	75W-85 W
Density, kg/liter @ 15℃	0.8685
Kinematic Viscosity, ㎟/s @ 40℃	66.7
Kinematic Viscosity, ㎟/s @ 100℃	11.55
Viscosity Index	169
Pour Point,˚C	-42
Flash Point, COC, ℃	210
PKG	1, 4T, 200

Fully Synthetic

GS PSF 4

AUTOMOTIVE POWER STEERING FLUID

HMC PSF 4

DESCRIPTION

GS PSF 4 is premium performance automotive power steering fluid specially designed to meet Hyundai, Kia requirements over a wide temperature range. It is also premium formula which uses high quality base stocks(including PAO), additives and provides optimum protection in power steering systems of modern vehicles.

PERFORMANCE STANDARDS

- Hyundai, Kia Power Steering Fluid Specification(HMC MS 517-16, PSF-4)

CUSTOMER BENEFITS

- Provides good start operation in cold climates thanks to its excellent low-temperature fluidity.
- Protects power steering system against wear and ensures long life-time.
- Provides high foam stability, oxidation and corrosion stability.
- Provides high anti-rusting performance and lower sludge formation.
- Provides more stable friction property.

APPLICATIONS

GS PSF 4 is ideal for use in the power steering systems of modern Hyundai and Kia vehicles. It exceeds the severe Hyundai, Kia power steering fluid specification. It is recommended for gasoline and diesel passenger cars, bus, trucks.

KEY PROPERTIES

Appearance	Green
Density, kg/liter @ 15℃	0.8404
Kinematic Viscosity, ㎟/s @ 40℃	27
Kinematic Viscosity, ㎟/s @ 100℃	7.4
Viscosity Index	260
Pour Point, ℃	-54
Flash Point, COC, ℃	180
Brookfield Viscosity, cP @-20˚C	520
Brookfield Viscosity, cP @-40˚C	2,240
PKG	200

Brake Fluid SHD

PREMIUM QUALITY AUTOMOTIVE BRAKE FLUID

DOT 4, DOT 3

DESCRIPTION

Premium, non-petroleum automotive brake fluid, designed for use in a wide range of conventional hydraulic brake and clutch systems in severe service conditions or where DOT fluids are recommended.

PERFORMANCE STANDARDS

- DOT-4: U.S. Federal Motor Vehicle Safety Standard (FMVSS) No. 116 DOT 4, SAE J1704, ISO 4925
- DOT-3: FMVSS No. 116 DOT 3, SAE J1703, ISO 4925

CUSTOMER BENEFITS

Excellent braking response

Low volatility minimizes vapor formation over a wide temperature range, ensuring good braking performance and providing an additional margin of safety against vapor lock under more severe service conditions.

Reliable operation in severe service

High thermal and oxidation stability provides resistance to fluid degeneration and formation of harmful deposits, even under severe service conditions.

Saves on maintenance

Compatible with all metallic, plastic and elastomer components, providing continuous corrosion protection and lubrication throughout the brake/clutch system.

Reduces inventory costs

Widespread suitability for different motor vehicles as it may be used in systems designed for DOT 3, DOT 4.

KEY PROPERTIES

FMVSS Grade	DOT 3	DOT 4
Specific Gravity	1.07	1.1
Equilibrium Reflux Boiling Pt., ˚C	234	258
Wet Equilibrium Reflux Boiling Pt., ˚C	151	163
Kinematic Viscosity, cSt @-40˚C	1225	1073
Kinematic Viscosity, cSt @ 100℃	2.8	2.1
pH	9.58	8.64
PKG	0.5,200	0.5,200

GS/AF Coolant

ANTIFREEZE/COOLANT

ASTM D 3306

DESCRIPTION

A premium quality, ethylene glycol based antifreeze coolant concentrate, designed primarily to meet the stringent corrosion protection requirements of late model car engines which have a significant amounts of aluminum in their construction.
It is dyed a distinctive color for easy identification.

PERFORMANCE STANDARDS

- Meets ASTM D 3306

CUSTOMER BENEFITS

- Protects cooling systems from corrosion and deposits.
- Provides a higher boiling point for protection against engine overheating.
- Prevents coolant freezing.
- Maximizes aluminum engine component life.
- Long service life.
- Compatible with hard tap water.

APPLICATIONS

- Primarily recommended for late model passenger car and light commercial vehicle engines where enhanced protection of aluminium 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).

- GS/AF 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 GS/AF Coolant in water is recommended.
- Freezing and boiling protection provided by various concentrations of GS/AF Coolant are as follows:

Amount of GS Engine Freezing Protection Bolling Point		
Coolant in Water(vol.%)	Down to(˚C)	Increase(˚C)
60	-52	10
50	-37	8
40	-24	6
33	-18	5
Should not be used at concentrations more than 67 percent or less than 33 percent		

KEY PROPERTIES

FMVSS Grade	
Density, kg/liter @20˚C	1.118
EquilibriumBoilinPt. (undiluted),˚C	169
PKG	3,200

GS Oil Treatment

ENGINE OIL BOOSTER

DESCRIPTION

High quality, shear-stable, oil booster specially designed to helf for engine oil maintain its stay-in-grade. it contain a shear stable viscosity index improver, a lubricity agent, a corrosion fighter and acid-inhibitor additives.

APPLICATIONS

- Booster for gasoline engine in passenger car.
- Booster for diesel engine in light and heavy duty truck.

BENEFITS

- Reduce Engine Wear
- Decrease Friction and Increase Power
- Reduce Oil Consumption
- Quiet Noisy Engine

RECOMMENDED USES

- Add GS Oil Treatment to your engine oil when engine is warm.
- Use 1 can of GS Oil Treatment with 4ℓ of engine oil (Approximately 10% GS Oil Treatment).
- Add GS Oil Treatment when you change oil or between oil change.

KEY PROPERTIES

FMVSS Grade	
Density, @15˚C	0.8486
Viscosity, cSt @ 100℃	374
PKG	0.444,200

Kixx Clean

ENGINE FLUSHING OIL

DESCRIPTION

Highly effective engine flushing oil is intended for clearing the buttered system of carbonaceous and varnish adjournment of gasoline and diesel engines of all types and also mechanical transmissions and allowing transition to oils with higher operational properties. It is recommended for use at transition from mineral oils to semi synthetic and synthetic oils.

APPLICATIONS

- Restores mobility of piston rings.
- Prevents blocking of hydrojacks and eliminates their knock.
- In the course of washing oil channels, other knots of the engine are cleared of harmful adjournment formed while in service.
- Application is recommended at each replacement of oil.

FLUSHING STEPS

- Merge old engine oil from system, having to have the used buttered filter in place.
- Then fill oil system with engine flush oil (no less than 75 % from necessary volume of oil in the engine).
- Start the engine and allow it to work idly in a current for 20 minutes.
- Then merge engine flush oil from system, change the oil filter and fill in with new engine oil.

KEY PROPERTIES

ISO Grade	32
Density, kg/liter @ 15℃	0.856
Kinematic Viscosity, ㎟/s @ 40℃	31.7
Kinematic Viscosity, ㎟/s @ 100℃	5.57
Viscosity Index	114
Pour Point, ℃	-15
Flash Point, COC, ℃	224
PKG	4T,200


Ultra Performance Motorcycle Oil
Premium performance, shear-stable, multi- grade gasoline engine oil specifically designed for use in motorcycles and portable power equipment operating in severe service.
Kixx Ultra 4T SJ
API SL JASO MA
SAE 20W/50
1L
GS Oil
Kixx Ultra 2T
JASO FB
1L
GS Oil
Dynamic
Kixx
GS Oil

Kixx Ultra 4T SL

PREMIUM FOUR-STROKE MOTORCYCLE ENGINE OIL

API SL, JASO MA2

DESCRIPTION

Premium performance, shear-stable, multi- grade gasoline engine oil specifically designed for use in four-stroke motorcycles and portable power equipment requiring API SL JASO MA2 lubricants, including high output engines operating in severe service.

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 SL
- JASO MA2

CUSTOMER BENEFITS

Prolongs engine life

Proven metallo-organic anti-wear additive system reduces wear of highly stressed engine components under severe operating conditions.

Saves on maintenance

High oxidation stability resists oil breakdown under the severe heat stress generated by modern engines, enabling the lubricant to do its primary job of providing effective protection for stressed components.

Lively throttle response

Highly effective detergent/dispersant additive system ensures excellent control of piston ring belt deposits for very good power release and acceleration. Correct frictional characteristics enable smooth operation of wet clutches and back torque limiters.

Good all-temperature protection

Highly shear stable viscosity index improver additive minimizes shear-thinning, particularly in the gearbox, and resists breakdown under the high stresses which occur at high rotational speeds, to provide the correct oil viscosity for protection at both start-up and during high temperature operation.

KEY PROPERTIES

SAE Grade	20W-40
Density,kg/liter@15˚CpH	0.873
Kinematic Viscosity,mm2/s@40˚C	130.9
Kinematic Viscosity,mm2/s@100˚C	15.0
Viscosity Index	130
Pour Point,˚C	-33
Flash Point,COC,˚C	240
PKG	200

Kixx Ultra 4T SJ

FOUR-STROKE MOTORCYCLE ENGINE OIL

API SJ, JASO MA

DESCRIPTION

Premium performance, shear-stable, multi- grade gasoline engine oil specifically designed for use in four-stroke motorcycles and portable power equipment requiring API SJ, JASO MA lubricants, including high output engines operating in severe service.

APPLICATIONS

- Air and liquid-cooled four-stroke motorcycle engines
- Particularly suitable for Japanese high performance motorcycle engines
- Motorcycles with combined engine/transmission units, or separate gear boxes where a multigrade 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, pumps, mowers, etc

PERFORMANCE STANDARDS

- API SJ
- JASO MA
- Japanese SE Industry Guideline

CUSTOMER BENEFITS

Prolongs engine life

Proven metallo-organic anti-wear additive system reduces wear of highly stressed engine components under severe operating conditions.

Saves on maintenance

High oxidation stability resists oil breakdown under the severe heat stress generated by modern engines, enabling the lubricant to do its primary job of providing effective protection for stressed components.

Lively throttle response

Highly effective detergent/dispersant additive system ensures excellent control of piston ring belt deposits for very good power release and acceleration. Correct frictional characteristics enable smooth operation of wet clutches and back torque limiters.

Good all-temperature protection

Highly shear stable viscosity index improver additive minimizes shear-thinning, particularly in the gearbox, and resists breakdown under the high stresses which occur at high rotational speeds, to provide the correct oil viscosity for protection at both start-up and during high temperature operation.

KEY PROPERTIES

SAE Grade	15W-40	20W-50
Density,kg/liter@15˚C	0.867	0.874
Kinematic Viscosity,mm2/s@40˚C	106.4	162.8
K inematic Viscosity,mm2/s@100˚C	14.5	18.5
Viscosity Index	140	128
Pour Point,˚C	-30	-24
Flash Point,COC,˚C	226	238
PKG	0.8,1,200	0.8,1,200

Semi Synthetic
World Top GS Lubricants
Made in Korea

Kixx Ultra 2T

TWO-STROKE GASOLINE ENGINE OIL

JASO FB

DESCRIPTION

High-performance, two-stroke motorcycle oil formulated with a low-ash additive system.
Available in one SAE fluidity/miscibility grade, F/M 2, as preferred by oil-injection systems. It is prediluted with a special solvent that permits ready mixing with gasoline over a wide temperature range. Dyed distinctively to aid in identifying its presence in fuel/oil mixtures.

PERFORMANCE STANDARDS

Meets JASO FB, the Global GB category and API TC for air-cooled, two-stroke engines

CUSTOMER BENEFITS

- Maximizes time between overhauls by minimizing scuffing, wear and deposits.
- Protects against preignition.
- Maximizes engine life by controlling the deposits which lead to ring sticking.
- Maximizes spark plug life by reducing fouling.
- Easy to mix with gasoline.

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.

KEY PROPERTIES

SAE Grade (J1536)	F/M2
Density,kg/liter@15˚C	0.8592
Kinematic Viscosity,mm2/s@40˚C	42.35
Kinematic Viscosity,mm2/s@100˚C	7.2
Viscosity Index	132
Pour Point,˚C	-39
Flash Point,COC,˚C	85
PKG	1, 200

GS Hydro HDCZ

WIDE TEMPERATURE RANGE EXCAVATOR HYDRAULIC FULID

ISO 46, 68

DESCRIPTION

Premium quality, shear stable, multi-viscosity, anti-wear hydraulic fluid, designed for use in hydraulic systems subjected to wide variations in ambient and operating temperatures. Specifically GS Hydro HDCZ designed to meet the all season requirements of major manufacturers and users of hydraulic system.

APPLICATIONS

- Industrial hydraulic equipment subject to wide variation in temperatures
- Hydraulics of mobile, construction and agricultural equipment
- Hydraulic systems with vane, gear or piston pumps
- Fork-lift trucks (in refrigerated areas)
- Plastic injection molding machines
- Marine deck equipment, steering gears, bow thrusters and automatic controls
- Numerically controlled (NC) machine tools

PERFORMANCE STANDARDS

- Denison Hydraulics HF-0
- Vickers 1-286-S [industrial applications], M-2950-S [mobile applications]
- Cincinnati Lamb P 70
- Mannesmann Rexroth requirement (RE 07 075)
- ISO Standard 6743 Part 4, Type HV
- DIN 51524 Part 3, HVLP
- SAE MS 1004 HV

CUSTOMER BENEFITS

Wide temperature application

Shear stable, multi-viscosity characteristics reduce the risk of breakdown in high pressure/high load hydraulic systems which are operating over a wide temperature range.

Longer equipment life

Special anti-wear additive package reduces wear by protecting surfaces when load causes breakdown of the lubricant film.

Reduced downtime

Effective rust and oxidation inhibitor system prevents the production of abrasive particles from rust formation, and deposits, varnishes and sludges from oil breakdown, which can damage equipment surfaces and seals, and block filters prematurely.

Trouble-free operation

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

Extended oil service life

High oxidation stability resists oil thickening and deposit formation in service, eliminating the need for unscheduled change of hydraulic fluid.

KEY PROPERTIES

ISO Grade	46	68
Specific Gravity, 15/4 °C	0.868	0.873
Flash Point, °C	230	234
Pour Point, °C	-42	-39
Viscosity,mm2/s@40˚C	43.9	66.7
Viscosity,mm2/s@100˚C	7.9	10.8
Viscosity Index	153	152
Copper Corrosion, 100 ˚C / 3Hr	1-a	1-a
Rust Preventive, sea water	Pass	Pass
Demulsibility, min	10	10
PKG	18, 200	18, 200

GS Hydro HDZ

WIDE TEMPERATURE RANGE HYDRAULIC FULID

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

DESCRIPTION

Premium quality, shear stable, multi-viscosity, anti-wear hydraulic fluid, designed for use in hydraulic systems subjected to wide variations in ambient and operating temperatures.

APPLICATIONS

- Industrial hydraulic equipment subject to wide variation in temperatures
- Hydraulics of mobile, construction and agricultural equipment
- Hydraulic systems with vane, gear or piston pumps
- Fork-lift trucks (in refrigerated areas)
- Plastic injection molding machines
- Marine deck equipment, steering gears, bow thrusters and automatic controls
- Numerically controlled (NC) machine tools
- Enclosed gear systems

PERFORMANCE STANDARDS

- Denison Hydraulics HF-0(ISO 32, 46, 68)
- Vickers 1-286-S [industrial applications], M-2950-S [mobile applications](ISO 32, 46, 68)
- Cincinnati Milacron P-68 (ISO 32), P-69 (ISO 68), P 70 (ISO 46)
- Mannesmann Rexroth RE 07 075
- ISO Standard 6743 Part 4, Type HV
- DIN 51524 Part 3
- AAMA Standard 524 Part 3
- US Steel 126 and 127

CUSTOMER BENEFITS

Wide temperature application

Shear stable, multi-viscosity characteristics reduce the risk of breakdown in high pressure/high load hydraulic systems which operate over a wide temperature range.

Longer equipment life

Special anti-wear additive package reduces wear by protecting surfaces when load causes breakdown of the lubricant film.

Reduced downtime

Effective rust and oxidation inhibitor system prevents the production of abrasive particles from rust formation, and deposits, varnishes and sludges from oil breakdown, which can damage equipment surfaces and seals, and block filters prematurely.

Trouble-free operation

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

Extended oil service life

High oxidation stability resists oil thickening and deposit formation in service, eliminating the need for unscheduled change of hydraulic fluid.

KEY PROPERTIES

	Fully Synthetic	Fully Synthetic	Semi Synthetic	Semi Synthetic	Semi Synthetic	Semi Synthetic
ISO Grade	15	22	32	46	68	100
Flash Point, °C	165	193	218	229	234	240
Pour Point, °C	-54	-45	-45	-42	-39	-36
Viscosity,mm2/s@40˚C	15.7	22.4	34.1	44.2	66.7	99.6
Viscosity,mm2/s@100˚C	3.9	5.0	6.6	8	10.8	14.5
Viscosity Index	153	152	152	152	152	151
PKG	20,200	20,200	20,200	20,200	20,200	20,200

GS Hydro HD

ANTIWEAR HYDRAULIC FLUID

ISO 32, 46, 68, 100

DESCRIPTION

Premium-quality antiwear hydraulic fluid designed for use in mobile and stationary high pressure hydraulic systems. Contains a stabilized zinc additive system which provides outstanding antiwear characteristics, it also provides good thermal and oxidation stability.

PERFORMANCE STANDARDS

Meets the requirements of German hydraulic fluid Standard DIN 51524 Part 2 and U.S.Steel Specification 126&127. Approved in the Denison Hydraulics HF-0 for severe-duty axial piston and vane pump service, and Vickers Specifications M-2952-S, 1-286-S for industrial applications and M-2950-S for mobile hydraulic equipment.

CUSTOMER BENEFITS

- Reduces risk of breakdown due to overloading by protecting the components of high pressure hydraulic systems against wear.
- Maintains system efficiency by rapidly releasing entrained air.
- Good filterability and trouble-free performance in the presence of water contamination through excellent hydrolytic stability and its rapid water separation characteristics.
- Compatible with all kinds metals used in hydraulic systems including silver and phosphor-bronze pump components which are used in axial piston pumps..
- Provides long service life by resisting oil thickening and the formation of harmful deposits.
- Protects against rust and corrosion.

APPLICATIONS

- Recommended for all hydraulic systems designed to use a mineral oil based fluid, regardless of pump type, operating speeds and pressures.
- Should be used whenever antiwear hydraulic fluids are specified by the equipment manufacturer or where high wear has occurred when using non-antiwear hydraulic fluids.
- Suitable for enclosed gears operating under moderate load conditions, as well as industrial circulating systems where a rust and oxidation inhibitor or antiwear oil is required.

KEY PROPERTIES

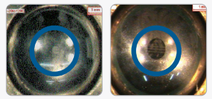
ISO Grade	32	46	68	100
Color, ASTM	1.0	1.0	1.0	1.0
Density,kg/liter@15˚C	0.859	0.861	0.864	0.866
Kinematic Viscosity,mm2/s@40˚C	32	44	64	96.5
K inematic Viscosity,mm2/s@100˚C	5.6	6.8	8.7	11.7
Viscosity Index	113	116	117	111
Pour Point,˚C	-33	-33	-30	-24
Flash Point,COC,˚C	221	229	235	243
RustPreventingCharacteristics(D665)	Pass	Pass	Pass	Pass
Oxidation Characteristics(D943)	1500+	1500+	1500+	1500+
PKG	20,200	20,200	20,200	20,200

USP(Unique Selling Point)

- The special anti-wear additive package reduces wear by protecting surface when load breakdown of the lubricant film.
- Outstanding oxidation stability compared with other anti-wear hydraulic oil ensure less in-service thickening and longer fluid life.

Long equipment life

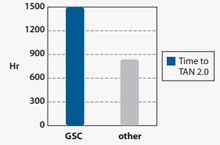
4-Ball anti-wear test result



GSC other

Longer service life

Oxidation Stability Test Result
(Time to TAN 2.0 @ 95˚C)



GS Hydro

GENERAL PURPOSE HYDRAULIC FLUID

ISO 32, 46, 68, 100

DESCRIPTION

General purpose Hydral Fluid, rust and oxidation inhibited hydraulic fluid designed for used in a variety of industrial applications.

PERFORMANCE STANDARDS

- Meets the requirements of German hydraulic fluid Standard DIN 51524 Part 1.
- Appropriate viscosity grades meet ANSI/ AGMA Standard 9005-D94.

CUSTOMER BENEFITS

- Provides long service life by resisting oil thickening and the formation of harmful sludge or varnish deposits.
- Protects against rust.
- Allows ready removal of water.
- Prevents spongy or erratic hydraulic system operation by inhibiting foam formation.
- Suitable for an extensive range of equipment.

APPLICATIONS

- Recommended for mobile and stationary hydraulic systems using axial piston type pumps where R&O type oils are suitable. May also be used in systems using vane and gear type pumps where pressures and speeds allow the use of R&O type oils. Not suitable for hydraulic systems where antiwear type oils are required.
- Recommended for use in non-turbine circulating systems and in industrial applications requiring a rust and oxidation inhibited oil, such as electric motor bearings, blowers, compressors, machine tools and industrial spindles.
- Suitable for enclosed gear applications where antiwear or EP properties are not required.

KEY PROPERTIES

ISO Grade	32	46	68	100
Color, ASTM	L0.5	0.5	L1.0	1.0
Density,kg/liter@15˚C	0.859	0.862	0.864	0.865
Kinematic Viscosity,mm2/s@40˚C	32	44	64	95
K inematic Viscosity,mm2/s@100˚C	5.5	7	9	11.7
Viscosity Index	114	117	115	114
Pour Point,˚C	-33	-30	-27	-24
Flash Point,COC,˚C	228	234	258	265
RustPreventingCharacteristics(D665)	Pass	Pass	Pass	Pass
Oxidation Characteristics(D943)	1500+	1500+	1500+	1500+
PKG	20,200	20,200	20,200	20,200

USP(Unique Selling Point)

- Superior oxidation & Thermal stability resists oil thickening and deposit formation in service, eliminating the need for unscheduled change of hydraulic oil.
- Formulated with highly refined base oil provide clean water like color.

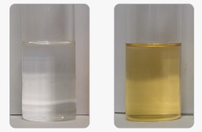
Superior Oxidation & Thermal stability

GSC product produce less sludge than other products
(test under 150˚C, 168 hrs)

GSC other

Water like color

GSC product is formulated with highly refined base oil.



GSC other

GS Gear EP

EXTREME PRESSURE INDUSTRIAL GEAR LUBRICANT

ISO 68, 100, 150, 220

DESCRIPTION

An EP industrial gear lubricant based on a sulfur-phosphorus additive system.

PERFORMANCE STANDARDS

- ANSI/AGMA 9005-D94[EP]
- U.S. Steel 224
- AGMA 250.04[EP]
- AGMA 251.02[EP]
- David Brown Table E approved

CUSTOMER BENEFITS

- Extends gear life due to high load carrying capacity and has an outstanding ability to keep gear surfaces free of deposits.
- Provides long oil service life thanks to its excellent oxidation resistance.
- Allows rapid separation of water.
- Protects against rust and corrosion.

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.

KEY PROPERTIES

ISO Grade	68	100	150	220
Density, kg/liter @15˚C	0.870	0.871	0.873	0.880
KinematicViscosity,mm2/s@40˚C	63.9	95.2	142.5	206.9
Kinematic Viscosity,mm2/s@100˚C	8.8	11.7	15.4	19.6
Viscosity Index	111	112	111	108
Pour Point,˚C	-21	-18	-18	-15
Flash Point,COC,˚C	235	244	248	280
Timken Ok Load, kg	27	27	27	27
FZG, Load Stage	12	12	12	12
PKG	20,200	20,200	20,200	20,200

GS Turbine oil

PREMIUM PERFORMANCE TURBINE OIL

ISO 32, 40, 68, SIEMENS, GE, WESTINGHOUSE

DESCRIPTION

Premium quality inhibited turbine oil. Contains highly effective rust, oxidation and foam inhibitors and it is formulated to have good air release properties and good oxidation stability.

APPLICATIONS

- Steam and hydraulic turbines operating under all service conditions
- Centrifugal, rotary and reciprocating compressors, turboblowers and centrifugal pumps, requiring a rust and oxidation inhibited oil (not recommended for use in breathing air compressors)
- Hydroelectric turbines
- Other applications where high quality rust and oxidation inhibited oils are required.

PERFORMANCE STANDARDS

- Siemens TLV 901304, TLV 901305 approval
- Meets the requirements of major turbine builders including GE, Westinghouse, ABB
- General Electric GEK-46506D & 32568E
- Mitsubishi Heavy Industries Turbines

CUSTOMER BENEFITS

Long service life assured by outstanding resistance

Excellent thermal and oxidation Stability

Excellent Filterability even in the presence of water and non turbine oil contaminants such as hydraulic oils.

Maintains high power output by resisting air entrainment in oil circulation Allows easy removal of water

Robust demulsibility control such that excess water, which is commonplace in steam turbines, can be drained easily from the lubrication system, minimizing corrosion and premature wear.

Protects against rust and corrosion

Prevents the formation of rust and guards against the onset of corrosion ensuring the protection of the equipment following exposure to humidity or water during operation and during shut down.

Allows one oil to be used for both turbine and non-turbine application

KEY PROPERTIES

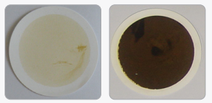
ISO Grade	32	46	68
Density kg/L @15°C	0.842	0.852	0.865
Viscosity mm^2/s @ 40°C	30.7	44.1	64.58
Viscosity mm^2/s @ 100°C	5.72	7.1	8.8
Viscosity Index	130	122	109
Flash Point(COC)°C	218	240	246
Pour Point,°C	-18	-18	-18
Air Release, min	1.3	3	
Copper Corrosion @100,3hrs	1a	1a	1a
Rust Prevention @ Proc B	PASS	PASS	PASS
PKG	20,200	20,200	20,200

USP(Unique Selling Point)

- Formulated with Group III Synthetic base Oil provide excellent thermal stability.
- Outstanding oxidation stability compared with other turbine Oil ensure longer fluid life.

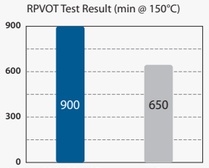
Excellent Thermal Stability

GS Turbine Oil produce less sludge than other products (test under 150°C, 168 hrs)



Longer service life

RPVOT Test Result (min @ 150°C)



GS Compressor Oil EP-VDL

PREMIUM PERFORMANCE RECIPROCATING COMPRESSOR OIL

ISO 32, 46, 68, 100, 150

DESCRIPTION

COMPRESSOR OIL EP-VDL is a range of mineral compressor lubricants, meeting DIN 51 506 class VDL specifications and exhibiting high load carrying capacity. COMPRESSOR OILS EP-VDL are blended from selected high quality paraffinic base oils. A well balanced additive package provides excellent oxidation resistance, corrosion protection, and outstanding EP characteristics. It provides a smooth, economical compressor operation especially under severe conditions.

APPLICATIONS

COMPRESSOR OILS EP-VDL are 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. COMPRESSOR OIL EP-VDL has been tested and approved by "Rheinische-Westfälischer Uberwachungsverein e.V." in Germany and it meets DIN 51 506 VDL.

CUSTOMER BENEFITS

Oxidation Stability

Resistance to oxidation at high temperatures prevents carbon formation in the air compressor chambers, discharge lines and air vessels.

Rust Protection

Assures protection against rust and corrosion.

Antifoam Properties

Prevents accumulation of surface foam in the crankcase.

Low Evaporation Loss

Guarantees minimum consumption of product.

KEY PROPERTIES

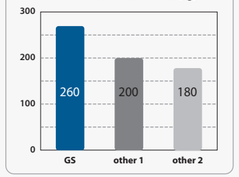
ISO Viscosity Grade	32	46	68	100	150
Density at 15°C, kg/l	0.8582	0.8595	0.8613	0.8652	0.8711
Flash point, COC, °C	222	250	256	258	259
Pour point, °C	-18	-18	-18	-18	-15
Rust test, distilled water	pass	pass	pass	pass	pass
Viscosity,kinematic,mm^2/s(cSt)at 40°C	30.6	43.9	64.6	92.8	154.8
Viscosity,kinematic,mm^2/s(cSt)at 100°C	5.7	7.3	9.3	11	16.1
Viscosity index	131	130	125	104	108
PKG	20,200	20,200	20,200	20,200	20,200

USP(Unique Selling Point)

- A well balanced additive package provides excellent corrosion protection and outstanding EP characteristics.
- It provides a smooth, economical compressor operation especially under severe conditions.

Outstanding EP characteristics

4-ball Weld Load Test Results (kg)



Excellent Corrosion Protection

Metal Corrosion Test Results (150°C, 168hr)

GS Compressor RA-X

PREMIUM PERFORMANCE ROTARY SCREW COMPRESSOR OIL

ISO 32, 40, 68, DIN 51506 VDL

DESCRIPTION

Premium performance, synthetic based compressor oil containing a special oxidation inhibitor and a rust inhibitor. Designed specifically for use in oil flood lubricated positive displacement rotary compressor. It will extend drain intervals up to 2 times longer than with conventional mineral oils.

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 6521
- ISO L DAA/DAB/DAH/DAG

CUSTOMER BENEFITS

Extended Oil Service Life

The outstanding oxidation stability of the synthetic base oil and special inhibitor system resists oil breakdown at the elevated temperatures encountered during intimate inter-mixing of oil and air in rotary compressor service, which permits the oil drain intervals to be extended up to two times longer than those achieved with conventional lubricants.

Minimum maintenance and downtime

The outstanding oxidation stability also resists the formation of harmful varnish and sludge deposits which are promoted by contact with condensed water vapor, dust and other particulate contaminants. The highly effective film forming corrosion inhibitor plates out on metal surface to protect the system against rust.

Trouble-free operation

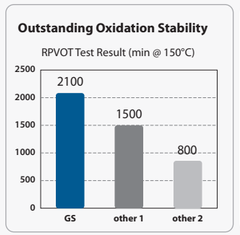
The excellent air release and anti-foam properties of the highly refined base oil and inhibitor system minimize lubricant carry-over, protect against interruption of lubrication due to air entrained in the oil, and minimize the possibility of foaming and overflow in tanks and reservoirs. Excellent water separating characteristics make it easy to remove water b draining.

KEY PROPERTIES

ISO Grade	32	46
Density, kg/liter @15˚C	0.845	0.849
KinematicViscosity,mm2/s@40˚C	32.96	44.5
Kinematic Viscosity,mm2/s@100˚C	5.86	7.3
Viscosity Index	124	123
Pour Point,°C	-36	-27
Flash Point(COC)°C	240	252
Copper corrosion, 3hr @ 100, ˚C	1a	1a
Color, ASTM	L0.5	L0.5
PKG	20,200	20,200

USP(Unique Selling Point)

- The outstanding oxidation stability of the synthetic base oil and special inhibitor system
- The superior thermal stability resists the formation of harmful varnish and sludge deposits



GS Trans I

TRANSFORMER OIL

IEC 60296:2003

DESCRIPTION

GS Trans I is a highly refined, inhibited transformer oil for use in severe conditions, such as high ambient temperatures. It should also be used where oxidation resistance and thermally stable insulating oils are needed. It meets the IEC 60296:2003 transformer oil specifications.

APPLICATIONS

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

PERFORMANCE STANDARDS

- IEC 60296:2003

CUSTOMER BENEFITS

Extended Service Life

Effective anti-oxidation inhibitor limits the formation of sludges, deposits and soluble compounds which break down the electrical properties of the oil in severe, high ambient temperature or extended service conditions.

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 quenching of arcs reduces contact erosion.

Maintains transformer efficiency

High dielectric strength and low dissipation factor provide excellent insulating characteristics.

KEY PROPERTIES

IEC 60296:2003 Type	Inhibited
Dielectric Strength, KV	60
Kinematic Viscosity,mm2/s@40˚C	7.57
KinematicViscosity,mm2/s@100˚C	2.23
PCB Contens	Not detected
Pour Point,˚C	-45
Flash Point, PM,˚C	146
Corrosive Sulfur	Non corrosive
PKG	200

GS Process Oil

PROCESS OIL

KIXX PO 2, 4, 6, 8 / KIXX WHITE 150, 220 / KIXX LP 600

DESCRIPTION

GS Process oils are highly saturated paraffinic process oils with very good color and low aromatic content. GS Caltex's modern all- hydroprocessing technology assures that these oils have a light color and are odorless.

CUSTOMER BENEFITS

GS Process oils deliver value through :
- Exceptional oxidation stability
- Very good color stability
- Low volatility and low weight loss

GS Process oils are recommended for applications where discoloration, staining, sludging, or fogging must be minimized.

APPLICATIONS

GS Process oils function as processing aids or as extender oils in rubber compounding.
They are used to :
- Reduce the amount of time required for mixing
- Reduce the amount of heat generated in mixing
- Maximize the dispersion of components
- Extend product volume
- Reduce product cost while maintaining the physical properties of the rubber compound

GS Process oils are ideal for use in compounding a wide variety of finished rubber products, including :
- Footwear
- Agricultural spray
- Furniture polish
- Textiles
- Wire and cable insulation
- Adhesive, sealants and coatings
- Polymer modified asphalts
- Asphalt extender
- Automobile interior moldings
- Automotive under hood parts
- Tires, tire whitewalls, tubes and inner liners
- Insulation
- Gels
- Dielectric fluids
- Drilling fluids
- Carpet underlayment
- Heat transfer fluids
- Foam
- Household products
- Roofing compounds
- Rubber membranes
- Weather-stripping

KEY PROPERTIES

Product	Kixx white 150	Kixx white 220	Kixx LP 600	Kixx PO 2	Kixx PO 4	Kixx PO 6	Kixx PO 8
Density, kg/liter @15˚C	0.8547	0.8562	0.8627	0.8993	0.8312	0.8394	0.8447
KinematicViscosity,mm2/s@40˚C	28.61	43.32	99.26	7.232	19.03	31.07	49.39
Kinematic Viscosity,mm2/s@100˚C	5.160	6.799	12.1	2.157	4.136	5.761	7.896
Viscosity Index	110	112	113	98	120	129	129
Saybolt Color	30	30	30	30	30	30	30
Pour Point,°C	-19	-30	-21	-45	-18	-20	-20
Aniline Point, °C	110.6	116.6	126.9	96.5	113.7	119.3	124.7
Carbon type % Paraffinic	68.99	71.5	73.24	65.18	79.62	77.65	79.15
Carbon type % Naphthenic	31.01	28.5	26.76	34.46	20.38	22.35	20.35
Carbontype%Aromatic	0	0	0	0.36	0	0	0
Flash Point, COC,˚C	224	240	282	158	226	234	260
PKG	200	200	200	200	200	200	200

GS Liplex 2

PREMIUM QUALITY MULTIPURPOSE GREASE

NLGI 2, GC-LB

DESCRIPTION

Premium, multipurpose EP automotive wheel bearing and chassis grease containing a lithium complex thickener, EP additives, rust and oxidation inhibitors and tackiness additives. Red in color.

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 additive protects against bearing wear under severe conditions and shock loading. The effective rust and corrosion inhibitors protect metal surfaces, even in conditions of severe water exposure.

Minimizes downtime

High dropping point minimizes leakage from bearings at elevated temperatures and excellent oxidation resistance ensures long grease life. The natural water resistance of the lithium complex thickener, combined with the additional tackiness additive, prevents water washout.

Minimizes inventory costs

Multipurpose capability allows use in a wide range of automotive and industrial applications, reducing the number of different greases required and eliminating product misapplication.

KEY PROPERTIES

NLGI Grade	2
Dropping Point,°C	265
Oil Viscosity, mm^2/s @ 40°C	200
Penetration, Worked @ 25°C	281
Thickener (Lithium Complex), m %	11
Water Washout @ 79°C, 1hr	0.65
PKG	15,180

New Golden Pearl EP

MULTIPURPOSE EXTREME PRESSURE GREASE

NLGI 0, 1, 2, 3

DESCRIPTION

Multipurpose EP grease contains highly refined mineral base oils, lithium thickener, extreme pressure (EP) additives and rust and oxidation inhibitors. Suitable as a multipurpose automotive grease for general purpose applications.

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 additive protects against component wear under high load conditions. Rust and corrosion inhibitors protect metal surfaces.

Long service life

Excellent oxidation resistance ensures enhanced grease service life.

Ease of application

Good pumpability characteristics of the lithium thickener provide suitable flow properties for grease pump application systems (NLGI 2)

Minimizes inventory costs

Multipurpose capability allows use in a wide range of industrial and automotive applications reducing the number of different greases required and eliminating product misapplication.

KEY PROPERTIES

NLGI Grade	0	1	2	3
Penetration, Worked @ 25°C	364	321	277	236
Dropping Point, °C	204	214	223	225
Thickener		Lithium		
CopperCorrosion@100°C, 24hrs		No tarnish(1a)		
Oxidation Stability, kgf/cm2@ 99°C, 100hrs	20	20	20	20
Water Washout, wt% @ 38°C, 1hr		7.7	1.25	
PKG	15,180	15,180	15,180	15,180

New Golden Pearl

GENERAL PURPORSE GREASE

NLGI 2, 3

DESCRIPTION

Smooth, buttery texture, yellowish, translucent, general purpose automotive and industrial grease with adhesive properties manufactured from lithium soap and containing an oxidation inhibitor.

CUSTOMER BENEFITS

- Protects bearings from damage under light-load or shock-load conditions.
- Lubricates effectively in wet conditions due to its resistance to water washout.
- Provides long service life through high oxidation stability.
- Resists leakage from bearing through good mechanical stability.
- Does not run down and gives continuous lubrication thanks to its excellent tackiness.

APPLICATIONS

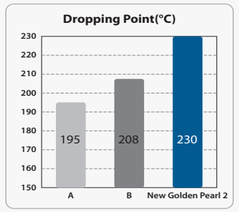
- Most automotive grease applications including wheel bearings, ball joints, universal joints and linkages.
- Industrial ball and roller bearing, plain bearing, niddle bearing.
- General industrial applications where EP characteristics are not needed.

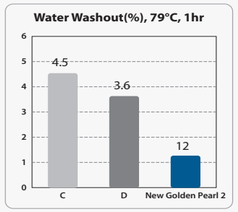
KEY PROPERTIES

NLGI Grade	2	3
Worked Penetration @ 25˚C, mm/10	277	236
Dropping Points, ˚C	233	225
Thickener(Lithium Soap), wt%	8.5	10.0
4-Ball EP, kgf	160	160
Water Washout, wt% @ 38˚C, 1hrs	0.75	0.75
Lift Performance, hrs @ 165˚C	80	80
Usable Temperature Range	-30 to 150	-20 to 160
PKG	0.5,1,15,180	0.5,1,3,15,180

USP(Unique Selling Point)

New Golden Pearl 2 is multipurpose grease with ISO 220 base oil, oxidation and corrosion inhibitors
New Golden Pearl 2 has high drop point, usable wide temperature range.





GS Therma EP

HIGH TEMPERATURE NON-MELTING GREASE

NLGI 1, 2

DESCRIPTION

Non-melting, EP grease formulated from a highly refined ISO 100 mineral base oil, an organoclay (bentonite) thickener, and an effective EP agent for high temperature applications where frequent re-application is available.

APPLICATIONS

- Industrial ball and roller bearings in high temperature applications.
- Exhaust fan bearings
- Furnace door bearings
- Kiln car wheel bearings
- Roll neck bearings
- High temperature conveyor bearings
- Rotary kiln bearings

Usable temperature range: Continuous service -20 to 135°C
With frequent relubrication 260°C

CUSTOMER BENEFITS

Minimizes equipment failure

The special non-melting organoclay thickener prevents grease loss from bearings at high temperature.

Wide temperature range application

May be used in applications up to 135°C with normal re-greasing, and up to 260°C with very frequent regreasing, making it suitable for use in a wide range of high temperature industrial applications.

Prevents failure in wet conditions

Organoclay thickener gives excellent resistance to water washout.

KEY PROPERTIES

NLGI Grade	1	2
Penetration, Worked @ 25°C	325	280
Dropping Points, ˚C	Not applicable	
Thickener (modified bentonite)	10	12
Oil Viscosity mm^2/s @ 40°C	92.5	92.5
Oil Viscosity mm^2/s @ 100°C	10.5	10.5
Timken OK Load, kg	20	20
PKG	15,180	15,180

GS Moly EP

MULTIPURPOSE EXTREME PRESSURE GREASE

NLGI 2

DESCRIPTION

Dark gray, multipurpose EP grease primarily designed for construction, mining and agricultural equipment where an extra measure of protection in shock loading conditions is required. Contains a highly refined ISO VG 220 mineral base oil, lithium soap thickener, EP additives, rust and oxidation inhibitors, plus molybdenum disulfide solid film lubricant.

APPLICATIONS

- Automotive
- Construction
- Earthmoving, quarrying and mining
- Agricultural equipment
- Chassis grease point lubrication
- Pins, bushings and other sliding surface or pivot points
- All types of anti-friction bearings
- Ball joints
- Universal joints (U-joints)
- High and shock load applications

Usable temperature range in continuous service is -30 to 130°C.
Maximum temperature for short term exposure is 175°C.

CUSTOMER BENEFITS

Saves on heavy-duty maintenance

Effective EP additive and molybdenum disulfide solid film lubricant protect against component wear under high load conditions and/or shock loading. Rust and corrosion inhibitors protect metal surfaces in wet operating conditions. Even if insufficient grease is used, some molybdenum disulfide tends to stay in place and protect metal surfaces.

Long service life

Excellent oxidation resistance ensures enhanced grease service life.

Ease of application

Good pumpability characteristics of the lithium thickener provide suitable flow properties for grease pump application systems.

Wide range of applications

Multipurpose capability allows use in a wide range of heavy-duty automotive and industrial applications, reducing the number of different greases

KEY PROPERTIES

NLGI Grade	2
Dropping Point, °C	195
Molybdenum Disulfide, m %	3
Oil Viscosity, mm^2/s @ 40°C	208
Oil Viscosity, mm^2/s @ 100°C	18.2
Penetration, Worked @ 25°C	275
Thickener (Lithium), m %	7.5
PKG	15,180

GS Cylinder

CROSS HEAD CYLINDER OIL

DESCRIPTION

GS Cylinder is a high-performance 70 BN SAE 50 cylinder lubricant intended for lubricating slow-speed engines at very high mechanical and thermal loads. It is blended from highly refined, paraffinic base oils and carefully selected additives to provide superior ring and liner wear protection and excellent piston cleanliness in slow-speed crosshead engines. GS Cylinder has been developed specifically for high pressure and high-temperature applications.

APPLICATIONS

GS Cylinder is recommended for lubricating the cylinders of all large slow-speed marine diesel engines operating at high specific power outputs and high thermal loads.
GS Cylinder has been approved by MAN, Wartsila and Mitsubishi Heavy Industries for use in the latest generation engine designs.

CUSTOMER BENEFITS

Wear Protection

Ensures protection against excessive cylinder liner and piston ring wear, thus allowing prolonged service intervals.

Detergent/Dispersant Properties

Prevents ring sticking and minimizes deposit formation throughout the combustion chamber exhaust areas.

Excellent Lubrication Properties

Maintains an oil film under severe, high load conditions, thereby reducing frictional wear and preventing scuffing of liners, pistons and rings.

Storage Stability

Completely stable at all ambient temperatures. Will not separate or deteriorate in longterm storage.

Compatibility

Fully miscible and compatible with single-phase alkaline diesel cylinder lubricants generally known to the international marine trade.

KEY PROPERTIES

SAE Grade	50
Viscosity,mm2/s@40˚C	220
Viscosity,mm2/s@100˚C	20.5
Viscosity Index	105
FZG Fail Load Stage	11
Sulfated Ash, m %	9.0
Base Number,mg KOH/g	70
Pour Point, ˚C	-15
PKG	200

GS System

CROSS HEAD SYSTEM OIL

DESCRIPTION

Premium quality, alkaline diesel engine oil designed for crankcase (system) lubrication of large, low speed diesel engines in marine and stationary applications.

APPLICATIONS

Crankcase lubrication of:

- Large, low speed (less than 250 rpm), two-cycle crosshead diesel engines
- Particularly suitable for engines with oil-cooled pistons
- Older-type marine trunk piston engines with separate cylinder lubrication
- Marine and stationary applications

CUSTOMER BENEFITS

Extends time between overhauls

Special detergent and ashless dispersant additive system ensures crankcases and lubricating oil lines are kept free of deposits. The combination of detergency and excellent oxidation stability provides clean piston cooling galleries and chambers.

Protects bearings from corrosive wear

Level of alkalinity reserve ensures that acidic combustion products (which enter the crankcase due to leaks in the connecting rod seals) are effectively neutralized to protect bearings and bright metals against corrosive wear.

Easy oil purification

Combination of highly refined basestocks and special detergent additive system provides excellent water tolerance and separation properties which enable efficient purifier operation. Therefore, water washing is neither necessary nor recommended.

KEY PROPERTIES

SAE Grade	30
Viscosity,mm2/s@40˚C	108
Viscosity,mm2/s@100˚C	11.9
Viscosity Index	98
Sulfated Ash, m %	0.7
Base Number,mg KOH/g	5.4
FZG Fail Load Stage	12
PKG	200

SERVICE CONSIDERATIONS

Marine system oils are designed for use with active purification systems. As such systems continuously remove contaminants from the oil, long service lives are possible and it is not usual to change out the lubricant on a fixed schedule. Accordingly, it is important that the oil's condition be monitored and the change-out period be determined by means of regular oil analysis and interpretation in accordance with manufacturers' guidelines. While GS System has excellent water separation properties, water washing is neither necessary nor recommended. However, contamination with other engine oils may drastically affect its ability to maintain these excellent water separation characteristics.

GS 1000 Marine

10-TBN TRUNK PISTON ENGINE OIL

DESCRIPTION

GS 1000 Marine is a lower alkaline reserve (12Base Number) trunk piston engine oil (TPEO). GS 1000 Marine is designed for use in medium-speed trunk piston engines burning distillate fuels with sulfur content up to 1.5% in marine or stationary service.

APPLICATIONS

- Medium-speed trunk piston engines in stationary power generation
- Medium-speed trunk piston engines (marine service)
- Engine reduction gears

PERFORMANCE STANDARDS

- Approved by major manufacturers for use in their medium-speed engines

CUSTOMER BENEFITS

Maintains power output

The detergent/dispersant additive system provides control of high temperature deposits in areas such as the undercrown of the piston and the piston ring belt area, enabling piston rings to function efficiently.

Prolongs oil life

Base Number (BN) level and superior alkalinity retention characteristics maintain sufficiently high BN under all service conditions to ensure corrosive acids formed by the combustion of fuel sulfur are effectively neutralized, thereby minimizing liner wear.

Efficient purifying system performance

Excellent water separation characteristics enable water to be centrifuged out with essentially no loss of additive.

KEY PROPERTIES

SAE Grade	30	40
Viscosity,mm2/s@40˚C	96.0	137
Viscosity,mm2/s@100˚C	11.0	14.0
Viscosity Index	99	98
FZG Fail Load Stage	11	11
Sulfated Ash, m %	1.6	1.6
Base Number,mg KOH/g	12	12
PKG	200	200

GS 2000 Marine

20 TBN TRUNK PISTON ENGINE OIL

DESCRIPTION

Medium alkaline reserve (20 Base Number) trunk piston engine oil (TPEO). Specifically designed for use in high specific output medium speed trunk piston engines burning lower sulfur content (up to 2.0%) heavy residual fuels or marine diesel fuel. Particularly suited to high load factor operations in marine or stationary service and where heavy fuels with high asphaltene content (such as those containing visbroken residues) are used.

APPLICATIONS

- Medium-speed trunk piston engines including latest designs in stationary power generation, especially in high load factor operations
- Medium-speed trunk piston engines in marine service

PERFORMANCE STANDARDS

- Approved by major manufacturers for use in their medium-speed engines

CUSTOMER BENEFITS

Wear Protection

High alkalinity levels control cylinder liner wear effectively and protect bearings from corrosion. High-performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings. GS 2000 Marine also provides a high degree of water tolerance and antifoam protection.

Detergent-Dispersant Properties

Keeps crankcase and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.

Oxidation Stability

Oxidation inhibitors protect the oil against thermal stresses, protect engine parts from corrosion and reduce undercrown deposits while promoting extended lubricant life.

Rust Prevention

Prevents corrosion of engine parts when engine is not in operation.

Balanced Additive Combination

Provides minimum maintenance and downtime, long engine life and economical operation.

KEY PROPERTIES

SAE Grade	30	40
Viscosity,mm2/s@40˚C	97.5	139
Viscosity,mm2/s@100˚C	11.0	14.0
Viscosity Index	98	97
FZG Fail Load Stage	12	12
Sulfated Ash, m %	2.5	2.5
Base Number,mg KOH/g	20	20
PKG	200	200

GS 3000 Marine

30 TBN TRUNK PISTON ENGINE OIL

DESCRIPTION

High alkaline reserve (30 Base Number) trunk piston engine oil (TPEO) designed for use in high specific output mediumspeed trunk piston engines burning residual fuels (up to 4.5% sulfur). Particularly suited to high load factor operations in marine or stationary service and where heavy residual fuels with high asphaltene content (via broken residue) are used.

APPLICATIONS

- Medium-speed trunk piston engines including latest designs in stationary power generation, especially in high load factor operations
- Medium-speed trunk piston engines in marine service

PERFORMANCE STANDARDS

- Approved by major manufacturers for use in their medium-speed engines

CUSTOMER BENEFITS

Wear Protection

High alkalinity levels control cylinder liner wear effectively and protect bearings from corrosion. High-performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings. GS 3000 Marine also provides a high degree of water tolerance and antifoam protection.

Detergent-Dispersant Properties

Keeps crankcase and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.

Oxidation Stability

Oxidation inhibitors protect the oil against thermal stresses, protect engine parts from corrosion and reduce undercrown deposits while promoting extended lubricant life.

Rust Prevention

Prevents corrosion of engine parts when engine is not in operation.

Balanced Additive Combination

Provides minimum maintenance and downtime, long engine life and economical operation.

KEY PROPERTIES

SAE Grade	30
Viscosity,mm2/s@40˚C	96.8
Viscosity,mm2/s@100˚C	11.1
Viscosity Index	100
FZG Fail Load Stage	12
Sulfated Ash, m %	3.6
Base Number,mg KOH/g	30
PKG	200

GS 4000 Marine

40 TBN TRUNK PISTON ENGINE OIL

DESCRIPTION

High alkaline reserve (40 Base Number) trunk piston engine oil (TPEO) designed for use in high specific output mediumspeed trunk piston engines burning residual fuels (up to 4.5% sulfur). Particularly suited to high load factor operations in marine or stationary service and where heavy residual fuels with high asphaltene content (via broken residue) are used.

APPLICATIONS

- Medium-speed trunk piston engines including latest designs in stationary power generation, especially in high load factor operations
- Medium-speed trunk piston engines in marine service

PERFORMANCE STANDARDS

- Approved by major manufacturers for use in their medium-speed engines

CUSTOMER BENEFITS

Wear Protection

High alkalinity levels control cylinder liner wear effectively and protect bearings from corrosion. High-performance antiwear additives provide excellent protection against adhesive wear for cams, camshaft and bearings. GS 4000 Marine also provides a high degree of water tolerance and antifoam protection.

Detergent-Dispersant Properties

Keeps crankcase and oil control rings clean. Prevents deposit formation throughout the engine. Reduces lube oil filter blockage. Effectively handles insolubles.

Oxidation Stability

Oxidation inhibitors protect the oil against thermal stresses, protect engine parts from corrosion and reduce undercrown deposits while promoting extended lubricant life.

Rust Prevention

Prevents corrosion of engine parts when engine is not in operation.

Balanced Additive Combination

Provides minimum maintenance and downtime, long engine life and economical operation.

KEY PROPERTIES

SAE Grade	40
Viscosity,mm2/s@40˚C	139
Viscosity,mm2/s@100˚C	14.0
Viscosity Index	97
FZG Fail Load Stage	12
Sulfated Ash, m %	4.8
Base Number,mg KOH/g	40
PKG	200

GLOBAL CERTIFICATE


BMW

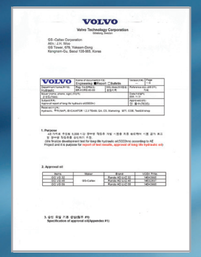

BMW


BMW


Mercedes-Benz


Mercedes-Benz


VOLVO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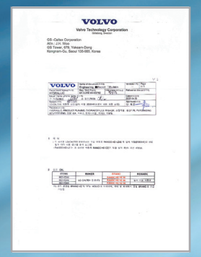

VOLVO


VOLVO


SIEMENS


ALSTOM


HYUNDAI KIA MOTOR


HYUNDAI MOTOR Company


HYUNDAI Heavy Industries


Doosan Infracore


Cummins

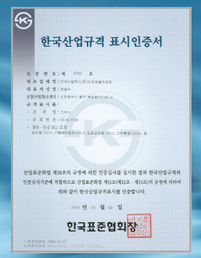

API


ISO 9001


ISO 14001


TS 16949

KOREA CERTIFICATE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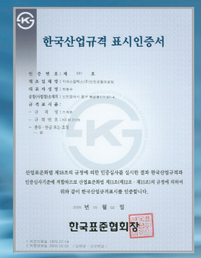
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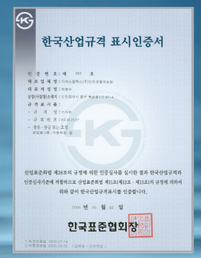
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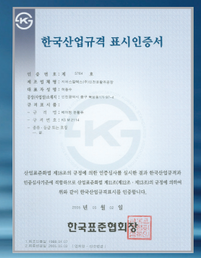
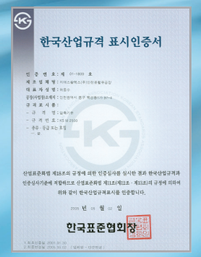

(KS) BEARING OIL


(KS) COMPRESSOR OIL


(KS) HEAT TRASNFER OIL


(KS) QUENCHING OIL


(KS) ENGINE OIL

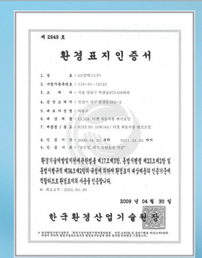

(KS) HYDRAULIC OIL

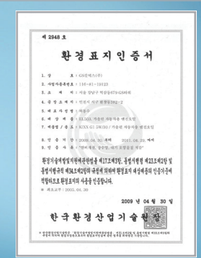

(KS) ATF


(KS) CUTTING OIL


(KS) TURBINE OIL


(KS) PROCESS OIL


ECO-FRIENDLY - Kixx D1(2011)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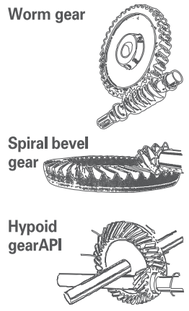
Performance Classification Gear Oil



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 grade : SAE-Engine Oil

SAE J300 Nov. 2007 (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 : SAE-Gear Oil

(SAE J306 OCT. 91)

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

Which oil is right for you?

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

Category	Status	Service
SN	**Current**	Deposit protection for pistons, more stringent sludge control, and seal compatibility. API SN with Resource Conserving matches ILSAC GF-5 by combining API SN performance with improved fuel economy, turbocharger protection, emission control system compatibility, and protection of engines operating on ethanol-containing fuels up to E85.
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	For 1996 and older engines. Valid when preceded by current C categories.
SG	Obsolete	For 1993 and older engines.
SF	Obsolete	For 1988 and older engines.
SE	Obsolete	CAUTION-Not suitable for use in gasoline-Powered automotive engines built after 1979.
SA~SD	Obsolete	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.

Diesel Engines

Category	Status	Service
CJ-4	**Current**	Introduced in 2006. For high-speed, four-stroke engines designed to Meet 2007 model year on-highway exhaust emission standards. CJ-4 oils are compounded for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm(0.05% by weight). However, use of these Oils with greater than 15ppm(0.0015%) sulfur fuel may impact Exhaust after-treatment system durability where particulate filters And other advanced after-treatment systems are used. Optimum Protection Is provided for control of catalyst poisoning, particulate filter blocking, Engine wear, piston deposits, loss-and high-temperature stability, Soot handling properties, oxidative thickening, foaming, and Viscosity loss due to shear. API CJ-4 oil 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 15ppm 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	**Obsolete**	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	**Obsolete**	Introduced in 1990. For high-speed, four-stroke, naturally aspirated and turbocharged engines. Can be used in place of CD and 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	Obsolete	We do not produce this grade

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