

**TEBOIL**  
Lubricants

# LUBRICANTS

**TEBOIL**



# Even more diverse lubricant supplier than before



**Oy Teboyl Ab** is a major lubricants manufacturer and supplier in Finland. We started manufacturing lubricants over 40 years ago, and today we actively operate domestic, and international markets.

## **Finnish oil expertise**

Teboil's lubricant production facilities are located in Hamina. Our production facilities and laboratories develop and produce lubricants especially designed for the Finnish environment and Finnish users. Teboil's lubricant production and laboratories have been granted the SFS-EN ISO 9001 and SFS-EN ISO 14001 certifications.

## **Continuing development**

Quick technical development along with vehicle and machinery manufacturers' changing recommendations are setting continuously new challenges for lubricants. Teboil conducts constant research in order to develop new and increasingly better-performing lubricants. In this work, we rely on our long experience and intense interaction with our clients, as well as with vehicle and machinery manufacturers.

## **Automotive lubricants**

Teboil has a wide selection of lubricants and lubrication greases to meet the demands of light and heavy vehicles. Teboil actively offers new products, which increases the clients' possibilities to select the best lubricant for their needs. The latest top oils in our selection are Diamond Carat III 5W-30, Diamond 5W-30 and Diamond Carat 0W-30 for cars and vans using long life service systems, and a new Super XLD L-SAPS produced under Low SAPS technology - the oil complies with EURO 4 requirements and is compatible with the newest exhaust gas purification systems.

## **Industrial lubricants**

Teboil is reliable and innovative partner for industrial corporations. Diverse production programme, possibility to develop tailored products, as well as optimized lubricating management programme OHVO, will help the industrial clients to rationalize their lubricating maintenance needs. The co-operation Teboil has started with German special lubricant manufacturer Rhenus Lub will provide improved competence to serve the needs of industrial corporations. Teboil exclusively provides the finest Rhenus Lub metal working fluids.

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# Basics about lubricants

## Density and specific gravity

Density of a substance is its weight divided by volume ( $\text{kg}/\text{m}^3$ ). Specific gravity is the relation between the weight of a material volume and corresponding weight of a similar water volume. Density and specific gravity are variables.

## Viscosity

Viscosity is a temperature-dependent variable that measures flowing characteristics of a liquid.

There are several viscosity units. Lubricating oils are generally measured with kinematic viscosity, which unit is Stoke [St] in the SI system [ $\text{m}^2/\text{s}$ ], or more functional centistoke [cSt] in the SI system [ $\text{mm}^2/\text{s}$ ]. When the kinematic viscosity is multiplied by oil density in the measuring temperature, the result is dynamic viscosity, which unit is Poise [P]. In the SI system, the unit of dynamic viscosity is Pascal-second [Pas] [ $\text{Ns}/\text{m}^2$ ].

## Viscosity index

Viscosity index, abbreviated VI, describes the viscosity's dependence on temperature change. The greater the VI value is, the less the oil's viscosity changes as the temperature varies.

## Flash point

When oil is heated, it extracts vapours that can be ignited briefly with open flame. This temperature is called the flash point and it can be measured either with an open (Cleveland) or closed (Pensky-Martens) cup test.

## Pour point

The pour point is defined as the lowest temperature at which the oil has not yet lost its ability to flow at the tilt of the test tube in which it is chilled. The pour point reflects the moment of an abrupt increase of viscosity and/or paraffin crystallization as a result of a decrease in temperature to such an extent that the oil stops flowing under its own weight.

## Neutralization value

Lubricants include acid and/or alkaline substances coming either from base oil, from additives or due to oxidation during use. These substances are analysed in laboratory as Total Basic Number (TBN) or Total Acid Number (TAN). Neutralisation value indicates the amount of alkaline or acid substance that is needed to neutralise the oil. Neutralisation value is indicated as [mg KOH/g] (milligrams of potassium hydroxide per oil gram).

## Base oil types

### Mineral oils

A high-quality mineral oil is very reliable raw material for lubricants. It boasts overall balanced properties: it is gentle for gasket materials, solubility of additives is good, and their effect is efficient. In normal running temperatures, the lubricating properties of mineral oils are perfectly sufficient, and choosing the suitable viscosity can help to control lubrication. However, it is difficult - or impossible - to produce a top-quality mineral oil based lubricant, the lubricating performance of which would be adequate in extreme temperatures.

### Synthetic oils

Synthetic oils are results of a long and complex distillation and refining process. The process is much longer than mineral oils and result is base oil with much better properties. However synthetic oil in itself does not guarantee quality. To ensure good quality, selecting the components and optimizing their ratios very carefully is vital. This is why even "similar" synthetic oils may have vary greatly in price.

The following properties can be achieved with synthetic oils:

- Excellent low-temperature performance, such as easy cold starting and good lubrication.
- Excellent high-temperature performance, such as corrosion-resistance, low vaporization rate and low oil consumption.

### Biodegradable oils

Biodegradable oils are usually made from biodegradable esters or vegetable oils. Oils produced based on such esters or vegetable oils have good flow characteristics at low temperatures and high viscosity index. It is not recommended to mix biodegradable oils with regular mineral oils. Similarly, it is not recommended to mix biodegradable oils of different producers if it is not known which base oils they contain. Oils that contain synthetic esters can usually be mixed with ester-based oils. Additional information about biodegradable oils can be found in the technical documentation.

## Additives

All the properties, which modern machines and engines require from their lubricant, cannot be achieved by using only base oils. This is why special substances must be added. These additives can improve the properties of high-performance base oils. It must be remembered, however, that even the best additives cannot turn low-quality base oils into high-quality lubricants.

### The most important additives are:

**Oxidation inhibitors.** Oxidation is a chain reaction, in which both former oxidation and impurities in lubricating oils increase the speed of the reaction. Oxidation inhibitors will stop the oxidation reaction and block the catalytic effect of the metallic surfaces.

**Detergent and dispersant additives** keep the engine clean.

**Corrosion inhibitors** form a film that prevents corrosion on the metallic surfaces.

**Anti-wear additives** form a film that prevents metal-to-metal contact on the lubricating surfaces.

**Extreme pressure additives (EP additives)**, form, together with metallic surfaces, a chemical film that will effectively prevent seizure. Transmission oils (oils for gearboxes, differentials, etc.) are typical oils that are used with EP additives.

**Antifoaming additives** stop the oil from foaming by decreasing the surface tension. This helps the air bubbles break more easily.

**Pour point depressants** prevent the wax crystals in the oil from joining each other. This ensures that the crystallised wax does not stop the oil from flowing.

**VI (viscosity index) improvers** are macromolecular polymers that prevent the oil from thinning when the temperature rises.

## Storing and handling lubricants

Containers with oil must be stored in such a way so as to prevent penetration of water and dirt from the outside. For example, barrels are best stored on their side or upside down. In this way, no water can accumulate on top of the barrel top will not penetrate under the plug because of any temperature and pressure fluctuations.

Soluble oils, such as coolants for mechanical treatment of metals should be stored and transported at temperatures above 0°C. It is also recommended that grease lubricants be stored at temperatures above 0°C.

When transporting and storing oils, one should adhere to the accepted requirements to storing petroleum, oil and lubricants, and to manufacturer's instructions.



# Engine oil classification



## SAE viscosity grades

Viscosity of engine oils is expressed in SAE (Society of Automotive Engineers) grades. In the SAE grading, engine oils have been divided in eleven classes: 0W, 5W, 10W, 15W, 20W, 25W, 30, 40, 50 and 60. A viscosity limit value in 100°C has been determined for oils that have been graded with only a numerical code, according to the chart provided.

The letter W in connection with the grading number indicates that the oil is suitable for low temperatures. Oils in these classes are graded with a pumping limit temperature and viscosity in cold circumstances, in addition to the minimum viscosity in 100 °C, according to the chart provided.

Each SAE grade has been given a maximum viscosity in its nominal temperature (see the chart below). Viscosity measurement is based on CCS testing. Pumping limit temperature describes the lowest temperature, in which the engine's oil pump is able to transfer oil in the lubricating system. This temperature can be taken as the lowest temperature for safe cold starting.

The HTHS value in the chart is abbreviated from High Temperature High Shear Rate. This is the test that measures the stability of oil's viscosity in extremely hot conditions. Most of the engine oils sold today are multi-grade oils, which means that they fulfil the viscosity requirements of their grading in both cold and hot conditions.

SAE class	CCS-viscosity CP/°C	Pumpability temperature limit, °C	Viscosity, cSt/100°C		HTHS, CP***
			min	max	
0 W	6.200/-35	-40	3,8	—	
5 W	6.600/-30	-35	3,8	—	
10 W	7.000/-25	-30	4,1	—	
15 W	7.000/-20	-25	5,6	—	
20 W	9.500/-15	-20	5,6	—	
25 W	13.000/-10	-15	9,3	—	
20			5,6	< 9,3	2,6
30			9,3	< 12,5	2,9
40			12,5	< 16,3	2,9*
40			12,5	< 16,3	3,7**
50			16,3	< 2 1,9	3,7
60			21,9	< 26,1	3,7

\*) For 0W-40, 5W-40, and 10W-40 oils.

\*\*) For 15W-40, 20W-40, 25W-40 and 40 oils.

\*\*\*) Minimum viscosity at 150°C in HTHS test..

## API service rating

API service rating of engine oils has been developed with API (American Petroleum Institute) ASTM (American Society for Testing and Materials) and SAE (Society of Automotive Engineers). It determines the limit values for several different parameters (e.g. piston cleanliness, piston ring abrasion, etc.) using a variety of test engines.

The API service rating of engine oils is divided into two categories:

- 1) petrol engines — SE, SF, SG, SH, SJ, SL, and SM
- 2) diesel engines — CC, CD, CE, CF, CH, and CI.

**SC, SD, SE petrol engine oils** — old classifications for 1979 and older engines.

**SF** For 1988 and older engines.

**SG** For 1993 and older engines.

**SH** For 1996 and older engines.

**SJ** For 2001 and older engines.

**SL** Introduced in 2001. Developed to satisfy the following three major requirements: better fuel economy, improved protection for emission-reducing components and increased service life of oil.

**SM** A new class introduced in 2005. SM oils are designed to provide improved oxidation resistance, improved deposit protection, better wear protection over the life of the oil.

**CB, CC, and CD diesel engine oils** — are old classifications that applies to engines that are no longer produced.

**CE** Introduced in 1985. For powerful turbocharged diesel engines operating under high loads.

**CF** Introduced in 1994. For pre-chamber diesels used in cars.

**CF-4** Introduced in 1990. Improved oil class that replaced the CE class.

**CF-2** Introduced in 1990. For two-stroke cycle engines.

**CG-4** Introduced in 1995. For American heavy-duty diesel engines meeting the 1994 emission standards.

**CH-4** Introduced in 1998. For engines designed to meet 1998 exhaust emission standards.

**CI-4** A new class introduced in 2002. For diesel 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.



## ACEA classification

ACEA, the European classification of service properties, contains stricter requirements to oils than the API classification. The ACEA classification is suited for motor vehicles and operating conditions typical for the European area.

The ACEA classification divides engine oils into three categories according to type of engine: petrol engine oils (A) and light diesel oils (B), and heavy-duty diesel engine oils (E). In 2004, A and B classes were merged into one A/B class. Additionally, class C was introduced. This class is intended for special exhaust gas recirculation and cleaning systems installed on light petrol and diesel engines using C class oils. These oils are Low SAPS oils and they contain less sulfur, phosphor, and sulfate ash than conventional engine oils.

### The classification is as follows:

Petrol engines (**A1, A2, A3, and A5**);

Light diesel vehicles (**B1, B2, B3, B4, and B5**);

Exhaust gas recirculation and cleaning systems light engines (**C1, C2, C3**);

Heavy diesel vehicles (**E1, E2, E3, E4, E5, and E7**).

### A1/B1

Oils intended for use in petrol and diesel car and light commercial vehicles specifically capable of using low friction, low viscosity oils with high temperature / high shear characteristics. These oils may be unsuitable for use in some engines. Consult owner manual or handbook if in doubt.

### A2/B2

For use in petrol and diesel cars and light commercials where normal drain intervals. A3/B3 and A3/B4 class oils may be used instead of A2/B2 oils.

### A3/B3

For use in high performance petrol and diesel cars and light commercials where extended drain intervals are specified by the vehicle manufacturer and / or for year-round use of low viscosity oils and / or for use in severe operating conditions as defined by the vehicle manufacturer.

### A3/B4

For use in high performance petrol and direct injection diesel engines. Also suitable for applications described under B3.

### A5/B5

For use at extended oil change intervals in high performance car and light commercial petrol and diesel engines designed for low viscosity oils. These oils may be unsuitable for use in some engines. Consult owner manual or handbook if in doubt.

### C1

For vehicles with DPF and TWC in high performance car and light van diesel and gasoline engines requiring low friction, low viscosity, low SAPS oils. These oils will increase the DPF and TWC life and provide fuel economy benefit.

### C2

Vehicles with DPF and TWC in high performance car and light van diesel and gasoline engines designed to be capable of using low friction, low viscosity oils. These oils will increase the DPF and TWC life and provide fuel economy benefit.

### C3

Vehicles with DPF and TWC in high performance car and light van diesel and gasoline engines. These oils will increase the DPF and TWC life.

### C4

Vehicles with DPF and TWC in high performance car and light van diesel and gasoline engines requiring low SAPS oil with HTHS higher than 3.5mPa.s. These oils will increase the DPF and TWC life.

**WARNING:** these oils have low SAPS limits and may be unsuit-

able for use in some engines. Consult owner manual or handbook if in doubt.

In addition to the API and ACEA classifications, many engine manufacturers develop their own classifications. Such manufacturers as Audi, BMW, Ford, GM, Mercedes-Benz, Opel, Saab, and Volkswagen require that oils that comply with their own classifications should be used. As a rule, engine manufacturers, in developing their classifications, use the API and ACEA classifications as a basis. In addition to that, an oil, to become approved, must be tested by the manufacturer in laboratory conditions and with engines.

## Heavy-duty diesel engines oils

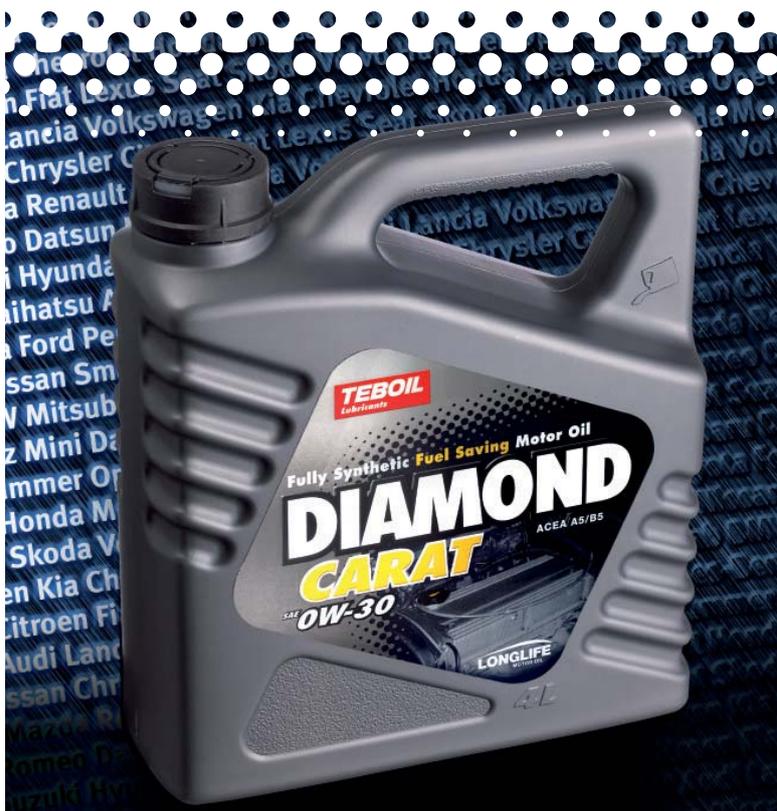
**E2 class oils** are designed for both turbocharged and non-turbocharged heavy-duty diesel engines mostly normal oil drain intervals.

**E4 class oils** are recommended for highly rated diesel engines under very severe conditions, e.g. significantly extended oil drain intervals according to the manufacturer's recommendations. Mostly for Mercedes-Benz and MAN Euro 3 engines. It is suitable for engines without particulate filters, and for some EGR engines and some engines fitted with SCR NOx reduction systems.

**E5 class oils** are recommended for highly rated diesel engines meeting Euro 1, Euro 2 and Euro 3 emission requirements and running under severe conditions, e.g. extended oil drain intervals according to the manufacturer's recommendations.

**E6 class oils** are recommended for highly rated diesel engines meeting Euro 3 and Euro 4 emission requirements and running under very severe conditions, e.g. significantly extended oil drain intervals according to the manufacturer's recommendations. It is suitable for EGR engines, with or without particulate filters, and for engines fitted with SCR NOx reduction systems. E6 quality is strongly recommended for engines fitted with particulate filters.

**E7 class oils** are recommended for highly rated diesel engines meeting Euro 1, Euro 2, Euro 3 and Euro 4 emission requirements and running under severe conditions, e.g. extended oil drain intervals according to the manufacturer's recommendations. It is suitable for engines without particulate filters, and for most EGR engines and most engines fitted with SCR NOx reduction systems.



## 2-stroke engine oil classifications

### Two-stroke engine

The performance level of a 2-stroke engine oil is determined by API service rating, which is based on laboratory and engine tests. The 2-stroke oils are divided into four different API rating categories as follows:

API designation	Primary purpose
API-TA	For 2-stroke engines of mopeds, lawnmowers, and other similar machines.
API-TB	For engines of small-power engine cycles and engine boats.
API-TC	For onshore two-stroke engines, and when API-TA or API-TB oil must be used.
API-TD	Specifically for 2-stroke outboard engines.

**Note:** API-TC and API-TD ratings are not corresponding, they cannot replace each other.

### JASO

Japanese manufacturers' classification for two-stroke engines. Particular attention was paid to reducing generation of smoke. In terms of requirement levels, oils are divided into four categories: FA, FB, FC and FD. Requirements become more stringent in alphabetical order (i.e. from A to D).

### NMMA

Outboard engine manufacturers' special classification for 2-stroke outboard engine oils. In this classification, special attention has been paid to maintaining the cleanliness of the engines. Outboard engine manufacturers' recommendations include classification levels TC-W2 and TC-W3, of which TC-W3 is the more demanding one, and was adopted in 1992 to replace TC-W2.

## Transmission oil performance characteristics

### SAE viscosity grades

SAE grades for these oils are 70W, 75W, 80W, 85W, 80, 85, 90, 110, 140, 190 and 250. The letter W indicates that the oil viscosity is determined in low temperatures, when the viscosity must remain below 150,000 centistokes in temperatures given in the chart provided, and to fulfil certain minimum requirements in 100°C. Other SAE grades viscosity limit values are determined in 100°C.

### SAE class

SAE class	Maximum temperature corresponding to a viscosity of 150.000 CP	Viscosity at 100°C, sq.mm/s 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 / <18,5
110		18,5 / <24,0
140		24,0 / <32,5
190		32,5 / <41,0
250		41,0 / -

### API service rating

**GL-1** gear oil without extreme pressure additives (EP additives). It is used in light-duty transmissions where surface pressures and speeds are low.

**GL-4** Oils with a fair amount of EP additives used in most cars with manual transmissions.

**GL-5** Oils with a great quantity of EP additives. Used in most modern vehicles and construction machines equipped with hypoid gears where high speeds, high temperatures and stroke-like peak loads are present.

**Note:** Always use GL class oils as the API reference.

Transmission components with friction elements operating in oil require oils containing special additives ensuring smooth and stable operation of these units. Under the API classification these oils are marked with LS letters (Limited Slip), for example, Teboil Hypoid LS 80W-90-API GL-5(LS).

In addition to regular properties of gear oils, automatic transmission fluids (ATF) must operate as a power transmission media and be able to fulfil the requirements for friction properties on different materials.

**Note:** The API classification does not include automatic transmission oils because the transmission manufacturers have their own requirements to the oils that must be used. Most of automatic transmissions can be lubricated with Dexron II or Dexron III type oils, but if the transmission manufacturers specify their own requirements as to the oil that must be used, they should be adhered to.

Lubrication grease is a lubricant that is formed when the liquid lubricating oil is made solid or semi-solid with a help of special thickening agents. To improve their properties, either solid or liquid additives are used.

**Lubrication grease = Oil (80-90 %) + Thickening agent + Additives**

## THICKENING AGENTS

- Metal soaps e.g. lithium (70% of all manufactured soaps), calcium, aluminium and sodium.
- Complex soaps from previously mentioned metals, the most generally used being lithium complex.
- Inorganic thickening agents, such as bentonite clay and silica gel.
- Synthetic thickening agents, such as polyurea and PTFE.

## Base oil

In lubricating greases, as in lubricating oils, both synthetic and mineral based oils are used. Base oil together with the thickening agent determine the rheological characteristics of the lubrication grease. (Rheology = flowing of liquid).

## Additives

In greases, as in lubricating oils, additives are used to improve their properties. In addition to liquids, solid lubricants (such as molybdenum sulphide (MoS<sub>2</sub>) and graphite) are added to grease.

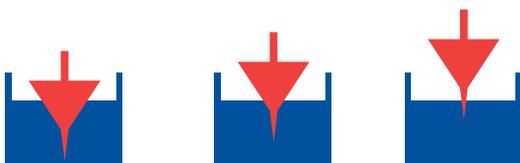
## Properties and analyzing

The hardness, or penetration, of greases is determined according to NLGI (National Lubricating Grease Institute) ratings. The penetration is measured with special equipment, where a cone is allowed to sink for five (5) seconds into grease in a temperature of +25°C. The penetration depth is measured and announced in 1/10mm. Usually, a point is made whether it is "whisked" or "non-whisked" penetration. The differences in these values indicate how well the grease can bear mechanical load. On the basis of penetration, greases are divided into NLGI categories, which vary from 000 to 6. The greater the number that indicates the category, the harder the grease is.

## NLGI ratings

NLGI number	Penetration 1/10 mm
000	450-475
00	400-430
0	355-385
1	310-340
2	265-295
3	220-250
4	175-205
5	130-160
6	85-115

000 00 0 1 2 3 4 5 6



## Dropping point

Temperature, at which oil begins to separate from grease.

## Lubricating properties

Lubricating properties of a grease, and its load-bearing capability, are equally dependent on the thickness of the base oil, as well as on thickening agent's behaviour in boundary lubrication situation and its ability to strengthen the EHD film.

## Anti-wear and EP properties are measured e.g. with the following tests:

- SKF bearing tests, e.g. SKF R2F (where, for example, the highest allowed operating temperature is determined).
- Timken EP test.
- Four-ball test.
- Almen EP test.

## Pumping limit

High pumping limit is an essential property for central lubrication systems, especially in cold climates. For example, Safematic has developed a grease pumping test, by which the lowest operating temperature of each grease is determined. Safematic updates and publishes a catalogue about tested greases.

## Corrosion resistance

For example SKF Emcor test, where the grease's ability to prevent bearing surfaces from rusting in the presence of water.

## Water resistance

The Water Wash Out Test establishes how well the grease remains on the lubrication target in the presence of flowing water. The result is the flushed percentage of grease.

## Lubricants' ability to be mixed with various thickeners

	Lithium soap	Lithium complex	Calcium soap	Calcium soap	Bentonite (microgel)	Sodium soap
Lithium soap	Possible	Possible	Possible	Impossible	Impossible	Impossible
Lithium complex	Possible	Possible	Possible	Possible	Impossible	Impossible
Calcium soap	Possible	Possible	Possible	Impossible	Possible	Impossible
Calcium complex	Impossible	Possible	Impossible	Possible	Impossible	Impossible
Bentonite (microgel)	Impossible	Impossible	Possible	Impossible	Possible	Impossible
Sodium soap	Impossible	Impossible	Impossible	Impossible	Impossible	Possible

This is an approximate lubricant mixing table.  
Additional information on mixing is given in the technical manual (p.020 4700 916).

## ISO 3448 viscosity classification

ISO 3448 viscosity grading consists of 18 viscosity categories. The numerical value (2-1500) describes the kinematic viscosity at 40°C in centistokes mm<sup>2</sup>/s (cSt). The lowest allowed variation limit of viscosity is  $\pm 10\%$  of the nominal value of each grade.

Teboil's hydraulic and lubricating oils are designed to meet the requirements of the latest technology. Our product development is based on the most recent data on lubricating technology. The names of Teboil hydraulic and lubricating oils include a number that indicates the ISO VG viscosity grade. Where the number indicating the ISO VG viscosity grade has been printed bold in the charts of this brochure, it is then a part of the product name. For example: Teboil Hydraulic Oil 15.

ISO VG class	Average viscosity in mm <sup>2</sup> /s in 40°C. Variation limits $\pm 10\%$
ISOVG 2	2,2
ISOVG 3	3,2
ISOVG 5	4,6
ISOVG 7	6,8
ISOVG 10	10
ISOVG 15	15
ISOVG 22	22
ISOVG 32	32
ISOVG 46	46
ISOVG 68	68
ISOVG 100	100
ISOVG 150	150
ISOVG 220	220
ISOVG 320	320
ISOVG 460	460
ISOVG 680	680
ISOVG 1000	1,000
ISOVG 1500	1,500

## Required properties

- Correct viscosity
  - Thin enough in start-up temperature;
  - Thick enough to ensure lubrication in operating temperature.
- Stable viscosity.
- Anti-wear properties.
- Corrosion preventing properties.
- Good water separation.
- Non-foaming and good deaeration.
- Oxidation resistance properties.
- Gasket friendliness.

## Classification

### Additional classifications

Besides the main classification of hydraulic oils, there are other classifications:

- DIN 51524, part 2 (HLP) and 3 (HVLP)
- SS 155 434

**DIN 51524, part 2 (HLP)** — applies to hydraulic oils with additional additives designed for modern high-pressure hydraulic systems with insignificant pressure fluctuations. The most typical examples of such systems are industrial systems operating indoors.

**DIN 51524, part 3 (HVLP)** — applies to hydraulic oils with additives for high-pressure hydraulic systems operating at alternating temperature. The oil's viscosity index must be 140 or higher. The most typical examples of such systems are hydraulic systems in mobile equipment.

**SS 155 434** is a Swedish standard for high viscosity index hydraulic oils. SS 155 434 standard covers the cold-enduring properties better than DIN standard.

## CLEANLINESS, APPLICATIONS AND STORING

Cleanliness of the hydraulic fluid is essential for the hydraulic system. According to manufacturers, over 70% of the equipment damages are caused by impurities. Hydraulic system should always be filled by pumping, not by pouring. In this way, possible impurities on top of the container cannot enter the system. The filling should be carried out through a filter, as the cleanliness of oil in the container is rarely adequate for demanding equipment.

Transport containers must be stored in such a way that no impurities or water will be able to get in. For example, barrels are best stored on their side or upside down. In this way, no water can accumulate on top of the barrels, from where the vacuum created by temperature variations could suck the water into the barrel.

## Choosing the right oil

The most important criterion in the selection of a hydraulic oil is its viscosity within the operating temperature range.

## Start-up viscosity

The highest allowed start-up viscosity depends on pump type. Pump manufacturers define the following guidelines for different types:

<b>Piston pumps</b>	200–800 mm <sup>2</sup> /s
<b>Vane pumps</b>	500–1,000 mm <sup>2</sup> /s
<b>Gear pumps</b>	800–1,600 mm <sup>2</sup> /s

## Optimum viscosity:

To prevent cavitation and ensure minimal flow resistance, the oil's viscosity must be as low as possible, but at the same time high enough to ensure pump lubrication.

## Minimal viscosity:

Viscosity at its minimum is so low that the films between surfaces reduce critically and metal begins to scrub against metal, thus increasing wear and tear.

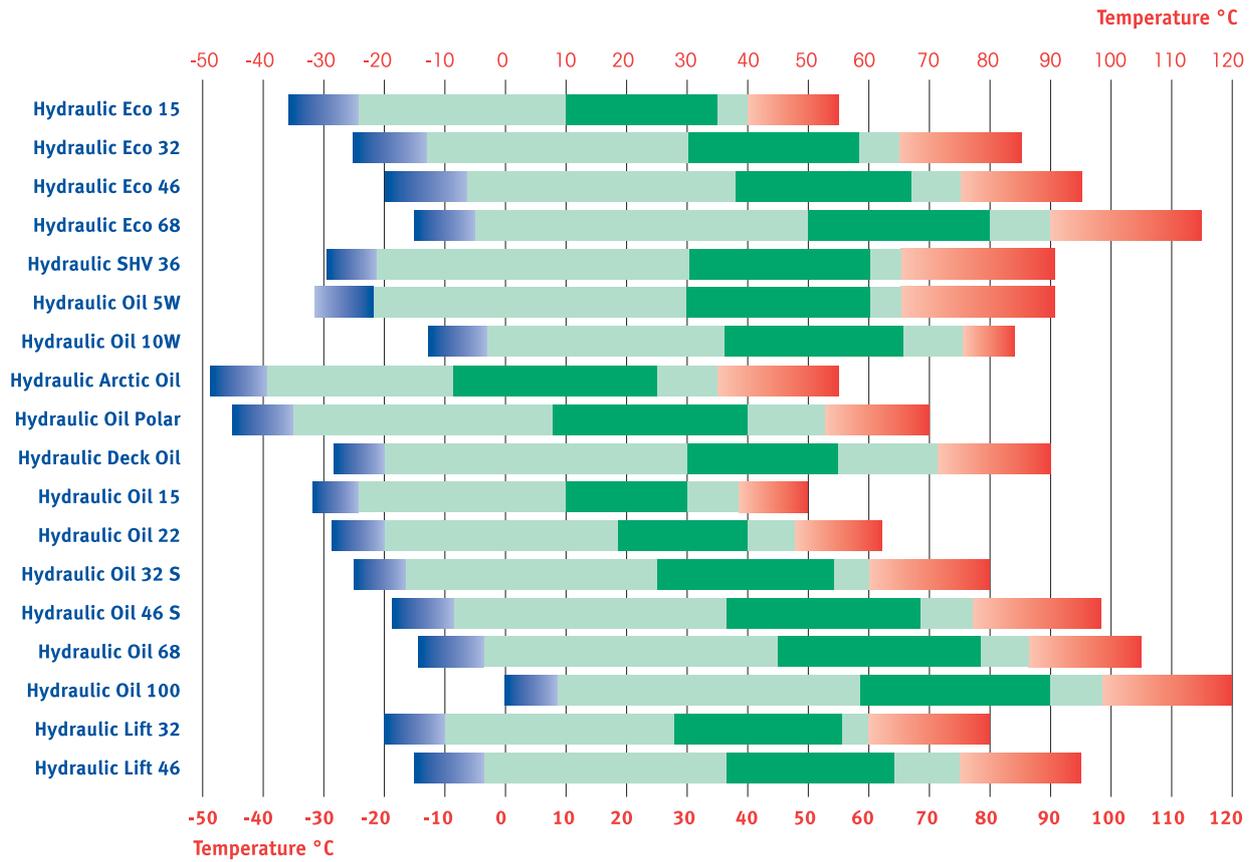
Because the viscosity depends on temperature, the operating temperatures of hydraulic oils are presented in charts. Limit value viscosities are established in accordance with the pump manufacturers' specifications and are thus only guidelines. (More specific instructions are available in equipment manufacturers' manuals).

**Engine oil is not recommended to be used in hydraulic equipment, because in comparison to the special hydraulic oils:**

- They have poor water separation and deaeration properties;
- Mono-grade engine oils have a narrow operating temperature range and most multi-grade engine oils contain viscosity index improving additives that do not withstand in hydraulic use.

Some manufacturers, by way of exceptions, recommend using engine oils in hydraulic systems. There are special hydraulic oils for this purpose marked similarly to the engine oils (Teboil Hydraulic Oil 5W and 10W), but, unlike traditional engine oils, they have different performance characteristics within a wide temperature range, and an ability to resist destruction.

## Operating temperature range of the hydraulic oils produced by Teboil



- Minimum starting temperature      Viscosity of 500 to 1,600 mm<sup>2</sup>/s: pump can be started carefully without load.
- Optimum operating temperature      Viscosity of 16 to 50 mm<sup>2</sup>/s
- Maximum operating temperature      Viscosity of 10 to 16 mm<sup>2</sup>/s: pump can only be used temporarily and short-term use

**Note:** These values are guidelines only. More specific instructions are available in manufacturers' manuals.



# Hydraulic oils

## Viscosity value comparison diagram

mm <sup>2</sup> /s (cSt)	°E	SUS	R.I.	mm <sup>2</sup> /s (cSt)	°E	SUS	R.I.
2	1,12	32,6	30,4	130	17,2	603	528
4	1,31	39,2	35,3	140	18,5	649	568
6	1,48	45,6	40,6	150	19,8	695	609
8	1,65	52,1	46,1	160	21,1	742	650
10	1,83	58,9	51,9	170	22,4	788	690
12	2,02	66,0	58,0	180	23,8	834	731
14	2,22	73,6	64,5	190	25,1	881	771
16	2,34	81,3	71,2	200	26,4	927	812
18	2,65	89,4	78,1	220	29,0	1020	893
20	2,88	97,8	85,2	240	31,7	1112	974
24	3,3	115	100	260	34,3	1205	1056
28	3,8	133	116	280	37,0	1298	1137
32	4,3	150	131	300	39,6	1390	1218
36	4,8	168	147	340	44,9	1576	1380
40	5,4	186	164	380	50,2	1761	1543
44	5,9	204	180	420	55,4	1947	1705
48	6,4	223	196	460	60,7	2132	1868
52	6,9	241	212	500	66,0	2317	2030
56	7,4	260	228	540	71,3	2503	2192
60	8,0	278	244	580	76,6	2688	2355
65	8,6	301	265	620	81,8	2874	2517
70	9,3	324	285	660	87,1	3059	2680
75	9,9	348	305	700	92,4	3245	2842
80	10,6	371	325	750	99,0	3476	3045
85	11,2	394	345	800	105,6	3708	3248
90	11,9	417	366	850	112,2	3940	3451
95	12,6	440	386	900	118,8	4172	3654
100	13,2	464	406	950	125,4	4403	3857
110	14,5	510	447	1000	132,0	4635	4060
120	15,8	556	487				

mm<sup>2</sup>/s (cSt) = kinematic viscosity (centistokes cSt)

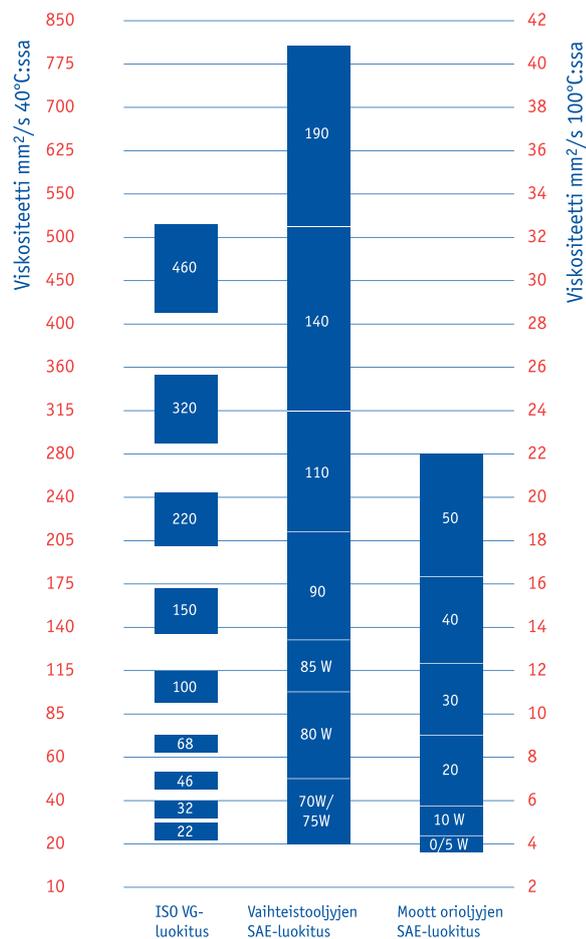
°E = Engler's degree

SUS — Saybolt universal seconds

R.I. — Redwood seconds

**Note:** viscosities must always be compared and measured in the same temperature.

## Viscosity classification



## Viscosity-temperature diagram

### How to use the diagram:

Viscosity of oil in different temperatures can be determined with the help of this diagram.

Viscosities in two different temperatures are marked in the diagram.

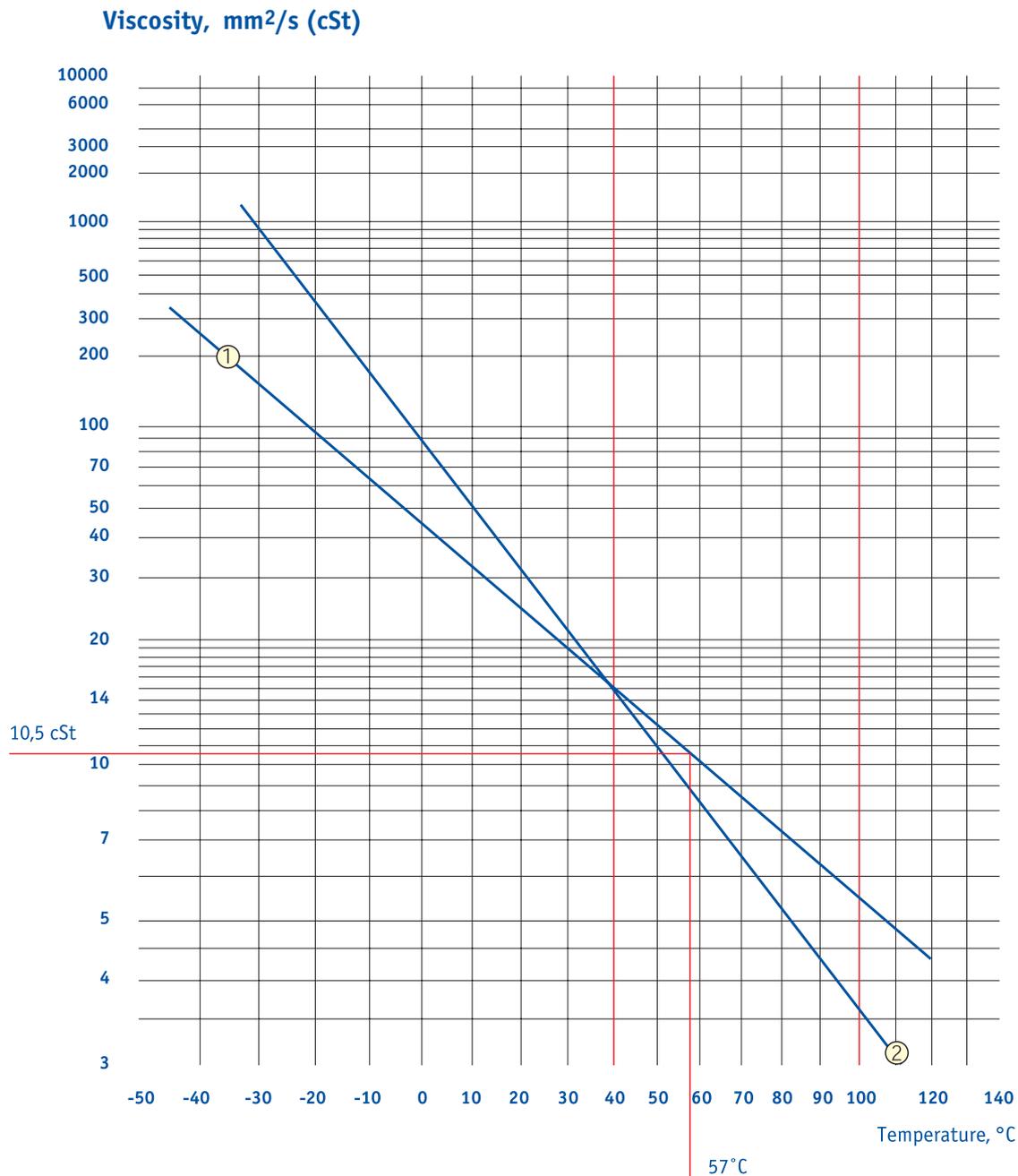
The line crossing the points describes the change of viscosity according to the temperature. Viscosity of oil in any temperature can thus be estimated.

Generally, viscosity diagrams use 40°C and 100°C, which can also be found in the technical charts of this brochure.

### Example of using the diagram

Hydraulic Arctic Oil:

- viscosity at 40°C is 15 cSt
- viscosity at 100°C is 5.5 cSt
- on the diagram you can see that the viscosity 57°C is 10.5 cSt.



### Example diagrams:

- (1) Teboil Hydraulic Arctic Oil, viscosity index 375.
- (2) Teboil Hydraulic Oil 15, viscosity index 125.

# Automotive oils



## Engine oils for cars and vans

### Teboil Diamond Carat

- **Viscosity class**  
SAE 0W-30
- **Specifications**  
API SL/SF, ACEA A5/B5

**Teboil Diamond Carat 0W-30** is a fully synthetic low viscosity A5/B5 engine oil for year-round use with extended oil-change intervals. Carat 0W-30 is suitable for many new generation cars using the *Longlife* service system. Not suitable for all cars check the owners manual.

### Teboil Diamond Carat III

- **Viscosity class**  
SAE 5W-30
- **Specifications**  
VW 504.00/507.00, ACEA A3/B4 and C3

**Teboil Diamond Carat III 5W-30** is a fully synthetic Low SAPS oil that fulfills VW 504.00/ 507.00 and ACEA C3 specifications. Diamond Carat III replaces VW specifications 503.00, 506.00 or 506.01 oils (except for V10 and R5 turbocharged diesel engines). The oil can be also used all Euro 4 engines that requires ACEA C3 class oil.

### Teboil Diamond Plus

- **Viscosity class**  
SAE 0W-40
- **Specifications**  
API SL/CF, ACEA A3/B3, BMW LL-98, MB 229.1, Porsche, VW 502.00 and 505.00

**Teboil Diamond Plus 0W-40** is a fully synthetic engine oil designed for most demanding use in car and van petrol and diesel engines. The oil allows to easily start engines, it reliably protects the engine from wear in any conditions, and ensures hydrodynamic lubrication (i.e. virtually without wear) both in extreme heat and in extreme cold weather conditions.

## Teboil Diamond

- **Viscosity class**  
SAE 5W-40
- **Specifications**  
API SL/CF, ACEA A3/B3, BMW LL-98,  
MB 229.1, Porsche, VW 502.00 and 505.00

**Teboil Diamond 5W-40** is a top-class fully synthetic engine oil for demanding year-round use. The oil is designed for both car and van petrol and diesel engines. Due to its low pour point and optimal viscosity-temperature properties, Teboil Diamond 5W-40 provides excellent protection to your engine under any conditions.

## Teboil Diamond

- **Viscosity class**  
SAE 5W-30
- **Specifications**  
API SL/CF, ACEA A3/B4, GM LL-A/B-025,  
BMW LL-01, MB 229.3, VW 502.00 and 505.00

**Teboil Diamond 5W-30** is a fully synthetic engine oil that meets special requirements of Opel, Saab (GM), BMW, and Mercedes Benz to extended oil-change intervals. High-performance additives ensure noiseless operation of the engine and cleanness of its internal surfaces during the entire service life of the oil until replacement.

## Teboil Diamond Diesel

- **Viscosity class**  
SAE 5W-40
- **Specifications**  
API CF, ACEA B3, MB 229.1, VW 505.00/505.01

**Teboil Diamond Diesel 5W-40** is Multi-Synthetic engine oil made of several synthetic base oils and last generation high-performance additives. Diamond Diesel 5W-40 is specially designed for modern high-speed diesel engines in cars and vans.

## Teboil Diamond eXtreme

- **Viscosity class**  
SAE 10W-60
- **Specifications**  
API CJ/CF, ACEA A3/B3  
BMW-, Porsche-, and VW-performance level

**Teboil Diamond eXtreme 10W-60** is Multi-Synthetic engine oil for high powered street and race cars. High viscosity of the oil at high temperatures ensures lubrication of engine and turbocharger.

## Teboil Gold S

- **Viscosity class**  
SAE 5W-40
- **Specifications**  
API CL/CF, ACEA A3/B3, MB 229.1,  
VW 502.00 and 505.00, BMW-LL-98, Porsche

**Teboil Gold S** — is a fully synthetic engine oil for year round use. Gold S is recommended for petrol and diesel engines of cars and minivans, including supercharged engines.

## Teboil Gold

- **Viscosity class**  
SAE 5W-30
- **Specifications**  
API SL and ACEA A1/B1

**Teboil Gold** — is a special low viscosity energy conserving engine oil that meets ACEA A1/B1 requirements. Gold 5W-30 is recommended for petrol and diesel engines of cars and minivans, including supercharged engines. Not suitable for all cars check the owners manual.

## Teboil Silver

- **Viscosity class**  
SAE10W-40
- **Specifications**  
API SL/SF and ACEA A3/B3

**Teboil Silver 10W-40** is a high-quality semi-synthetic engine oil designed for use in older diesel and petrol engines, including those with supercharged engines.

## Teboil Moniaste

- **Viscosity class**  
SAE10W-30 and 15W-40
- **Specifications**  
API SF/CD

**Teboil Moniaste** is designed for older petrol and diesel engines of the cars and vans. Teboil Moniaste with SAE 15W-40 viscosity class is especially good for the engines with increased oil consumption and operated in summer.

# Automotive oils



## Heavy-duty engine oils

### Teboil Super HPD

- **Viscosity class**  
SAE 5W-40 (fully synthetic)  
10W-40 (synthetic), 10W-30 and 15W-40
- **Specifications**  
API CI-4, CH-4, CG-4, CF-4, ACEA E7, E5, E3, B3, B4, MB 228.3, MAN 3275, Volvo VDS-2, VDS-3 (10W-40, 15 W-40), RVI RLD, Cummins CES 20,071, -2,-6,-7, and 8, MackEO-M Plus, CAT ECF-1 (10W-40, 15W-40)

**Teboil Super HPD** — diesel engine oils are designed for heavy professional use, typically for high-powered diesel engines and long service intervals. ACEA E7 and API CI-4 classifications guarantee that Super HPD is excellent for the new European and American low-emission diesel engines. With long service intervals, most engine manufacturers require the use of SHPD classified oils. Teboil Super HPD series include a fully synthetic SAE 5W-40, synthetic SAE 10W-40 and mineral oil-based SAE 10W-30 and 15W-40 oils.

### Teboil Super XLD L-SAPS

- **Viscosity class**  
SAE 10W-40
- **Specifications**  
API CF, ACEA E6, E4, MB 228.51, MAN 3477

**Teboil Super XLD L-SAPS** is a fully synthetic low SAPS oil for new EURO 4 diesel engines that are equipped with diesel particulate filter (DPF) or other after treatment systems that requires low SAPS oils. Super XLD L-SAPS prevents the engine efficiently against wear, carbon deposit formation and cylinder wearing.

### Teboil Super XLD

- **Viscosity class**  
SAE 10W-40
- **Specifications**  
API CF, ACEA E4, MB 228.5, MAN 3277, Volvo VDS-2 and Scania LDF

**Teboil Super XLD** is a synthetic diesel engine oil that has been developed for European engines and vehicles that operate in heavy long-distance traffic and have "ultra-long" service intervals. Super XLD prevents the engine efficiently against wear, carbon deposit formation and cylinder wearing.

## Teboil Special GML

- **Viscosity class**  
SAE 15W-40
- **Categories of performance characteristics**  
Volvo CNG, MAN M3271

**Teboil Special GML** is a fully synthetic engine oil for gas engines in automotive use and gas operated forklifts. Special GML has excellent clean-up and lubricating characteristics and supreme low-temperature performance in comparison with the normal SAE 15W-40 oils.

## Teboil Power Plus

- **Viscosity class**  
SAE 10W-30 and 15W-40
- **Specifications**  
API CH-4, CG-4, CF-4/SJ, ACEA E2, B2, A3, Cummins CES 20.071, -6, Mack EO-M Plus, MB 228.1, MAN 271, Volvo VDS-2, Allison C4, CAT TO-2

**Teboil Power Plus** engine oils are developed to satisfy a full range of engine oil requirements in transport and construction equipment companies. Power Plus oils are excellent choice for modern on- and off-highway diesel and petrol engines operating in severe applications, even with long service intervals.

## Teboil Power D

- **Viscosity class**  
SAE 10W-30 and 15W-40
- **Specifications**  
API CG-4, CF/ SJ, ACEA E2,B2,A3, Volvo VDS, MB 228.1, Mark EO-L

**Teboil Power D 10W-30 и 15W-40** are mineral oil based multi-grade diesel engine oils for year-round use in heavy-duty diesel engines. Power D oils are excellent choice when there is no need to meet to latest specifications. Suitable for most heavy-duty vehicles manufactured during 1990's.

## Teboil Power D

- **Viscosity class**  
SAE 10W, 20W-20, 30, 40 and 50
- **Specifications**  
API CG-4, CF-4, CF-2, CF/SG, ACEA E2, MB 228.0, MIL-L-2104E, Allison C3/C4

**Teboil Power D 10W, 20W-20, 30, 40 and 50** are mono-grade diesel engine oils. Power D oils can also be used in hydraulic systems and transmission when the equipment manufacturer recommends using of engine oils.

## Teboil Serina

- **Viscosity class**  
SAE 10W-30, 15W-40 and 30
- **Specifications**  
API CF/SF, MIL-L-2104D

**Teboil Serina** engine oils are recommended to older diesel engines that have no need to meet the latest quality requirements.

## Multi-purpose farming machinery oil

### Teboil Monitra Plus

- **Viscosity class**  
SAE 10W-30
- **Specifications**  
API CG-4, CF-4, CF/SF, GL-4/GL-5, ACEA E3

**Teboil Monitra Plus** is a multi-purpose oil for farming machinery. Monitra Plus was developed in co-operation with additive producers and tractor manufacturers. It is suitable for all farming machinery engines, transmissions, gear units and hydraulic systems. Due its carefully selected friction properties, Monitra Plus is also suitable for most power take-off clutches and wet brakes. Monitra Plus fulfils for example, the following quality requirements;  
MIL-L-2104D; Massey Ferguson M1127, M1135, M1139, and M1144; Case-IH M1207; Ford M2C 86A, 134C/D, and 159B; John Deere J 20 A/C, and J27; Allison C4; CAT TO-2; ZF TE-ML 06B.

# Oils for small-size two- and four-stroke engines



## 2-stroke engine oils

### Teboil 2T Bike

- **Specifications**  
API TC, JASO FC, ISO-L-EGD, ISO GD++, Husqvarna, Piaggio Hexagon

**Teboil 2T Bike** is a fully synthetic low-smoke and low ash oil for powerful 2-stroke motorbikes. Excellent lubricating properties reduces wear and keeps engine clean. Suitable for premix and autolube systems.

### Teboil 2T Snow

- **Specifications**  
API TC, JASO FC, ISO-L-EGD, ISO GD++, Rotax 253

**Teboil 2T Snow** is a fully synthetic low-smoke and low ash oil especially for snowmobiles and other powerful 2-stroke engines. (operating in extreme cold conditions.) 2T Snow oil has excellent low temperature characteristics which ensure trouble-free operation of the engine at extremely low temperatures. Suitable for premix and autolube systems.

### Teboil 2T Mix

- **Specifications**  
API TC

**Teboil 2T Mix** is self-mixing two-stroke engine oil for all kind of 2-stroke engines. Suitable for premix and autolube systems.

### Teboil 2T Special Outboard

- **Specifications**  
APITD, NMMA:TC-W3

**Teboil 2T Special Outboard** is a special 2-stroke engine oil for modern outboard engines. It includes anti-ash additives, which is why the carbon deposit formation is lower than with regular 2-stroke engine oils. 2T Special Outboard provides good protection for engine against wear and corrosion.

## 4-stroke engine oils

### Teboil 4T SuperBike Oil

- **Viscosity class**  
SAE 15W-50
- **Specifications**  
API SJ/SH, SG, and JAGO MA, API GL-1

**Teboil 4T SuperBike Oil** is a special fully synthetic engine oil for four-stroke motorbikes. The oil is manufactured taking into consideration the motorbike engine specifications and gearbox special requirements. 4T SuperBike boasts excellent high-temperature performance and stable viscosity. The oil's friction and pressure endurance properties are carefully determined to suit the gearboxes and wet clutches. It maintains the properties that protect the engine from wear, and improve the operation of clutch even in the most demanding conditions, through the whole oil-change interval.

## Small engine oil

### Teboil Pienkoneoljy

- **Viscosity class**  
SAE 30
- **Specifications**  
API SF

**Teboil Pienkoneoljy** is a special oil for small 4-stroke engines. It is excellent for e.g. lawn mowers, cutters, shredders and aggregates.



# Automotive oils



## API GL-1 transmission oils

### Teboil Gear

- **Viscosity class**  
SAE 80W-90
- **Specifications**  
API GL-1, Volvo 97305

### Teboil Gear Oil VO

- **Viscosity class**  
SAE 75W-90
- **Specifications**  
API GL-1, Volvo 97305

### Teboil Gear Oil MTF-V

- **Viscosity class**  
SAE 75W-90
- **Specifications**  
Volvo 97307, Eaton, Voith Retaarder, MAN 341SL and ZF transmissions

**Teboil Gear** is a transmission oil that contains wear and corrosion inhibitors. Teboil Gear meets the API GL-1 requirements and does not contain EP additives. It Has good anti-wear properties and excellent viscosity characteristics.

**Teboil Gear Oil VO** is a high-quality fully synthetic transmission oil that meets the API GL-1 requirements. It is designed for transmissions that do not require EP additives. The oil has excellent flow characteristics at low temperatures ensuring trouble-free transmission even in extremely cold weather.

**Teboil Gear Oil MTF-V** — is a high-quality fully synthetic transmission oil for heavy vehicles manual transmissions with extreme long service intervals. Excellent flowing characteristics in cold conditions ensure that the transmission operates also in sub-zero temperatures; and the thoroughly selected additives provide excellent protection against wear, also in high temperatures and high loads.

## API GL-4 transmission oils

### Teboil EP

- **Viscosity class**  
SAE 80W and 80W-90
- **Specifications**  
API GL-4, MB 235.1, MIL-L-2105, MAN 341N, ZF TE-ML 02A, 16A, 17A, 19A

**Teboil EP** oils are designed for light and heavy machinery transmissions, when API GL-4 rating is required. These oils have efficient additives against gear abrasion, oil oxidation and foaming.

### Teboil EP (fully synthetic)

- **Viscosity class**  
SAE 75W-90
- **Specifications**  
API GL-4, MIL-L-2105

**Teboil EP 75W-90** is a fully synthetic API GL-4 transmission oil. Its low pour point ensures that the transmission operates even in the coldest temperatures and its efficient EP additives give the transmission first rate protection against wear in high temperatures and high loads. Due its excellent flowing characteristics, it reduces power loss in the power train and improves fuel economy.

## API GL-5 transmission oils

### Teboil Hypoid

- **Viscosity class**  
SAE 90 and 80W-90
- **Specifications**  
API GL-5, MB 235.0, MIL-L-2105, MAN 342N, ZF TE-ML 05A, 16B, 17B, 19B

**Teboil Hypoid** is a differential oil for light and heavy machinery and it can also be used in transmissions, when the required level is API GL-5. Carefully selected base oil and advanced additives secure good cold properties, and efficient EP additives give the gearbox first-rate protection against wear in high temperatures and high loads.

### Teboil Hypoid (fully synthetic)

- **Viscosity class**  
SAE 75W-90 and 75W-140
- **Specifications**  
API GL-5, MT-1, MAN 3343 SL, MIL-PRF-2105E, Scania STO 1:0, ZF TE-ML 05B, 12B, 16F, 17B, 19C

**Teboil Hypoid 75W-90** is a fully synthetic differential oil for light and heavy machinery. It is also suitable for transmissions if the requirement is API GL-5. Hypoid 75W-90 has excellent low temperature performance, which decreases power loss in power train and improves fuel economy. Carefully selected base oil and additives give first-rate protection against wear in high temperatures and high load.

**Teboil Hypoid 75W-140** is a fully synthetic differential oil for extremely demanding conditions in heavy machinery. Hypoid 75W-140 has exceptional lubricating and anti-wear properties. And excellent low temperature performance decreases power loss in power train and improves fuel economy compared to regular SAE 140 oils.

### Teboil Hypoid (semi-synthetic)

- **Viscosity class**  
SAE 80W-140
- **Specifications**  
API GL-5, MIL-L-2105D, Scania STO 1:0, ZF TE-ML 05A, 12E, 16D, 19B

**Teboil Hypoid SAE 80W-140** is a semi-synthetic differential oil for demanding conditions in heavy machinery. This viscosity grade is often recommended for final drives and hub reduction gears in heavy use.

### Teboil Hypoid LS

- **Viscosity class**  
SAE 80W-90
- **Specifications**  
API GL-5 (LS), MIL-L-2105D, ZF TE-ML 02C, 05C

**Teboil Hypoid LS** is a high-quality special oil for differentials and final drives equipped with "limited slip" friction locks. Its suitable for light and heavy machinery. Teboil Hypoid LS meets the LS (Limited Slip) requirements.

# Transport vehicles and equipment oils



## Transmission oils

### Teboil Wetol and Wetol SHV

- **Viscosity class**  
SAE 80W and 75W-80
- **Specifications**  
API GL-4

**Teboil Wetol** and synthetic **Wetol SHV** are transmission and gear oils especially for tractors and working machinery with wet brakes. Wetol oils are suitable year round use. Carefully determined friction properties ensures steady and smooth operation of brakes. It's excellent for constructions in which brakes are integrated into the same oil cavity with gearbox and final drive. Wetol and Wetol SHV are designed for heavy-duty year-round use. for transmissions and main gears, especially for those in tractors and machining equipment that have parts operating in oil. In such designs these oils are often used in hydraulic control systems as well. Their properties were selected so as to provide reliable protection of transmission components from wear, and to ensure smooth and trouble-free operation of friction elements. Thanks to its flat temperature-viscosity curve, Teboil Wetol SHV oil ensures reliable operation of electrohydraulic transmission control systems, especially in winter.

Teboil Wetol oil and Wetol SHV oil meet the requirements of the following manufacturers: Allison C3/C4; Case-IH B6, 185, 1204, 1206 and 1207; Cat TO-2; Ford M2C 41 B, M2C 53A, M2C 86A/B, M2C 134C/D; John Deere J20A/C; Massey Ferguson M 1110, M 1127 A/B, M 1141 and M 1143; Volvo BM Valmet.

In hydraulic systems: - Denison HF-0, HF-1, HF-2; Sauer Sundstrand; Vickers I-280-S, M 2950 S.

### Teboil Outboard Gear

- **Viscosity class**  
SAE 90
- **Specifications**  
API GL-4

**Teboil Outboard Gear** is a special gear oil for drive units in boats and final drives of outboard engines. Excellent water separation and corrosion inhibition properties are required in these uses.

### Teboil Hydraulic Oil WB 46

- **Viscosity class**  
ISO 46

**Teboil Hydraulic Oil WB 46** is a special synthetic hydraulic oil that contains friction modifier, designed for hydraulic systems of port and other equipment with friction elements operating in oil. Hydraulic Oil WB 46 oil demonstrated excellent performance with the abovementioned Valmet and Kalmar systems, it has excellent low- and high-temperature properties and is recommended for year-round operation.

## Teboil Fluid E

- **Specifications**  
Dexron IIIH, Mercon, Allison C4, CAT TO-2, MB 236.1, 236.2, 236.5, MAN 339 type Z-1 and V-1, Voith 55.6335, ZF TE-ML 04D, 09, 11, 14A, 17C

**Teboil Fluid E** is a semi-synthetic automatic transmission fluid that fulfils e.g. GM Dexron IIIH and Ford Mercon specifications. It is designed for modern automatic transmissions. Its friction properties remain good also in high temperatures and its good low temperature performance ensures smooth operation of automatic transmissions in varying temperatures.

## Teboil Fluid ES-Max

- **Specifications**  
Dexron IIE, Ford Mercon, Allison C4, ZF TE-ML-14B, Voith G 1363, MB 236.8, MAN 339 Typ D

**Teboil Fluid ES-Max** is a fully synthetic automatic transmission fluid for the most demanding conditions. It is specifically designed for heavy-duty machinery with long service intervals. The special requirements of transmission manufacturers have been taken into consideration.

## Teboil Fluid D

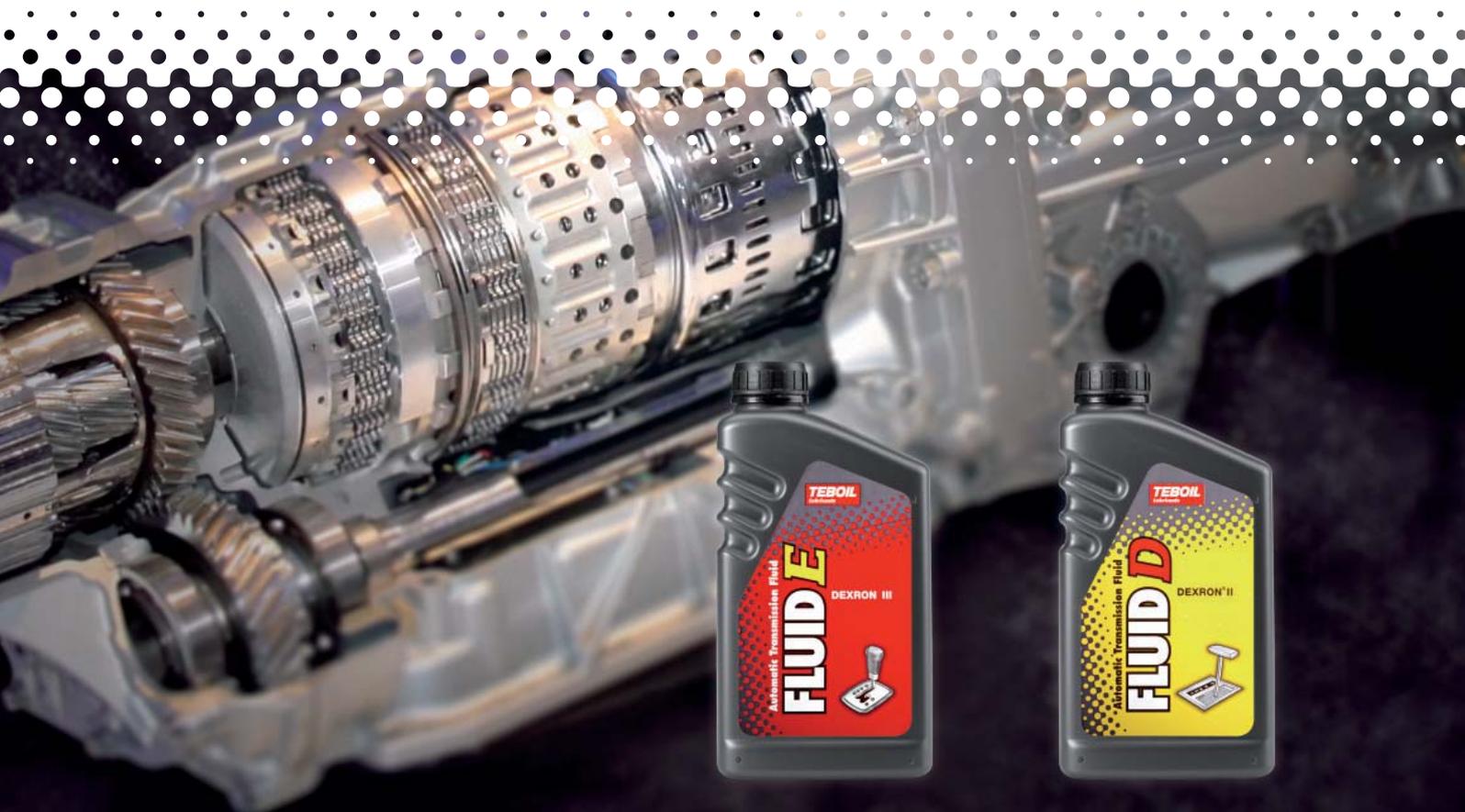
- **Specifications**  
Dexron II, Allison C4, ZF, ATF Type A Suffix A, Ford M2C-138-CJ, Ford M2C-166-H, Cat TO-2, MB 236.2

**Teboil Fluid D** is a GM Dexron II rating automatic transmission fluid, which is also suitable for most power steering systems.

## Teboil Fluid TO-4

- **Viscosity class**  
SAE 10W, 30 and 50
- **Specifications**  
CAT TO-4, Allison C4, Komatsu

**Teboil Fluid TO-4** is a transmission and gear oil for heavy-duty construction equipment, that requires Cat TO-4 fluids. It has an efficient additive substance against wear, oil oxidation and foaming. Fluid TO-4's friction-controlling additives maintain smooth and silent operation of wet brakes.



# Automotive lubricants



## Special automotive hydraulic oils

### Teboil Hydraulic Oil S

- Oils of this series are designed for hydraulic systems operating under high pressure and extreme weather conditions. The oils contain efficient additives to protect against wear, oxidation and corrosion. Hydraulic systems in mobile equipment are the typical uses of these oils.

Specifications: SS 15 54 34 AV (formerly - the SMR standard), DIN 51524, part 3 (HVLP), Vickers 1-286-S, M-2950-S.

	ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
		at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
<b>32S</b>	32	32	7,1	192	- 51	175
<b>46S</b>	46	46	9,2	188	- 48	178
<b>68S</b>	68	68	11,1	154	- 48	188

### Teboil Hydraulic Oil (15, 22, 100) Teboil Hydraulic Lift (32, 46)

- Oils in this series are designed for high-pressure hydraulics in mobile equipment, when the low temperature performance demands are reasonable due to pre-heating or other reasons.

Specifications: DIN 51524, part 3 (HVLP), Vickers 1-286-S, M-2950-S.

	ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
		at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
<b>15</b>	15	15	3,7	141	- 54	175
<b>22</b>	22	22	4,7	141	- 54	175
<b>100</b>	100	100	14,1	145	- 36	200
<b>Lift 32</b>	32	32	6,0	147	- 42	185
<b>Lift 46</b>	46	46	7,8	141	- 42	195

### Teboil Hydraulic Oil ML

- Special hydraulic oil for older removable platforms systems. A package of EP additives ensures lubricating properties meeting the requirements of the API GL-5 standard.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
<b>22</b>	22	4,8	145	- 51	165

## Teboil Hydraulic Arctic Oil (15) Teboil Hydraulic Oil Polar (22) Teboil Hydraulic Deck Oil (32)

- Oils of this series are designed for hydraulic systems operating within a wide range of temperatures. These oils have a very high viscosity index and excellent properties at low temperatures. **Hydraulic Arctic Oil** is excellent choice for tale gate lifts in trucks.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
15	15	5,5	375	-60	110
22	22	7,5	375	-60	110
32	36	8,9	245	-54	170

## Teboil Hydraulic SHV 36

- Teboil Hydraulic SHV 36** is a fully synthetic zink-free hydraulic oil designed for heavy-duty hydraulic systems that require a wide operating temperature, from the heat of the summer to sub-zero winter conditions. Typical uses are earthwork and forestry machinery, truck hydraulics, port equipment and deck hydraulics.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
36	36	7,7	175	-48	230

## Teboil Hydraulic Oil 5W Teboil Hydraulic Oil 10W

- Fully Synthetic **Teboil Hydraulic Oil 5W** and mineral oil based **Teboil Hydraulic Oil 10W** — special hydraulic oils developed for hydraulic systems requires mono grade engine oils. **Hydraulic Oil 5W** has excellent performance at low and high temperatures ensuring reliable operation of equipment under various weather conditions.

SAE	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
5W	32	6,2	150	-54	180
10W	41	6,5	110	-39	210

## Teboil Hydraulic Eco

- Teboil Hydraulic Eco** oils are hydraulic oils manufactured of biodegradable synthetic esters. Their excellent cold-flowing characteristics enable a risk-free start even in the lowest temperatures. High viscosity index guarantees lubrication also in high operating temperatures and extremely low shearing ensures full operating power for the whole day. Hydraulic Eco oils are specifically designed for demanding high-pressure systems operating in the vicinity of ground water, shoreline and park areas. Biodegradability is over 70% (OECD 301 B)/

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
15	15	4,0	170	-60	200
32	32	7,3	185	-54	200
46	43	9,2	205	-54	200
68	68	13,0	195	-48	230

## Saw chain oils

### Teboil Teraketjuoljy BIO

- Teboil Teraketjuoljy BIO** is a biodegradable synthetic chain oil for chain saws used year-round.

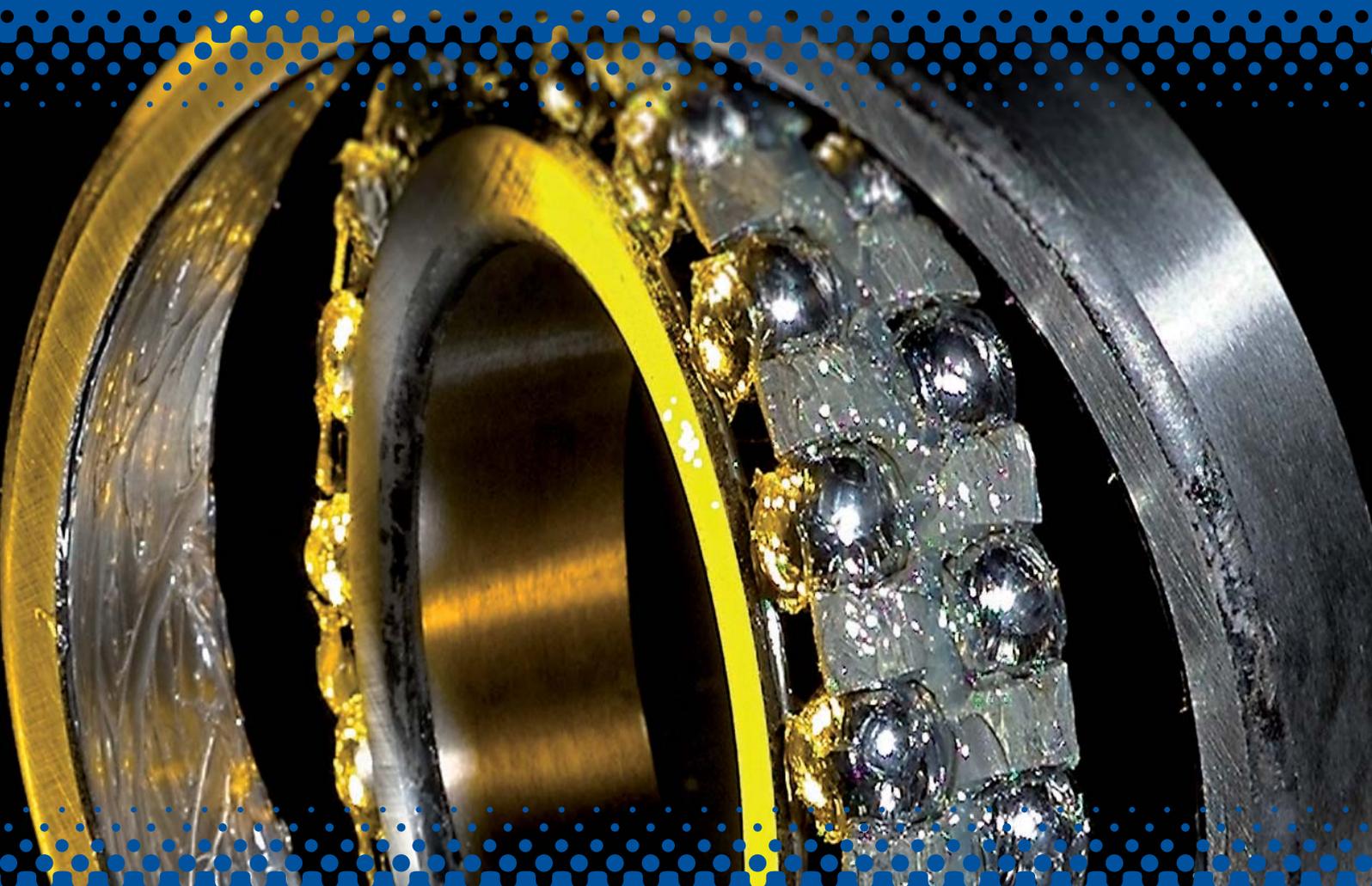
### Teboil Teraketjuoljy

- Teboil Teraketjuoljy** is a mineral oil based chain oil for chain saws.

### Teboil MoTo

- Teboil MoTo** is a mineral oil based chain oil for harvesters. The product is available in winter (T) and summer (K) qualities.

# Lubricant greases



## Multi-purpose greases

### Teboil MultiPurpose Grease

- Multipurpose bearing grease for automotive and industrial use.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium soap	2	185	110	- 30...120

### Teboil MultiPurpose EP

- Grease for heavily loaded bearings, such as wheel bearings in automotive use. Excellent choice for multipurpose grease.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium soap	2	185	200	- 30...130

### Teboil MultiPurpose EP 0

- Multi-Purpose EP 0 is softer than EP and that makes it suitable for central lubrication systems and extremely low temperatures.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium soap	0	>160	200	- 30...120

### Teboil MultiPurpose Extra

- Special grease is for high speed bearings. Bismuth-based EP additives ensure good lubricating properties. Typical applications are motors and industrial blowers.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium soap	2	185	55	- 35...110

## High temperature greases

### Teboil MultiPurpose HT

- A special high temperature grease for heavily loaded and/or bearings in high temperatures. Suitable for industrial and automotive use. As an example, the grease is used in wheel hubs in heavy-duty vehicles. Excellent choice for multipurpose grease.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium complex	2	>260	200	- 30...150

### Teboil Grease HL 520

- High temperature grease for bearings operating at high temperatures and under heavy loads.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium complex	2	>260	600	- 25...150

## Central lubrication greases

### Teboil Universal CLS-1

- Automotive and industrial central lubrication grease.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium complex	0,5	230	150	- 30...120

### Teboil Universal CLS

- Central lubrication grease for vehicles in extremely low temperatures. Suitable also for grease-lubricated gears.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium complex	00	170	125	- 35...100

## Synthetic multi-purpose grease for extreme temperatures Teboil Syntec Grease

### Teboil Syntec Grease

- **Teboil Syntec Grease** is a lithium complex grease based on synthetic base oil. It has broad operating temperature range. Typical uses are bearings in high and/or low temperatures. Syntec Grease is excellent multipurpose grease for industry, when especially high performance is required.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium complex	2	>260	160	- 40...150

## Molybdenum disulfide greases

### Teboil Universal M

- Special grease that contains molybdenum disulphide (MoS<sub>2</sub>). Typical uses are kind bolts, ball joints and journal bearings.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, sq.mm/s	Range of use temperature, °C
Lithium soap	2	180	110	- 30... 120

## Teboil Solid 2

- **Teboil Solid 2** is water-free calcium grease for heavily loaded, slowly running journal and roller bearings, especially in humid conditions. It has excellent adhesion, water-resisting and load-carrying characteristics. Solid 2 is excellent choice for lubricating automotive and construction machinery joints and chassis bearings.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Calcium soap	2	140	800	- 20....120

## Teboil Solid 0

- **Teboil Solid 0** is ideal for winter use, as it is softer and easier to pump than Solid 2. Suitable also for central lubrication systems.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Calcium soap	0	120	800	- 300....90

## Open gear and chain greases

### Teboil Gear Grease XHP

- **Teboil Gear Grease XHP** is new type special grease that has efficient EP additives for lubricating heavily loaded open gears and chains that operate in a wide range of temperatures. Short-term temperature peaks up to 240 °C are allowable. One specific use is rotating frames of construction equipment. Other uses are chains, steel ropes and different sliding surfaces. Gear Grease XHP is also excellent for lubricating journal and roller bearings in hot and/or heavy conditions.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Calcium-lithium complex	0,5	>220	700	- 30....140

### Teboil Gear Grease MDS

- **Teboil Gear Grease MDS** is traditional grease for open gears, steel ropes and chains. Gear Grease MDS based on inorganic thickening agent and it contains molybdenum disulphide (MoS<sub>2</sub>), which effectively prevent shearing. Typical lubricating uses are extremely heavily loaded, slowly moving equipment and equipment exposed to vibration. For example hydraulic hammers requires this type of grease.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Inorganic	0,5	нет	2100	- 10....150

## Gear grease

### Teboil DKW-Grease

- **Teboil DKW-Grease** is a semi-solid sodium grease for closed gears. Used for lubricating cone crushers' top bearings.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Sodium soap	00	>100	650	- 20....100

## Teboil O-Grease

- **Teboil O-Grease** is a special grease obtained by thickening low-viscosity mineral oil with lithium soap. Contains EP and anticorrosion additives. This grease is recommended for use with roller bearings operating under light loads, measuring instruments and other devices used at very low temperatures.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Lithium soap	2	180	9,0	- 50....90

## Multipurpose grease for food industry

### Teboil FM-Grease

- **Teboil FM-Grease** is a special grease for food industry machinery. The product does not contain hazardous substances that might cause health risks when accidentally getting in touch with food products.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Sodium soap	2	Her	65	- 30....100

## Polytetrafluorethylene-based grease

### Teboil AR-Grease

- **Teboil AR-Grease** is special grease based on a synthetic base oil. The thickener for this grease is produced from polytetrafluorethylene. This grease is applied when aggressive chemicals and thinners are used and in extremely acid environment. The grease performs well at low and high temperatures.

Thickener	NLGI	Drop point, °C	Base oil viscosity at 40°C, mm <sup>2</sup> /s	Range of use temperature, °C
Polytetrafluorethylene	1,5	Her	150	- 50....200





## Hydraulic and circulation oils

### Teboil Larita Oil

- **Teboil Larita** oils are industrial oils for hydraulic- and circulation systems. Larita Oils contain antiwear, antioxidant, and anticorrosion additives. Typical applications are industrial hydraulic systems, light-loaded gears, roller and slide bearings, as well as circulation oil systems.

**Specifications:**

DIN 51524 part 2 (HLP), Vickers 1-286-S, M-2950-S

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
5	5	1,7		-60	110
10	10	2,7	80	-51	165
22	22	4,2	90	-45	195
32	32	5,3	105	-39	200
46	46	6,9	105	-36	200
68	68	8,8	100	-33	220
100	100	11,0	95	-15	220
150	150	11,0	90	-15	230
220	220	18,0	90	-12	240
320	320	23,0	90	-9	260
460	460	29,0	90	-9	260

## Transmission and circulation oils

### Teboil Pressure Oil

- **Teboil Pressure Oil** are high-quality industrial EP gear oils. They are used in heavily loaded gears and circulation oil systems.

**Specifications:**

AGMA 250.04, DiN 51517 part 3 (CLP)  
US Steel 224

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
68	68	9,1	110	-27	220
100	100	11,4	100	-27	240
150	150	15,0	100	-21	240
220	220	18,0	90	-18	250
320	320	23,0	90	-15	270
460	460	29,0	90	-12	290

## Teboil Sypres

- **Teboil Sypres** oils are fully synthetic industrial EP gear oils. Typical applications are gears operating at wide temperature range and industrial gears with extended service intervals.

### Specifications:

AGMA 250.04, DIN 51517 part 3 (CLP), US Steel 224

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
68	68	11,2	158	-51	220
100	100	15,0	155	-51	210
150	150	20,0	155	-48	210
220	220	26,0	150	-39	210
320	320	33,0	150	-36	200
460	460	43,0	145	-30	190

## Teboil Synpag

- Teboil Synpag serie oils are special polyglycol-based gear oils with excellent friction properties and anti-oxidation performance. Main applications are worm gears with bronze-steel gear pairs. Oils can also be used in other transmissions operating at temperatures, too high for mineral oils.

### Note:

- Do not mix with mineral or other hydrocarbon oils.
- The oil may dissolve some paints. We recommend epox paints or corresponding coatings and paints.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
220	220	36,0	215	-32	320
460	460	76,0	245	-42	250

## Compressor oils

### Teboil Compressor Oil P

- These oils are specially designed for lubrication of piston compressors. They have excellent anti-oxidation characteristics and low carbon sludge buildup tendency at high temperatures. Compressor Oil P 68 S is semi-synthetic oil.

### Specifications:

DIN 51506 VDL

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
32	32	5,4	100	-39	200
68	68	8,8	100	-33	210
100	100	11,0	95	-27	220
68S	68	9,8	125	-42	210

### Teboil Compressor Oil S

- **Teboil Compressor Oil S** is a special oil designed for lubricating of screw compressors. Compressor Oil S has good oxidation stability and low foaming tendency.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
46	46	6,8	100	-39	200

### Teboil Compressor Oil 46 SHV

- **Teboil Compressor Oil 46 SHV** is a fully synthetic compressor oil containing anti-wear and anti-oxidation additives. Compressor Oil 46 SHV is designed for air compressors operating in most demanding conditions. Meets ISO-L-DAJ requirements for screw compressors.

### Specifications:

ISO-L-DAJ

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
46	46	7,5	135	51	255

## Teboil Pneumo

- **Teboil Pneumo** oils are special oils for impact and rotation pneumatic tools. Efficient additives ensure that the metal surfaces have a permanent lubricating film, to prevent metal-to-metal contact and corrosion inhibitors prevent moisture from corroding metal surfaces. Pneumo oils do not release vapours that might be hazardous for health.

ISO VG	Operating mode	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
		at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
22	<0	22	4,5	115	-42	180
68	-15...+22	68	9,0	105	-30	200
100	>0	100	11,4	100	-15	210
150	>0	150	14,5	95	-15	220

## Heat-transfer oils

### Teboil Termo Oil

- **Teboil Termo Oil** series are high-quality heat-transfer oils for closed heat-transfer systems. Termo Oils have low cracking tendency, low vapour pressure and long lifetime. Termo 100 is compatible with sites that require extremely low vapour pressure.

ISO VG	Operating mode	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
		at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
15	>+200	15	3,3	80	-42	180
32	>+320	32	5,4	100	-12	200
100	>+320	100	11,0	95	-12	220

## Turbine oils

### Teboil Turbine Oil XOR

- **Teboil Turbine Oil XOR** is fully synthetic turbine oil designed for extremely demanding conditions. It has excellent anti-oxidation, water and air separation, anti-foaming, and anti-corrosion characteristics. This oil is recommended for steam and water turbines circulation lubrication and for compressors that require the use of turbine oils.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
32	32	5,9	128	-15	240
46	46	7,3	135	-12	250
68	68	8,7	105	-12	230

## Non-drip oils

### Teboil Past Oil

- **Teboil Past Oil** series oils are designed for lubricating of slide ways, screws, and chains. They have good lubricating and adhesion properties. Past Oil S oils are developed for lubricating of drier chains at plywood mills. The oils do not form deposits even in hot temperatures.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
46	46	6,8	100	-12	210
100	100	11,0	95	-12	220
460	460	29,0	90	-9	260
150 S	150	14,5	95	-12	230
320 S	320	23,0	90	-12	260

## Slide-way oils

### Teboil Slide

- **Teboil Slide** series is designed for lubricating slide ways in machine tools. Their "anti slip-stick" properties enable smooth feed movements that ensure smooth surface quality for workpiece even in heavy grinding and low feeding speeds. Teboil Slide 32 is also suitable for hydraulic systems, where hydraulic oil lubricates guiding surfaces.

ISO VG	Kinematic Viscosity		Viscosity Index (VI)	Pour Point, °C	Flash Point, °C
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s			
32	32	5,4	100	-12	200
68	68	8,7	105	-12	210
150	150	14,5	95	-12	220
220	220	19,0	95	-12	240

## Transformer oils

### Teboil Muuntajaoljy SL 200

- **Teboil Muuntajaoljy SL 200** is a high quality transformer oil with good anti-oxidation and electrical isolation characteristics. It is designed for use in oil-immersed transformers and breakers. Dielectric strength in a cup > 30 kV. Dielectric strength when dried (after treatment) > 70 kV.

Kinematic Viscosity at 40°C mm <sup>2</sup> /s	Kinematic Viscosity at 100°C mm <sup>2</sup> /s	Viscosity Index (VI)	Pour Point, °C	Flash Point, °C

## Concrete form oil

### Teboil Form Oil E

- **Teboil Form Oil E** is concrete form oil that eases removal of the casting from the form and protects the steel from corrosion. It is suitable for all types of concreting and use with conventional materials of which forms are made, in particular, with steel, wood, and hardboard. Optimal oil consumption is 1l / (35-55) m<sup>2</sup>.

Kinematic Viscosity at 40°C at 100°C mm <sup>2</sup> /s		Flash Point, °C
8	-	



# Marine lubricants



## Cylinders and systems oils for low-speed crosshead engines

### Teboil Ward L 5T

- **Teboil Ward L 5T** is a alkaline system oil for modern high-powered marine crosshead engines.

SAE	Kinematic Viscosity		TBN, mg KOH/g
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s	
SAE 30	106	11,5	5,7

### Teboil Ward L

- **Teboil Ward L** — oils are cylinder oils for slow-running crosshead engines that use marine diesel fuel with sulfur content of less than 2 %.

SAE	Kinematic Viscosity		TBN, mg KOH/g
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s	
SAE 40	149	14,5	42
SAE 50	207	18,0	42

### Teboil Ward Heavy L

- **Teboil Ward Heavy** — is cylinder oil for slow-running crosshead engines that use heavy fuel with sulfur content of even 3,5 %.

SAE	Kinematic Viscosity		TBN, mg KOH/g
	at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s	
SAE 50	207	18,0	73

## Cylinders and systems oils for medium-speed trunk piston engines

### Teboil Ward L 10T, 25T, 30T and 40T

- Cylinder oils for marine medium-speed trunk piston engines and other marine systems. Oil's applicability is determined as per SAE classification and based on the percentage of sulfur contained in the fuel.

	SAE	Kinematic Viscosity		TBN, mg KOH/g
		at 40°C mm <sup>2</sup> /s	at 100°C mm <sup>2</sup> /s	
Ward L 10T, if sulfur content is less than 1,0%;	SAE 30	106	11,5	12
	SAE 40	149	14,5	12
Ward L 25T, if sulfur content is less than 2,5 %;	SAE 30	106	11,5	25
	SAE 40	149	14,5	25
Ward L 30T, if sulfur content is less than 3,5 %;	SAE 30	106	11,5	31
	SAE 40	150	14,5	31
Ward L 30T, if sulfur content is less than 3,5 %;	SAE 40	149	14,5	42



## Special lubricants

- Rhenus Lub GmbH, a German producer of lubricants, was founded in 1872. Teboil is Rhenus' distributor and exclusive representative in Finland. Rhenus markets and sells special lubricant products as well as water-soluble metalworking coolants in Finland

Oil production            r.Meta

Oil treatment            r.Form

Water-soluble  
products treatment    r.Meta

To obtain additional information about the company's products or receive a consultation on the manufactured products, please call us at 020 4700 916.





## Modern lubricant technologies in Europe

Equipment-wise, Teboil's lubricant plant in Hamina is one of the most advanced in Europe. Efficient automation of the production process and close control over the quality of the produced articles allow us to manufacture high quality lubricant products. In order to develop new high-grade lubricants, improve the production process, and control the quality of the manufactured products the plant operates its own laboratory to carry out the necessary research.

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