



PRODUCT CATALOGUE

**MODRIČA**  
OIL REFINERY

| MORE THAN 60 YEARS OF TRADITION&QUALITY





Dear friends,

We are pleased to present You the new edition of Oil Refinery Modrica product catalogue, enriched with info about the new products our expert and research teams have developed since.

Our Customer Support Specialist Teams keep in permanent contact with You - our product users. They are there to hear any observation from Your side, both positive and negative, because Your suggestions always contribute to customization of our product quality, design and packaging to the end-user requirements. Permanent quality enhancement of our products has inevitably brought to a new packaging design, capturing, along with the new labels, the spirit of modern times. In addition to aesthetic and technical aspects, it also has functional and economic advantages. In the catalogue You can find basic information about each product, and for more detailed technical information regarding appropriate selection, application and quality control of the lubricants used, You can contact our Technical Application Department, available 24 hours a day.

Modern Oil Refinery Modrica laboratory has been accredited according to BAS EN ISO/IEC 17025:2006 standard. The testing laboratory is equipped with the most update laboratory equipment for lubricant and functional fluid testing, and they apply standard international testing methods. Professional lab staff ensures the highest level of testing results. Our product users can conduct any lubricant testing they may require, at any time and free of charge. Permanent Oil Refinery Modrica cooperation with world's most prestigious engine, vehicle and equipment manufacturers, additive and other synthetic component manufacturers, associations and organizations for standardization, as well as with universities, institutes and other scientific and professional agencies, results in application of the latest technological achievements at new product development and manufacturing.

Therefore, approvals granted by engine, vehicle and equipment manufacturers are of multiple importance: they confirm the quality of our products, the quality of our own testing laboratory results, and, most importantly, such approvals will recommend our products for use in their engines. Experience gained through many-years standing participation in car and motorcycle contests and direct cooperation of our engineering team with racing vehicle drivers have been successfully applied in new development projects. Oil Refinery Modrica was among the first in Europe to build a hydrocracked base oil manufacturing plant. Compared to conventional mineral oils, hydrocracked base oils have a better oxidation stability, lower volatility, lesser change in viscosity with temperature (high viscosity index), as well as very low content of overall and polycyclic aromatic hydrocarbons, sulfur, nitrogen and oxygen compounds. Motor and industrial oil formulations using hydrocracked base oils ensure outstanding technical characteristics of the finished product, as well as compliance with applicable European environmental protection standards.

By using our products, You will extend Your engine, motor vehicle and other machinery service life, reduce operating costs, and contribute to the protection and preservation of the environment. Quality Management System according to BS EN ISO 9001: 2008 standard and BS ISO 14001:2004 Environmental Management System provide full quality control and environmental management at all organizational stages, thus guaranteeing to our customers a steady and reliable quality of the products used. By adhering to OHSAS 18001:2007 - Workplace Health and Safety Management System, we are able to establish control over workplace health hazards and risks, and take appropriate care of our human resources and their contribution to the company values. As Oil Refinery Modrica has ensured its continued presence on the EU market, meeting of all the requirements arising from REACH Regulation makes itself a guarantee that all the environmental and human health protection criteria, as well as the requirements regarding movement of chemicals and chemical products, have been met.

It is important to emphasize that Oil Refinery Modrica is one of the first companies in Bosnia and Herzegovina to have successfully fulfilled its obligations under the a/m EU regulation, enabling thereby its equal membership in the EU REACH community. Our new Blending Center, into which we have invested more than € 13 million, is equal among the first in the European community. The main Blending Center project and main technological equipment were supplied by the French company "ABB", being the world leader in production process automation. By choosing the Oil Refinery Modrica products, you will do us a great honor, and in return we will continue to gain your trust simply by QUALITY.

**Yours, NESTRO!**

OPTIMA GROUP | OIL REFINERY BROD | REFINERY OIL MODRIČA | NESTRO PETROL



## CONTENTS

08-13	PASSENGER CAR ENGINE OILS	
16-21	COMMERCIAL VEHICLE ENGINE OILS	
24-26	TWO-STROKE AND FOUR-STROKE ENGINE OILS	
26-27	CHAINSAW OILS	
30-31	AGRICULTURAL OILS	
34-35	MARINE OILS	
38-41	GEAR AND TRANSMISSION OILS	
44-45	HYDRAULIC BRAKE FLUIDS	
48-49	ENGINE COOLANT AND PROTECTION FLUIDS	
52-53	SPECIAL AUTOMOTIVE SERVICE PRODUCTS	
58-61	HYDRAULIC SYSTEM OILS AND FLUIDS	
62-73	INDUSTRIAL LUBRICANTS	
76-81	MULTI-PURPOSE LUBRICATING GREASES	
84-85	BASE OILS AND PARAFFINS	
88-98	APPENDICES	

# CERTIFICATES

Standards and Approvals

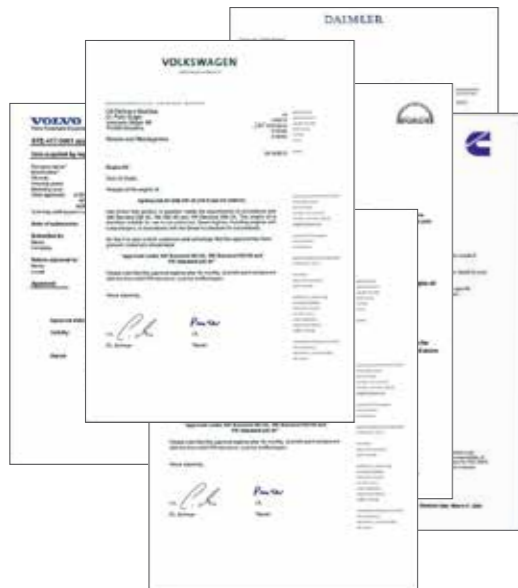
ISO 9001 | ISO 14001



BAS ISO 17025 | OHSAS 18001



APPROVALS



# CLASSICS IN A NEW FORM

New packaging and labels

# PACKAGING AND LABELLING

Our new product packaging design has been customized both to our customer and the specific market requirements. It had to be changed in a way necessitating permanent product quality improvement. Thus such new packaging, along with new labels, captures the spirit of modern times. In addition to aesthetic and technical aspects, it also has functional and economic advantages.

## OIL AND LUBRICANT SEGMENTATION

- PASSENGER CAR ENGINE OILS
- COMMERCIAL VEHICLE ENGINE OILS, MARINE OILS
- TWO-STROKE & FOUR-STROKE ENGINE, HYDRAULIC BRAKE LUBS & FLUIDS
- AGRICULTURAL AND HYDRAULIC SYSTEM LUBS & FLUIDS
- GEAR AND AUTOMATIC TRANSMISSION LUBS & FLUIDS
- SPECIAL APPLICATION PRODUCTS, COOLANTS

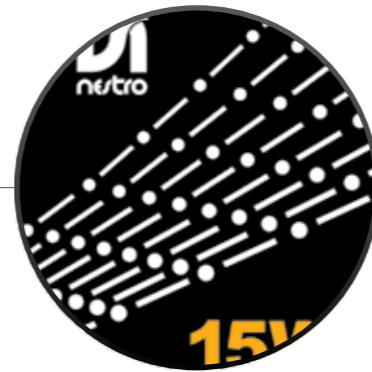
SYNTHETIC PRODUCTS



SEMISYNTHETIC PRODUCTS



MINERAL PRODUCTS



SPECIAL FLUIDS



PRODUCT DESCRIPTION  
(B&H, SRB, HR, MNE, SLO, MK, EN, RUS, D, UKR, AL, ITA)

SPECIFICATIONS AND APPROVALS

CONTACT INFORMATION

PRODUCT GROUP

GRADE LABEL

PRODUCT NAME

BRAND NAME





## OPTIMA ECO PLUS

### SAE 5W-30

Optima ECO Plus is a synthetic engine oil meeting the most stringent passenger car petrol and diesel engine requirements. It is intended for use in engines complying with EURO 4, EURO 5 and EURO 6 exhaust emission standards. It can also be used in vehicles fitted with exhaust gas after treatment system, requiring lowered SAPS (sulfated ash, phosphorus and sulfur) contents. Optima ECO Plus engine oil has been developed for vehicles with DPF filter, belonging to VW, Audi, Seat, Skoda engine group, requiring quality level under VW 504 00/507 00 specifications. It can also be applied in other manufacturer motor vehicles, requiring the a/m quality level.

#### MEETS SPECIFICATIONS

ACEA A3/B4/C3; MB 229.51; VW 504 00 / 507 00 Approved; BMW Longlife-04

#### AVAILABLE IN PACKS



OPTIMA ECO PLUS SAE	5W-30
Viscosity at 100°C, mm <sup>2</sup> /s	11.8 - 12.3
Viscosity index, min.	155
Pour point, max., °C	-35
Flash point, min., °C	230



## OPTIMA ECO

### SAE 5W-30 | SAE 5W-40

OPTIMA ECO is a high-quality synthetic engine oil characterized by low sulfated ash, phosphorus and sulfur content (low SAPS).

It is recommended for use in all modern passenger car petrol and diesel engines meeting the EURO 4, EURO 5 and EURO 6 exhaust emission standards.

The product is compatible with diesel particulate filter (DPF), as well as with the catalyst system.

Optima Eco can also be used in vehicles with pump-line-nozzle (VW 505 01) system. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA C3, A3/B4; API SN/CF; VW 502 00/505 00/505 01 Approved; MB 229.51 Approved; GM Dexos 2; BMW Long life 04

#### AVAILABLE IN PACKS



OPTIMA ECO SAE	5W-30	5W-40
Viscosity at 100°C, mm <sup>2</sup> /s	11.5 - 12.5	14.0 - 15.0
Viscosity index, min.	165	160
Pour point, max., °C	-30	-30
Flash point, min., °C	230	230



## OPTIMA MAGNUM

### SAE 5W-40

A fully synthetic engine oil used for lubrication of all types of modern passenger car petrol and diesel engines.

It has been designed for the new generation of petrol and diesel engines, fitted with turbo compressor and direct fuel injection system (TDI, GDI, HDI, TDI, CDI, DTI, JTD...).

It can be applied in all High-Tech engines with multiple valve technology and turbochargers. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA A3/B4, A5/B5; API SM/CF; MB 229.3/229.5; VW 502 00/505 00; BMW LL-98/01; OPEL GM-LL-A/B-025; RENAULT RN0700/0710; PORSCHE

#### AVAILABLE IN PACKS



OPTIMA MAGNUM SAE	5W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.2 - 14.8
Viscosity index, min.	165
Pour point, max., °C	-40
Flash point, min., °C	230



## OPTIMA 505 01

### SAE 5W-40

Synthetic engine oil designed for lubrication of modern VW-Group (VW, Audi, Seat, Skoda) passenger car diesel and turbo-diesel engines (fitted with pump-line-nozzle system). It can also be applied in other passenger car petrol and diesel engines for which the use of engine oil complying to VW 502 00 and VW 505 00 specifications has been recommended.

Applicable as well in other manufacturer motor vehicles requiring the above specified quality level. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA A3/B4; API SL/CF; VW 502 00/ 505 00/ 505 01 Approved; MB 229.1; BMW L L-98

#### AVAILABLE IN PACKS



OPTIMA 505 01 SAE	5W-40
Viscosity at 100°C, mm <sup>2</sup> /s	13.8 - 14.2
Viscosity index, min.	150
Pour point, max., °C	-40
Flash point, min., °C	230



## OPTIMA HC POWER

SAE 10W-40

Semi-synthetic engine oil designed for lubrication of automotive, as well as small delivery vehicle engines, operating in urban conditions.

Protects the engine against cold sediment formation, which can have a negative impact to the vital engine parts wear and thus reduce the engine life.

Optima HC Power is a type of oil formulated from our own hydrocracked base oils, enriched with last generation additives, intended for use in all engine types for which the above specified quality level has been recommended by vehicle manufacturers.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A3/B4; API SL/CF; VW 502 00/505 00 Approved; MB 229.1

### AVAILABLE IN PACKS



OPTIMA HC POWER SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0
Viscosity index, min.	150
Pour point, max., °C	-27
Flash point, min., °C	230



## OPTIMA HC CITY

SAE 10W-40

Semi-synthetic engine oil designed for lubrication of automotive, as well as small delivery vehicle engines, operating in urban conditions.

Protects the engine against cold sediment formation, which can have a negative impact to the vital engine parts wear and thus reduce the engine life.

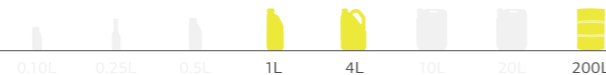
Optima HC City is a type of oil formulated from our own hydrocracked base oils, enriched with last generation additives, intended for use in all engine types for which the above specified quality level has been recommended by vehicle manufacturers.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A3/B4; API SL/CF; VW 501 01/505 00; MB 229.1

### AVAILABLE IN PACKS



OPTIMA HC CITY SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0
Viscosity index, min.	150
Pour point, max., °C	-27
Flash point, min., °C	230



## OPTIMA SINT TURBO

SAE 10W-40 | SAE 15W-40

A semi-synthetic engine oil with modern formulation. Possesses good lubricating performance, ensuring trouble-free engine operation in the most extreme driving conditions and in changeable weather.

Intended for lubricating of all types of European and world automotive manufacturer high-performance petrol and diesel engines, fitted with (or without) turbocharger.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A3/B4; API SL/CF; VW 501 01/505 00; MB 229.1

### AVAILABLE IN PACKS



OPTIMA SINT TURBO SAE	10W-40	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0	14.0 - 15.0
Viscosity index, min.	145	135
Pour point, max., °C	-27	-24
Flash point, min., °C	230	230



## OPTIMA GAS PLUS

SAE 10W-40

This is a special engine oil intended for lubrication of Otto engines using LPG or gasoline as propellant.

The Optima Gas Plus engine oil has the following advantages compared to standard-type oils for passenger car petrol and diesel engines: lower engine oil consumption, longer drain intervals, improved engine operating conditions, longer engine life.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A3, API SL

### AVAILABLE IN PACKS



OPTIMA GAS PLUS SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0
Viscosity index, min.	145
Pour point, max., °C	-27
Flash point, min., °C	230



## OPTIMA GAS

SAE 15W-40

A special engine oil intended for lubrication of Otto engines using LPG or gasoline as propellant.

The Optima Gas engine oil has the following advantages compared to standard-type oils for passenger car petrol and diesel engines: lower engine oil consumption, longer drain intervals, improved engine operating conditions, longer engine life.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A3, API SL

### AVAILABLE IN PACKS



OPTIMA GAS SAE	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0
Viscosity index, min.	135
Pour point, max., °C	-24
Flash point, min., °C	230



## OPTIMA LONG LIFE

SAE 20W-60

Special engine oil intended for lubrication of petrol and diesel engines of any global automotive manufacturer passenger cars and small commercial vehicles, running with, or without the turbocharger system.

Optimal oil formulation guarantees good lubrication and reduced wear in older cars, as well as in cars with high mileage.

It can also be applied in other manufacturer vehicles engines, requiring the above specified quality level.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

ACEA A2/B3, API SJ/CF-4

### AVAILABLE IN PACKS



OPTIMA LONG LIFE SAE	20W-60
Viscosity at 100°C, mm <sup>2</sup> /s	22.0 - 23.0
Viscosity index, min.	135
Pour point, max., °C	-22
Flash point, min., °C	230



## OPTIMA SUPERVISK

SAE 15W-40 | SAE 20W-40 | SAE 20W-50

Quality engine oil designed for lubrication of petrol and diesel engines installed in any global automotive manufacturer passenger vehicles.

Provides engine protection from wear and corrosion and maintains engine cleanliness. Recommended for use in older-type vehicles.

Drain interval: according to the engine manufacturer recommendations.

### MEETS SPECIFICATIONS

API SF/CD

### AVAILABLE IN PACKS



OPTIMA SUPERVISK SAE	15W-40	20W-40	20W-50
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0	14.0 - 15.0	17.5 - 18.5
Viscosity index, min.	135	130	130
Pour point, max., °C	-24	-21	-21
Flash point, min., °C	230	230	230

**MAXIMA**

COMMERCIAL VEHICLE ENGINE OILS





### MAXIMA EURO 5+ SAE 10W-40

Maxima Euro 5+ SAE 10W-40 is an XHPD engine oil (Extra High Performance Diesel) for lubrication of engines complying with EURO 4, EURO 5 and EURO 6 exhaust emission standards. Due to very low content of sulfated ash, sulfur and phosphorus (low SAPS), it is primarily intended for engine lubrication in vehicles with EGR engines and/or SCR systems, with/without DPF filters, as well as for all other vehicles operating under extreme conditions and with very extended drain intervals. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA E6/E7/E9; API CJ-4/CI-4; MB 228.51/MB 228.5; MAN M3477; MAN M3277; MTU Type 3.1; RVI RXD/RGD; Caterpillar ECF-1a; Volvo VDS-3/Volvo CNG; Cummins CES 20076/7/8; MACK EO-N/MACK EO-M PL; Deutz DQC IV-10LA Approved

#### AVAILABLE IN PACKS



MAXIMA EURO 5+ SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	13.5 - 14.5
Viscosity index, min.	150
Pour point, max., °C	-27
Flash point, min., °C	230



### MAXIMA E9 SAE 10W-40 | SAE 15W-40

Maxima E9 is a synthetic engine oil for lubrication of modern engines complying with EURO 4, EURO 5 and EURO 6 exhaust emission standards. Due to very low content of sulfated ash, sulfur and phosphorus (low SAPS), it is primarily intended for engine lubrication in vehicles with EGR engines or SCR systems, fitted with/without DPF filters, with very extended drain intervals. Maxima E9 belongs to the SHPD oil group, demonstrating a very high performance level. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA E9/E7; API CJ-4/CI-4+/CI-4; MB 228.31/228.3; MAN M3575 Approved; Caterpillar ECF-3/ECF-2/ECF-1; Cummins CES 20081; MTU Type 2.1; Volvo VDS-3/VDS-4 Approved; Mack EO-O PP-07; Renault Trucks RLD-3; DEUTZ DQ III-10LA (III-05); Detroit Diesel DDC 93K218

#### AVAILABLE IN PACKS



MAXIMA E9 SAE	10W-40	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5	14.0 - 15.5
Viscosity index, min.	150	140
Pour point, max., °C	-27	-24
Flash point, min., °C	240	240



### MAXIMA MAGNUM XHPD SAE 5W-30

Maxima Magnum XHPD SAE 5W-30 is a high-performance XHPD (Extra High Performance Diesel) engine oil, ensuring an excellent protection of all engine parts and providing exceptionally long drain intervals. It is used for lubrication of modern heavy duty commercial vehicle engines, complying with EURO 4 and EURO 5 exhaust emission standards without limited chemical composition requirements (without DPF). Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API CI-4; ACEA E4/E7; MB-228.5; Cummins CES 20077/78; MAN M 3277 Approved; Scania LDF; MTU Type 3; VOLVO VDS-3; RENAULT RXD/RLD-2; Deutz DQC IV-10; Mack EO-L/EO-M+/EO-N

#### AVAILABLE IN PACKS



MAXIMA MAGNUM XHPD SAE	5W-30
Viscosity at 100°C, mm <sup>2</sup> /s	12.0 - 12.5
Viscosity index, min.	160
Pour point, max., °C	-45
Flash point, min., °C	230



### MAXIMA XHPD SAE 10W-40

Maxima XHPD SAE 10W-40 is a high-performance XHPD (Extra High Performance Diesel) engine oil which ensure an excellent protection of all engine parts and provide exceptionally long drain intervals. It is used for lubrication of modern heavy duty commercial vehicle engines, complying with EURO 4 and EURO 5 exhaust emission standards without limited chemical composition requirements (without DPF). Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA E4/E7; API CI-4; MB-228.5; Scania LDF-2; Volvo VDS-3; MAN M3277 Approved; Mack EO-L/EO-M+/EO-N; MTU Type 3; Renault RXD/RLD-2; Deutz DQC-IV-10; Caterpillar ECF-2;

#### AVAILABLE IN PACKS



MAXIMA XHPD SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	155
Pour point, max., °C	-27
Flash point, min., °C	230



## MAXIMA HC PRESTIGE XLD

### SAE 10W-40

Maxima HC Prestige XLD SAE 10W-40 is a very-high performance (SHPD - Super High Performance Diesel) engine oil. Ensures excellent wear protection and extended drain intervals.

Applicable at engines complying with EURO 4 and EURO 5 exhaust emission standards, in vehicles with EGR engine or with SCR system, but without DPF filter. Provides excellent soot control and wear protection of all engine components.

Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA E7/E5/E3; ACEA A3/B4; API CI-4/CH-4/CG-4/CF/SL; MB 228.3/MB 229.1; MAN M3275; Volvo VDS-3; Cummins CES 20076/7/8; Mack EO-M+ /Mack EO-N; Caterpillar ECF-2, ECF-1; Global DHD-1; Deutz DQC III-10 (III-05)

#### AVAILABLE IN PACKS



MAXIMA HC PRESTIGE XLD SAE	10W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	155
Pour point, max., °C	-27
Flash point, min., °C	230



## MAXIMA TURBO

### SAE 15W-40

Premium engine oil intended for lubrication of all types of commercial vehicle diesel engines (i.e. for use in freight trucks, buses, mining, construction and agricultural machinery), operating under normal and severe service conditions. This type of oil is characterized by a very high performance. It belongs to the SHPD (Super High Performance Diesel) oil group, which can be used over an extended period of time. Also applicable in engines complying with EURO 4 and EURO 5 exhaust emission standards, without limited chemical composition requirements (without DPF).

Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API CI-4; ACEA E7/E5/E3/A3/B4; MB 228.3/229.1; MTU Category 2; Caterpillar ECF-2, ECF-1; Global DHD-1; Deutz DQC III-10(III-05); MACK EO-N/EO-M+; MAN 3275 Approved; VOLVO VDS-3 Approved; Cummins CES 20076/7/8 Approved

#### AVAILABLE IN PACKS



MAXIMA TURBO SAE	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	140
Pour point, max., °C	-21
Flash point, min., °C	230



## MAXIMA SUPER MG

### SAE 15W-40

Premium engine oil intended for lubrication of all types of commercial vehicle diesel engines (i.e. for use in freight trucks, buses, mining, construction and agricultural machinery), operating under normal and severe service conditions.

This type of oil is characterized by excellent performance. It belongs to the SHPD (Super High Performance Diesel) oil group.

Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API CF-4/SG, ACEA E2, MB 228.1, MAN 271, Volvo VDS

#### AVAILABLE IN PACKS



MAXIMA SUPER MG SAE	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	140
Pour point, max., °C	-21
Flash point, min., °C	240



## MAXIMA LONG LIFE

### SAE 20W-50

Special engine oil intended for lubricating of all types of commercial vehicle diesel engines, fitted with normal or turbocharging system, and operating under severe service conditions.

Application of this type of oil can be advantageous in engines showing noticeable lubricating system pressure drop and increased oil consumption at using SAE 15W-40 oil grades. Applicable for engine lubrication in older-type and high mileage vehicles. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API CF-4/SG, ACEA E2, MB 228.1, MAN 271, Volvo VDS

#### AVAILABLE IN PACKS



MAXIMA LONG LIFE SAE	20W-50
Viscosity at 100°C, mm <sup>2</sup> /s	18.0 - 19.5
Viscosity index, min.	130
Pour point, max., °C	-21
Flash point, min., °C	230



**MAXIMA HD S3**  
SAE 15W-40 | SAE 20W-50

Mineral engine oil designed for lubrication of all types of commercial vehicle diesel engines (i.e. for use in freight trucks, buses, mining, construction and agricultural machinery), fitted with or without turbocharging system, and operating under normal conditions. Provides reliable protection in European climate zone.

Recommended for older-type vehicles. Drain interval: according to the engine manufacturer recommendations.

**MEETS SPECIFICATIONS**

API CD/SE; MIL-L-2104 C; MB 227.1; MAN 271

**AVAILABLE IN PACKS**



MAXIMA HD S3 SAE	15W-40	20W-50
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5	18.0 - 19.5
Viscosity index, min.	140	130
Pour point, max., °C	-21	-21
Flash point, min., °C	230	230



**MAXIMA SUPER**  
SAE 10W | SAE 20W | SAE 30 | SAE 40 | SAE 50

Mineral monograde engine oils of SAE 30, SAE 40 and SAE 50 grades are used for lubrication of all diesel engine types, while the SAE 10W and SAE 20W oil grades are used for lubrication of automotive mechanical assemblies (hydraulic systems, transmissions, clutches,...) in commercial vehicles (freight trucks, buses, mining, construction and agricultural machinery), operating under normal operating conditions.

Provides reliable protection in European climate zone. Drain interval: according to the engine manufacturer recommendations.

**MEETS SPECIFICATIONS**

API CF-4/SG, ACEA E2, MB 228.0, MAN 270

**AVAILABLE IN PACKS**



MAXIMA SUPER SAE	10W	20W	30	40	50
Viscosity at 100°C, mm <sup>2</sup> /s	6.0 - 7.0	7.5 - 8.5	11.5 - 12.5	14.0 - 15.5	18.0 - 19.5
Viscosity index, min.	120	120	95	95	95
Pour point, max., °C	-30	-21	-15	-15	-12
Flash point, min., °C	220	230	240	240	250



**MAXIMA HD S3**  
SAE 10W | SAE 20W | SAE 30 | SAE 40 | SAE 50

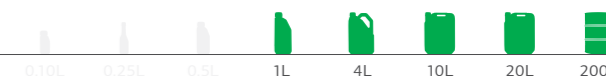
Mineral monograde engine oils of SAE 30, SAE 40 and SAE 50 grades are used for lubrication of all diesel engine types, while the SAE 10W and SAE 20W oil grades are used for lubrication of automotive mechanical assemblies (hydraulic systems, transmissions, clutches,...) in commercial vehicles (freight trucks, buses, mining, construction and agricultural machinery), operating under normal operating conditions.

Provides reliable protection in European climate zone. Drain interval: according to the engine manufacturer recommendations.

**MEETS SPECIFICATIONS**

API CD/SE; MIL-L-2104C; MB 227.0; MAN 270

**AVAILABLE IN PACKS**



MAXIMA HD S3 SAE	10W	20W	30	40	50
Viscosity at 100°C, mm <sup>2</sup> /s	6.0 - 7.0	7.5 - 8.5	11.5 - 12.5	14.0 - 15.5	18.0 - 19.5
Viscosity index, min.	120	120	95	95	95
Pour point, max., °C	-30	-18	-12	-15	-12
Flash point, min., °C	220	230	240	240	250



RAILROAD DIESEL ENGINE OIL  
**LOKOMODOL**  
SAE 40

Special oil for lubrication of railroad locomotive diesel engines, manufactured by General Motors, Electrical Division and other railroad manufacturers, with or without turbocharging. This is a zinc-free type of oil, designed for lubrication of engines with silver-alloy made piston pin bearings. Provides effective protection against wear and engine deposit control.

**MEETS SPECIFICATIONS**

API CF-2/CD/CF, LMOA GENERATION 4, LMOA GENERATION 5, G.E.LMOA, GENERATION 4 Long Life, Caterpillar 3600

**AVAILABLE IN PACKS**



LOKOMODOL SAE	40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	95
Pour point, max., °C	-21
Flash point, min., °C	240



TWO-STROKE AND FOUR-STROKE ENGINE OILS



## DVOTAKTOL SINT

Fully synthetic lubricating oil designed for the new generation of two-stroke motorcycle, outboard engine, chain saw, lawn mower engines and similar devices using an oil and high-octane gasoline blend. Such blend is prepared according to the engine manufacturer recommendations or as listed on the product label.

### MEETS SPECIFICATIONS

API TC+, JASO FC+, ISO-L-EGD, STIHL, HUSQVARNA

### AVAILABLE IN PACKS



DVOTAKTOL	SINT
Viscosity at 100°C, mm <sup>2</sup> /s	8.5 - 9.5
Pour point, max., °C	-18
Flash point, min., °C	>110



## DVOTAKTOL RACING

Fully synthetic oil designed for lubrication of modern two-stroke racing engines with air or water cooling. It is suitable for all types of two-stroke motorcycle, moped, go-kart, outboard engines and similar devices, regardless of whether such engines are lubricated by a previously prepared oil and gasoline blend, or from a separate oil tank. Such blend is prepared according to the engine manufacturer recommendations or as recommended on the product label.

### MEETS SPECIFICATIONS

API TC+, JASO FC+, ISO-L-EGD; STIHL; HUSQVARNA; YAMAHA; PIAGGIO; HONDA; TOMOS

### AVAILABLE IN PACKS



DVOTAKTOL	RACING
Viscosity at 100°C, mm <sup>2</sup> /s	8.5 - 9.5
Flash point, min., °C	>110



## DVOTAKTOL

Mineral engine oil designed for lubricating of two-stroke motorcycle, moped, chain saw, agriculture machine engines and similar devices using an oil and gasoline blend. Such blend is prepared according to the engine manufacturer recommendations, with a blend ratio from 2% and higher.

### MEETS SPECIFICATIONS

API TC, JASO FB/FC, ISO-L-EGD

### AVAILABLE IN PACKS



DVOTAKTOL	
Viscosity at 100°C, mm <sup>2</sup> /s	8.5 - 9.5
Viscosity index, min.	105
Pour point, max., °C	-18
Flash point, min., °C	>110



## DVOTAKTOL BIO

DVOTAKTOL Bio is environmentally suitable, fully biodegradable oil designated for lubrication of all types of two-stroke engines. Its formulation is based solely on synthetic components and additives. This type of oil is intended for lubrication of all types of two-stroke engines, regardless of whether such engines are lubricated by a previously prepared oil and gasoline blend, or from a separate oil tank. The blend is prepared according to the engine manufacturer recommendations or as recommended on the product label.

### MEETS SPECIFICATIONS

API TC+, NMMA TC-W III

### AVAILABLE IN PACKS



DVOTAKTOL	BIO
Viscosity at 100°C, mm <sup>2</sup> /s	12.0 - 13.0
Pour point, max., °C	-24
Flash point, min., °C	>110



## MOTOTAKTOL RACING 4T

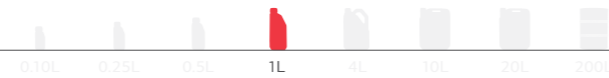
### SAE 15W-50

High-quality semi-synthetic engine oil intended for lubrication of modern four-stroke motorcycle engines. This type of oil is designed for engines at which the same oil is applied both in the engine and in the transmission gear. Provides exceptionally good lubrication under all operating conditions, from urban driving to all kinds of runway and open-road racing competitions.

#### MEETS SPECIFICATIONS

API SL, ACEA A3

#### AVAILABLE IN PACKS



MOTOTAKTOL RACING 4T SAE	15W-50
Viscosity at 100°C, mm <sup>2</sup> /s	17.5 - 18.5
Viscosity index, min.	140
Pour point, max., °C	-21
Flash point, min., °C	230



## SPECIJALNO ULJE ZA KOSILICE / SPECIAL LAWN MOWER OIL

### SAE 30

High-quality engine oil designed for lubrication of the new generation of four-stroke lawn mower engines and similar machinery engines, constantly operating at high RPM, fitted with air-and-oil engine cooling system.

#### MEETS SPECIFICATIONS

API SG; ACEA A2

#### AVAILABLE IN PACKS



SPEC. ULJE ZA KOSILICE SAE	SAE 30
Viscosity at 100°C, mm <sup>2</sup> /s	12.0 - 12.5
Viscosity index, min.	105
Pour point, max., °C	-21
Flash point, min., °C	230



## TESTEROL

### 100

Testerol 100 is a high-quality mineral oil intended for lubrication of various manufacturer chain saws operating under severe conditions. It is characterized by good adhesibility and fair low-temperature properties, allowing this type of oil to be applied in winter conditions, providing at the same time excellent protection against corrosion and wear.

#### MEETS SPECIFICATIONS

ISO 6743-1 (L-AC); STIHL; PARTNER-FARMER; SACS-DOLMAR; HUSQVARNA

#### AVAILABLE IN PACKS



TESTEROL	100
Viscosity at 40°C, mm <sup>2</sup> /s	100 - 110
Viscosity index, min.	100
Pour point, max., °C	-27
Flash point, min., °C	230



## TESTEROL

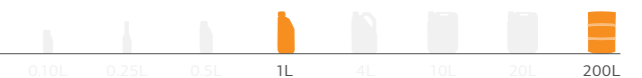
### BIO

Testerol Bio is environmentally suitable, fully biodegradable oil designed for chainsaw lubrication. Its formulation is based on extremely stable ester oils. This type of oil is characterized by good performance and biodegradability properties and is intended for lubrication of all chainsaw types.

#### MEETS SPECIFICATIONS

ISO 6743-1 (L-AC); CEC-L-33-T-82

#### AVAILABLE IN PACKS



TESTEROL	BIO
Viscosity at 40°C, mm <sup>2</sup> /s	55.0 - 65.0
Viscosity index, min.	200
Pour point, max., °C	-27
Flash point, min., °C	250



AGRICULTURAL OILS



### AGROMAX C SAE 10W-30

This is a universal type of oil designed for lubrication in tractors and other agricultural machinery. Belongs to the STOU oil group, having a very wide application range. This type of oil is used for lubrication of agricultural machinery engines, transmissions, hydraulics and wet brakes.

Recommended for use in CASE-branded agricultural machinery, as well as in other manufacturer machinery such viscosity grade is recommended for.

Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

ACEA E2; API CF-4/SF/GL-4; CASE MS 1207; JD J20A/J20C/J27; CATERPILLAR TO-2; FORD M2C 86B/134D/159B/C; ALLISON C4; MF CMS M 1135/1139/1143/1144/1145; NH 82009201/2/3; CNH MAT 3525/3526; ZF TE ML 06A/06B/06C/07B

#### AVAILABLE IN PACKS



AGROMAX C SAE	10W-30
Viscosity at 100°C, mm <sup>2</sup> /s	11.5 - 12.5
Viscosity index, min.	145
Pour point, max., °C	-27
Flash point, min., °C	230



### AGROMAX 2G SAE 15W-40

This is a universal type of oil designed for lubrication in tractors and other agricultural machinery. Belongs to the STOU oil group, having a very wide application range. This type of oil is used for lubrication of agricultural machinery engines, transmissions, hydraulics and wet brakes.

#### MEETS SPECIFICATIONS

ACEA E2; API CF-4/SF/GL-4; JD J20A/J20C/J27; CATERPILLAR TO-2; FORD M2C 86B/134D/159B/C; ALLISON C4; MF CMS M 1135/1139/1143/ 1144/1145; NH 82009201/2/3; CNH MAT 3525/3526; ZF TE ML 06A/06B/06C/07B

#### AVAILABLE IN PACKS



AGROMAX 2G SAE	15W-40
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.5
Viscosity index, min.	135
Pour point, max., °C	-24
Flash point, min., °C	230



### JD FLUID

Multi-purpose oil intended for lubrication in tractors and other agricultural machinery. Belongs to the UTTO oil group, having a very wide application range.

This type of oil is used for lubrication of transmissions, hydraulics and wet brakes in medium and high-power tractors.

Recommended for lubrication in John Deere tractors, as well as in other manufacturer tractors such oil quality grade is recommended for. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API GL-4; JD J20A/J20C; FORD M2C 86B/134D; CNH MAT 3225/3226; MF CMS M 1143/1135/1145; ZF TE ML 03E/05F; ALLISON C4; CASE MS 1206/07/09

#### AVAILABLE IN PACKS



JD FLUID	
Viscosity at 100°C, mm <sup>2</sup> /s	9.2 - 9.6
Viscosity index, min.	130
Pour point, max., °C	-30
Flash point, min., °C	240



### TRAKTOL M-80 | M-85W

Multi-purpose oil intended for lubrication in tractors and other agricultural machinery. Belongs to the UTTO oil group, having a very wide application range.

This type of oil is used for lubrication of transmissions, hydraulics and wet brakes in medium and low-power tractors.

Applicable for lubrication of tractor types such oil quality grade is recommended for. Drain interval: according to the engine manufacturer recommendations.

#### MEETS SPECIFICATIONS

API GL-4; MIL-L-2105; MF M 1135\*; FORD M2C 134D\*

#### AVAILABLE IN PACKS



TRAKTOL	M-80	M-85W
Viscosity at 100°C, mm <sup>2</sup> /s	14.0 - 15.0	11.0 - 11.5
Viscosity index, min.	90	90
Pour point, max., °C	-15	-27
Flash point, min., °C	240	240





MARINE OILS



**MAXIMA E9**  
SAE 10W-40 | SAE 15W-40

MAXIMA E9 SAE 10W-40 and SAE 15W-40 are fully synthetic engine oils designed for lubrication of high-speed four-stroke marine engines complying with EURO 4, EURO 5 and EURO 6 exhaust emission standards, requiring lowered SAPS contents (sulfated ash  $\leq 1.0$ , sulfur  $\leq 0.4$  and phosphorus  $\leq 0.12$ ).

A special formulation of high-quality base oils and additives successfully prevents sediment formation, protects the engine from wear and keeps the soot dispersed, maintaining thereby engine's efficiency and power. This type of oil belongs to the SHPD (Super High Performance Diesel) oil group, demonstrating a very high performance level.

**MEETS SPECIFICATIONS**

ACEA E9/E7; API CJ-4/CI-4+/CI-4; MB 228.31/228.3; MAN M3575 Approved; Caterpillar ECF-3/ECF-2/ECF-1; Cummins CES 20081; MTU Type 2.1; Volvo VDS-3/VDS-4 Approved; Mack EO-O PP-07; Renault Trucks RLD-3; DEUTZ DQ III-10LA (III-05); Detroit Diesel DDC 93K218

**AVAILABLE IN PACKS**



MAXIMA E9 SAE	10W-40	15W-40
Viscosity at 100°C, mm²/s	14.0 - 15.5	14.0 - 15.5
Viscosity index, min.	150	140
Pour point, max., °C	-27	-24
Flash point, min., °C	240	240



**MAXIMA TURBO**  
SAE 15W-40

MAXIMA TURBO SAE 15W-40 is a top-quality engine oil from SHPD (Super High Performance Diesel) oil group, with a very long drain interval, designed for lubrication of high-speed marine engines propelled by diesel fuel.

A special high-quality base oil and additive formulation keeps the engine clean, prevents piston rings sticking and reduces the vital engine parts wear. It can also be applied in engines complying with EURO 4 and EURO 5 exhaust emission standards, without limited chemical composition requirements (without DPF).

**MEETS SPECIFICATIONS**

API CI-4; ACEA E7/E5/E3/A3/B4; MB 228.3/229.1; MTU Category 2; Caterpillar ECF-2, ECF-1; Global DHD-1; Deutz DQC III-10(III-05); MACK EO-N/EO-M+; MAN 3275 Approved; VOLVO VDS-3 Approved; Cummins CES 20076/7/8 Approved

**AVAILABLE IN PACKS**



MAXIMA TURBO SAE	15W-40
Viscosity at 100°C, mm²/s	14.0 - 15.5
Viscosity index, min.	140
Pour point, max., °C	-21
Flash point, min., °C	230



**MAXIMA MARINE OIL**  
Marine Oil 5 | Marine Oil 70

MO 5 is a quality marine oil intended for engines propelled by residual (HFO) fuels. Its formulation is based on high-quality mineral base oil and additive package with anti-corrosion, detergent and dispersant properties. This type of oil is designed for slump system lubrication in low-speed two-stroke CROSSHEAD diesel engines with separate cylinder lubrication system.

MO 70 is a high-quality marine cylinder oil of SAE 50 viscosity grade, intended for boats engines that use residual fuels. Its formulation is based on high-quality mineral base oil and a special additive package with anti-corrosion, detergent and dispersant properties. This type of oil is designed for slump system lubrication in low-speed two-stroke CROSS-HEAD diesel engines propelled by residual (HFO) fuels with sulfur content up to 4%.

**MEETS SPECIFICATIONS**

API CF

**AVAILABLE IN PACKS**



MAXIMA Marine Oil	MO 5 SAE 30	MO 5 SAE 40	MO 70 SAE 50
Viscosity at 100°C, mm²/s	11.5 - 12.5	14.0 - 15.0	19.0 - 20.0
TBN, mg KOH/g	5	5	70
Viscosity index, min.	90	90	95
Pour point, max., °C	-21	-21	-18
Flash point, min., °C	245	245	244



**MAXIMA MARINE OIL**  
Marine Oil 12 | Marine Oil 30 | Marine Oil 50

MO 12, MO 30 and MO 50 are high-quality, multifunctional TPEO (trunk piston engine oil) marine oils. Their formulation is based on high-quality mineral base oils and a specially selected additive package with excellent anti-corrosion, detergent and dispersant properties, enabling a great acidic combustion product neutralization level.

This type of oil is designed for lubrication in medium-speed and high-speed TPEO diesel engines propelled by distillate fuels with sulfur content up to 1%.

**MEETS SPECIFICATIONS**

API CF

**AVAILABLE IN PACKS**



MAXIMA Marine Oil	MO 12 SAE 30	MO 12 SAE 40	MO 30 SAE 30	MO 30 SAE 40	MO 50 SAE 40
Viscosity at 100°C, mm²/s	11.5 - 12.5	14.0 - 15.0	11.5 - 12.5	14.0 - 15.0	14.0 - 15.0
TBN, mg KOH/g	12	12	30	30	50
Viscosity index, min.	90	90	90	95	95
Pour point, max., °C	-21	-21	-21	-21	-21
Flash point, min., °C	245	245	245	245	245





## HIPOIDNO ULJE TDL

SAE 75W-80 | SAE 75W-90 | SAE 80W-90

Hipoidno ulje TDL are multi-purpose synthetic oils designed for lubricating of various types of gearboxes and gear transmissions, requiring GL-4/GL-5 oil quality level. These oil types demonstrate exceptional low-temperature properties, thus reducing friction and enabling reduction of fuel consumption.

They are intended for lubrication of synchronized and non-synchronized transmission as well as gear system elements in passenger and commercial vehicles, requiring the a/m viscosity grade and quality level.

### MEETS SPECIFICATIONS

**SAE 75W-80; SAE 75W-90:** API GL-4/GL-5; API MT-1; ARVIN MERITOR 0-76-N; DAF; DETROIT DIESEL DFS93K219.01; IVECO; MAN 341 E-3/Z-2; MAN 342 M-3; MACK GO-J; MB 235.8; MIL-PRF-2105E; SAE J2360; SCANIA STO 1.0; ZF TE-ML 02B/05B/07A/12B/12L/12N/16F/17B/19C/21B  
**SAE 80W-90:** API GL-4/GL-5; API MT-1; MIL-PRF-2105E; ARVIN MERITOR; DAF; IVECO; MACK GO-J; MAN 341 E-2/Z-2; MAN 342 M-2; MB 235.0; SCANIA STO 1.0; ZF TE-ML 02B/05A/07A/08/12L/12M/16B/16C/16D/17B/19B/21A

### AVAILABLE IN PACKS



HYPOID OIL TDL SAE	75W-80	75W-90	80W-90
Viscosity at 100°C, mm²/s	8.5 - 9.0	15.0 - 17.0	15.0 - 17.0
Viscosity index, min.	145	145	115
Viscosity	na -40°C	<150000	-
Brookfield, mPas	na -26°C	-	<150000
Flash point, min., °C	195	200	200



## HIPOIDNO ULJE B

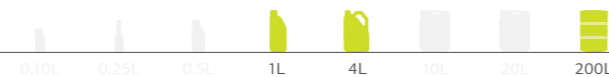
SAE 80W-90 | SAE 85W-140 | SAE 80W | SAE 90 | SAE 140 | SAE 250

Multi-purpose mineral oils intended for gear transmission lubrication and lubrication of extremely loaded motor vehicle hypoid, spiral-bevel, worm transmissions, as well as toothed transmissions of similar design, for which the application of EP oils is recommended. Applied as lubricant in passenger car, commercial vehicle, construction, mining and agricultural machinery transmission systems, where the API GL-5 quality level is recommended.

### MEETS SPECIFICATIONS

**SAE 80W-90; SAE 85W-140:** API GL-5, MIL-L-2105D, MB 235.0, VOITH 3.325-339, VOLVO 97310, VOLVO 97316, ZF TE ML 07A/08/16B/16C/16D/17B/19B/21A, DAF, MAN 341 E1, 342 M1  
**SAE 80W; SAE 140; SAE 250:** API GL-5, ZF TE ML 07A/08  
**SAE 90:** API GL-5, ZF TE ML 07A/08; MAN 342 Typ M1 Approved

### AVAILABLE IN PACKS



HYPOID OIL B SAE	80W-90	85W-140	80W	90	140	250
Viscosity at 100°C, mm²/s	15.0 - 17.0	25.0 - 27.0	8.5 - 9.5	16.5 - 17.5	25.0 - 27.0	42.0 - 46.0
Viscosity index, min.	110	105	100	90	90	90
Pour point, max., °C	-21	-18	-18	-15	-9	-6
Flash point, min., °C	220	230	230	230	230	230



## HIPOIDNO ULJE LS

SAE 80W-90 | SAE 90

Hipoidno ulje LS is recommended for lubrication of toothed transmissions, which, in addition to basic typical requirements, must also possess the required LS (Limited Slip) properties. Applicable in all types of vehicles and machinery where such quality level is required by the manufacturer.

Applied as lubricant in passenger car, commercial vehicle, construction, mining and agricultural machinery transmission systems, where the API GL-5 quality level is recommended.

### MEETS SPECIFICATIONS

API GL-5, MIL-L-2105D, ZF TE ML 05C/07A/08/12C/16B/16C/16D/16E/17B/19B/21A/21C, DAF, MAN 341 E1, 342 M1, MB 235.0, VOITH 3.325-339, VOLVO 97310, VOLVO 97316

### AVAILABLE IN PACKS



HYPOID OIL LS SAE	80W-90	90
Viscosity at 100°C, mm²/s	15.0 - 17.0	25.0 - 27.0
Viscosity index, min.	110	105
Pour point, max., °C	-21	-18
Flash point, min., °C	220	230



## TRANSLUB GL-4

SAE 80W-90 | SAE 80W

Multi-purpose oil intended for lubrication of toothed transmissions. Applied as lubricant for toothed transmissions in commercial vehicle, passenger vehicle, agricultural, construction and mining machinery synchronized and non-synchronized gear transmissions. It can also be used for lubricating of normally loaded drive shaft, where the API GL-4 quality level is recommended.

### MEETS SPECIFICATIONS

**SAE 80W-90:** API GL-4, MB 235.1, MAN 341E-1, MAN 341 Z-2, ZF TE-ML 02B/06L/08/16A/17/19A/19C  
**SAE 80W:** API GL-4; MIL-L-2105; MAN 341; MB 235.1; ZF TE ML 02A/08/17A

### AVAILABLE IN PACKS



TRANSLUB GL-4 SAE	80W-90	80W
Viscosity at 100°C, mm²/s	15.0 - 17.0	8.5 - 9.5
Viscosity index, min.	100	95
Pour point, max., °C	-21	-20
Flash point, min., °C	220	220



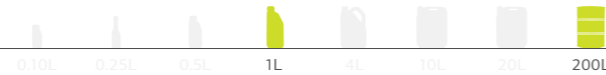
**MATIK  
DX III**

Matik DX III is a universal automatic transmission oil, intended for lubricating of world's leading manufacturer motor vehicle automatic transmissions. This type of oil has excellent low-temperature properties, good thermal and oxidation stability, as well as very good anti-wear properties. According to manufacturers instructions, it can be applied in all automatic gear transmissions requiring GM DEXRON quality level.

**MEETS SPECIFICATIONS**

GM DEXRON III; FORD MERCON M; MB 236.1/236.5/236.6/236.7/236.9; ALLISON C-4; CATERPILLAR TO-2, MAN 339 Z1, V1, Z2, V2; VOITH G 607 Approved

**AVAILABLE IN PACKS**



MATIK	DX III
Viscosity at 100°C, mm <sup>2</sup> /s	7.0 - 7.3
Viscosity index, min.	180
Pour point, max., °C	-50
Flash point, min., °C	230



**MATIK  
DX II**

Matik DX II is a universal oil used for lubrication of automatic transmissions, power steering and similar assemblies. It is characterized by excellent low-temperature and anti-wear properties, as well as by good thermal and oxidation stability. According to manufacturers instructions, it can be applied in all automatic gear transmissions requiring GM DEXRON II D quality level.

**MEETS SPECIFICATIONS**

GM DEXRON II D; VOITH G 607 Approved; FORD M2C 138 CJ/166H; ALLISON C-4; MB 236.7; MAN 329 D

**AVAILABLE IN PACKS**



MATIK	DX II
Viscosity at 100°C, mm <sup>2</sup> /s	7.0 - 7.3
Viscosity index, min.	170
Pour point, max., °C	-39
Flash point, min., °C	220



**MATIK ATF  
TYPE A**

Universal oil for lubrication of automatic transmission systems in motor vehicles, also in agricultural, mining and construction machinery (automatic gear levers, hydraulic steering systems, hydraulic couplings, torque converters, heavy vehicle power controls, etc.) for which Type A Suffix A (TASA) oil quality level is recommended.

**MEETS SPECIFICATIONS**

ATF type A Suffix A; MB 236.2; ALLISON C-3; VOITH; MAN 339 type A; Volvo 97325

**AVAILABLE IN PACKS**



MATIK ATF	TYPE A
Viscosity at 100°C, mm <sup>2</sup> /s	7.0 - 7.5
Viscosity index, min.	140
Pour point, max., °C	-21
Flash point, min., °C	230

■ HYDRODYNAMIC TRANSMISSION OIL

**ALISON FLUID TCF  
SAE 10W | SAE 30**

Universal monograde oil designed for torque converters in heavy mining, construction and other machinery, requiring oil performance level complying with Allison C4 and Caterpillar TO-4 specifications. Provides better wear protection, compared to C3 and TO-2 fluids.

**MEETS SPECIFICATIONS**

API GL-4, Caterpillar TO-2/4, Caterpillar TO-4M, Allison C-4, Komatsu KES 07.868.1, Sperry Vickers/Eaton M2950S, I-280-S

**AVAILABLE IN PACKS**



ALISON FLUID TCF SAE	10W	30
Viscosity at 100°C, mm <sup>2</sup> /s	5.7 - 7.0	9.3 - 10.0
Viscosity index, min.	120	110
Pour point, max., °C	-27	-15
Flash point, min., °C	230	240





HYDRAULIC BRAKE FLUIDS

# HYDRAULIC BRAKE FLUIDS

Synthetic fluids



## UHK RACING

**DOT 5.1**

Synthetic fluid designed for hydraulic brake system in racing cars and motorcycles operating in extremely harsh conditions during circular track, mountain and rally races. This type of oil is also recommended to drivers of all other car and motorcycle models, preferring "sharp" driving, thus forced to brake more frequently and more harshly.

### MEETS SPECIFICATIONS

SAE J 1703, SAE J 1704, ISO 4925 Class 5.1, FMVSS 116 DOT 5.1

### AVAILABLE IN PACKS



UHK RACING	DOT 5.1
Viscosity at 100°C, mm <sup>2</sup> /s	1.5
Viscosity at -40°C, mm <sup>2</sup> /s	900
Boiling point, min., °C	260
Wet boiling point, min., °C	180



## UHK 4

**DOT 4**

A type of liquid intended for pressure transmission in hydraulic brake systems of all motor vehicle types, for which DOT-4 quality level is recommended.

Applied in leading world and European automotive manufacturer brake systems. It can also be used for hydraulic couplings in motor vehicles, agricultural and construction machinery, as well as for shock absorbers and similar hydraulic systems such type of fluid is recommended by manufacturers for.

### MEETS SPECIFICATIONS

SAE J 1703, SAE J 1704, ISO 4925 Class 4, FMVSS 116 DOT 4, DBL 7760.40, N 05171, ESD-M6C57-A

### AVAILABLE IN PACKS



UHK 4	DOT 4
Viscosity at 100°C, mm <sup>2</sup> /s	1.5
Viscosity at -40°C, mm <sup>2</sup> /s	1800
Boiling point, min., °C	230
Wet boiling point, min., °C	155

Synthetic/mineral fluids



## UHK 2

**DOT 3**

Brake fluid intended for all braking system types for which DOT-3 quality level is recommended.

It can also be used for hydraulic couplings in motor vehicles, agricultural and construction machinery, as well as for shock absorbers, where such type of fluid is manufacturer recommended.

### MEETS SPECIFICATIONS

SAE J 1703, ISO 4925 Class 3, FMVSS 116 DOT 3, Fiat 9.55597, IVECO 18-820

### AVAILABLE IN PACKS



UHK 2	DOT 3
Viscosity at 100°C, mm <sup>2</sup> /s	1.5
Viscosity at -40°C, mm <sup>2</sup> /s	1500
Boiling point, min., °C	205
Wet boiling point, min., °C	140

### SHOCK ABSORBER HYDRAULIC OIL

## HIDROKIP

**VG 32**

HIDROKIP 32 oil is intended for lubrication of hydraulic dump bodies and shock absorbers. HIDROKIP 32 is a special type of oil, designed for motor vehicle and machinery shock absorbers, for which ISO 32 viscosity grade is recommended.



### MEETS SPECIFICATIONS

TAP tip A, ZCZ 55598, FIAT 55598

### AVAILABLE IN PACKS



HIDROKIP	VG 32
Viscosity at 100°C, mm <sup>2</sup> /s	28.8 - 35.2
Viscosity index, min.	140
Pour point, max., °C	-30
Flash point, min., °C	220



## ENGINE COOLANTS AND PROTECTION FLUIDS





## PERMANT LONG LIFE -40 | LONG LIFE 100

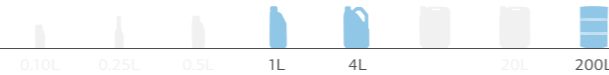
A fluid intended for cooling system protection in VW and other manufacturer vehicles, requiring VW TL 774-D/F (G-12/G-12+) quality level. Fluid replacement interval: after 5 years or 240 000 km.

PERMANT LONG LIFE- 40 is a ready-to-use fluid poured into the vehicle coolant reservoir. PERMANT LONG LIFE 100 is a concentrated fluid, which must be mixed with softened water according to the instructions and ratios listed on the packaging label.

### MEETS SPECIFICATIONS

VW TL 774-D/F (G-12/G-12+); MAN 324-SNF; MB 325.3; MTU MTL 5048; Ford WSS-M97B44-D; John Deere JDM H5; GM/Opel GM 6277M

### AVAILABLE IN PACKS



PERMANT LONG LIFE	-40	100
Color	Red	Red
Density at 15°C, kg/m <sup>3</sup>	1070	1120
pH value	7.0 - 9.0	8.0 - 8.5
Boiling point, min., °C	110	180

■ PERMANT mixing ratio diagram is shown at Page 95



## PERMANT -40 | 100

A fluid intended for both the engine and the entire cooling system protection (replacement interval: 3 years or 100 000 km), which at the same time effectively prevents corrosion and deposit formation inside the cooling system. PERMANT-40 is a ready-to-use fluid which shall be poured directly into the cooling system.

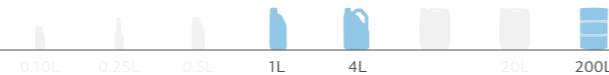
PERMANT 100 is a concentrated fluid, which must be mixed with softened water according to the instructions and ratios listed on the package label.

This product is recommended for use in heavy duty commercial vehicles, mining, construction and agricultural machinery, as well as in passenger car cooling systems.

### MEETS SPECIFICATIONS

MB 325.0; G 05; VW TL 774B; JD JDM H-24; MTU MTL 5048; ASTM D 6210-03 (Type I-FF/III-FF); JIS 2234; UNE26361-88; CUNA NC 956-16; SRPS H.Z2.010 Tip 1/Tip 3

### AVAILABLE IN PACKS



PERMANT	-40	100
Color	Green	Green
Density at 15°C, kg/m <sup>3</sup>	1070	1130
pH value	7.5 - 8.5	6.0 - 7.0
Boiling point, min., °C	110	180

■ PERMANT mixing ratio diagram is shown at Page 95



## PERMANT ECONOMIC -40 | ECONOMIC 100

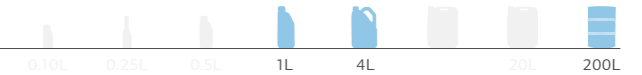
Permant Economic is the product intended for engine and cooling system protection. This type of coolant offers anti-frost protection up to -400C, as well as protection against corrosion. Provides a 3-year system protection.

PERMANT ECONOMIC -40 a ready-to-use fluid poured into the vehicle coolant reservoir. PERMANT ECONOMIC 100 is a concentrated fluid, which must be mixed with softened water according to the instructions and ratios listed on the packaging label.

### MEETS SPECIFICATIONS

BS 6580; AFNOR R 15-601; SAE J 1034; ASTM D 3306; VW TL 774-C (G11); MB 325.0; MAN 324 NF; BMW N 600 69.0; Ford WSS-M97B44-C

### AVAILABLE IN PACKS



PERMANT ECONOMIC	-40	100
Color	Green	Dark green
Density at 15°C, kg/m <sup>3</sup>	1065	1100
pH value	7.5 - 9.0	7.5 - 9.0
Boiling point, min., °C	110	180

■ PERMANT mixing ratio diagram is shown at Page 95



## PERMANT ECONOMIC 100 CENTRAL HEATING

PERMANT ECONOMIC 100 is intended for central heating system protection against: freezing, rust, corrosion, cavitation and foaming, thus providing maximum cooling system cleanliness.

It is completely safe to use in all cast iron and aluminum constructions, as well as in systems containing aluminum and copper alloy structural parts. This fluid must be mixed with the softened water according to the instructions and ratios listed on the packaging label.

### MEETS SPECIFICATIONS

BS 6580; AFNOR R 15-601; SAE J 1034; ASTM D 3306

### AVAILABLE IN PACKS



PERMANT	100
Color	Dark green
Density at 15°C, kg/m <sup>3</sup>	1100
pH value	7.5 - 9.0
Boiling point, min., °C	180

■ PERMANT mixing ratio diagram is shown at Page 95



SPECIAL AUTOMOTIVE SERVICE PRODUCTS



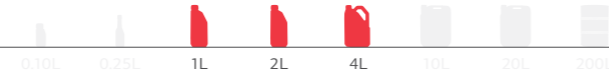
## MOSOL WINTER | SUMMER

This is a service fluid intended for cleaning, washing and frost protection of the windscreen washer system. Fully and effectively removes all kinds of dirt from the windscreen, including insect stains. Provides good visibility and safe driving in bad weather conditions (rain, snow, muddy driveway etc.).

### MEETS SPECIFICATIONS

IS-M.5.01.001

### AVAILABLE IN PACKS



MOSOL	WINTER	SUMMER
Color	Blue	Yellow
Scent	Lavender	Lavender
Density at 15°C, kg/m <sup>3</sup>	970	990
Freezing point, min., °C	-22	-2



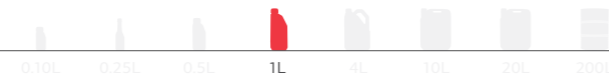
## DEMI WATER

DEMI WATER is demineralised water, intended for diluting of engine coolant & protection fluids, and also for diluting of PERMANT ECONOMIC 100, PERMANT 100, PERMANT LONG LIFE 100 central heating protection fluids and other concentrated antifreeze fluids. Diluting shall be performed according to the instructions listed on the packaging label. This product can also be used in batteries, irons, for alcohol diluting, as well as for other purposes.

### MEETS SPECIFICATIONS

IS-M.5.01.002

### AVAILABLE IN PACKS



DEMI WATER	
Appearance	Clear
Density at 15°C, kg/m <sup>3</sup>	988
El. conductivity at 25°C, µS/cm	10
pH value	6.7 - 7.5



## AD BLUE

AdBlue is a product intended for use in modern commercial and passenger vehicles fitted with SCR exhaust after-treatment system.

AdBlue is a quality product with an extremely high purity level (phosphates, Ca, Fe, Al, Mg, Na, K content <0.5 mg/kg, Cu, Zn, Cr, Ni content <0.2 mg/kg), manufactured under the most advanced technology.

Application of AdBlue has been approved by leading European and world automotive and engine manufacturers, such as Mercedes-Benz, Iveco, Volvo, Renault, DAF, MAN, Scania.

### MEETS SPECIFICATIONS

ISO 22241, DIN 70070

### AVAILABLE IN PACKS



AD BLUE	
Urea, mass%	31.8 - 33.2
Density at 20°C, g/cm <sup>3</sup>	1.087 - 1.093
Refraction index at 20°C	1.3814 - 1.3843
Alkalinity as NH <sub>3</sub> , mass%	0.2 max.
Aldehydes, mg/kg	5 max.
Insoluble materies, mg/kg	20 max.



## MOTOR CLEANER

MOTOR CLEANER is a product intended for degreasing of engines and other greasy surfaces. Very effectively cleans greasy or dirty surfaces, providing a flawless engine cleanliness. After application of this agent, cleaned surfaces can be rinsed with cold or warm water.

### MEETS SPECIFICATIONS

IS-M.5.01.002

### AVAILABLE IN PACKS



MOTOR CLEANER	
Viscosity at 40°C, mm <sup>2</sup> /s	3
Density at 15°C, kg/m <sup>3</sup>	838
TBN, min. mg KOH/g	9.5



## ADDITIVE / ADITIV DIESEL / DIZEL

Application of DIESEL FUEL ADDITIVE ensures easy engine low temperature start (up to -25 °C), better fuel flowability and filterability at low temperatures, better lubricity, nozzle and valve cleanliness, corrosion protection, better combustion, as well as fuel saving.

It also helps increase the cetane number by more than 2 units, and reduce harmful gas emissions. Application: one 0.25 l bottle added into 50 l of diesel fuel.

### MEETS SPECIFICATIONS

IS-M.5.02.001

### AVAILABLE IN PACKS



### DIESEL ADDITIVE

Viscosity at 40°C, mm <sup>2</sup> /s	3.5
Density at 15°C, kg/m <sup>3</sup>	840
TBN, min. mg KOH/g	7



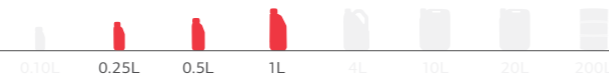
## ADDITIVE / ADITIV DIESEL LUBE PLUS

Diesel fuel additive DIESEL LUBE PLUS is an additive recommended as euro-diesel supplement, designed to improve fuel lubricating characteristics and to protect sensitive parts of the injection system against wear. Diesel fuel additive DIESEL LUBE PLUS is intended for older-vehicle engines, which have been previously using D2-type diesel fuel. Supplementing this additive to the fuel helps a protective layer be formed on the metal surfaces of the injection system, thus reducing friction and increasing fuel lubricity. This kind of product is compatible with other fuel additives. It protects the high-pressure fuel pump, as well as direct, indirect and common rail injection system against wear. Application: according to the ratio listed on the packaging label.

### MEETS SPECIFICATIONS

IS-M.5.02.001

### AVAILABLE IN PACKS



### ADITIV DIESEL LUBE PLUS

Viscosity at 100°C, mm <sup>2</sup> /s	3.1
Density at 15°C, kg/m <sup>3</sup>	908
Acid number, mg KOH/g	7.5 - 8.5
Flash point, min., °C	160



## ADDITIVE / ADITIV GASOLINE / BENZIN

GASOLINE ADDITIVE is applied as a gasoline supplement, designed to prevent deposit formation on valves, pistons, piston rings, spark plugs and other surfaces within the combustion area.

Regular use of GASOLINE ADDITIVE ensures efficient fuel combustion at all engine operating conditions, and allows an approx. 2-3% fuel saving. Application: one 0.25 l bottle added into 80 l of gasoline.

### MEETS SPECIFICATIONS

IS - M.5.02.003

### AVAILABLE IN PACKS



### GASOLINE ADDITIVE

Viscosity at 40°C, mm <sup>2</sup> /s	7.5
Density at 15°C, kg/m <sup>3</sup>	925
TBN, min. mg KOH/g	12.5



## RADIATOR SEALANT/ZAPTIVAČ

Zaptivač is a synthetic product intended for repairing vehicle radiator gaps and cracks. It fully covers cracks and holes formed in the vehicle radiator, ensuring smooth coolant circulation in the engine cooling system and thus a normal engine operation.

### MEETS SPECIFICATIONS

IS-M.5.01.003

### AVAILABLE IN PACKS



### RADIATOR SEALANT

Density at 15°C, kg/m <sup>3</sup>	1080
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HYDRAULIC SYSTEM OILS AND FLUIDS



## HIDRAULIČNO ULJE / HYDRAULIC OIL HD

ISO VG 5 | 10 | 15 | 22 | 32 | 46 | 68 | 100 | 150 | 220 | 320 | 460

HD hydraulic oils are applied in modern hydraulic systems operating under moderate load and at relatively constant temperatures.

Lower viscosity grade HD oils are used as hydraulic media for power transfer in high-precision low-power machines (spindles, grinding spindles, precision machine tools). Medium viscosity HD oil grades are used in medium-power-pressure-and-load hydraulic systems (presses, cranes, machine tools). Besides that, they are suitable for lubrication of medium-pressure toothed gear pumps and rotary piston pumps.

Higher viscosity grade HD oils are used in high-temperature-and-load operating conditions.

### MEETS SPECIFICATIONS

ISO 6743/4 (HM); DIN 51524/2 (HLP); AFNOR NF E 48-603 (HM); DENISON HF-0/HF-2 (Approved ISO VG 32, ISO VG 46, ISO VG 68); SPERRY VICKERS I-286-S; CINCINNATI MACHINE P-68 (ISO VG 32), P-70 (ISO VG 46), P-69 (ISO VG 68)

### AVAILABLE IN PACKS



HYDRAULIC OIL HD	5	10	15	22	32	46	68	100	150	220	320	460
Viscosity at 40°C, mm <sup>2</sup> /s	4.14-5.06	9.0-11.0	13.5-16.5	19.8-24.2	28.8-35.2	41.4-50.6	61.2-74.8	90-110	135-165	198-242	288-352	414-506
Viscosity index, min.	90	95	100	115	120	120	110	95	90	90	90	90
Pour point, max., °C	-33	-30	-27	-21	-18	-15	-12	-12	-12	-9	-9	-9
Flash point, min., °C	105	150	190	230	230	240	240	240	240	>240	>240	>240



## HIDRAULIČNO ULJE / HYDRAULIC OIL SUPER HVL

ISO VG 15 | 22 | 32 | 46 | 68 | 100 | 150

SUPER HVL hydraulic oils belong to the high-quality hydraulic oil group with high viscosity index, and can be used in variable temperature and pressure conditions.

They are designed for lubrication of outdoor hydraulic systems, as well as for other systems exposed to the ambient influence.

Application of such oils ensures smooth operation of hydraulic systems, mobile cranes, excavators, loaders, dumpers and forklifts. Exceptional quality of these oils, formulated with zinc-free additive packages, provides good protection against wear, even in the most harsh operating conditions, as well as corrosion protection, good filterability, and an excellent thermal and oxidation stability.

### MEETS SPECIFICATIONS

ISO 6743/4 (HV); DIN 51524/3 (HVL); AFNOR NF E 48-603 (HV); DENISON HF-0/HF-2; SPERRY VICKERS M-2950-S/I-286-S; CINCINNATI-MACHINE P-68 (ISO VG 32), P-70 (ISO VG 46), P-69 (ISO VG 68)

### AVAILABLE IN PACKS



HYDRAULIC OIL SUPER HVL	15	22	32	46	68	100	150
Viscosity at 40°C, mm <sup>2</sup> /s	13.5 - 16.5	19.8 - 24.2	28.8 - 35.2	41.4 - 50.6	61.2 - 74.8	90 - 110	135 - 165
Viscosity index, min.	140	140	140	140	140	140	120
Pour point, max., °C	-39	-39	-30	-27	-24	-21	-18
Flash point, min., °C	180	200	220	230	240	240	240



## HIDRAULIČNO ULJE / HYDRAULIC OIL MH 46

MH 46 hydraulic oil is a specially formulated oil for hydraulic systems, with very high viscosity index and with extended drain interval of up to 5,000 operating hours. It is designed for working machine hydraulic systems with hydraulic power transmission, operating under heavy load.

This type of oil is characterized by exceptional filterability, even in the presence of water. Provides outstanding wear protection in severe service conditions. It is characterized by exceptional oxidation and thermal stability, thus preventing varnish and sludge formation. Due to the high viscosity index, this oil can be applied instead of recommended VG 32, 46 and 68 oil grades.

### MEETS SPECIFICATIONS

DENISON HF-0; CINCINNATI MACHINE P-70; DIN 51524-2/3; EATON VICKERS 35VQ-25; BOSCH REXROTH 90220

### AVAILABLE IN PACKS



HYDRAULIC OIL MH	46
Viscosity at 40°C, mm <sup>2</sup> /s	41.4 - 50.6
Viscosity index, min.	177
Pour point, max., °C	-34
Flash point, min., °C	230



## HIDRAULIČNO ULJE / HYDRAULIC OIL HLPD

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

HLPD hydraulic oils are multi-purpose hydraulic oils with exceptional detergent properties. Application of these oils prevents the sludge and varnish formation on sensitive hydraulic system, machine tool and other machine parts.

Applicable in modern machine tools with highly developed management and control systems, fitted with control valves and sensitive electro-hydraulic servo devices that must be fine-filter protected for possible damage prevention.

Such oils have an excellent oxidation, thermal and chemical stability, good filterability, excellent anticorrosion and anti-wear properties.

### MEETS SPECIFICATIONS

ISO 6743/4 (HM); DIN 51524/2 (HLPD); AFNOR NF E 48-603 (HM); DENISON HF-0/HF-2; CINCINNATI MACHINE P-68 (ISO VG 32), P-69 (ISO VG 68), P-70 (ISO VG 46)

### AVAILABLE IN PACKS



HYDRAULIC OIL HLPD	15	22	32	46	68	100
Viscosity at 40°C, mm <sup>2</sup> /s	13.5 - 16.5	19.8 - 24.2	28.8 - 35.2	41.4 - 50.6	61.2 - 74.8	90 - 110
Viscosity index, min.	100	120	120	120	110	100
Pour point, max., °C	-27	-21	-18	-15	-12	-12
Flash point, min., °C	200	225	240	240	240	240

## BIOHYDRAULIC HEES ISO VG: 46, 68

An environment-friendly hydraulic fluid manufactured from biodegradable synthetic esters, enriched with selected ashless additives. It is used in outdoor hydraulic systems, also in hydraulic systems operated in places under the spill and environment pollution risk. Biohidraulik-HEES oil is used in mining, construction and agricultural machinery. Its high viscosity index allows a smooth system operation within the temperature range from -30°C to 120°C. This type of oil is characterized by good load-carrying capacity.

### MEETS SPECIFICATIONS

ISO 6743-4 HEES, ISO 15380/2002 (E), VDMA 24568 HEES

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

BIOHYDRAULIC ISO VG	1	2	3	4
46	41,4-50,6	140	-30	250
68	61,2-74,8	140	-30	250

## HYDRAULIC FLUID HFC 46

Hydraulic fluid HFC-46 is a synthetic hydraulic fluid with polyglycol, water and additive package-based formulation. It is used in hydraulic systems requiring application of water-soluble, non-flammable fluids.

Applied in metal processing industry, mines, iron work factories, foundries and other places where the use of non-flammable fluids is required.

### MEETS SPECIFICATIONS

ISO 6743-4, ISO-L-HFC, ISO 12922 HFC, VDMA 24317 HFC, DIN 51502

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C

HYDRAULIC FLUID HFC 46 ISO VG	1	2
46	41,4-50,6	-33

## HYDRAULIC FLUID HFD-U 46

Hydraulic fluid HFD-U 46 is a non-flammable with biodegradable synthetic ester and additive package-based formulation.

It is used in hydraulic systems requiring application of non-flammable hydraulic fluids. Applicable in iron work factories, metal processing industry, foundries, mines and other places where the use of non-flammable fluids is required.

### MEETS SPECIFICATIONS

ISO 6743/4 HFD-U, ISO 12922 HFD-U, DIN 51502

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

HYDRAULIC FLUID HFD-U 46 ISO VG	1	2	3
46	41,4-50,6	-33	280

## HIDROLUBE HPM

Hidrolube HPM is a semi-synthetic emulsion oil manufactured from high quality base oils and emulsifiers, enriched with bactericides and fungicides. Hidrolube HPM is used as hydraulic medium for power transmission in emulsion-using systems, such as hydraulic roof supports at pit coal mining, as well as for independent hydraulic pillar backfilling. Depending on the operating conditions, emulsion concentration ratio varies from 3-5%.

### MEETS SPECIFICATIONS

ISO 6743/4 HFAE

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 5% emulsion
- 2 Emulsion appearance
- 3 Corrosivity of 5% emulsion

HIDROLUBE	1	2	3
HPM	8,5-9,5	milky	0

## HIDROLUBE HPM - S

Hidrolube HPM-S is a fluid manufactured from synthetic components, water, bactericides and fungicides. Hidrolube HPM-S is used as hydraulic medium for power transmission in aqueous solution-using systems, such as hydraulic roof supports at pit coal mining, as well as for independent hydraulic pillar backfilling. Depending on the operating conditions, aqueous solution concentration ratio varies from 3-5%.

### MEETS SPECIFICATIONS

ISO 6743/4 HFAS

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 5% emulsion
- 2 Emulsion appearance
- 3 Corrosivity of 5% emulsion

HIDROLUBE	1	2	3
HPM - S	8,5-9,5	clear	0



INDUSTRIAL OILS



## CIRKULACIONA ULJA / CIRCULATING OIL M

ISO VG :10, 15, 22, 32, 46, 68, 100, 150, 220, 320, 460, 680, 800, 1000

Circulating oil "M" are used in circulation systems for plain bearing lubrication, either as an oil bath or oil mist, as well as for lubrication of toothed transmissions not requiring application of oils with anti-wear and EP properties. Lower circulating oil viscosity grades are designed for lubrication of high speed spindles, precision grinders and textile industry spindles. Higher oil viscosity grades are used for lubrication of steam engine cylinders, as well as in circulating systems of medium-loaded toothed transmissions and bearings operating at medium-elevated temperatures, where application of oils with EP properties is not required.

### MEETS SPECIFICATIONS

DIN 51524/1, ISO 6743/6 CKB, ISO 6743/4 (HL), ISO 11158

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

CIRCULATING OILS M				
ISO VG	1	2	3	
10	9,0-11,0	-30	130	
15	13,5-16,5	-27	170	
22	19,8-24,2	-21	220	
32	28,8-35,2	-18	240	
46	41,4-50,6	-15	240	
68	61,2-74,8	-12	240	
100	90-110	-12	250	
150	135-165	-9	260	
220	198-242	-9	260	
320	288-352	-6	>260	
460	414-506	-6	>260	
680	612-748	-6	>260	
800	720-880	-6	>260	
1000	900-1000	-6	>260	

## MOLUBE CS

ISO VG : 46, 68, 100, 150, 220, 320, 460, 680, 1000

MOLUBE CS circulating oils are used for lubrication of industrial systems operating under increased water presence conditions. They are especially recommended for lubricating of Morgoil and Demag bearings, rolling mill units, reducers, centrifugal pumps, air compressors and similar devices. Such oils are mostly applied in large lubrication systems, primarily in rolling mills and paper industry plants. They have excellent demulsifying properties, good oxidation and thermal stability, as well as excellent air separation properties. They also provide good protection against corrosion.

### MEETS SPECIFICATIONS

DIN 51506, ISO 6743/4 (HL), Morgan Construction Company

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

MOLUBE CS				
ISO VG	1	2	3	
46	41,4-50,6	-15	200	
68	61,2-74,8	-15	240	
100	90-110	-12	250	
150	135-165	-12	>260	
220	198-242	-9	>260	
320	288-352	-9	>260	
460	414-506	-6	>260	
680	612-748	-6	>260	
1000	900-1000	-6	>260	

## KOMPRIMOL

ISO VG: 46, 68, 100, 150, 220, 320, 460, 680, 1000

Komprimol is a high quality mineral oil designed for lubrication of reciprocating and rotary air compressors, as well as for vacuum pumps operating under wide temperature, speed and load range.

It is characterized by good oxidation stability, excellent anti-corrosion properties, and good water separation capability. Suitable for application in air compressors with operating temperature reaching up to 220°C.

### MEETS SPECIFICATIONS

ISO 6521 LDAB : ISO 6521 LDAA; DIN 51506 VDL; DIN 51506 VBL

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

KOMPRIMOL				
ISO VG	1	2	3	
46	41,4-50,6	-15	200	
68	61,2-74,8	-15	240	
100	90-110	-12	250	
150	135-165	-12	>260	
220	198-242	-9	>260	
320	288-352	-9	>260	
460	414-506	-6	>260	
680	612-748	-6	>260	
1000	900-1000	-6	>260	

## KOMPRIMOL VK

ISO VG: 15, 32, 46, 68, 100, 150

Komprimol VK is a high-quality compressor oil providing good equipment protection, applicable in very harsh operating conditions. It is designed for lubrication of screw air compressors operating under a wide temperature, speed and load range. This oil contains ashless antiwear additives, providing maximum protection against wear and corrosion, and ensuring vital compressor parts cleanliness. It has good water separation capability, thus reducing the possibility of sludge formation inside the crankcase and drain hoses.

### MEETS SPECIFICATIONS

ISO 6743-3, VICKERS V 104 C, "TRUDBENIK" Dobojo, ISO / DP 6521 (DAA, DAB, DAH, DAG), DIN 51506 (VBL, VCL, VDL)

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

KOMPRIMOL VK				
ISO VG	1	2	3	4
15	13,5-16,5	110	-24	180
32	28,8-35,2	110	-24	230
46	41,4-50,6	110	-24	240
68	61,2-74,8	110	-21	240
100	90-110	95	-18	240
150	135-165	90	-9	250

## FRIGOL

ISO VG: 15, 32, 46, 68

Frigol oils are intended for lubrication of compressor cooling units in cooling devices using ammonia, carbon dioxide, sulfur dioxide, propane, R11, R12, R13, R14, R22, R23, R113, R114, R115, R502 and R503 freons, frigon, and similar cooling media (fluids). They are manufactured from high-quality naphthenic base oils.

Frigol oils are characterized by low pour point, they are foam-resistant and compatible with most commonly used cooling agents.

### MEETS SPECIFICATIONS

DIN 51503 KA, DIN 51503 KC, ISO 6743/3

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

FRIGOL				
ISO VG	1	2	3	
15	13,5-16,5	-42	160	
32	28,8-35,2	-42	180	
46	41,4-50,6	-36	180	
68	61,2-74,8	-33	190	

## REDUKTOL SUPER

ISO VG: 46, 68, 100, 150, 220, 320, 460, 680, 1000

Reduktol Super is the oil recommended for lubrication of high-loaded gear reducers and bearings in industrial plants. Reduktol Super is a top-quality oil used in industrial systems operating under harsh conditions (cement plants, iron work factories, mining, paper industry, rolling mills, rubber industry, etc.). Recommended for lubrication of derrick, excavator, crane and machine tool bearings. It has excellent thermal and oxidation stability, good demulsifying, anti-wear and EP properties. This type of oil provides good protection against corrosion and is foam-resistant.

### MEETS SPECIFICATIONS

DIN 51517/3 (CLP), ISO 12925-1 CKC, ISO 6743-6 CKC, AIST 224, AGMA 9005-E02

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

REDUKTOL SUPER				
ISO VG	1	2	3	4
46	41,4-50,6	120	-15	200
68	61,2-74,8	120	-15	230
100	90-110	90	-15	240
150	135-165	90	-12	>245
220	198-242	90	-9	>245
320	288-352	90	-9	>260
460	414-506	85	-6	>260
680	612-748	85	-6	>260
1000	900-1000	85	-6	>260

## REDUKTOL

HKT 30

Reduktol HKT-30 oil is manufactured from high-quality base oil and specially selected additives. Reduktol HKT-30 is recommended for all hydrokinetic transmissions (with or without toothed parts), couplings, torque converters, reducer units fitted with torque converter and differential, as well as in other similar systems.

This type of oil is characterized by exceptional anti-wear and EP properties. It has excellent thermal and oxidation stability, resulting in long oil service life.

### MEETS SPECIFICATIONS

VOITH; MTU (Motoren und Turbinen Union); MAYBACH

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

REDUKTOL HKT				
ISO VG	1	2	3	4
30	28,8-35,2	120	-25	230

## ULJE ZA KLIZNE STAZE KS / SLIDWAY OIL

ISO VG: 32, 46, 68, 100, 150, 220, 320

Ulje za klizne staze are high-quality oils used for slideway and tool lubricating. Lower slideway oil viscosity grades are designed for lubrication of slideways and hydraulics in combined industrial systems.

Higher slideway oil viscosity grades are designed for lubrication of slideways operating under medium and high-loads. Slideway oils provide excellent protection against corrosion, they have good anti-wear properties and good adhesibility.

### MEETS SPECIFICATIONS

ISO 6743/4 HG (ISO VG 32, ISO VG 46, ISO VG 68); ISO 11158 HG (ISO VG 32, ISO VG 68); MAG CINCINNATI-MACHINE P-53 (ISO VG 32), P-47 (ISO VG 68), P-50 (ISO VG 220); ISO 6743/13 L-G (ISO VG 100, ISO VG 150, ISO VG 220, ISO VG 320); ISO 19378 G-A (ISO VG 100, ISO VG 150, ISO VG 220, ISO VG 320)

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

SLIDWAY OILS KS				
ISO VG	1	2	3	4
32	28,8-35,2	120	-15	220
46	41,4-50,6	120	-9	230
68	61,2-74,8	100	-9	240
100	90-110	90	-9	240
150	135-165	90	-9	260
220	198-242	90	-9	260
320	288-352	90	-6	260

## ULJE ZA KALUPE / MOULD OIL

ISO VG: 150, 200

Mould oil is manufactured from solvent base oil and adhesion-improving additives. It is used as a mould lubricant in gas concrete (aerated concrete) and similar product manufacturing. This type of oil has very strong adhesibility properties, thus allowing easy detaching of gas concrete (aerated concrete) from the mould.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

MOULD OIL	1	2	3
ISO VG			
150	135-170	-9	240
200	185-205	-6	240

### MEETS SPECIFICATIONS

ISO 3448

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## ULJE ZA OPLATE / FORMWORK RELEASE OIL

ISO VG: 15

Formwork release oil is a high-quality oil, containing adhesion-improving additives. It is used as a coating agent for steel, wood and similar formwork (moulds) in concrete manufacturing. Formwork release oil ensures easy detaching of concrete from the formwork, thus leaving the concrete surface smooth.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

FORMWORK RELEASE OIL UP-15	1	2	3
ISO VG			
15	13.5-15.5	-15	180

### MEETS SPECIFICATIONS

ISO 3448

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TURBINE OIL

ISO VG 32, 46, 68, 100

Turbine oil is a superior quality oil, with a formulation based on hydrocracked base oils with increased oxidation stability, enriched with anti-wear & corrosion additive package. It is used for lubrication and cooling of steam, water and gas turbine bearings and toothed transmissions, requiring quality level as indicated in relevant specifications. Such oils provide appropriate sealing, thus contributing to the reliable control and regulation system operation. The product is released with viscosity grades 32, 46, 68 and 100.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Viscosity index, min.
- 3 Pour point, max., °C
- 4 Flash point, min., °C

TURBINE OIL	1	2	3	4
ISO VG				
32	28,8-35,2	120	-6	200
46	41,6-50,6	120	-6	220
68	61,2-74,8	90	-6	230
100	90-110	90	-6	240

### MEETS SPECIFICATIONS

ISO 8068, DIN 51515 dio 1, BS 489, Siemens TLV 9013, BS 489, Alstom HTGD 90117

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TRANSTERM

2000

TRANSTERM 2000 is a heat transfer oil, manufactured from paraffin-based narrow hydrocracked base oil cuts.

It is recommended as a heat transfer agent in closed heating systems, operating at a temperature range from -10°C to 320°C. This type of oil has a very strong thermal stability, high specific heat capacity and thermal conductivity, as well as low thermal expansion coefficient, resulting in small pressure increase at temperatures over 300°C.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

TRANSTERM	1	2	3
2000	28,8-35,2	-8	240

### MEETS SPECIFICATIONS

ISO 6743-12 (L-QC); DIN 51522

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TRAFOMOL

Trafomol is a uninhibited insulating oil for transformers, manufactured from specially refined high-purity base oil.

It has high dielectric strength, as well as an appropriate specific heat capacity and thermal conductivity. This type of oil is used for isolating and cooling of various electrical drive equipment, such as transformers, switches, dampers, oil cables, etc.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

TRAFOMOL	1	2	3
	12,0	-40	135

### MEETS SPECIFICATIONS

IEC 60296 (U):2012

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TRAFOMOL

SPECIAL

Trafomol Special is an inhibited transformer oil with high dielectric strength, appropriate specific heat capacity and thermal conductivity.

It is manufactured from specially refined high-purity base oil and oxidation inhibitor. This type of oil is used for isolation and cooling of various electrical drive equipment, such as transformers, switches, oil cables, etc.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Pour point, max., °C
- 3 Flash point, min., °C

TRAFOMOL	1	2	3
SPECIAL	12,0	-40	135

### MEETS SPECIFICATIONS

IEC 60296 (I):2012

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## CUTTING OIL/ULJE ZA REZANJE

### EPN -10, EPN-22, EPN-32, EPN-46

Multi-purpose oils used for cooling and lubrication at machining of all metal types. Such oils are manufactured from refined mineral oil, enriched with chlorine and active sulfur-free additives, and characterized by good antioxidant, anti-corrosion and anti-wear properties. They have an extremely wide application range, being especially effective at steel and non-ferrous metal processing. These oil types are used at machining requiring high surface finish quality. They can also be used in automates, where, besides cooling, they also have a machine lubricating function.

#### MEETS SPECIFICATIONS

ISO 6743/7, L-MHC, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

CUTTING OIL	1	2	3
EPN 10	9-11	105	1b
EPN 22	19,8-24,2	170	1b
EPN 32	28,2-35,2	180	1b
EPN 46	41,4-50,6	190	1b

## MOLUB

### OZ

A non-emulsifying type of inactive oil designed for all types of steel, cast steel, non-ferrous metal and non-ferrous alloys processing. It is manufactured from mineral base oils, enriched with anti-wear and EP additives, corrosion and oxidation inhibitors, as well as with lubricity and adhesion-improving additives. This type of oil is used at gearing, high-speed milling and cutting operations. It does not have adverse impact to copper and copper alloys. Recommended for metalwork performed on Gleson, Cerlikon and Klingelberg machines.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHE, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
OZ	41,0-46,0	190	1b

## MOLUB

### NA

A non-emulsifying type of inactive oil designed for all types of steel and non-ferrous metal processing on lathes and automated machines. It is manufactured from mineral base oils, and enriched with anti-wear and EP additives, as well as corrosion and oxidation inhibitors. Recommended for indexable automated lathe machining. Molub NA does not have adverse impact to copper and copper alloys.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHE, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
NA	41,0-46,0	190	1b

## MOLUB

### FS

Non-emulsifying type of inactive metalworking oil designed for cooling and lubrication at all kind of material fine blanking. Special EP additives allow this type of oil to be applied at complex deep drawing operations. Recommended for lubrication of Feintal presses tooling. It can also be used in other machines and blanking automates. This type of oil is manufactured from mineral base oils, enriched with anti-wear and EP additives, corrosion and oxidation inhibitors, as well as with lubricity and adhesion-improving additives. It does not have adverse impact to copper and copper alloys.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHE, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
FS	90-100	200	1b

## MOLUB

### HF

Molub HF is an inactive oil used at honing, finishing and super finishing processes. It can be applied at final processing of all materials, except for aluminum and aluminum alloys. Due to its low viscosity, this type of oil has a good rinsing and fully-developed heat transfer capacity. It also has exceptional lubrication qualities.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHC, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
HF	4,0-5,0	100	1b

## MOLUB

### HK

Molub HK is an inactive type of oil used at heavy metalwork operations, such as cold forging, as well as at light metalwork operations, such as cold deformation and punching of all steel types. Contains selected additive package, ensuring extremely high pressure persistence, along with good machining results. It does not have adverse impact to non-ferrous metals, so it can be used for more complex machining of copper and copper alloys. This type of oil provides good cooling and lubrication, resulting in long tool service life.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHE, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
HK	70-100	200	1b

## MOLUB

### BR 25 | BR 35

Molub BR 25 and Molub BR 35 are inactive-type oils used for grinding of tool steel, high-speed, fire-resistant, acid-resistant and stainless alloy steel. It is recommended for profile grinding on Reishauer grinders. Molub BR 25 is used for profile grinding on Reishauer grinding machines with supporting cooling aggregate, while Molub BR 35 is used in Reishauer grinders without cooling aggregate.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHB, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
BR 25	20-24	160	1b
BR 35	38-41	170	1b

## MOLUB

### IP 32 | IP 46

Non-emulsifying type of inactive metalwork oil designed for lubrication at cold drawing operations performed through steel plate and profile matrixes at higher drawing speeds. It is manufactured from mineral base oils, enriched with anti-wear and EP additives, as well as with corrosion and oxidation inhibitors. This type of oil is designed for machining of such alloy steel being most difficult to machining. It does not have adverse impact to copper and copper alloys.

#### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHE, ISO/TS 12927

#### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
IP 32	28,2-35,2	180	1b
IP 46	41,4-50,6	180	1b

## MOLUB VP | HP

MOLUB VP and MOLUB HP are very efficient cooling lubrication oils used at metal machining with boundary lubrication. Application of these oils allows fair cooling, preventing at the same time deposit formation on tool cutting blades, thus extending tool service life.

Such oils are used for cooling lubrication at all steel types vertical (VB) or horizontal (HB) broaching, grooving and threading, and also at blind hole drilling. They have adverse impact to copper and copper alloys.

### MEETS SPECIFICATIONS

ISO 6743/7, L - MHF; ISO/TS 12927

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
VP	28-33	180	4c
HP	58-62	200	4c

## MOLUB DB

MOLUB DB is a very effective cooling lubrication oil, used at such machining operations as steel gun drilling. Additive selection allows its efficiency at high temperatures, typical for this type of machining. Molub DB is not recommended for machining of copper and copper alloys, as it contains active sulfur, having adverse impact to such materials.

Molub DB has good rinsing and cooling capabilities. Application of this oil prevents spot welding of cutting blade, thus extending tool service life.

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MHF, ISO/TS 12927

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min., °C
- 3 Copper strip corrosion, 3h, 100°C

MOLUB	1	2	3
DB	13,5-15,5	150	4c

### PURE INACTIVE-TYPE MACHINING OILS

DESCRIPTION	TYPE OF METALWORK	TYPE OF MATERIAL PROCESSED
CUTTING OIL EPN 10,	CUTTING, MACHINE LUBRICATION	STEEL, NON-FERROUS METALS
EPN 22, EPN 32, EPN 46	GEARING, HIGH-SPEED MILLING AND CUTTING	STEEL, CAST STEEL, NON-FERROUS METALS AND NON-FERROUS ALLOYS
MOLUB OZ	LATHE AND AUTOMATED MACHINING, INDEXABLE AUTOMATIC LATHE MACHINING	STEEL, CAST STEEL, NON-FERROUS METALS AND NON-FERROUS ALLOYS
MOLUB NA	FINE BLANKING, DEEP DRILLING, FEINTAL PRESSES TOOLING LUBRICATION	ALL TYPES OF STEEL, COPPER AND COPPER ALLOYS
MOLUB FS	HONING, FINISHING, SUPER FINISHING	STEEL, NON-FERROUS METALS AND NON-FERROUS ALLOYS
MOLUB HF	COLD FORGING, LIGHT METALWORK OPERATIONS, SUCH AS COLD DEFORMATION, PUNCHING OF ALL STEEL TYPES	STEEL, NON-FERROUS METALS AND NON-FERROUS ALLOYS
MOLUB HK	GRINDING OF TOOL STEEL, HIGH-SPEED, FIRE-RESISTANT, ACID-RESISTANT AND STAINLESS ALLOY STEEL. PROFILE GRINDING ON REISHAUER GRINDERS	STEEL ALLOYS
MOLUB BR 25, BR 35	COLD DRAWING OPERATIONS PERFORMED THROUGH STEEL PLATE AND PROFILE MATRIXES AT HIGHER DRAWING SPEED	STEEL ALLOYS, COPPER AND COPPER ALLOYS

### PURE ACTIVE-TYPE MACHINING OILS

MOLUB VP	VERTICAL/HORIZONTAL BROACHING, GROOVING AND THREADING, BLIND HOLE DRILLING	ALL STEEL TYPES
MOLUB HP	VERTICAL/HORIZONTAL BROACHING, GROOVING AND THREADING, BLIND HOLE DRILLING	ALL STEEL TYPES
MOLUB DB	DEEP DRILLING	STEEL

## SINTASOL SHD

Sintasol SHD is a synthetic agent whose aqueous solutions are used at metal processing operations. Due to its specific composition, Sintasol SHD has a wide application range. Mixed with water, it gives true clear dilutions, providing efficient cooling and lubrication. Applicable dilution rates are determined depending on the machining operations required. Dilution rate used at grinding shall be from 2.5-3.5%. For drilling, turning and milling operations, dilution rate shall be about 3-5%. Dilution rate used at thread cutting and thread forming operations shall be from 5-10%.

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAH

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 3% dilution
- 2 Corrosivity of 3% dilution
- 3 Dilution appearance

SINTASOL	1	2	3
SHD	8,0-9,5	0	transparent

## SINTASOL B

Sintasol B is a synthetic agent whose aqueous solutions are used at metal grinding operations. Mixed with water, it gives true clear dilutions, providing efficient cooling and lubrication. Applicable dilution rates: from 2.5-3.5%.

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAG

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 3% dilution
- 2 Corrosivity of 3% dilution
- 3 Dilution appearance

SINTASOL	1	2	3
B	8,0-9,5	0	transparent

## SINTASOL PSA

Sintasol PSA is a multipurpose semi-synthetic emulsifying agent. Mixed with water, it gives a stable semi-transparent emulsion used at metal processing. Due to its specific composition, Sintasol PSA has a wide application range. Its aqueous emulsion provides efficient cooling and lubrication. Applicable dilution rates are determined depending on the machining operations required. Dilution rate used at grinding shall be from 3-3.5%. For drilling, turning and milling operations, dilution rate shall be about 3-5%. Dilution rate used at thread cutting shall be from 5-10%.

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAF

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 3% dilution
- 2 Corrosivity of 3% dilution
- 3 Dilution appearance

SINTASOL	1	2	3
PSA	8,5-9,5	0	semi-transparent

## SINTASOL BS

Sintasol BS is a semi-synthetic biologically stable emulsifying agent. Mixed with water, it gives a stable semi-transparent emulsion used at various metal processing operations. Due to its specific composition, Sintasol BS has a wide application range. Its aqueous emulsion provides efficient cooling and lubrication at machining operations. Applicable dilution rates are determined depending on the machining operations required. Dilution rate used at grinding, turning and milling operations shall be about 3.5-5%. Dilution rate used at thread cutting and thread forming shall be from 7-10%.

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAF

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



- 1 pH value of 3% dilution
- 2 Corrosivity of 3% dilution
- 3 Dilution appearance

SINTASOL	1	2	3
BS	8,5-9,5	0	semi-transparent

## UNIVERZAL M-30

Univerzal M-30 is a semi-synthetic emulsifying oil used at metal processing. Mixed with water, it gives a stable milky emulsion designed for metal drilling and grinding. It is most commonly used in central systems of welded pipe factories. Applicable dilution rates: from 5-7%.



- 1 pH value of 4% emulsion
- 2 Corrosivity of 4% emulsion
- 3 Emulsion appearance

UNIVERZAL	1	2	3
M 30	8,5-9,5	0	milky

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAB

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## UNIVERZAL M-40 | M-50

Univerzal M-40 and Univerzal M-50 Universal are semi-synthetic emulsifying metalworking oils. Mixed with water, they give stable milky emulsions designed for complex metal processing operations. Applicable dilution rates are determined depending on the machining operations required. Dilution rate used at drilling, grinding and milling operations shall be from 3-5%. Dilution rate used at thread cutting and thread forming shall be from 5-10%.



- 1 pH value of 4% emulsion
- 2 Corrosivity of 4% emulsion
- 3 Emulsion appearance

UNIVERZAL	1	2	3
M 40	8,5-9,5	0	milky
M 50	8,5-9,5	0	milky

### MEETS SPECIFICATIONS

ISO 6743/7, ISO L-MAC

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

### EMULSION SYSTEM CLEANING AND MAINTENANCE AGENTS

## PREVENT A



Prevent A is an agent used for cleaning and disinfection of systems using metalworking emulsions and dilutions. Prevent A can be added to the central or individual systems before discharging of the emulsion/dilution used. Depending on emulsion/dilution contamination level, this agent shall be added to the operating emulsion/dilution at 1-1.5% concentration rate for at least 6 hours before replacement. After adding of Prevent A, it shall be left to circulate in the system, and then discharged.

### MEETS SPECIFICATIONS

IS M.3.05.001

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## PREVENT B



Prevent B is an agent serving as a combined bactericide and fungicide in metalworking fluids. Prevent B can be used both in central and individual systems. Depending on emulsion/dilution or system contamination level, this agent shall be added at a 0.15-0.2% concentration rate.

### MEETS SPECIFICATIONS

IS M.3.05.002

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TERMOL S 15, 32, 68, 100, 220

Termol S is the high quality quenching oil. It is manufactured from highly refined mineral oils and specially selected additive package, and released in several ISO viscosity grades: 15, 32, 68, 100 and 220.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min, °C

TERMOL S	1	2
15	13,5-16,5	160
32	28,8-35,2	220
68	61,2-74,8	240
100	90-110	240
220	198-242	240

**Termol S-15** is used for quenching of low alloy steel, Mn-Si spring steel, and ball bearing steel.

**Termol S-32** is used at tool and structural parts tempering, performed directly in baths, regardless of the heating method.

**Termol S-46** is used at tool and structural parts tempering, performed directly in baths, regardless of the heating method.

**Termol S-68** is designed for tempering of tool and constructional steel, heated to high annealing temperatures in the presence of air.

**Termol S-100** is applied at tool and constructional alloy steel tempering performed at highest temperatures, especially in the automotive industry.

**Termol S-220** is designed for tool and constructional alloy steel tempering, performed at highest temperatures.

### MEETS SPECIFICATIONS

ISO 6743-14, L-UHC

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L

## TERMOL SE 15, 22, 32, 46, 68

Termol SE is the high quality quenching oil. This type of oil is manufactured from highly refined mineral oils and specially selected additive package and emulsifiers. It contains special emulsifiers, providing better processed surface wetting. Tempered metal pieces can be then water-rinsed. Termol SE is characterized by good oxidation and thermal stability. Termol SE oil can be mixed with water and used as an emulsion at induction tempering. It is released in several ISO viscosity grades: 15, 22, 32, 46 and 68.



- 1 Viscosity at 40°C, mm<sup>2</sup>/s
- 2 Flash point, min, °C

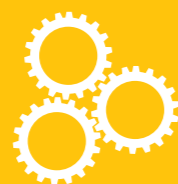
TERMOL SE	1	2
15	13,5-16,5	150
22	19,8-24,2	170
32	28,8-35,2	170
46	41,4-50,6	210
68	61,2-74,8	210

### MEETS SPECIFICATIONS

ISO 6743-14, L-UHA

### AVAILABLE IN PACKS

1L | 4L | 10L | 20L | 60L | 200L



MULTI-PURPOSE LUBRICATING GREASES

# MULTI-PURPOSE LUBRICATING GREASES

Lithium greases

## LITMA

1 | 2 | 3

LITMA 1, 2, 3 multi-purpose lubricating greases are manufactured from lithium 12-hydroxystearate, highly refined base oil and an additive package, providing to very good lubricating grease chemical stability, colloidal stability, adhesivity to metal surfaces, as well as load-bearing. They are used for lubrication within the operating temperature range from -30 to 120°C.

**Litma 1** is the lubricating grease used for lubrication of high-speed sliding and roller bearings, as well as other mechanical assemblies in motor vehicles, transportation vehicles, agricultural and construction machinery. It can also be used in centralized lubrication systems.

**Litma 2** is the lubricating grease designed for lubrication of moderate rotation speed sliding and roller bearings, other motor vehicle, transportation vehicle, agricultural and construction machinery mechanical assemblies, as well as for various industrial plants and equipment.

**Litma 3** is applied at lubrication of sliding and roller bearings, other tribomechanical parts of motor vehicles, transport vehicles, agricultural and construction machinery, as well as for various industrial plants and equipment. It is particularly recommended for lubrication of large sliding and roller bearings operating at lower operating speed.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 1, 2, 3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

## LITMA

1 EP | 2 EP | 3 EP

LITMA 1, 2, 3 EP multi-purpose lubricating greases are manufactured from lithium 12-hydroxystearate, specially selected highly refined base oil, and additives improving the load-carrying capacity and adhesivity to metal surfaces. Recommended operating temperature range: from -30 to 130°C.

**Litma 1 EP** is applied for lubrication of high-speed sliding and roller bearings, other motor vehicle, transportation vehicle, agricultural and construction machinery tribomechanical parts, as well as at various industrial plants and devices exposed to increased operating pressure, shocks and vibrations. It is particularly suitable for use in central lubrication systems.

**Litma EP 2** is designed for lubrication of large sliding and roller bearings, other motor vehicle, transportation vehicle, agricultural and construction machinery tribomechanical parts, as well as at various industrial plants and devices exposed to increased operating pressure, shocks and vibrations.

**Litma 3 EP** is used for lubricating of all mechanical assemblies in iron work factories, rolling mills and other industrial plants, exposed to high operating pressure and vibrations, as well as in transportation systems, mining, agricultural and construction machinery, etc. This type of lubricating grease is irreplaceable for its universal characteristics, and suitable for any kind of lubrication performed under lower operating speed, elevated temperature and high load conditions.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 1, 2, 3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

LITMA	1	2
1	310-340	175
2	265-295	180
3	220-250	180

	NLGI	ISO*	DIN*
1	1	L-XCCHA 1	K1K-30
2	2	L-XCCHA 2	K2K-30
3	3	L-XCCHA 3	K3K-30

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## LITMA

2 VT

A lubricating grease made from lithium 12-hydroxystearate, specially selected base oil, and additives increasing the load-bearing capability at elevated operating temperatures. This type of lubricating grease is used for lubrication of plain and rolling bearings and other tribomechanical assemblies in iron work factories, rolling mills, various industrial plants, as well as in transportation systems, machinery, etc., exposed to elevated operating temperatures. It is suitable for lubrication at high operating pressures and loads within the operating temperature range from -30 to 150°C, and, for short periods, even up to 200°C.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 2

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

LITMA	1	2
2 VT	265-295	260

	NLGI	ISO*	DIN*
2 VT	2	L-XCGHB 2	KP2T-30

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## LITMA

1 EP MoS | 2 EP MoS | 3 EP MoS

Besides the additive package providing increased load-bearing capability, such type of lubricant greases also contain molybdenum. At some high-load conditions, the lubricant can be squeezed, so then the molybdenum disulfide remains at parts requiring lubrication, providing exceptional lubricant film strength and bearing capacity, and thus enabling extended lubrication. These lubricant greases can be applied within the operating temperature range from -30 to 130°C.

**Litma 1 EP MoS** - used for lubrication of all mechanical assemblies exposed to high operating pressures, vibrations and friction in iron work factories, rolling mills and other industrial plants, as well as in transportation systems, mining, agricultural and construction machinery, etc. Suitable for use in central lubrication systems.

**Litma EP MoS 2** - designed for lubrication of all mechanical assemblies exposed to high operating pressures, vibrations and harsh friction in iron work factories, rolling mills and other industrial plants, as well as in transportation systems, mining, agricultural and construction machinery, etc.

**Litma 3 EP MoS** - used for lubrication of all mechanical assemblies exposed to high operating pressures, vibrations and harsh friction in iron work factories, rolling mills and other industrial plants, as well as in transportation systems, mining, agricultural and construction machinery, and the like.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 1, 2, 3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

LITMA	1	2
1 EP MoS	310-340	175
2 EP MoS	265-295	180
3 EP MoS	220-250	185

	NLGI	ISO*	DIN*
1 EP MoS	1	L-XCCHB 1	KPF1K-30
2 EP MoS	2	L-XCCHB 2	KPF2K-30
3 EP MoS	3	L-XCCHB 3	KPF3K-30

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## LITMA

00 EP | 000 EP

LITMA EP 00 and 000 EP are semi-liquid greases, whose formulation is based on specially selected additive package that enables fair lubrication at high operating pressures and formation of a stable lubricating film during application. Such greases are used for lubrication of tribomechanical parts in central industrial lubrication systems, and especially as a lubricant of leaning, rotating and suspending motor vehicle components. Recommended application: within the operating temperature range from -30°C to 130°C.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51826, DIN 51502, NLGI 00, 000

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 NLGI, ISO, DIN classification

LITMA	1
00 EP	400-430
000 EP	445-475

	NLGI	ISO*	DIN*
00 EP	00	L-XCCHB00	KP00K-30
000 EP	000	L-XCCHB000	KP000K-30

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

# MULTI-PURPOSE LUBRICATING GREASES

Lithium greases

## LITMA 00 EP MoS



Designed for lubrication of car steering boxes. This type of lubricating grease is characterized by excellent lubricant qualities, high durability during long-term lubrication, as well as good adhesivity to metal surfaces, thus protecting such surfaces against corrosion and wear.

Enables lubrication even in wet environment. Enriched with molybdenum disulfide and selected additives, it provides long-term lubrication. Applicable within a wide temperature range, from -20°C to +130°C.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51826, DIN 51502, NLGI 00

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

- 1 Working penetration, mm/10
- 2 NLGI, ISO, DIN classification

LITMA		1
00EP		400-430

NLGI			ISO*			DIN*		
00EP	00	L-XCCHB00	KPF00K-30					

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## AUTOPLEX 100/1 | 100/2 | 100/3 | PLUS



These motor vehicle lubricant greases belong to the lithium lubricating greases group, specially formulated for lubrication of motor vehicle and agricultural machinery tribomechanical parts. They can also be applied in industry, for lubrication of machine assemblies exposed to severe operating conditions, such as shock loads, vibrations, etc.

Such lubricant greases have good water resistance and adhesivity to metal surfaces, thus protecting them from corrosion. Improved lubricating film quality, composition consistency and good anticorrosive properties guarantee extended lubrication efficiency without the need for replacement. Applicable within the temperature range from -30°C to 130°C.

**Autoplex 100/1** is recommended for lubrication in motor vehicles, agricultural and mining machinery exposed to the most severe operating conditions. It can also be applied in industry, for lubricating of machine assemblies exposed to harsh operating conditions, such as shock loads, vibrations etc.

**Autoplex 100/2** is a lubricant grease specially formulated to provide motor vehicle, agricultural and mining machinery lubrication even under harshest operating conditions. It is particularly recommended for lubrication of wheel hubs in all motor vehicle types, with replacement interval after 100 000 km. It can also be used in industry, for lubricating of machine assemblies exposed to harsh operating conditions, such as shock loads, vibrations etc.

**Autoplex 100/3** is particularly recommended for lubrication of wheel hubs in all motor vehicle types, with replacement interval after 100 000 km. It can also be used in industry, for lubricating of machine assemblies exposed to harsh operating conditions, such as shock loads, vibrations etc.

**Autoplex Plus** is designed for lubrication of constant-velocity and universal joints, but can also be successfully applied for lubrication of toothed couplings and clamps in rail vehicles, exposed to harsh operating conditions, such as shock loads, vibrations etc. Lubricating film load-bearing capacity of these lubricants has been enhanced by adding molybdenum disulfide as friction modifier. Molybdenum disulfide ensures particular lubricating benefits at certain lubrication conditions, especially where sliding or vibrating can displace the grease from the contact surface. In cases where lubrication is rarely done, molybdenum disulfide provides extended lubrication.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 1, 2, 3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

AUTOPLEX		1	2
100/1		310-340	185
100/2		265-295	190
100/3		220-250	195
PLUS		265-295	190

NLGI			ISO*			DIN*		
100/1	1	L-XCCHB 1	KP1K-30					
100/2	2	L-XCCHB 2	KP2K-30					
100/3	3	L-XCCHB 3	KP3K-30					
PLUS	2	L-XCCHB 2	KPF2K-30					

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

Aluminum complex greases

## ALMAPLEX 00 G EP | 0 G EP | 1 G EP | 2 G EP | 3 G EP



Aluminum complex lubricating greases are manufactured from aluminum complex thickener and high-quality base oil, enriched with specially selected extreme pressure additives. Such greases have good adhesivity, thermal and oxidation stability, anti-wear and anti-corrosion properties, they are water- and kneading-resistant, thus enabling their wide range application within the temperature range from -30°C to 180°C.

**Almaplex 00 G EP** - This type of grease is especially recommended for use in central lubrication system of crown cage excavator turntable bearing, at excavators operating in open mining pits, as well as for lubricating of other open toothed transmissions, toothed crown wheels and rack railways in mining, transportation and construction machinery. It is characterized by extremely good adhesivity to metal surfaces, thus enabling its outdoor, wet and dirty environment use.

**Almaplex 0 G EP** - This type of grease is especially recommended for use in central lubrication system of crown cage excavator turntable bearing, at excavators operating in open mining pits, as well as for lubricating of other open toothed transmissions, toothed crown wheels and rack railways in mining, transportation and construction machinery, for lubrication of crushers, rotary kilns and mills, belt conveyors, and all other mechanical assemblies exposed to high operating pressure, shocks and high temperatures. It is characterized by extremely good adhesivity to metal surfaces, thus enabling its outdoor, wet and dirty environment use.

**Almaplex 1 G EP** - This type of grease is especially recommended for lubrication of crushers, rotary kilns and mills, belt conveyors, and all other mechanical assemblies exposed to high operating pressure, shocks and elevated temperatures. It can also be used for lubricating of crown cage excavator turntable bearing, at excavators operating in open mining pits, as well as for lubrication of plain and rolling bearings, other open toothed transmissions, toothed crown wheels and rack railways in mining, transportation and construction machinery. It is characterized by extremely good adhesivity to metal surfaces, thus enabling its outdoor, wet and dirty environment use.

**Almaplex 2 G EP** - Recommended for lubrication of plain and rolling bearings, open toothed transmissions in mining, transportation and construction machinery, as well as for lubricating of crushers, rotary kilns and mills, belt conveyors, and all other mechanical assemblies exposed to high operating pressures, shocks and elevated temperatures. It is characterized by extremely good adhesivity to metal surfaces, thus enabling its outdoor, wet and dirty environment use.

**Almaplex 3 G EP** - Recommended for lubrication of plain and rolling bearings, open toothed transmissions in mining, transportation and construction machinery, as well as for lubricating of crushers, rotary kilns and mills, belt conveyors, and all other mechanical assemblies exposed to high operating pressures, shocks and elevated temperatures. It is characterized by extremely good adhesivity to metal surfaces, thus enabling its outdoor, wet and dirty environment use.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51826, DIN 51502, NLGI 00, 0, 1, 2, 3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

ALMAPLEX		1	2
00 GEP		400-430	-
0 GEP		355-385	-
1 GEP		310-340	220
2 GEP		265-295	230
3 GEP		220-250	240

NLGI			ISO*			DIN*		
00 GEP	00	L-XCFIB00	OGPF0R-30					
0 GEP	0	L-XCFIB0	OGPF0R-30					
1 GEP	1	L-XCFIB1	OGPF1R-30					
2 GEP	2	L-XCFIB2	KPF2R-30					
3 GEP	3	L-XCFIB3	KPF3R-30					

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION



## TANTAL

1 EP | 2 EP | 1 EP MoS | 2 EP MoS

This type of lubricating greases consist of a homogeneous dispersion obtained from non- carboxylated thickener and high-quality oil base, enriched with specially selected additive package. Such greases comply with the special requirements for lubrication at high operating temperatures.

**Tantal 1 EP** and **Tantal 2 EP** are used for lubrication of low-speed bearings and other tribomechanical parts permanently exposed to elevated temperatures within the temperature range from -20°C to +180°C, and, at shorter intervals, even up to 200°C.

**Tantal 1 EP MoS** and **Tantal 2 EP MoS** are lubricating greases contain molybdenum disulfide, enabling their use under high-load conditions. They are used for lubrication of power transmission elements and other tribomechanical parts permanently exposed to elevated temperatures, high operating pressure, shocks and vibrations. Application: within the temperature range from -20°C to 180°C, and, at shorter intervals, even up to 200°C.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 1, 2

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

## KALCIMA

KS 2 | KS 3 | G KS 2 | G KS 3

Lubricating greases Kalcima KS 2 and Kalcima KS 3 are calcium-based greases, manufactured from calcium soap, as thickener, and specially selected base oils. Lubricating greases Kalcima G KS 2 and Kalcima G KS 3 contain colloidal graphite. Good water resistance allows their use in ambient-influence exposed components.

**Kalcima KS 2, KS 3** are recommended for lubrication of slideways, trunkings, joints, and any sliding components operating at low load, within the operating temperature range from -30°C to 70°C.

**Kalcima G KS 2, G KS 3** are used for lubrication of sliding bearings, joints, and any sliding components operating at low load and speed, within the operating temperature range from -30°C to 70°C. These greases demonstrated outstanding lubrication qualities when applied to railway bumpers and other lubrication-requiring components, such as chains, sprocket-wheels, wire ropes etc.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 2,3

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg

## ELKOMA

Elkoma is a lubricating grease manufactured from specially selected thickener and mineral base oil, enriched with colloidal graphite and appropriate additives.

This type of grease is used for lubrication of contact and connection points in electrical and power engineering, such as busbar connectors, connectors, disconnectors and contact switches, all the components of disjunctive and sliding retractable HV and LV facilities, electric traction contact lines, batteries etc.

Enables increasing of contact surface by reducing the contact resistance, as well as the contact and connecting temperature, provides protection of contact point against wet, corrosion and oxidation, as well as reduction of sliding contact friction resistance. Suitable for application within the temperature range from -30°C to 180°C.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

TANTAL	1	2
1 EP	310-340	260
2 EP	265-295	260
1 EPM	310-340	260
2 EPM	265-295	260

	3		
	NLGI	ISO*	DIN*
1 EP	1	L-XBGB1	KP15-20
2 EP	2	L-XBGB2	KP25-20
1 EPM	1	L-XBGB1	KPF15-20
2 EPM	2	L-XBGB2	KPF25-20

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## BIO MAST

000 | 000 G | 2

Biodegradable lubricating greases manufactured from natural and synthetic esters and additives complying with the latest environmental requirements relating not only to product biodegradability, but also to the use of raw materials produced from renewable sources.

**Bio mast 2** is used for lubrication of machinery and all other assembly parts where the lubricant is directly exposed to the ambient environment, with a possibility of lubricant ground spill.

**Bio mast 000** is used for lubricating of moving parts of railroad switch points, ski-lifts, road machinery, as well as in all other assembly parts where the lubricant is directly exposed to the ambient environment, with a possibility of lubricant ground spill.

**Bio mast G 000** is used for lubrication of machinery and all other assembly parts where the lubricant is directly exposed to the ambient environment, with a possibility of lubricant ground spill. Suitable for lubrication of wheel hub crown in rail vehicles.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 000, 000G, 2

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 NLGI, ISO, DIN classification

BIO MAST	1
2	265-295
000	445-475
000G	445-475

	2		
	NLGI	ISO*	DIN*
2	2	L-XCAHB2	KE2E-30
000	000	L-XCAHB000	KE000E-30
000G	000	L-XCAHB000	KEF000E-30

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## MAST ZA ČELIČNU UŽAD / STEEL WIRE ROPE GREASES

Steel wire rope grease is a special grease formulated from mineral oils, heavy oil distillates, thickener and specially selected additives, providing good anti-wear properties, mechanical stability, as well as water and moisture resistance.

This type of grease is used for lubrication of open and closed gear wheels, steel wire ropes, chains and cables.

It has excellent lubricant properties, thus delivering high durability performance and extended lubricant life. Applicable within a wide temperature range, from -20°C to 120°C.

### MEETS SPECIFICATIONS

ISO 6743/6, CKL, DIN 51826, DIN 51502, NLGI 0

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

MČU	1	2
	355-385	0/0

	3		
	NLGI	ISO*	DIN*
	0-00	L-XBCHB00	KPF00K-25

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION

## REDMA 0

Lubricating grease consisting of a homogeneous dispersion, obtained from non-carboxylated thickener and oily base, enriched with specially selected additives.

Recommended for lubrication of reducers and other closed-type toothed transmissions, the structure of which requires application of lubricating grease, as well as for lubricating of toothed transmissions in high-speed power tools.

Especially recommended for lubricating of motor cultivator rear drive axle and drive brake transmissions. Contains extreme-pressure (EP) and wear-reducing additives, allowing the application of this type of lubricating grease in high-load operating conditions.

### MEETS SPECIFICATIONS

ISO 6743/9, DIN 51825, DIN 51502, NLGI 0

### AVAILABLE IN PACKS

0.4 kg | 0.85 kg | 3 kg | 18 kg | 50 kg | 180 kg



- 1 Working penetration, mm/10
- 2 Dropping point, °C, min.
- 3 NLGI, ISO, DIN classification

REDMA	1	2
0	355-385	180

	3		
	NLGI	ISO*	DIN*
0	0	L-XBFH0	GP0R-20

\* APPLICABLE FOR ISO 6743/9, DIN 51825, DIN 51502 CLASSIFICATION



BASE OILS AND PARAFFINES

### HYDROCRACKED BASE OILS

#### HC-3 | HC-4 | HC-5 | HC-6 | HC-7 | HC-8

Oil Refinery Modrica manufactures hydrocracked base oils belonging to API Group II and III. Modrica's hydrocracked base oils are of exceptional quality, thus having a number of advantages over conventional base oils. The advantage of hydrocracked base oil manufacturing technology is based on the fact that all the technically and ecologically undesirable compounds can thereby be transformed into technically preferred compounds. Hydrocracked base oils are further used for production of modern motor, hydraulic and turbine oils.

These base oils are characterized by low volatility. Such low volatility is an extremely important engine oil property. Basic Oil Refinery Modrica hydrocracked base oil characteristics are shown in the tables below.

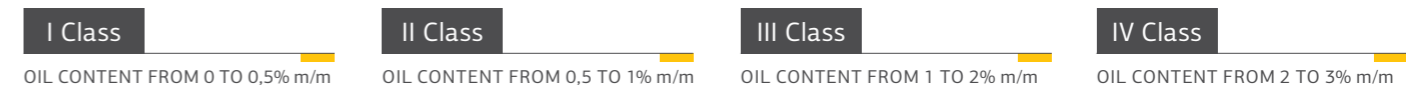
HYDROCRACKED BASE OILS   GROUP II			HC-3 N		HC-3		HC-4 L	
PROPERTY	UoM	TESTING METHOD	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES
DENSITY AT 15°C	kg/m <sup>3</sup>	ASTM D 5002	*	852	*	852	*	847
VISCOSITY AT 100°C	mm <sup>2</sup> /s	BAS ISO 3104	2,8-3,4	3,2	3,1-3,5	3,3	3,41-4,20	3,9
VISCOSITY AT 40°C	mm <sup>2</sup> /s	BAS ISO 3104	12-15	13,8	12-15	14,0	15-22	17,5
VISCOSITY INDEX, MIN.	-	BAS ISO 2909	90	100	95	100	105	115
POUR POINT, MAX.	°C	ISO 3016	-15	-16	-15	-16	-11	-12
FLASH POINT, MIN.	°C	ISO 2592	180	200	190	205	200	220
COLOUR, MAX ASTM	ASTM	BAS ISO 2049	2,0	1,5	1,5	1,0	1,5	1,0
SULFUR, MAX	ppm	ASTM D 4294	50	10	50	10	50	30
NOACK	% m/m	DIN 51581	*	*	*	*	22	20

HYDROCRACKED BASE OILS   GROUP III			HC-4		HC-5		HC-6		HC-7		HC-8	
PROPERTY	UoM	METODA	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES	LIMIT VALUES	TYPICAL VALUES
DENSITY AT 15°C	kg/m <sup>3</sup>	ASTM D 5002	*	847	*	844	*	846	*	848	*	*
VISCOSITY AT 100°C	mm <sup>2</sup> /s	BAS ISO 3104	4,21-4,61	4,5	5,0-5,60	5,47	5,61-6,20	5,8	6,3-7,20	6,6	7,7-8,3	8,0
VISCOSITY AT 40°C	mm <sup>2</sup> /s	BAS ISO 3104	20-24	21,5	26-32	28,0	28-38	30,2	34-44	36,5	46-54	50,0
VISCOSITY INDEX, MIN.	-	BAS ISO 2909	120	123	125	134	125	135	125	138	125	133
POUR POINT, MAX.	°C	ISO 3016	-9	-12	-9	-9	-7	-9	-5	-7	-5	-6
FLASH POINT, MIN.	°C	ISO 2592	220	241	235	254	240	250	240	262	250	260
COLOUR, MAX ASTM	ASTM	BAS ISO 2049	2,0	1,0	2,0	1,5	2,0	2,0	4,0	3,5	4,0	3,5
SULFUR, MAX	ppm	ASTM D 4294	50	30	50	30	50	30	50	30	50	30
NOACK	% m/m	DIN 51581	15	9	8	6	7	5	5	4	5	3

### BLEACHED PARAFFIN WAX

#### I CLASS | II CLASS | III CLASS | IV CLASS

Oil Refinery Modrica also manufactures hard paraffin, obtained through the deparaffinization process. Paraffin is used as an impregnating agent in candle, textile, rubber, packaging industry, as well as for other similar purposes. Depending on the oil content, it can be divided into four classes:



Basic hard paraffin properties are displayed in the table below.

PARAFFIN WAX   CLASS I			48/50 B	50/52 B	52/54 B	54/56 B	56/58 B	58/60 B
PHYSICAL AND CHEMICAL PROPERTIES	UoM	TESTING METHOD	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES
SOLIDIFICATION POINT	°C	BAS ISO 3841	48-50	50-52	52-54	54-56	56-58	58-60
OIL CONTENT	% m/m	BAS ISO 3104	0-0,5	0-0,5	0-0,5	0-0,5	0-0,5	0-0,5
COLOR, MAX.	ASTM	BAS ISO 2049	0,5	0,5	0,5	0,5	0,5	0,5
PENETRATION AT 25°C, MAX.	mm/10	ASTM D 1321	30	30	25	25	30	30

PARAFFIN WAX   CLASS II			48/50 B	50/52 B	52/54 B	54/56 B	56/58 B	58/60 B
PHYSICAL AND CHEMICAL PROPERTIES	UoM	TESTING METHOD	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES
SOLIDIFICATION POINT	°C	BAS ISO 3841	48-50	50-52	52-54	54-56	56-58	58-60
OIL CONTENT	% m/m	BAS ISO 3104	0,5-1,0	0,5-1,0	0,5-1,0	0,5-1,0	0,5-1,0	0,5-1,0
COLOR, MAX.	ASTM	BAS ISO 2049	0,5	0,5	0,5	0,5	0,5	0,5
PENETRATION AT 25°C, MAX.	mm/10	ASTM D 1321	30	30	30	30	30	30

PARAFFIN WAX   CLASS III			48/50 B	50/52 B	52/54 B	54/56 B	56/58 B	58/60 B
PHYSICAL AND CHEMICAL PROPERTIES	UoM	TESTING METHOD	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES
SOLIDIFICATION POINT	°C	BAS ISO 3841	48-50	50-52	52-54	54-56	56-58	58-60
OIL CONTENT	% m/m	BAS ISO 3104	1,0-2,0	1,0-2,0	1,0-2,0	1,0-2,0	1,0-2,0	1,0-2,0
COLOR, MAX.	ASTM	BAS ISO 2049	0,5	0,5	0,5	0,5	0,5	0,5
PENETRATION AT 25°C, MAX.	mm/10	ASTM D 1321	35	35	35	35	35	35

PARAFFIN WAX   CLASS IV			48/50 B	50/52 B	52/54 B	54/56 B	56/58 B	58/60 B
PHYSICAL AND CHEMICAL PROPERTIES	UoM	TESTING METHOD	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES	LIMIT VALUES
SOLIDIFICATION POINT	°C	BAS ISO 3841	48-50	50-52	52-54	54-56	56-58	58-60
OIL CONTENT	% m/m	BAS ISO 3104	2,0-3,0	2,0-3,0	2,0-3,0	2,0-3,0	2,0-3,0	2,0-3,0
COLOR, MAX.	ASTM	BAS ISO 2049	0,5	0,5	0,5	0,5	0,5	0,5
PENETRATION AT 25°C, MAX.	mm/10	ASTM D 1321	40	40	40	40	40	40



## LUBRICANT WAREHOUSING AND APPLICATION

In order to achieve proper technical conditions for tribomechanical system lubrication, the lubrication service unit should pay attention to the following:

- properly lubricant type and quality selection,
- lubricant identification and quality control,
- lubricant storage,
- records kept on lubricant consumption and control of lubricated assembly parts,
- lubricant monitoring during operation,
- timely replacement and collection of waste lubricants.

Appropriate lubricant selection is the primary condition that must be in place for proper lubrication, along with proper storage and application. There are many types of lubricants requiring proper storage and application, as well as good knowledge of lubricant type and characteristics. Therefore, as lubricant warehouse facilities and release points must be selected such facilities and locations allowing their proper sorting and storage. The release point must be accessible to tribological systems, so as to avoid unnecessary reloading and transfer of lubricants over the storage space, and thus to prevent possible mixing up or wrong replacement of lubricants, handling losses, damage to packaging etc. As lubricant storage place should be chosen the place located not too far from the subject lubricated device, while the warehouse facility should be as large as to enable storage of all types of lubricants used in a factory during a certain period of time. Metal barrels and plastic containers with lubricant should be arranged in a way enabling easy prospect of lubricant names printed on the packaging. For better safety and reduced possibility of mix-up over different types of lubricant, it is necessary to allocate a permanent place for each type of lubricant within the warehouse, and to setup a visible labeling plate above that place, indicating lubricant name and stock number. Thereby you will avoid the possibility of releasing a wrong lubricant. The decanter barrels should be placed on a pedestal, with a tap setup in stopper's place. The pedestal must be raised enough, so as to enable a bucket or a container for decanting of smaller quantity of lubricant be placed under the tap, in order to prevent any spillage. There should be a sufficient number of containers in the warehouse, as well as funnels with strainer and washing bowls, enabling release of different lubricant types.

Storage space and release points should be constructed of non-flammable material, and should be frost-protected, fitted with appropriate ventilation and lighting, with appropriate humidity level maintained. It is recommended not to leave in the warehouse any easily flammable substances (varnishes, paints, thinners), except from small amounts of fuel for workshop cleaning, as to avoid the possibility of mix-up over such products, but also for fire-prevention purposes. Warehouse floors should be made of oil- and grease-resistant material, which at the same time should be strong enough to withstand the barrel handling operations, without sparking at barrel, bucket, or used tool hitting the floor. Warehouse sewage must not be connected to other sewage systems; it would be the best to drain it separately into a special pit, which can be cleaned from possible lubricant spillages. Ventilation should be made with roof-ends. Lubricant delivery and unloading at the warehouse should be conducted as neatly as possible, i.e. the barrels must be cleaned before placed into the warehouse, due to the fact that impurities may penetrate into the lubricant through the stopper during decanting. Unloading of lubricants must be done carefully, to avoid throwing or tumbling which may damage the barrels. If barrels have to be left in an open space, they must be stacked horizontally, in order to prevent water penetration through the stopper. Waste oil, discharged at draining, must be collected by type and delivered to relevant authorized waste management companies, as to keep the warehouse space clean and to ensure environmental protection. Any open fire or smoking must be prohibited at the whole lubricant (oil product) storage area. All electrical installations must be specially secured so as to prevent sparking which may cause fire. Lubricants under fire must not, and cannot be extinguished by water. It is recommended to use sand for small fire extinguishing, as the sand can easily extinguish the fire, if used timely. Efficient fire extinguishing can also be achieved with foam extinguisher. However, as any fire is hard to be extinguished, it is best to prevent a fire breakout, this by regular inspection of electrical installations and smoking prohibition.



## ENGINE OILS

### SAE J 300

According to the commonly accepted and applicable SAE (Society of Automotive Engineers) classification, since December 1999 engine oils have been classified into eleven grade groups. The “W”-labeled SAE viscosity grades have been determined as having the maximum dynamic viscosity at low temperatures, maximum pumpability temperature thresholds, and minimum kinematic viscosity at 100°C. Non “W”-labeled oil grades have been determined by their kinematic viscosity range at 100°C and dynamic viscosity at high temperatures (150°C) developed at high shear rates.

VISCOSITY GRADES SAE	LOW TEMPERATURE VISCOSITY IN COLD-CRANKING SIMULATOR (CCS), mPas Max.	LOW TEMPERATURE VISCOSITY IN MINI-ROTARY VISCOMETER (MRV), mPas Max.	KINEMATIC VISCOSITY AT 100°C, MIN mm <sup>2</sup> /s	KINEMATIC VISCOSITY AT 100°C, MAX mm <sup>2</sup> /s	DYNAMIC VISCOSITY MPAS MIN AT 150°C AND 10 <sup>6</sup> s <sup>-1</sup>
	ASTM D 5293	ASTM D 4634	ASTM D 445	ASTM D 445	ASTM D 4683, D 4741, D 5481 ILLI CEC 1-36-90
0W	6200 at -35°C	60000 at -40°C	3,8		
5W	6600 at -30°C	61000 at -35°C	3,8		
10W	7000 at -25°C	62000 at -30°C	4,1		
15W	7000 at -20°C	63000 at -25°C	5,6		
20W	9500 at -15°C	64000 at -20°C	5,6		
25W	13000 at -10°C	65000 at -15°C	9,3		
16			6,1	< 8,2	2,3
20			6,9	< 9,3	2,6
30			9,3	< 12,5	2,9
40			12,5	< 16,3	3,5 (0W-40, 5W-40, 10W-40 grades)
40			12,5	< 16,3	3,7 (15W-40, 20W-40, 25W-40, 40 grades)
50			16,3	< 21,9	3,7
60			21,9	< 26,1	3,7

### Engine oil Classification API

API American Petroleum Institute is the largest US association of oil and natural gas producers, representing about 400 corporations involved in the production, processing, distribution and other oil industry-related activities. According to their application, API has grouped the internal combustion engine lubricating oils into two basic categories:

- “S” category of oils, designated for petrol engines, and
- “C” category of oils, designated for passenger and commercial vehicle diesel engines.

#### S - OIL CATEGORY, DESIGNATED FOR PASSENGER VEHICLE PETROL ENGINES

- API SE For engines manufactured up to 1980
- API SF For engines manufactured up to 1989, this type of oil provides enhanced protection against corrosion and wear compared to SE oils, and also prevents varnish and sludge formation inside the engine.
- API SG For engines manufactured up to 1992, compared to SF oils, they have improved control over varnish and sludge formation inside the engine, as well as over engine oil oxidation and engine wear.
- API SH For engines manufactured up to 1996, such oils provide enhanced protection against corrosion compared to SG oils, and meet more stringent requirements concerning volatility, filterability and oil foaming.
- API SJ For engines manufactured up to 2001, they display improved SH-levels.
- API SL For engines manufactured after 2001, they provide better control over varnish and sludge formation inside the engine, as well as lowered evaporation losses.

API SM	For engines produced after 2004, SM oils have enhanced oxidation resistance, improved protection against deposit formation, better wear protection, and better low-temperature properties delivered during their life cycle.
API SN	For engines manufactured after 2010, such oils provide better protection against deposit formation at high temperatures, much better protection against sludge formation, and better compatibility with engine seals. API SN complies with ILSAC GF-5 requirements for greater performance, improved fuel efficiency, excellent turbocharger protection and compatibility with exhaust gas after treatment systems, as well as for protection of engines using ethanol-gasoline blends, up to E85 high blend.
<b>C - CATEGORY OF OILS, DESIGNATED FOR PASSENGER AND COMMERCIAL VEHICLE DIESEL ENGINES</b>	
API CD	Introduced into commerce in 1955. Designed for use in engines fitted with, or without turbocharger. Not recommended for use in diesel engines manufactured after 1994.
API CD-II	Two-stroke engine oils. Introduced into commerce in 1987.
API CE	High-speed engine oils, for engines fitted with, or without turbocharger. They can be used instead of CC and CD oils. Introduced into commerce in 1985. Not recommended for use in diesel engines manufactured after 1994.
API CF	Oils designed for vehicles with indirect fuel injection, as well as for other engines using fuel with a sulfur content exceeding 0.5%. Introduced into commerce in 1994. They can also be used instead of CD oils.
API CF-2	Oils designed for heavy-duty two-stroke engines. Introduced into commerce in 1994. They can also be used instead of CD-II oils.
API CF-4	Oils designed for high-speed four-stroke engines, fitted with, or without turbocharger. Introduced into commerce in 1990. They can be used instead of CD and CE oils.
API CG-4	Oils designed for heavy-duty, high-speed four-stroke engines, fitted with, or without turbocharger, using fuels with a sulfur content below 0.5%. Introduced into commerce in 1995. CG-4 oils are should be used in engines complying with exhaust emission standards from 1994. They can also be used instead of CD, CE and CF-4 oil.
API CH-4	Oils designed for heavy-duty, high-speed four-stroke engines using fuels with a sulfur content below 0.5%, designed to satisfy the exhaust emission requirements from 1998. Introduced inot commerce in 1998. They can also be used instead of CD, CE, CF-4 and CG-4 oil.
API CI-4	Oils for heavy-duty, high-speed four-stroke engines, using fuels with a sulfur content below 0.5%, fitted with exhaust gas recirculation (EGR) system, designed to satisfy the exhaust emission requirements from 2002. Introduced into commerce in 2002. They can be used instead of CD, CE, CF-4, CG-4 and CH-4 oils. CI-4 oils, complying with more stringent requirement s for shear stability and improved dispersion properties, are labeled as CI-4+.
API CJ-4	Oils designed for heavy-duty high-speed four-stroke diesel engines with limited SAPS (sulfated ash, sulfur and phosphorus) values. Introduced into commerce in 2006. CJ-4 oils are designed for use along with diesel fuels with a sulfur content up to 500 ppm (0.05%). However, application of such oils along with fuels containing more than 15 ppm (0.0015%) sulfur may affect the durability of the exhaust emission control system, DPF filters and other exhaust gas after-treatment systems. API CJ-4 oils provide optimal protection against catalyst "poisoning", they prevent solid particle filter blockage, engine wear and deposit formation on pistons. Such oils have good stability both at low and at high temperatures, and they provide excellent protection against soot, stalling, foaming and shear-caused viscosity changes. API CJ-4 oils surpass in quality the API CI-4, CI-4+, CH-4, CG-4, and CF-4 oils. They can also be used for lubricating of engines requiring the above specified quality levels. In case the CJ-4 oils are used along with fuels containing more than 15 ppm of sulfur, it should be necessary to consult the engine manufacturer for drain interval recommendations.

## ACEA Specifications

ACEA "Association des Constructeurs Européens d'Automobiles" is the association of European vehicle manufacturers, which in 1991 succeeded the former CCMC (Comité des Constructeurs d'Automobiles du Marche Commun) and assumed the CCMC specifications. Oil quality specifications for passenger car petrol engines (labeled as "A") and Oil quality specifications for passenger car diesel engines (labeled as "B") have been merged into a common specification regulating the quality of oils used in both engine types. There have also been introduced new specifications, stipulating the quality of oils compatible with catalyst system in passenger vehicles meeting exhaust emission requirements. These specifications have been C-labeled: ACEA C1, C2, C3 and C4. As such oils must be compatible with exhaust gas after-treatment systems, there are upper sulfated ash, phosphorus and sulfur thresholds stipulated for them. C-labeled oils are applicable in vehicles fitted with diesel particulate filter (DPF) and Three-way catalyst (TWC) system. As for their operating qualities, these oils are equivalent to the oils complying with ACEA A3/B4 or ACEA A5/B5 specifications. Regarding commercial vehicle diesel engine-related specifications, old E3 and E5 specifications have been replaced with the new E6 and E7 specifications. Shown below are the standards for passenger vehicle petrol and diesel engines:

- Petrol engine standards are A-labeled: ACEA A1, A2, A3, A4 and A5.
- Diesel engine standards are B-labeled B: ACEA B1, B2, B3, B4 and B5.

### QUALITY SPECIFICATIONS FOR PASSENGER AND COMMERCIAL VEHICLE PETROL AND DIESEL ENGINE OILS

ACEA A1/B1	In accordance with standard quality stipulated for oils with low HTHS-viscosity (2.9-3.5 mPas). Such oil types can contribute to fuel saving. Viscosity grades available: SAE 0W-30, SAE 5W-20, SAE 5W-30, SAE 10W-30.
ACEA A3/B3	These are extra quality engine oils with extreme shear stress stability. After testing, they remain within the viscosity grade values stipulated. According to the engine manufacturer recommendations, such oils are designed for extended drain intervals.
ACEA A3/B4	Extra quality engine oils remaining within appropriate viscosity grade values even after long operation periods. Designed for use in high-performance petrol and diesel engines with direct injection system. Complying with the A3/B3 specification requirements. Engine oils complying with the a/m specifications have exceptional dispersive and engine cleanliness properties, as well as increased resistance to thickening caused by increased soot presence, especially in diesel engines with direct fuel injection.
ACEA A5/B5	They meet performance requirements from A3/B4 specifications, now with a reduced HTHS viscosity values, as stipulated in A1/B1 specifications (2.9-3.5 mPas). Viscosity grades available: SAE 0W-20, SAE 0W-30, SAE 5W-30. Such oils are designed for extended drain intervals. They can contribute to fuel savings, both as specification-stipulated, and as proven. Manufacturing standard applied complies with the highest engine oil quality requirements, above all in terms of ageing resistance, high shear stability, fuel economy, enhanced wear- resistance and engine cleanliness, especially at extended drain intervals. Reduced HTHS-viscosity value ( $\leq 3.5$ mPas) enables low fuel consumption.

### QUALITY SPECIFICATIONS FOR ENGINE OILS COMPATIBLE WITH EXHAUST GAS THREATMENT SYSTEMS

ACEA C1	Engine oil with low sulfated ash, phosphorus and sulfur content (low SAPS) and HTHS-viscosity above 2.9 mPas. ACEA C1-04 is an oil formulated upon performance tests equivalent to ACEA A5/B5-04 specification requirements. Application of such quality level oil extends the DPF filter and TWC catalyst life cycle, thus contributing to fuel savings. These oils have the lowest SAPS content and are not suitable for all engines. (Before use, see the manufacturer recommendations.)
ACEA C2	Engine oil with medium SAPS content and reduced HTHS-viscosity (above 2.9 mPas). ACEA C2-04 is an oil formulated upon performance tests equivalent to ACEA A5/B5-04 specification requirements. C2 oils can be described as oils with medium SAPS content (mid SAPS). These oils are not suitable for all engines, so before use it would be necessary to see the manufacturer recommendations.
ACEA C3	Engine oil with medium SAPS content, but with increased HTHS-viscosity (above 3.5 mPas). ACEA C3 is an oil formulated upon performance tests equivalent to ACEA A3/B4-04 specification requirements. C3 oils can be described as oils with medium SAPS content (mid SAPS). These oils are not suitable for all engines, so before use it would be necessary to see the manufacturer recommendations.

ACEA C4 Engine oils with reduced SAPS (S  $\leq$ 0,2, P  $\leq$ 0,09, sulfated ash  $\leq$ 0,5), but with increased HTHS-viscosity ( $\geq$ 3,5 mPas). In addition to that, its volatility index (NOACK) is reduced, never exceeding 11%. ACEA C4 is an oil formulated upon performance tests equivalent to ACEA A3/B4-04 specification requirements. These oils are not suitable for all engines, so before use it would be necessary to see the manufacturer recommendations.

#### QUALITY SPECIFICATIONS FOR COMMERCIAL VEHICLE DIESEL ENGINE OILS

ACEA E2 Such oil types are designed for heavy-duty diesel engines, fitted with, or without turbochargers, with normal drain intervals.

ACEA E4 These oils are characterized by stable viscosity, thus providing excellent control of piston cleanliness, wear and soot formation protection. They are designed for engines without DPF-filters, and for some engines fitted with SCR NOx systems. Recommended for use in heavy-duty diesel engines complying with EURO 1, EURO 2, EURO 3, EURO 4 and EURO 5 exhaust emission standards, not requiring SAPS threshold compliance. They have significantly extended drain intervals.

ACEA E6 These oils are characterized by stable viscosity, thus providing excellent control of piston cleanliness, wear and soot formation protection. Recommended for use in heavy-duty diesel engines using fuel with a sulfur content of up to 50 ppm. They are EURO 1, EURO 2, EURO 3, EURO 4, EURO 5 and EURO 6 exhaust emission standard-compliant, and have a significantly extended drain intervals. Suitable for engines fitted with, or without DPF filter, with exhaust gas recirculation (EGR) system, as well as for engines equipped with NOx reduction system.

ACEA E7 These oils are characterized by stable viscosity, thus providing excellent control of piston cleanliness, wear and soot formation protection, as well as protection against formation of soot deposits in the turbocharger. Recommended for use in heavy-duty diesel engines complying with EURO 1, EURO 2, EURO 3, EURO 4 and EURO 5 exhaust emission standards, such oils have significantly extended drain intervals. They are suitable for use in engines without DPF filter, most engines equipped with exhaust gas recirculation system (EGR), and for most engines equipped with NOx reducing system.

ACEA E9 Engine oils exceptionally resistant to viscosity alterations. They provide very good piston cleanliness, and display excellent dispersive properties with exceptional protection against wear and the presence of soot in the oil. Recommended for use in heavy-duty diesel engines complying with EURO 1, EURO 2, EURO 3, EURO 4, EURO 5 and EURO 6 exhaust emission requirements. Applicable in engines fitted with, or without DPF filter, as well as in most EGR engines equipped with selective catalytic reduction system, using low-sulfur diesel fuel.

#### OEM | VW

VW 500.00 This specification stipulates quality requirements for SAE 5W-X and 10W-X viscosity grade easy-flowing engine oils for petrol and diesel engines with normal charging, without extended oil change interval allowance. Recommended for engines manufactured up to 1999.

VW 501.01 Stipulates the quality requirements for conventional engine oils for petrol and diesel engines with normal charging, without extended oil change interval allowance. Recommended for engines manufactured up to 1999. Nevertheless, engine oils compliant with VW 500.00 and VW 501.01 specifications continue to appear in the market, although those specifications are formally invalid.

VW 502.00 Oil for petrol engines without extended oil change intervals (up to 15,000 km), with HTHS-viscosity min. 3.5 mPas, ACEA A3 + additional VW tests.

VW 503.01 This type of engine oil is characterized by low volatility, and high thermal and oxidation stability. Recommended for AUDI turbocharged petrol engines, as well as for Volkswagen W-8 and W-12 engines. Drain interval: after 30,000 km (two years).

VW 505.00 This standard is applied to synthetic and mineral engine oils, used in diesel engines with turbochargers. Most of the easy-flowing oils are usually compliant with VW 500.00 and 505.00 specifications. Engine oils meeting VW 505.00 specification can only be used in diesel engines.

VW 505.01 Oils complying with the requirements of this specification have outstanding anti-wear and dispersive properties, as well as increased resistance to oil thickening caused by soot presence. Recommended for diesel engines with direct fuel injection, fitted with pump-nozzle system, without extended oil change interval (after 15,000 km). ACEA B4 SAE 5W-40 specification compliant.

VW 503.00, VW 506.00 Oils complying with this specification have outstanding anti-wear properties and reduced HTHS-viscosity. Applicable in vehicles with extended oil drain intervals (WIV), from 30,000 to 50,000 km (0W-30).

VW 506.01 Oils complying with the requirements specified in this standard display excellent anti-wear and dispersive properties, as well as enhanced resistance to oil thickening caused by the increased amount of soot particles. They have an extended drain interval. Applicable in diesel engines fitted with pump-nozzle system.

VW 504.00, VW 507.00 Specially formulated oils with reduced phosphorus, sulfur and sulfated ash contents (SAPS). Applicable in new vehicle models allowing extended oil drain intervals, complying at the same time EURO 4, EURO 5 AND EURO 6 requirements.

VW 508.00 This specification, which has not yet begun to be applied, applies to Low SAPS Oils with low HTHS-viscosity (2.6 mPas).

#### OEM | MERCEDES BENZ (MB)

MB 229.1 Oil for petrol engines not allowing extended oil drain intervals. Must comply with ACEA A2/B2 plus additional MB tests. SAE 5W-X; 10W-X; 15W-X; 20W-X. Sulfated ash  $\leq$ 1,5% HTHS  $\geq$ 3,5 mPa.s. Drain interval: from 15,000 to 30,000 km.

MB 229.3 Oil for passenger vehicle petrol and diesel engines, enabling fuel savings. Must comply with SAE 0W-X; 5W-X; 10W-X. ACEA A3/B3/B4, plus additional MB tests. Sulfated ash  $\leq$ 1,5%, sulfur  $\leq$ 0,5%, chlorine  $\leq$ 0,015%. HTHS  $\geq$ 3,5 mPa.s. Drain interval: after 15,000-30,000 km, or up to 2 years.

MB 229.31 Latest specification, being a modified version of the MB 229.3 specification. Applies to engine oil with reduced content of sulfated ash ( $\leq$ 0,8%), sulfur ( $\leq$ 0,3%), phosphorus ( $\leq$ 0,09%) and chlorine ( $\leq$ 0,015%) (mid SAPS), designed for Euro 4, Euro 5 and Euro 6 engines with improved fuel economy (up to 1%) and without extended oil drain intervals (15,000-30,000 km). ACEA C3 plus additional MB requirements. HTHS  $\geq$ 3,5 mPa.s. Volatility: Noack  $\leq$  12%.

MB 229.5 Must comply with ACEA A3/B3/B4 plus additional MB tests. Provides fuel economy and extended drain intervals in passenger vehicle petrol and diesel engines, from 25,000 to 50,000 km. Volatility (Noack)  $\leq$ 10%. Sulphated ash  $\leq$ 1,6%, sulfur  $\leq$ 0,5%  $\leq$ 0,11% phosphorus, chlorine  $\leq$ 0,015%. HTHS  $\geq$ 3,5mPa.s

MB 229.51 Must comply with ACEA C3 specification, plus additional MB tests. Sulfated ash  $\leq$ 0,8%  $\leq$ 0,3% sulfur, phosphorus  $\leq$ 0,09%, HTHS  $\geq$ 3,5 mPa.s.

MB 229.52 Oils complying with this specification must have increased fuel efficiency, by 1% better than MB 229.31 and MB 229.51, as well as better oxidation stability and compatibility with bio-fuels. Such oils can be used where compliance with MB 229.31 and MB 229.51 specifications is required. The a/m specification stipulates types of oil enabling for extended drain intervals.

MB 226 Monograde oils for diesel engines without turbocharger. Must comply with API SF/CC; CCMC G2/D1 specification. However, this specification is out-of-date.

MB 226.9 Gas engine oils. Sulphated ash  $\leq$ 1% volatility (Noack)  $\leq$  13%, HTHS  $\geq$ 3,5 mPa.s. Must comply with ACEA A2/E2 specification.

MB 227.0/1 Monograde/multigrade engine oils for naturally aspirated diesel engines. Must comply with ACEA B2/E1, API CF/CE. Zinc 0.08-0.12%. HTHS > 3.5 mPa.s. Sulfated ash <2%.

MB 228.0/1 Monograde / multigrade engine oil for commercial vehicle diesel engines fitted with, or without turbocharger. Must comply with ACEA B2/E2, API CF-4. Sulfated ash  $\leq$ 2%. Volatility (Noack)  $\leq$  13%. HTHS  $\geq$ 3,5 mPa.s. Drain interval: up to 45,000 km.

MB 228.2/3 Monograde/multigrade oils for commercial vehicle diesel engines fitted with, or without turbocharger. Designed for extended drain intervals (up to 75,000 km). Must comply with ACEA B3/E3, API CF-4/CG-4 designs. Sulfated ash:  $\leq$ 2%. Volatility: Noack  $\leq$  13%. HTHS  $\geq$ 3,5 mPa.s. Drain interval: up to 75,000 km.

## APPENDICES

### Oil/Fluid Quality Specifications

- MB 228.31 For commercial vehicle diesel engines with diesel particulate filter (DPF). Must comply with API CJ-4 specification, plus additional Mercedes Benz OM611 and OM441LA tests. Sulfated ash  $\leq 1,0\%$ , sulfur  $\leq 0,4\%$ , phosphorus  $\leq 0,12\%$ .
- MB 228.5 Must comply with ACEA E4, plus additional MB tests. Sulfated ash  $\leq 2\%$ . Volatility (Noack)  $\leq 13\%$ . HTHS  $\geq 3,5$  mPa.s. Euro 4 exhaust emission requirements-compliant. Drain interval: up to 100,000 km.
- MB 228.51 This is a modified MB 228.5 specification. Applies to oils with low sulfated ash ( $\leq 1\%$ ), sulfur ( $\leq 0,3\%$ ), phosphorus ( $\leq 0,08\%$ ) and chlorine ( $\leq 0,015\%$ ) contents (low SAPS), designed for Euro 4, Euro 5 and Euro 6 engines. HTHS  $\geq 3,5$  mPa.s. Volatility: Noack  $\leq 12\%$ . ACEA E6, plus additional MB requirements. Drain interval: up to 100,000 km.

## CLASSIFICATION OF GEARBOX AND DIFFERENTIAL OILS

### SAE J 306

The SAE Association has made a gearbox and differential oil classification by their viscosity. Besides numerical label, the first four SAE grades are also “W”-labeled, whereat “W” refers to the so-called winter-grade oils, while the other three grades are not “W”-labeled, thus belonging to the summer-grade oils.

SAE VISCOSITY GRADES	70W	75W	80W	85W	80	85	90	110	140	190	250	
MAXIMUM TEMPERATURE LEVEL (°C), AT WHICH THE VISCOSITY BY BROOKFIELD TEST IS 150000 mPas	55	-40	-26	-12	*	*	*	*	*	*	*	
KINEMATIC VISCOSITY THRESHOLDS AT 100°C, mm <sup>2</sup> /s	MIN.	4,1	4,1	7,0	11,0	7,0	11,0	13,5	18,5	24,5	32,5	41,0
	MAX.	*	*	*	*	11,0	13,5	18,5	24,0	32,5	41,0	*

### API

In addition to SAE classification, the API has also made the following application-based gearbox and differential oil classification:

API GL - 1	MANUAL GEARBOX OILS FOR MOTOR VEHICLES OPERATING UNDER VERY LIGHT-LOAD CONDITIONS.
API GL - 2	OILS FOR MANUAL TRANSMISSIONS AND WORM GEARS USED IN INDUSTRY.
API GL - 3	OILS FOR MANUAL GEARBOXES CONTAINING NON-FERROUS ASSEMBLY PARTS.
API GL - 4	HYPOID GEAR OILS FOR DIFFERENTIALS AND SYNCHROMESH GEARBOXES IN PASSENGER AND FREIGHT VEHICLES OPERATING UNDER VERY MODERATE-LOAD CONDITIONS.
API GL - 5	HIGH-ADDITIVE CONCENTRATION OILS FOR HYPOID TOOTHED TRANSMISSIONS IN MOTOR VEHICLES OPERATING UNDER SEVERE IMPACT-LOAD AND EXTREME PRESSURE CONDITIONS.

## AUTOMATIC TRANSMISSION FLUID QUALITY SPECIFICATIONS

Transmission fluid quality specifications have been determined according to the automatic transmission manufacturers' requirements (specifications), primarily with the quality specifications of two world's leading manufacturers: General Motors and Ford. These two specifications differ in friction size-scale. Oils manufactured according to FORD's specifications have a higher friction coefficient of at low slip speed than at high slip speed, while in oils manufactured according to GM specifications this ratio is inverted. Manufacturers have generally accepted one of the a/m requirements, along with additional number of tests providing for better fluid applicability in their own assemblies. Therefore, automatic transmission fluid quality is determined by the following specifications:

GENERAL MOTORS	FORD	ALLISON	MANUFACTURER REQUIREMENTS
ATF type A Suffix A	MC 33-G	(GM CHAPTER)	Caterpillar TO-2
DEXRON B (B)	MC 138- CJ	ALLISON C-3	Caterpillar TO-4
DEXRON II (C)	MERCON	ALLISON C-4	VOITH
DEXRON IID (D)			MB 236.6
DEXRON IIE (E)			MB 236.2
DEXRON II (F)			ZF TE ML 09-11-14
DEXRON III (G)			

### Coolant Quality Specifications

## COOLANT QUALITY SPECIFICATIONS

Coolant quality specifications are based on recognized international standards, such as ASTM D 3306, ASTM D 4985, ASTM D 6210, and BS 6580.

ASTM D 3306 standard determines the quality of glycol-base formulated fluids, applied as automotive cooling fluids and designed for light load-conditions. This specification stipulates minimum quality requirements, as most automotive manufacturers have their own quality specifications, being more stringent in most cases. According to this standard, there are six coolant types, listed in Table 1.

This specification stipulates the process of determining required corrosion protection level for certain metals and alloys through monitoring of weight loss of plate according to ASTM D 1384 method, widely used by most respectable coolant manufacturers. Table 2 displays an overview of corrosion protection requirements according to the specific metal types. ASTM D 6210 and ASTM D 4985 standards stipulate quality requirements for coolants designed for use in heavy-duty engines.

Coolant concentrates compliant with ASTM D 6210 specification do not require any Supplemental coolant additive (SCA) enrichment. To the contrary, ASTM D 4985 specification describes a coolant which must be enriched with SCA additive package at the initial cooling system charge, thus such enrichment must be continued in line with certain maintenance intervals. BS 6580 specification stipulates quality requirements for glycol and corrosion inhibitor-based engine coolants.

TABLE 1

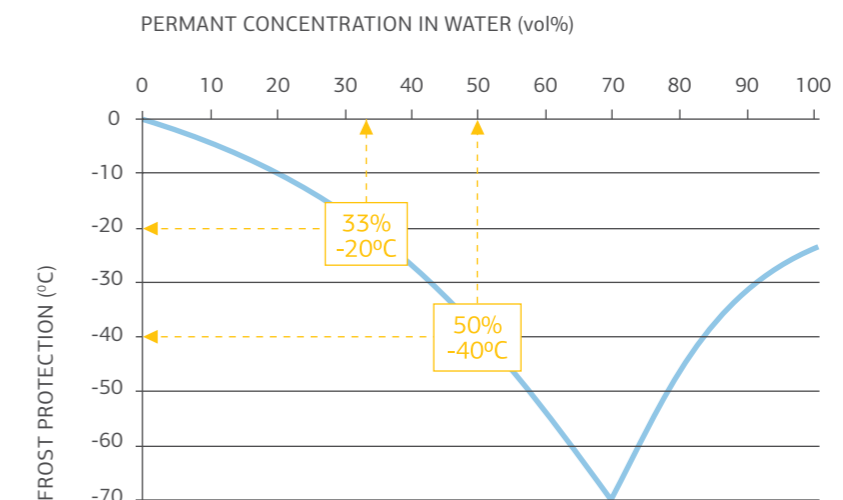
TYPE	FORMULATION
I	ETHYLENE GLYCOL-BASED CONCENTRATE
II	PROPYLENE GLYCOL-BASED CONCENTRATE
V	ETHYLENE GLYCOL AND GLYCEROL-BASED CONCENTRATE
III	READY-TO-USE ETHYLENE GLYCOL-BASED FLUID (50%)
IV	READY-TO-USE PROPYLENE GLYCOL-BASED FLUID (50%)
VI	READY-TO-USE ETHYLENE GLYCOL AND GLYCEROL-BASED FLUID (50%)

TABLE 2

METALS AND ALLOYS	THRESHOLDS*, max., mg/plate	ASTM METHOD
COPPER	10	D 1384
SOLDER	30	D 1384
BRASS	10	D 1384
STEEL	10	D 1384
CAST IRON	10	D 1384
ALUMINUM	30	D 1384

\* THRESHOLDS ACCORDING TO ASTM D 3306 STANDARD

### PERMANT BLENDING CHART





## ISO CLASSIFICATION OF INDUSTRIAL OILS BY VISCOSITY

ISO (International Organization for Standardization) industrial oil classification includes 18 grade categories within viscosity range from 2 to 1 500 mm<sup>2</sup>/s at 40 °C, covering thereby the industrial oil production range entirely.

VISCOSITY GRADES ISO	VISCOSITY GRADES ISO AVERAGE KINEMATIC VISCOSITY VALUES AT 40°C, mm <sup>2</sup> /s	LIMIT KINEMATIC VISCOSITY VALUES AT 40°C, mm <sup>2</sup> /s	VISCOSITY GRADES ISO	VISCOSITY GRADES ISO AVERAGE KINEMATIC VISCOSITY VALUES AT 40°C, mm <sup>2</sup> /s	LIMIT KINEMATIC VISCOSITY VALUES AT 40°C, mm <sup>2</sup> /s
2	2,2	1,98	2,24	68	61,2
3	3,2	2,8	3,52	100	90,0
5	4,6	4,14	5,06	150	135
7	6,8	6,1	7,48	220	198
10	10	9,0	11,0	320	288
15	15	13,5	16,5	460	414
22	22	19,8	24,2	680	612
32	32	28,8	35,2	1000	900
46	46	41,4	50,6	1500	1350

## INDUSTRIAL OILS CLASSIFICATION ACCORDING TO THE APPLICATION RANGE

Industrial oils classification according to their application range is stipulated by ISO 6743/0 standard according to the International Classification ISO.

LABEL	APPLICATION RANGE	LABEL	APPLICATION RANGE
ISO L-A	INSTANTENOUS LUBRICATION OILS	ISO L-M	METALWORKING OILS AND FLUIDS
ISO L-B	FORMWORK RELEASE OILS	ISO L-P	PNEUMATIC TOOL OILS
ISO L-C	TOOTHED TRANSMISSION OILS	ISO L-Q	HEAT TRANSFER OILS
ISO L-D	COMPRESSOR OILS	ISO L-R	ANTI-CORROSION OILS AND AGENTS
ISO L-E	INTERNAL COMBUSTION ENGINE OILS	ISO L-T	TURBINE OILS
ISO L-F	CIRCULATORY SYSTEM OILS	ISO L-U	METAL HEAT TREATMENT OILS
ISO L-G	SLIDEWAY OILS	ISO L-X	LUBRICANT GREASES AND RELATED PRODUCTS
ISO L-H	HYDRAULIC SYSTEM OILS	ISO L-Y	OILS FOR OTHER APPLICATION AREAS
ISO L-N	OILS FOR ELECTRICAL INSTALLATIONS	ISO L-Z	STEAM CYLINDER OILS

ISO 6743 CLASSIFICATION	DIN 51520 CLASSIFICATION	COMPOSITION	APPLICATION RANGE
HL	HL DIN 51524-1	MINERAL BASE OILS ENRICHED WITH CORROSION AND OXIDATION INHIBITORS, WITHOUT ANTI-WEAR AND EP ADDITIVES	APPLIED IN HYDRAULIC SYSTEMS NOT REQUIRING ANTI-WEAR PROTECTION
HR	*	HL-HYDRAULIC OIL WITH IMPROVED VISCOSITY INDEX	*
HM	HLP DIN 51 524-2	MINERAL OIL-BASED FLUIDS, ENRICHED WITH CORROSION & OXIDATION INHIBITORS AND WEAR PROTECTION ADDITIVES	HLP-FLUIDS ARE USED IN HYDRAULIC SYSTEMS OPERATING UNDER HIGH PRESSURE AND VITAL COMPONENT WEAR-THREATS
HV	HVLP DIN 51 524-3	MINERAL OIL-BASED HVLP-FLUIDS ENRICHED WITH CORROSION & OXIDATION INHIBITORS, WEAR PROTECTION ADDITIVES AND VISCOSITY INDEX IMPROVERS	APPLIED IN SYSTEMS OPERATING UNDER HIGH PRESSURE & WITHIN A WIDE TEMPERATURE RANGE
HG		HM-OIL, ENRICHED WITH ANTI-STICKSLIP ADDITIVE	*
*	HLPD-fluids	HLP & HVLP FLUIDS, ENRICHED WITH DETERGENT AND DISPERSANT ADDITIVES	APPLIED IN SYSTEMS REQUIRING DISPERSION OF IMPURITIES ALL OVER THE OIL VOLUME. SUCH FLUIDS MAY TAKE IN SOME WATER, WHICH MAY FURTHER AFFECT THEIR ANTI-WEAR AND ANTI-AGEING PROPERTIES.

## CLASSIFICATION OF METALWORKING LUBRICANTS M-FAMILY ACCORDING TO ISO 6743/7

LABEL	APPLICATION
L-MHA	FLUIDS WITH ANTI-CORROSION PROPERTIES
L-MHB	MHA-TYPE FLUIDS WITH FRICTION REDUCERS
L-MHC	MHA-TYPE FLUIDS WITH EXTREME PRESSURE (EP) PROPERTIES.
L-MHD	CHEMICALLY INACTIVE. MHA-TYPE FLUIDS WITH EXTREME PRESSURE (EP) PROPERTIES.
L-MHE	CHEMICALLY ACTIVE. MHB-TYPE FLUIDS WITH EXTREME PRESSURE (EP) PROPERTIES.
L-MHF	CHEMICALLY INACTIVE. MHB-TYPE FLUIDS WITH EXTREME PRESSURE (EP) PROPERTIES.
L-MHG	CHEMICALLY ACTIVE. GREASES, PASTES AND WAXES APPLIED AS READY-TO-USE OR DISOLUTED, MHA-TYPE OIL.
L-MHH	SOAPS, POWDERS, SOLID LUBRICANTS AND THEIR BLENDS.
L-MAA	CONCENTRATED FLUIDS WHICH, MIXED WITH WATER, GIVE MILKY EMULSIONS WITH ANTI-CORROSION PROPERTIES.
L-MAB	MAA-TYPE FLUID WITH FRICTION REDUCERS.
L-MAC	MAA-TYPE FLUID WITH EXTREME PRESSURE (EP) PROPERTIES
L-MAD	MHB-TYPE FLUIDS WITH EXTREME PRESSURE (EP) PROPERTIES.
L-MAE	CONCENTRATED FLUIDS WHICH, MIXED WITH WATER, GIVE TRANSPARENT EMULSIONS WITH ANTI-CORROSION PROPERTIES.
L-MAF	MAA-TYPE FLUID WITH FRICTION-REDUCING PROPERTIES AND/OR EXTREME PRESSURE (EP) PROPERTIES.
L-MAG	CONCENTRATED FLUIDS WHICH, MIXED WITH WATER, GIVE TRANSPARENT EMULSIONS WITH ANTI-CORROSION PROPERTIES.
L-MAH	MAG-TYPE FLUIDS WITH FRICTION-REDUCING PROPERTIES AND/OR EXTREME PRESSURE (EP) PROPERTIES.
L-MAI	GREASES AND PASTES APPLIED IN A FORM OF WATERY MIXTURE.

## LUBRICATING GREASES CLASSIFICATION

According to the American National Lubricating Grease Institute (NLGI) classification, lubricating greases have been classified based on their composition consistency. Such division is based on grease penetration properties, according to which the greases have been classified into nine NLGI grades. The classification is ISO 6743/0 specification-compliant.

NLGI GRADES	000	00	0	1	2	3	4	5	6
PENETRATION mm/10	445-475	400-430	355-385	310-340	265-295	220-250	175-205	130-160	85-115
COMPOSITION CONSISTENCY	SEMIFLUID	SEMIFLUID	VERY SOFT	SOFT	MEDIUM SOFT	MEDIUM SOLID	SOLID	VERY SOLID	EXTREMELY SOLID

## APPENDICES

### International Abbreviations

## ACRONYMS OF INTERNATIONAL ORGANIZATIONS FROM FUEL, LUBRICANT AND AUTOMOTIVE FIELD

ABBREVIATION	FULL NAME
AAMA	AMERICAN AUTOMOBILE MANUFACTURERS ASSOCIATION
ACEA	EUROPEAN AUTOMOBILE MANUFACTURERS' ASSOCIATION
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
API	AMERICAN PETROLEUM INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ATC	TECHNICAL COMMITTEE OF PETROLEUM ADDITIVE MANUFACTURERS IN EUROPE
CCMC	COMMITTEE OF COMMON MARKET AUTOMOBILE CONSTRUCTORS (SUCCEEDED BY EUROPEAN ASSOCIATION OF CAR CONSTRUCTORS ACEA)
CEC	COORDINATING EUROPEAN COUNCIL FOR STANDARDIZATION AND EVALUATION OF VEHICLE, FUEL, LUBRICANT AND ADDITIVE QUALITY
CRC	US COORDINATING RESEARCH COUNCIL
DIN	GERMAN INSTITUTE FOR STANDARDIZATION
DOT	DEPARTMENT OF TRANSPORTATION TO NATIONAL TRAFFIC SAFETY ADMINISTRATION. AUTOMOTIVE BRAKING SYSTEM STANDARDS.
EUROPIA	EUROPEAN PETROLEUM INDUSTRY ASSOCIATION
GOST	USSR (NOW RUSSIAN) NATIONAL STANDARDIZATION SYSTEM
IEC	INTERNATIONAL ELECTROTECHNICAL COMMISSION. STIPULATES TRANSFORMER OIL AND ELECTRIC SWITCH LUBRICANT QUALITY
ILSAC	INTERNATIONAL LUBRICANT STANDARDIZATION AND APPROVAL COMMITTEE
ISO	INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
JASO	JAPANESE AUTOMOTIVE STANDARDS ORGANIZATION
JUS	YUGOSLAVIAN STANDARDIZATION SYSTEM, NOW SRPS
SRPS	STANDARDS ACCORDING TO SERBIAN STANDARDIZATION INSTITUTE
NLGI	US NATIONAL LUBRICATING GREASE INSTITUTE
NMMA	NATIONAL MARINE MANUFACTURERS ASSOCIATION
SAE	US SOCIETY OF AUTOMOTIVE ENGINEERS

## INDEX

ADBLUE	53	HIPOIDNO ULJE B	38	MOLUB FS	68	REDUKTOL SUPER	65
ADDITIVE GASOLINE/ADITIV BENZIN	55	HIPOIDNO ULJE LS	39	MOLUB HF	69	RADIATOR SEALANT/ZAPTIVAČ	55
ADDITIVE DIESEL/ADITIV DIZEL	54	HIPOIDNO ULJE TDL	38	MOLUB HK	69	SINTASOL B	71
AGROMAX 2G	30	JD FLUID	31	MOLUB HP	70	SINTASOL BS	71
AGROMAX C	30	KALCIMA	80	MOLUB IP	69	SINTASOL PSA	71
ALISON FLUID TCF	41	KOMPRIMOL	64	MOLUB NA	68	SINTASOL SHD	71
ALMAPLEX	79	KOMPRIMOL VK	64	MOLUB OZ	68	SPECIAL LAWN MOWER OIL/ SPECIJALNO ULJE ZA KOSILICE	26
AUTOPEX	78	LITMA	76	MOLUB VP	70	TANTAL	80
CLAY-TREATED PARAFFIN WAX	85	LITMA 2VT	77	MOLUBE CS	64	TERMOL S	73
BIOHIDRAULIK-HEES	60	LITMA EP	76	MOSOL	52	TERMOL SE	73
BIO-MAST	81	LITMA EP MoS	77	MOTOR CLEANER	53	TESTEROL 100	27
CIRCULATING OILS/CIRKULACIONO ULJE M	64	LOKOMODOL	21	MOTOTAKTOL RACING 4T	26	TESTEROL BIO	27
DEMI WATER	52	MATIK ATF Type A	41	OPTIMA 505 01	09	TRAFOMOL	67
DVOTAKTOL	25	MATIK DX II	40	OPTIMA ECO	08	TRAFOMOL SPECIAL	67
DVOTAKTOL BIO	25	MATIK DX III	40	OPTIMA ECO PLUS	08	TRAKTOL	31
DVOTAKTOL RACING	24	MAXIMA E9	16	OPTIMA GAS	12	TRANSLUB GL-4	39
DVOTAKTOL SINT	24	MAXIMA EURO 5+	16	OPTIMA GAS PLUS	11	TRANSTERM 2000	67
ELKOMA	80	MAXIMA HC PRESTIGE XLD	18	OPTIMA HC CITY	10	TURBINE OIL	67
FRIGOL	65	MAXIMA HD S3	20	OPTIMA HC POWER	10	UHK RACING DOT 5.1	44
HYDRAULIC FLUID HFC	60	MAXIMA HD S3	21	OPTIMA LONG LIFE	12	UHK-2	45
HYDRAULIC FLUID HFD-U	60	MAXIMA LONG LIFE	19	OPTIMA MAGNUM	09	UHK-4	44
HYDRAULIC OIL/HIDRAULIČNO ULJE HD	58	MAXIMA MAGNUM XHPD	17	OPTIMA SINT TURBO	11	MOULD OIL/ULJE ZA KALUPE	66
HYDRAULIC OIL/HIDRAULIČNO ULJE HLPD	59	MAXIMA MARINE	32	OPTIMA SUPERVISK	13	SLIDEWAY OILS/ULJE ZA KLIZNE STAZE	65
HYDRAULIC OIL/HIDRAULIČNO ULJE MH-46	59	MAXIMA SUPER	20	PERMANT	48	FORMWORK RELEASE OIL/ ULJE ZA OPLATE UP-15	66
HYDRAULIC OIL/ HIDRAULIČNO ULJE SUPER HVL	58	MAXIMA SUPER MG	19	PERMANT ECONOMIC	49	CUTTING OIL/ULJE ZA REZANJE	68
HIDROKIP	45	MAXIMA TURBO	18	PERMANT LONG LIFE	48	UNIVERZAL M	72
HIDROLUBE HPM	61	MAXIMA XHPD	17	PREVENT A	72		
HIDROLUBE HPM-S	61	MOLUB BR 25	69	PREVENT B	72		
HYDROCRACKED BASE OILS	84	MOLUB BR 35	69	REDMA 0	81		
		MOLUB DB	70	REDUKTOL HKT-30	65		





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