ENGINE OIL
G-ENERGY

FREQUENTLY ASKED QUESTIONS ABOUT LUBRICANTS

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GENERAL INFORMATION

FREQUENTLY ASKED QUESTIONS

ENGINE OIL
G-ENERGY

GENERAL INFORMATION

COMPOSITION OF THE FINISHED LUBRICANTS

ADDITIVE PACKAGE 1-25%

BASE OIL 75-99%

Base oil content in the finished products:

- engine oils: 75 - 95%
- transmission oils: 75 - 95%
- hydraulic oils: 85 - 99%

BASE OILS USED IN G-ENERGY FORMULATIONS

Mineral
API Group I:
Gazpromneft

Synthetic
API Group III:
G-Base
Etro (Petronas)
Yubase (SK Lubricants)
Nexbase (Neste Oil)

Synthetic
API Group IV & V:
Chevron
Croda

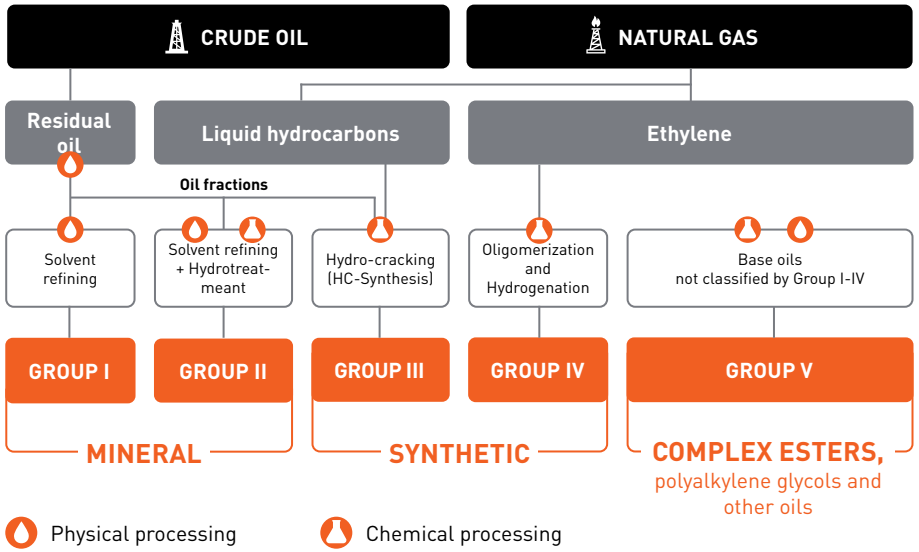
ADDITIVE PACKAGES

Lubrizol
Afton
Chevron Oronite
Evonik Industries
Infineum

- detergents
- dispersants
- anti-wear (AW)
- extreme pressure (EP)
- antioxidants
- corrosion inhibitors
- viscosity modifiers
- pour point depressants
- friction modifiers
- foam suppressants
- deemulsifiers etc.

API (American Petroleum Institute) — Primary classification of the base oils.

BASE OIL TYPES AND PRODUCTION TECHNOLOGIES



HOW WE INDICATE BASE OILS IN TDS

Fully Synthetic base (PAO + Esters):

- PAO (Group IV)
- Esters or Complex Esters (Group V)

Fully Synthetic base (contains PAO):

- PAO (Group IV)
- VHVI (Group III)

Fully Synthetic base:

- VHVI (Group III)

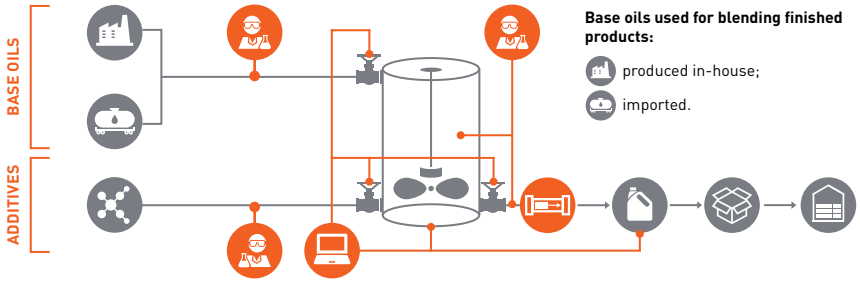
Semi-Synthetic base (mineral and synthetic oil blend):

- VHVI (Group III)
- Mineral oils (Group I)

Abbreviations:
VHVI (Very High Viscosity Index) — API Group III synthetic base oil
PAO (Poly-Alpha-Olefines) — API Group IV synthetic base oil
Esters & Complex Esters — API Group V synthetic base oil

MODERN PRODUCTION TECHNOLOGIES

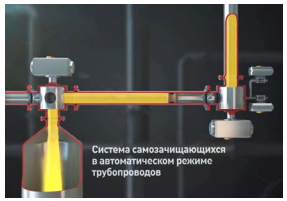
MANUFACTURING OF FINISHED PRODUCTS



Product quality control in ISO 17025 certified laboratories.

Fully automated blending facilities, filling lines and packaging equipment.

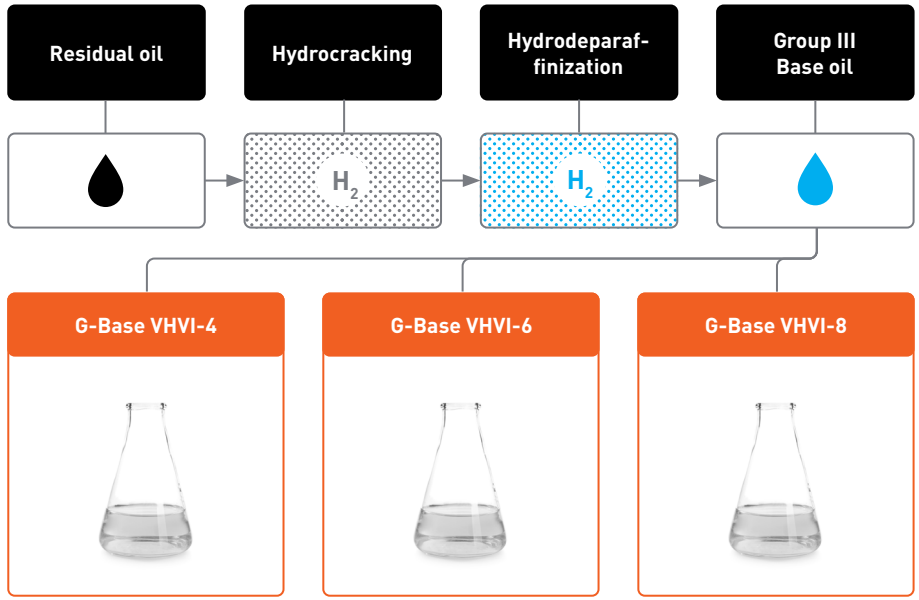
Unique self-cleaning pipe line system.



Constantly high quality of each blended batch — reliable equipment operation

International ISO certification:
ISO 9001, OHSAS 18001, ISO 14001, ISO 50001, IATF 16949.

G-BASE SYNTHETIC TECHNOLOGY



0
Acid Number
Perfectly neutral fluid.

0
Cokeability
High resistance to deposit formation.

<10
Sulfur content ppm
Comparable to content in mineral water.

Successfully passed series of tests to acquire corresponding approvals for G-Base (homologation):
API, ILSAC, ACEA, Renault, Mercedes-Benz, Volkswagen.

All physical and chemical properties correspond to the performance of global competitors.

HOW TO CHOOSE OIL?

1 ?

2 ?

3 ?

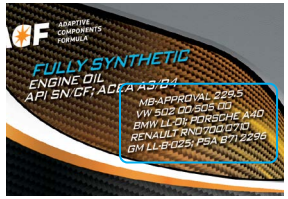
ENGINE OILS ARE CLASSIFIED ACCORDING TO:

Viscosity — SAE J300 classification

Performance properties

International classifications like API/ACEA/ILSAC

OEM specifications



These 2 points are the cornerstone for correct lubricant selection and are written in the vehicle user manual.
Choice based solely on the viscosity grade involves a risk of equipment malfunction or even failure.

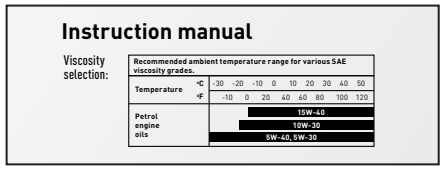
HOW TO ENSURE THE RIGHT OIL IS SELECTED?

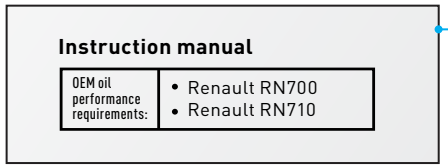
STEP 1

Open the user's manual of the vehicle and find the chapter dedicated to lubricant application.

STEP 2

Compare information on the product label with the recommendations in the user's manual.





The highest priority for choosing engine oil is for the OEM requirement, while ACEA, ILSAC and API additionally describe applicability of the product.

SAE J300 ENGINE OIL VISCOSITY CLASSIFICATION

Viscosity grade does not determine operating performance or product quality.

SAE J300 VISCOSITY GRADES

Low temperature

Characterize low temperature pumpability, Identifier W (Winter).

Multigrade (all-season)

Combine low and high temperature viscosity grades depending on properties.

High temperature

Characterize oil film thickness at operating temperature.

-35 -30 -25 -20 -15 -10

0W 5W 10W 15W 20W 25W

Engine cold-start.

5W-30

15W-40

20W-50

and others

20 30 40 50 60

Viscosity behavior at engine operating temperature.

Low temperature properties			High temperature properties		
Vis-cosity grade	CCS	MRV	Kinematic viscosity at 100 °C		HTHS, mPa·s, min
	Maximum viscosity, mPa·s, at temperature		min	max	
0W	6 200 at -35 °C	60 000 at -40 °C	3,8	-	-
5W	6 600 at -30 °C	60 000 at -35 °C	3,8	-	-
10W	7 000 at -25 °C	60 000 at -30 °C	4,1	-	-
15W	7 000 at -20 °C	60 000 at -25 °C	5,6	-	-
20W	9 500 at -20 °C	60 000 at -20 °C	5,6	-	-
25W	13 000 at -25 °C	60 000 at -15 °C	9,3	-	-
8	-	-	4	6,1	1,7
12	-	-	5	7,1	2
16	-	-	6,1	8,2	2,3
20	-	-	6,9	9,3	2,6
30	-	-	9,3	12,5	2,9 (A5/B5), 3,5 (A3/B4)
40	-	-	12,5	16,3	3,5 (0W-, 5W-, 10W-)
40	-	-	12,5	16,3	3,7 (15W-, 20W-, 25W-)
50	-	-	16,3	21,9	3,7
60	-	-	21,9	26,1	3,7

CCS — crankshaft cranking simulation. MRV — simulation of pumpability. HTHS — oil film thickness between friction surfaces in high temperature, high shear conditions

SAE grade determines temperature range for application of engine oil.

G-Energy F Synth 0W-30 and **G-Energy F Synth 0W-40 engine oils** provide widest range of the ambient temperature applicability.

- Formulated using exclusive Group IV (PAO) synthetic base oil.
- Engine start-up and protection at extremely low temperatures operation conditions
- Outstanding engine protection at operating temperature even for the equipment subjected to hot climate conditions.

-40 °C +50 °C

WHAT 0W-40 GRADE STANDS FOR

0W-40

Effortless crankshaft cranking at engine start-ups (no excessive viscosity related oil resistance) in temperature down to -35 °C.

At operating engine temperature oil maintains optimal oil film thickness according to SAE 40 viscosity grade limits.

API ENGINE OIL CLASSIFICATION (AMERICAN PETROLEUM INSTITUTE)

ENGINE OILS

Petrol S — service	Universal (gasoline and diesel powered)	Diesel C — commercial
SH, SJ, SL, SM, SN	API SN/CF	CF, CG, CH, CI, CJ

Second letter indicates performance level. Alphabetically ascending letter indicates more stringent requirements and newer/upgraded specification.

API SN → API SL		API SL → API SN	
Recommended	CANNOT be used	Recommended	CAN be used

Newer specification may be used instead of an older one, NOT THE OTHER WAY AROUND!

API SN GRADE ADVANTAGES OVER API SL

Advantages	Prevents	Affects
Enhanced protection against high temperature deposit formation	Piston ring sticking	• Engine lifetime • Heat transfer • Oil volatility (consumption)
Enhanced protection against low temperature deposit formation	Deposits on the valve train and in the sump	• Engine lifetime • Oil filter clogging
Enhanced anti-wear protection	Excessive wear	• Lifetime of the engine
Compatibility to the most popular elastomers	Degradation of the elastomeric gasket materials	• Lifetime of the elastomeric gaskets • Oil leaks

ILSAC ENGINE OIL CLASSIFICATION

ILSAC (International Lubricant Standardization and Approval Committee) classification is based on API classification of petrol engine oils. It is usually prescribed for Japanese and Korean cars that require low viscosity energy-saving engine oils.

API requirements + **Energy efficiency (Resource Conserving)** = **ILSAC**

Year of introduction	API Grade	ILSAC Grade
2001	API SL	ILSAC GF-3
2004	API SM	ILSAC GF-4
2011	API SN	ILSAC GF-5
2020	API SP	ILSAC GF-6A/6B

Gasoline engine only.

EC **Energy conserving properties.**

DIFFERENCE BETWEEN API SN AND ILSAC GF-5

Parameters	API SN	ILSAC GF-5
Fuel economy		✓
Compatibility with alternative fuels		✓
Protection against high temperature deposits	■■■	■■■
Catalyst useful life	■■	■■■

ACEA ENGINE OIL CLASSIFICATION

Engine oil classification introduced by European Automobile Manufacturers Association in 1996. Distinguishes oils for petrol powered engines (A and C categories) and light duty diesel powered engines (B and C categories).

High ash content gasoline and diesel engine oils (DPF incompatible); ACEA Ax/Bx

- A1/B1 (replaceable with A5/B5)
- A3/B3 (replaceable with A3/B4)
- A3/B4 (regular viscosity oils)
- A5/B5 (energy-saving oils)

Low ash content petrol and diesel engine oils (DPF compatible); ACEA Cx

- C1
- C2
- C3
- C4
- C5

Not interchangeable

Requirements (approvals) of European automotive manufacturers are based on ACEA classification.

ACEA A1/B1
ACEA A5/B5
ACEA A3/B3
ACEA A3/B4

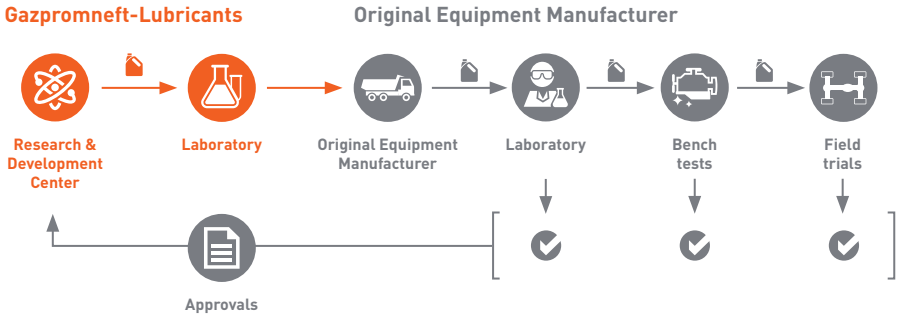
\+

Additional OEM tests

=

OEM approvals
MB-229.X, VW 50X 0X, BMW longlife-XX, Renault RN07X0, Ford WSS-XXXX etc.

APPROVAL PROCEDURE



HIGH ASH CONTENT ENGINE OILS
Full SAPS oils for light duty engines

ACEA A3/B3

Indirect injection engines:

- VW (VW, Audi, Skoda, Seat) 501 01/505 00;
- Mercedes-Benz-229.1.

ACEA A3/B4 (replaced A3/B3)

Indirect and direct injection engines:

- VW (VW, Audi, Skoda, Seat) 502 00/505 00;
- Mercedes-Benz 229.3, 229.5;
- BMW Longlife-01;
- Renault RN 0700/0710;
- Peugeot/Citroen PSA B71 2296.

ACEA A5/B5 (replaced A1/B1)

Indirect and direct injection engines + energy saving:

- Ford WSS-M2C 913-C/D;
- Mazda, Jaguar, Land Rover, Volvo engines

Medium and Low Ash (Mid-SAPS and Low SAPS) content oils for petrol and diesel engines equipped with advanced exhaust gas aftertreatment systems including particle filters.

ACEA C1

Low-SAPS + energy conserving:

- Ford M2C934-B;
- Jaguar, Land Rover, Volvo engines.

ACEA C2

Mid-SAPS + energy conserving:

- Ford M2C948-B;
- Ford M2C950-A;
- BMW Longlife-12 FE;
- Peugeot/Citroen PSA B71 2290, PSA B71 2312;
- Honda, Toyota, Lexus, Suzuki engines.

ACEA C3

Mid-SAPS:

- VW (VW, Audi, Skoda, Seat) 504 00/507 00;
- Mercedes-Benz-229.31, 229.51, 229.52;
- BMW Longlife-04;
- GM (Opel) dexos2;
- Honda, Suzuki, Mitsubishi, Nissan, Mazda, Hyundai, KIA engines.

ACEA C4

Low-SAPS:

- Renault RN 720;
- Nissan engines.

ACEA C5

Mid-SAPS + energy conserving:

- MB. 229.71;
- VW 508 00/ 509 00;
- BMW Longlife-17 FE;
- Porsche C20;
- Volvo VCC RBS0-2AE;
- Honda, Mazda, Suzuki, Toyota, Nissan, Opel/GM, Chrysler engines.

HOW TO SAFELY SWITCH OIL BRANDS?

HOW TO SAFELY SWITCH TO XXX 5W-40

STEP 1. Determine viscosity grade according to SAE J300, in this instance — 5W-40.

STEP 2. Choose product of the same viscosity grade, for instance G-Energy F Synth 5W-40.

STEP 3. Compare specifications of both products:

G-Energy F Synth 5W-40	Unspecified 5W-40
• API SN/CF; • ACEA A3/B4; • MB 229.5; • VW 502 00/505 00; • BMW LL-01; • Renault RN0700/0710; • Porsche A40; • PSA B71 2296.	• API SN/CF; • ACEA A3/B3/B4; • MB 229.5; • VW 502 00/505 00; • BMW LL-01; • Renault RN0700/0710; • Porsche A40; • PSA B71 2296; • Ferrari.

Product substitute is found if both oils coincide or are identical according to:

- scope of application;
- ACEA/ILSAC/API (consider ACEA and ILSAC classifications as a top priority);
- SAE viscosity grade;
- most of the OEM approval list (OEM specifications).

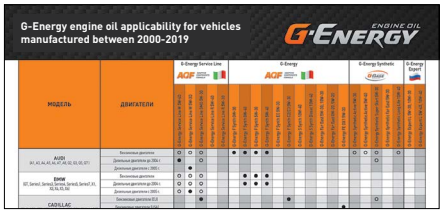
Be cautious selecting engine oil according to the specifications of previously used product — earlier product choices often may be partially or totally incorrect. Instead, always follow user manual guidelines!

STEPS FOR PICKING THE RIGHT PRODUCT FOR OIL CHANGE

Instruction manual available

Determine appropriate lubricant according to OEM recommendations and offer corresponding G-Energy or Gazpromneft branded product.

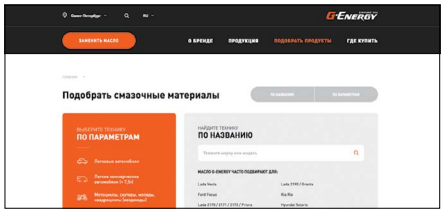
Use oil selection tables for G-Energy or Gazpromneft product choice.



Instruction manual unavailable

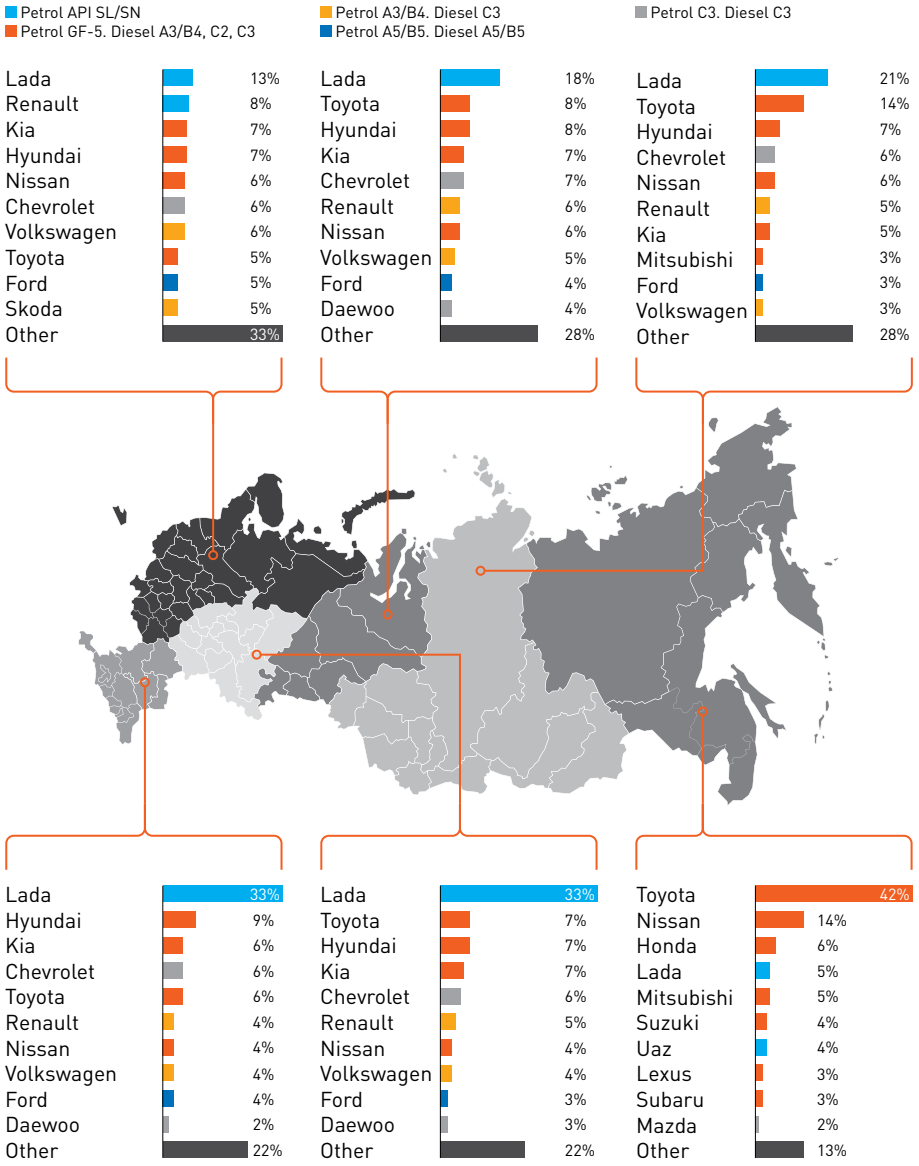
Ask customer:
- Manufacturer and model of the vehicle;
- Production year;
- Type of the engine: gasoline or diesel. In case of diesel - if DPF installed or not

Use online oil selector:
- **www.gazpromneft-oil.ru**
- **www.g-energy.org**



VEHICLE FLEET IN RUSSIA*

Recommended performance levels of engine oils**:



Information valid in 2019. Data https://www.autostat.ru
* Vehicles newer than 10 years.

** Before use please check your vehicle user manual.

G-ENERGY ENGINE OIL

FREQUENTLY ASKED QUESTIONS

1. HOW TO VERIFY PRODUCT ORIGINALITY?

G-ENERGY BRAND

G-Energy product packaging is protected against counterfeit by unique design visually presented at website **g-energy.org.**

GAZPROMNEFT BRAND

Gazpromneft 4 and 5 liter cans have a unique code printed as additional protection of the product. The code can be verified at the website www.gazpromneft-oil.com:

- obtain 4 or 5 liter can of the product;
- scrape off protective layer on the reverse label;
- check code on the website **www.gazpromneft-oil.ru.**

ORIGINAL PRODUCT MEANS:

- Conformity to the declared properties.
- Guarantee of the high quality standards provided by G-Energy and Gazpromneft oils.
- Confidence in effortless engine operation.

2. IS IT POSSIBLE TO EVALUATE PRODUCT QUALITY FROM COLOR OR SMELL?

Modern engine oils are designed using synthetic components free of any odor and are absolutely translucent and colorless. Odor and color of the finished product is determined by additive package type blended in the base oil. Even identical application lubricants may contain different additive packages, therefore odor and color may vary as well. Therefore, quality of the product can be determined exclusively by specialized laboratory.

SYNTHETIC BASE OIL

No additives | Additive package 1 | Additive package 2 | Additive package + dye

3. CAN I USE A DIFFERENT OIL FOR TOP-UP?

In case of emergency, mixing products made by different manufacturers is allowed up to 20-25%. Both products must comply to OEM requirements. However such oil blend must be replaced by a single appropriate product as soon as possible, since chemical interaction of the mixed additive packages may lead to deterioration of the product performance.

4. WHAT DETERMINES THE OIL CHANGE INTERVAL?

Oil change routines are determined by vehicle manufacturer. According to instruction manual drain intervals must be shortened in half if driving conditions are severe. Examples of severe conditions:

- **Traffic jam conditions**
- **Increased loads**
- **Short distance driving**
- **Cold starts**
- **Low fuel quality (high sulfur content)**
- **Extremely high and low ambient temperature operating conditions**

For instance: 15 000km drain interval at various driving speed averages may result in significantly diverse load on the aging rate of lubricant:

	Motorway*	City	Traffic jams
Average speed	60 km/h	40 km/h	20 km/h
Operation time	250 engine hours	375 engine hours	750 engine hours

5. IS IT NECESSARY TO FLUSH THE ENGINE BEFORE SWITCHING TO ANOTHER OIL?

NECESSITY OF THE ENGINE FLUSH

- Before upgrade to a superior oil specification (e.g. API SL replaced with API SN)
- Low quality (high sulfur) fuel used
- Previous drain intervals unknown or OEM recommended intervals exceeded
- Questionable quality of the oil used earlier
- Previous product data unavailable

PURPOSE OF THE OIL FLUSH

- Removes accumulated sludge and deposits
- Removes drained oil residue, wear particles and by-products of the fuel combustion.

*Instruction manuals typically determine drain intervals according to these driving conditions.

ENGINE FLUSH PROCEDURE

Special engine flush oil method

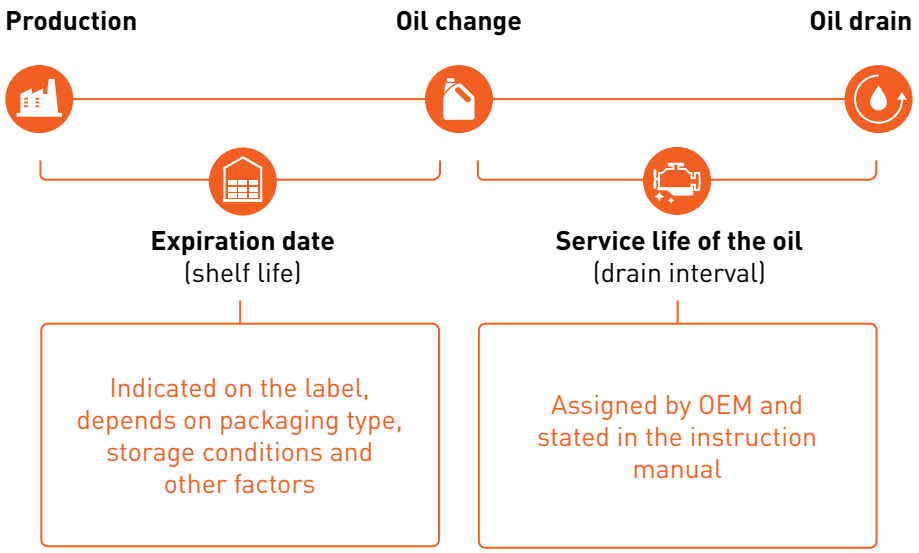
1. Drain the old oil and without replacing oil filter, fill in flushing oil, idle engine for 15-20 minutes.
2. Instantly drain hot flushing oil from the sump and let it run down for at least 30 minutes. Replace the oil filter and refill fresh engine oil.

Fresh engine oil method

1. Fill in fresh oil, replace the oil filter.
2. Shorten drain interval 2-3 times, drain the oil.
3. Change the engine oil and oil filter once again.

6. IF THE OIL IS EXPIRED, CAN I STILL USE IT?

Expiration date (shelf time) on the label and drain interval of the oil are different concepts. Oil can be filled in the engine any day till the end of expiration date. If oil is already filled in the system it must perform according to specifications till the end of drain interval recommended by vehicle manufacturer.



7. WHAT DETERMINES OIL CONSUMPTION?

Combustion related oil loss is inevitable because part of the oil left on cylinder walls is burned together with fuel. Combustion related oil consumption limits are stated in the instruction manual. Various vehicle manufacturers set different limits and may reach even 1 liter per 1000 kilometers.

COMBUSTION RELATED OIL CONSUMPTION DEPENDS ON:

1. Engine size.
2. Operating conditions.
3. Technical condition of the engine.

Increased combustion related oil losses happen either due to mechanical failures or increased volatility of the oil.

POSSIBLE TECHNICAL CAUSES

- Wear of valve stem seals.
- Piston ring sticking.
- Wear of the turbine shaft and bearings.
- Engine crankcase ventilation failures.

POSSIBLE OIL RELATED CAUSES

Incorrect selected performance level and/ or viscosity grade.

Suboptimal oil quality / counterfeit product.

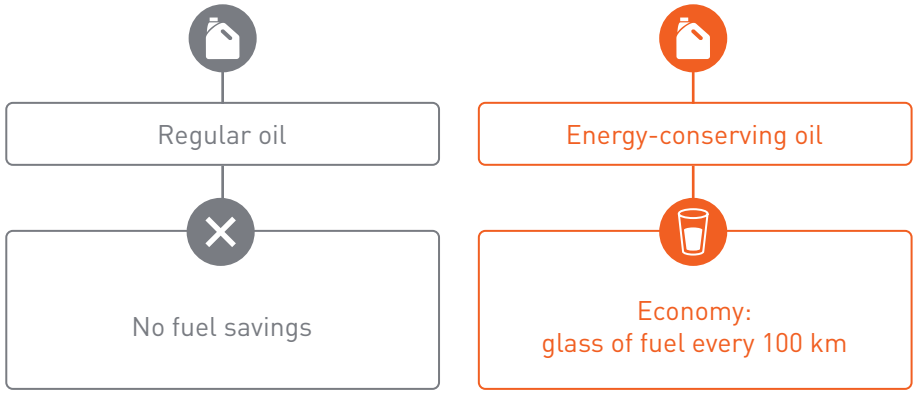
Exceeded drain interval / continuous top-ups with no complete oil change.

8. ARE OEM LUBRICANTS REPLACABLE?

Any engine model has specific set of requirements imposed by vehicle manufacturer according to OEM own standards, usually incorporating international API, ACEA, ILSAC standard requirements as well. Assigned engine oil specification is indicated in the instruction manual. If the engine oil you have decided to use instead of the original OEM product conforms to specifications in the instruction manual, you can safely use such a product in the engine of your vehicle.

9. ARE ENERGY CONSERVING LUBRICANTS REALLY SAVING FUEL?

Use of energy conserving lubricants provides fuel economy up to 3% in normal driving conditions*. Such products are applicable only for the engines designed to be lubricated by these specific oils. Clearances and oil channels in these engines are designed for a thinner oil film and, accordingly, the viscosity of the oil. But in a conventional engine the use of such oils can lead to increased wear.



* For instance application of ILSAC grade oil

10. WHAT CAUSES HYDRAULIC LIFTER NOISES?

PRIMARY CAUSES

- Camshaft cam wear
- Air/foam ingress in the hydraulic compensator
- Production errors
- Clogged/collapsed oil filter
- Clogged hydraulic compensators or lubrication channels
- Incorrect engine oil selection
- Engine overheating
- High mileage, exceeded drain interval

HYDRAULIC COMPENSATOR NOISE REDUCTION METHODS

Engine oil and oil filter change.

Accurate engine oil selection.

Reduction of drain intervals; prevention of excessed drains.

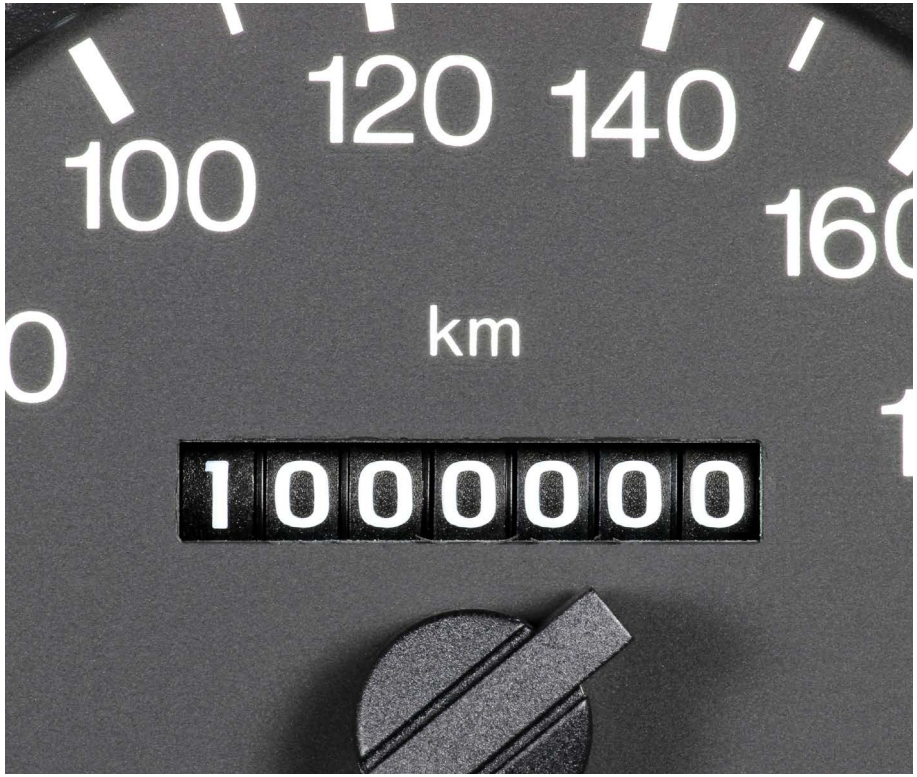
11. WHAT EXTRA ADDITIVES SHOULD BE USED FOR ENHANCED ENGINE PROTECTION?

All additives that needed to provide performance according to the oil specifications are already blended in the finished product. All components balanced to perform adequately and to avoid any unpredictable interaction.
Putting extra additives may lead chemical imbalances, loss of specific lubricant properties and even total engine failure!

12. SHOULD I USE HIGHER VISCOSITY GRADE FOR HIGH MILEAGE ENGINES?

Viscosity of the engine oil must be selected according to instruction manual provided by vehicle manufacturer. All permissible viscosity grades for specific ambient temperatures are listed in the corresponding lubrication chapter. If vehicle manufacturer allows use of higher viscosity grade, then you can do so. However, unwarranted choice of higher viscosity grade without OEM permission may lead to abnormal engine operation or even to the failure of entire systems.

Vehicle manufacturer recommends properties of the applicable lubricant according to characteristics of the engine. **Recommended viscosity is determined primarily by diameter of the lubrication channels, clearances and design specifics of the engine.**



13. CAN I USE RACING OIL IN MY CAR, IF I LIKE TO DRIVE AGGRESSIVELY?

Most racing oils are extremely viscous — typical viscosity grades are 10W-60, 15W-50, 20W-60 according to SAE J300. This is determined by the loads on lubricant to maintain viscosity-temperature properties. Besides, heat stress on the engine racing conditions is significantly higher. In normal operating condition, use of such viscosity oils in an engine designed to be lubricated with low viscosity oils, will hinder lubrication of crucial parts.

Use of G-Energy Racing engine oils in regular driving conditions is recommended solely for engines capable to circulate high temperature viscosities like xW-60, xW-50 without excessive pressure in the system.

14. DO I NEED A SPECIAL OIL FOR AN ENGINE RUNNING ON GAS (LPG OR CNG)?

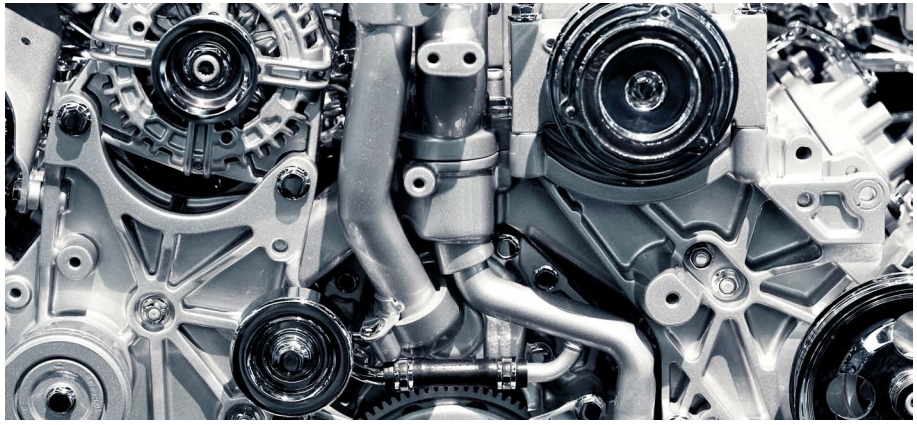
Installation of gas injection system in a gasoline powered engine requires highly professional skills but in this recommendation we do not consider unprofessional rebuild.

Installation of the additional injection system significantly alters requirements placed on properties of the lubricant:

- due to higher average operating temperature **oxidation inhibiting property must be enhanced**
- since gas fuel combustion is more complete, **detergency no longer so important**

Oil properties	Petrol/Diesel powered engines	Gas powered engines
Detergency (alkalinity)	+ + +	+ +
Viscosity-Temperature	+ + +	+ + +
Oxidation inhibition	+ +	+ + +

However, since technical characteristics of the engine (output, surface loads, rpm, clearances between parts, materials used etc.) remain unchanged it is recommended to continue use of engine oil according to OEM specifications.



15. ARE SYNTHETIC LUBRICANTS BASED EXLUSIVELY ON POLYALPHAOLEFINS (PAO) AND ESTERS (COMPLEX ESTERS)?

Most countries qualify three API basestock groups - Group III, Group IV and Group V - as synthetics.

SYNTHETIC BASE OILS

Group III	Group IV	Group V
• **Hydrocracked oils, HC-synthesis oils, VHVI oils**	• **Polyalphaolefins (PAO)**	• **Esters** • **Naphthenes** • **Other**

Each basestock is characterized by a specific set of properties.

GROUP III BASE OILS

Advantages	Disadvantages
• Wide application range of finished products • Withstands high temperature oxidation (decomposition) • Reduced sulfur and unsaturated hydrocarbon content	• Not suitable for high viscosity formulations

GROUP IV BASE OILS

Advantages	Disadvantages
• Extended temperature range of the applications • Excellent low temperature properties • High oxidation stability	• Weak adhesion • Insufficient additive solvency • High cost

GROUP V BASE OILS

Advantages	Disadvantages
• Good adhesion • Excellent additive solvency • Low volatility • High thermal stability	• Most expensive basestock • Low stability in the presence of water

16. WHERE CAN I PURCHASE GAZPROMNEFT AND G-ENERGY OILS?

Gazpromneft and G-Energy lubricants are available at the service stations or official sales partner offices/stores. Search for nearest reseller on the websites: **www.gazpromneft.ru** and **www.new.g-energy.org.**

WHERE CAN I CHANGE OIL?

G-ENERGY SERVICE — PROMISE OF QUALITY SERVICE:

- Unified service quality standard over entire international network.
- Professional training of personnel by G-Energy Academy experts.
- Fair prices as service parts are supplied directly by manufacturers.

Oil change and quality servicing can be done in specialized G-Energy Service centers. Locate the nearest service center on our website: **www.service.g-energy.org.**

More than 120 service centers in Russia and more than 50 service centers abroad.

IF YOU HAVE MORE QUESTIONS

G-Energy Academy lubrication engineers are available to help with product application issues

Professional development of customer`s personnel by training them to apply various tools

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