

G-ENERGY

FREQUENTLY ASKED QUESTIONS

ABOUT LUBRICANTS



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FREQUENTLY ASKED QUESTIONS

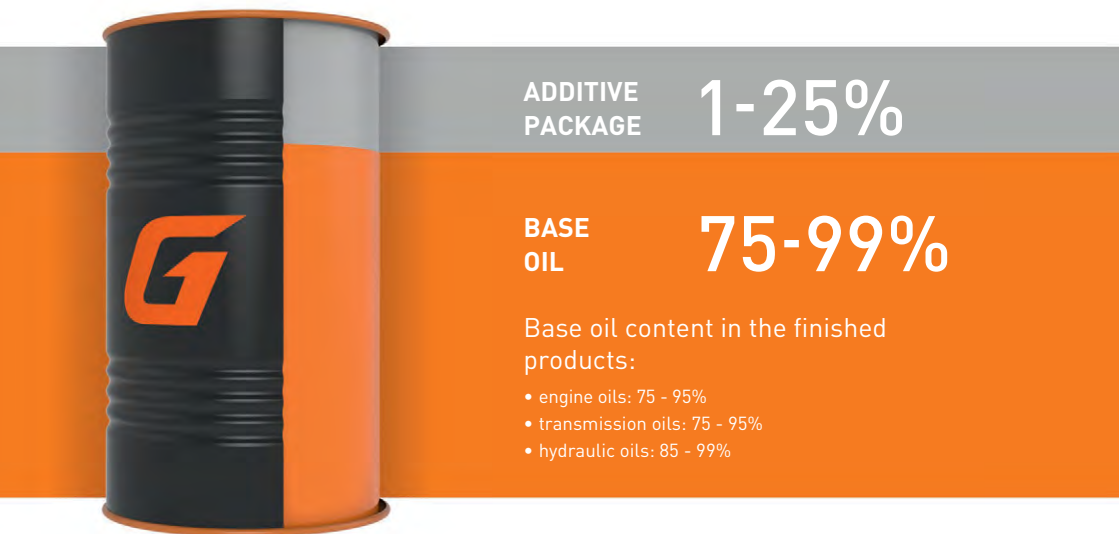
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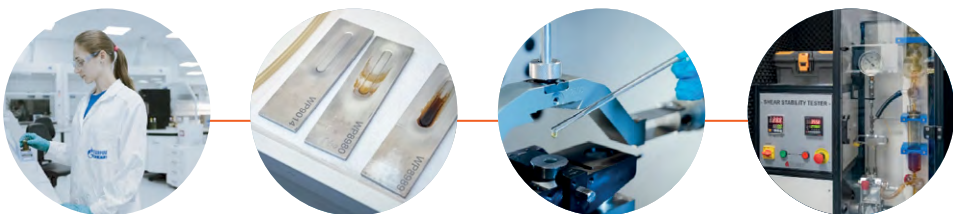
**GENERAL
INFORMATION**

1. COMPOSITION OF THE FINISHED LUBRICANTS?



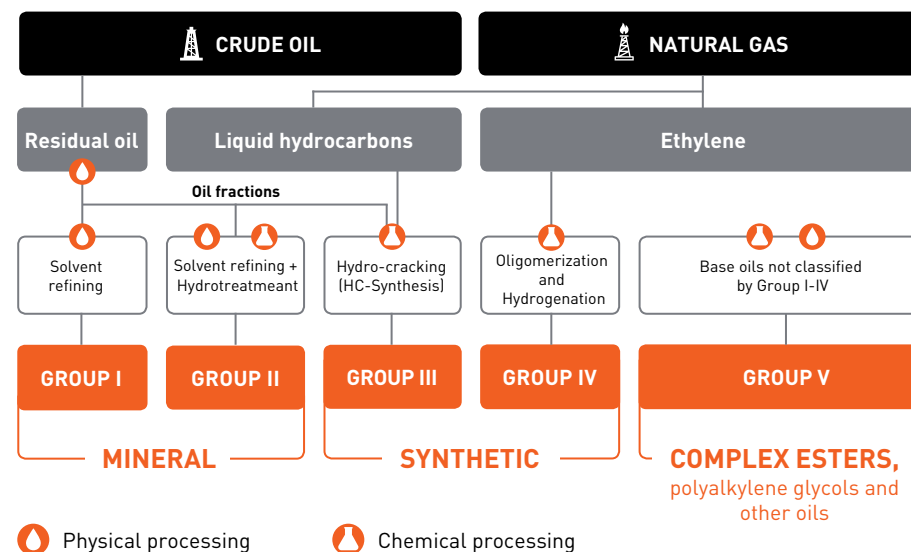
HOW DO WE CHOOSE THE COMPONENTS FOR OUR OILS

All components are carefully selected in our own research center.



Modern testing techniques are used in the study, which allow us to assess the real performance characteristics of the future oil.

2. 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)

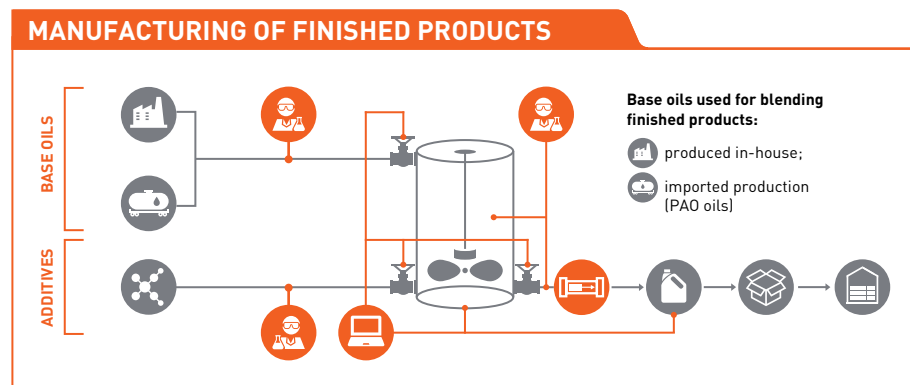


Semi-Synthetic base (mineral and synthetic oil blend):

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

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

3. MODERN PRODUCTION TECHNOLOGIES



Product quality control in ISO 17025 certified laboratories



Fully automated blending facilities, filling lines and packaging equipment



Unique self-cleaning pipe line system

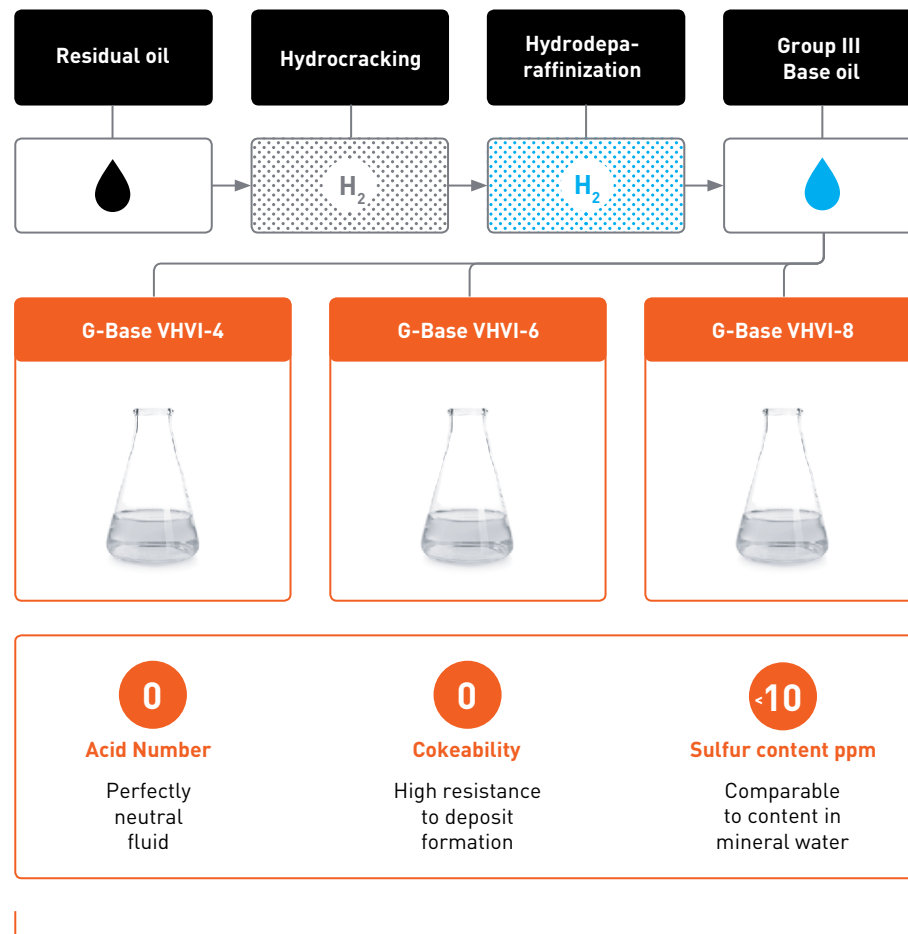


Constantly high quality of each blended batch - reliable equipment operation



International ISO certification: ISO 9001, ISO 45001, ISO 14001, ISO 50001

4. G-BASE SYNTHETIC TECHNOLOGY

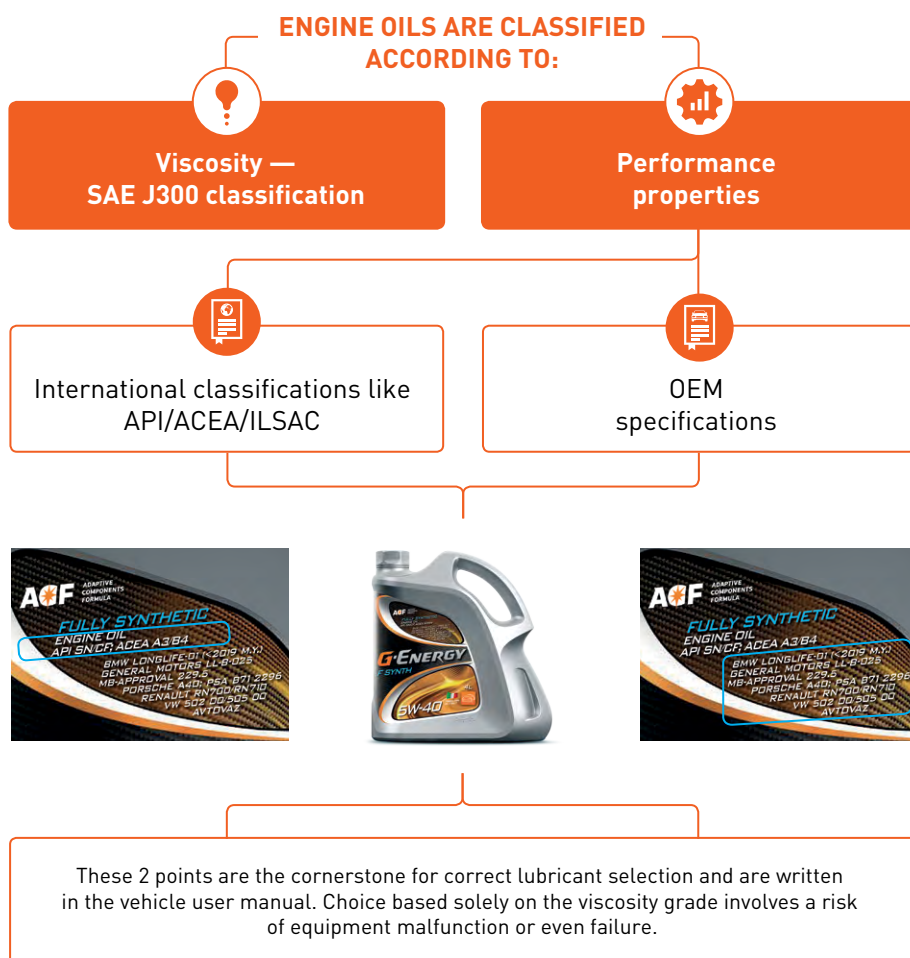


Modern technology of hydroisodeparaffinization allows to obtain molecules of an ideal structure, which endow oils with improved properties.



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

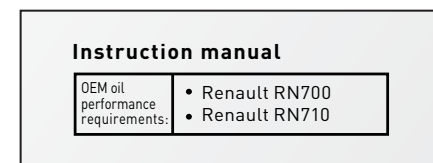
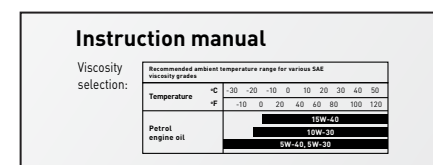
5. HOW TO CHOOSE OIL?



6. HOW TO ENSURE THE RIGHT OIL IS SELECTED?

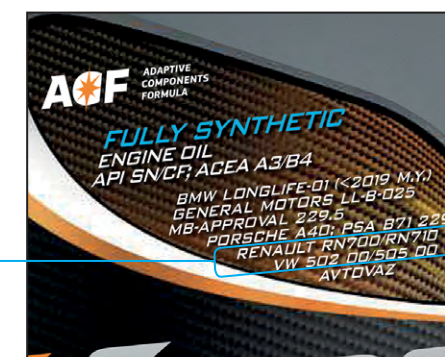
STEP 1

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.

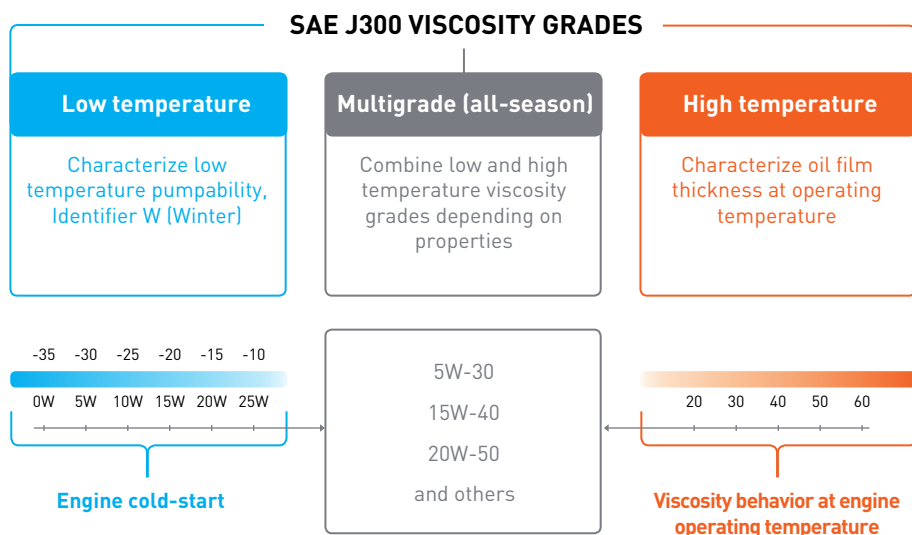


The highest priority for choosing engine oil is for the OEM requirement, while ACEA, ILSAC and API additionally describe applicability of the product.



7. SAE J300 ENGINE OIL VISCOSITY CLASSIFICATION

! Viscosity grade does not determine operating performance or product quality.



Viscosity grade	Low temperature properties		High temperature properties		
	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; HTHS — oil film thickness between friction surfaces in high temperature, high shear conditions; MRV — simulation of pumpability.

! 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.

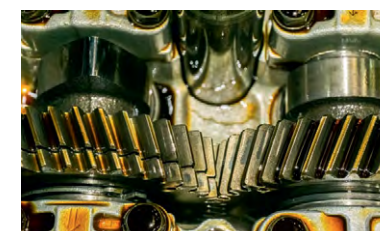
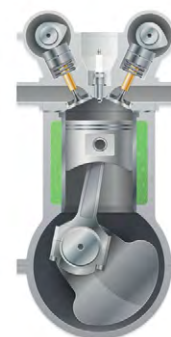


WHAT 0W-40 GRADE STANDS FOR

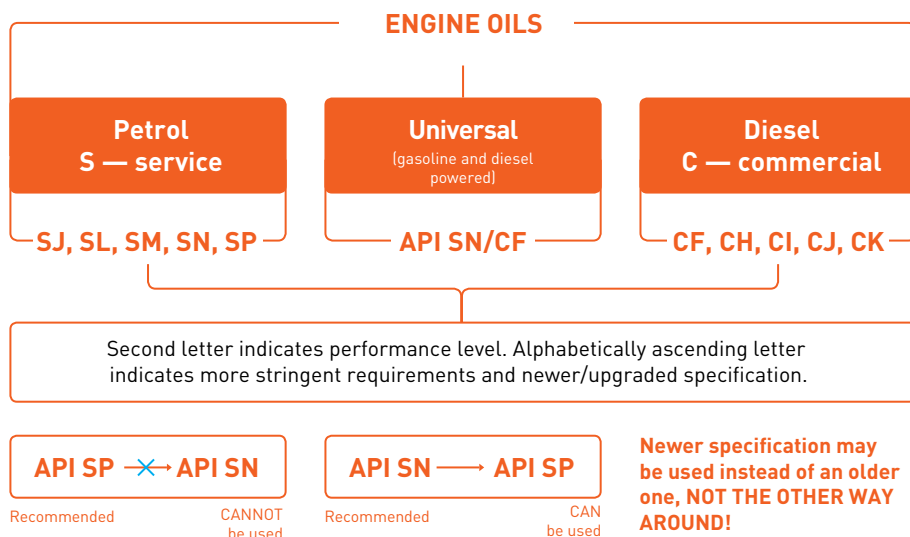
Effortless crankshaft cranking at engine start-ups (no excessive viscosity related oil resistance) in temperature down to -35°C.

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

0W-40



8. API ENGINE OIL CLASSIFICATION (AMERICAN PETROLEUM INSTITUTE)



API SN GRADE ADVANTAGES OVER API SL

Advantages	Prevents	Affects
 Prevention of the LSPI effect (self-ignition of the fuel mixture during compression)	Damage or destruction of pistons	• Engine lifetime
 Increased protection against high temperature deposits	Formation of carbon deposits on the piston, occurrence of piston rings	• Maintaining the factory characteristics of the engine
 Improved viscosity stability	Oil film rupture	• Engine lifetime • Engine reliability
 Protection against wear of the gas distribution mechanism	Stretching of the gas distribution mechanism	• Inter-service mileage • Engine reliability

9. 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 energysaving engine oils.



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



Energy conserving properties

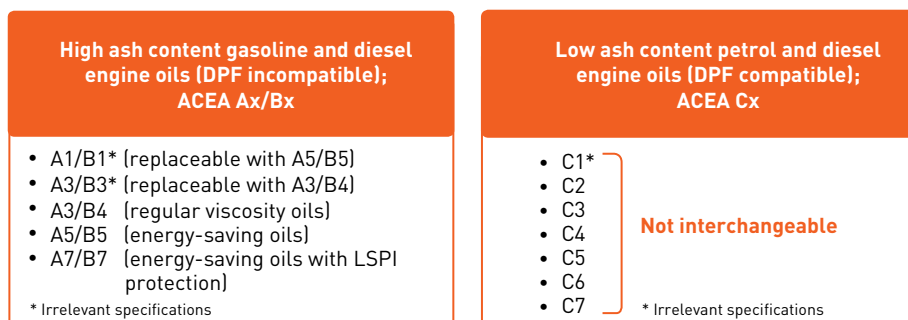
DIFFERENCE BETWEEN API SN AND ILSAC GF-6A

Parameters	API SP	ILSAC GF-6A
Fuel economy		✓
Compatibility with alternative fuels		✓
Protection against high temperature deposits	■■■	■■■
Catalyst useful life	■■■	■■■



10. ACEA ENGINE OIL CLASSIFICATION

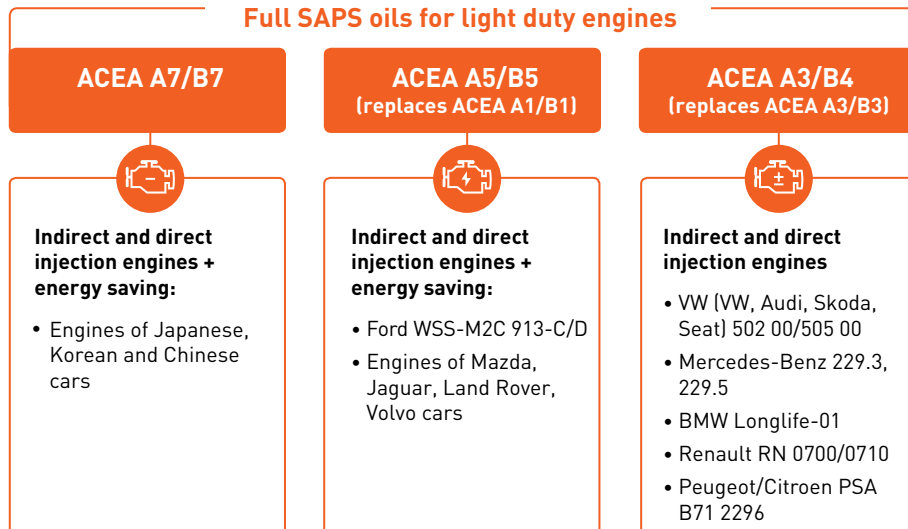
Engine oil classification introduced by European Automobile Manufacturers Association in 1996. Distinguishes oils for petrol powered engines (A and C categories) and light duty diesel powered engines (B and C categories).



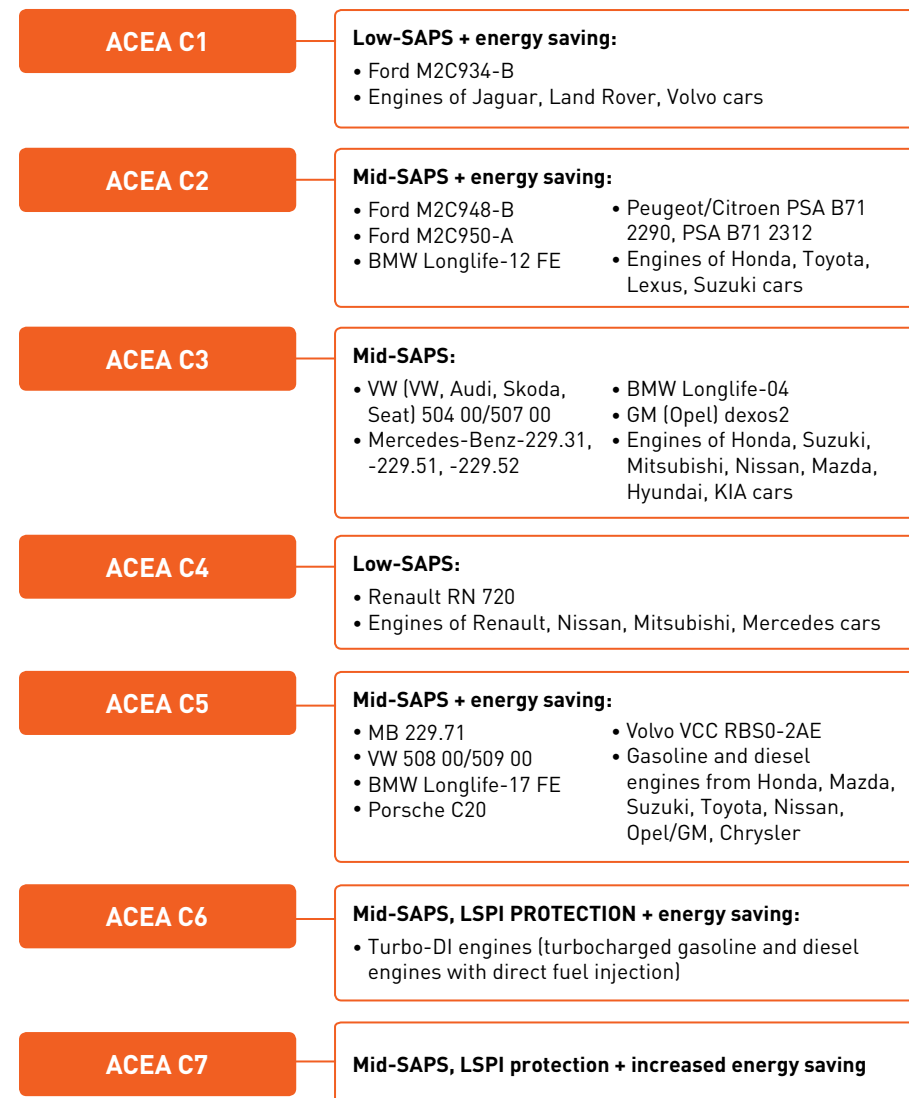
Requirements (approvals) of European automotive manufacturers are based on ACEA classification:



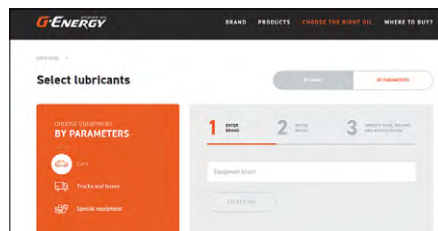
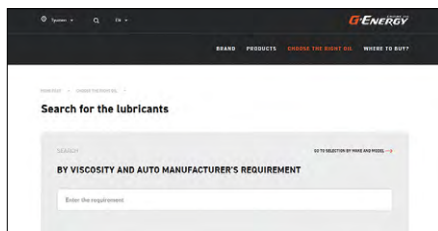
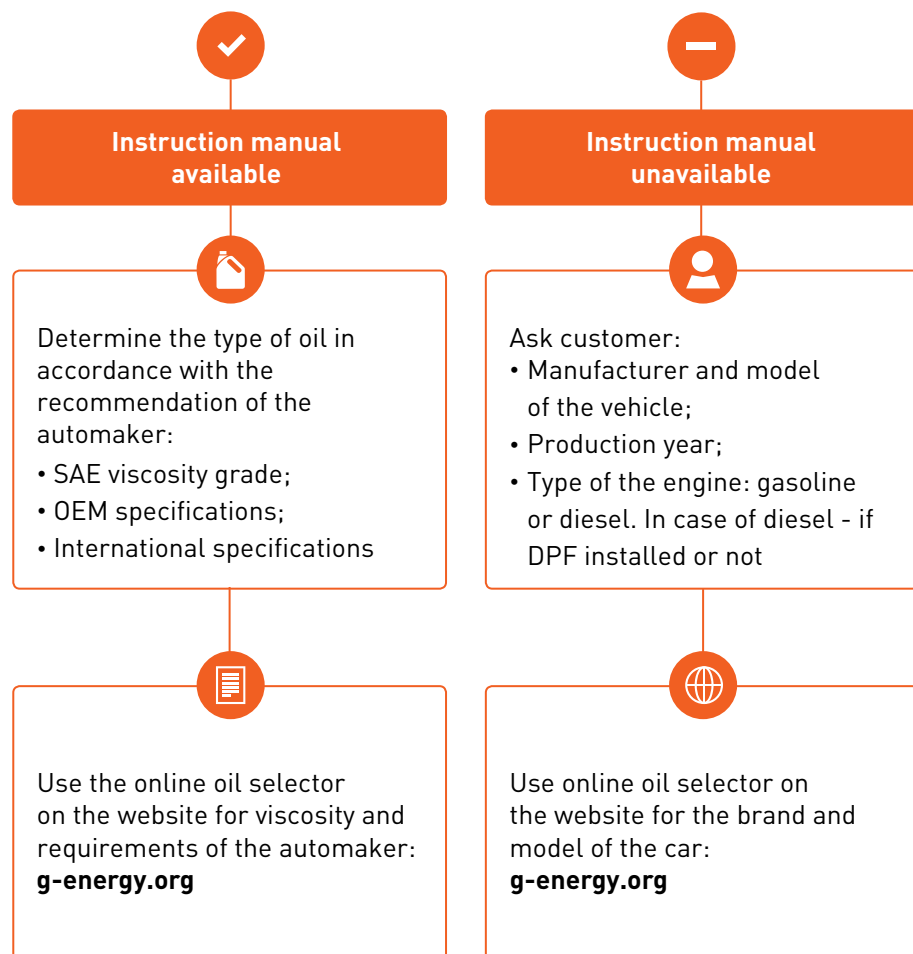
HIGH ASH CONTENT ENGINE OILS Full SAPS oils for light duty engines



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



11. STEPS FOR PICKING THE RIGHT PRODUCT FOR OIL CHANGE



12. HOW TO SAFELY SWITCH OIL BRANDS?

! 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!

HOW TO SAFELY SWITCH TO xxx 5W-30

STEP 1. Determine viscosity grade according to SAE J300, in this instance — 5W-30.

STEP 2. Choose product of the same viscosity grade, for instance G-Energy F Synth C2/C3 5W-40.

STEP 3. Compare specifications of both products:



G-Energy F Synth C2/C3 5W-30	Unspecified xxx 5W-30
• API SP • ACEA C2, C3 • GM dexos2 • BMW Longlife-04 • MB 229.52, 229.51, 229.31 • VW 505.00/505.01 • Fiat 9.55535-S3/S1 • Chrysler MS-11106 • Opel-Vauxhall OV0401547 • Iveco 18-1811 SC1 • PSA B71 2290 (<2022 m.y.)	• API SP • ACEA C2, C3 • GM dexos2 • BMW Longlife-04 • MB 229.52 • Chrysler MS 11106

✓ 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).



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**FREQUENTLY ASKED
QUESTIONS**

1. HOW TO CHECK PRODUCT AUTHENTICITY?

G-ENERGY BRAND



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

HOW TO IDENTIFY ORIGINAL G-ENERGY ENGINE OIL

1. Canister

Made of high quality opaque plastic. The sides of the container are smooth, without roughness and white colored inclusions. When pressed, the wall deflects and the shape is quickly restored.



2. Lid

Produced from the same material as the canister. There is a protective membrane on the filler neck.



There is a measuring ruler on the side of the handle

3. Label

The date of manufacture is laser-printed: it is impossible to remove the inscription without damaging the packaging. The label is made as a single block and imitates the shape of racing goggles.

The membrane under the lid can be of two types:

Gold-colored with logo and tear-off tab (usual appearance)



Silver color without tear-off tab (updated appearance)



ORIGINAL PRODUCTION IS



Compliance with stated standards



Guarantee of high quality standards of G-Energy oils



Reliable engine performance

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 WHEN REFILLING?

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



Increased loads



Short distance driving



Cold starts



**Low fuel quality
(high sulfur content)**



**Extremely high and low
ambient temperature o
perating conditions**

For example: 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:

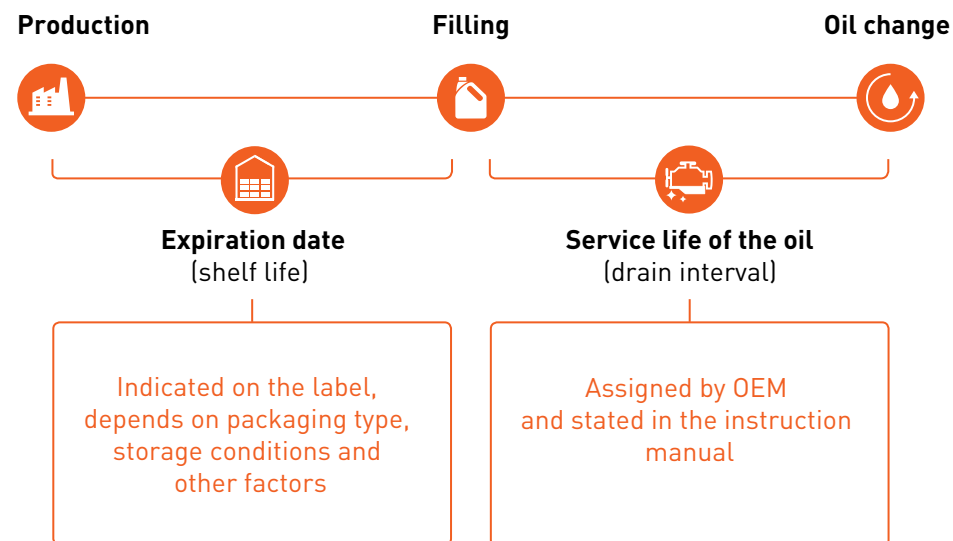
1. Drain the old oil and without replacing oil filter, fill in flushing oil, idle engine for 15-20 minutes.
2. Instantly drain hot flushing oil from the sump and let it run down for at least 30 minutes. Replace the oil filter and refill fresh engine oil.

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.

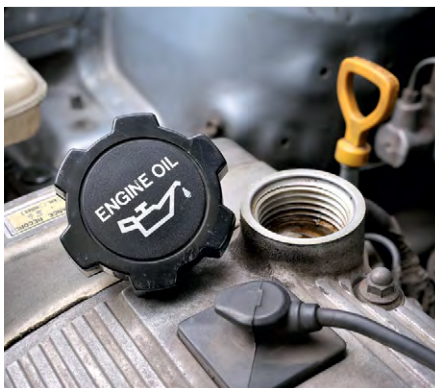


7. WHAT DETERMINES OIL CONSUMPTION?

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.

OIL CONSUMPTION DEPENDS ON:

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



Excessive oil consumption may be caused either by the oil quality or by technical faults in the engine.

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



Incorrectly selected performance level and/or viscosity grade



Suboptimal oil quality/counterfeit product



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

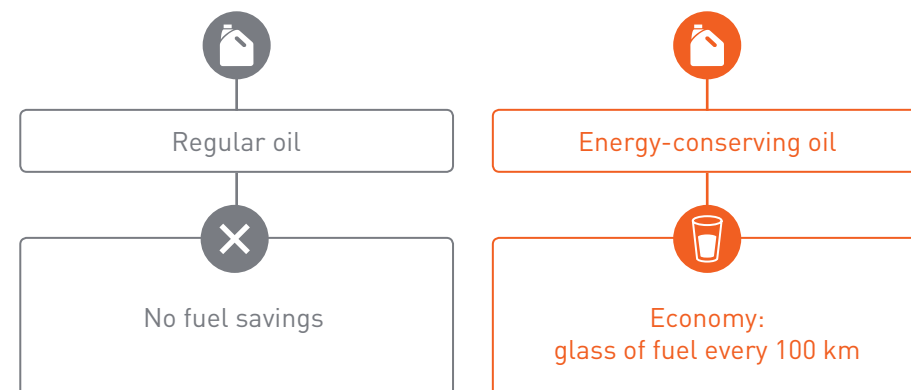
8. CAN I PUT IN A DIFFERENT OIL INSTEAD OF THE OEM OIL?

The engine of any automobile requires oil of a certain specification. The specification can be either from the car manufacturer or an international standard (API, ACEA, ILSAC). The required specification is specified in the vehicle's instruction manual. In case the oil you want to put into your car instead of the original oil has a specification that corresponds to the one specified in the car's instruction manual, you can safely use this product instead of the original oil.



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 example, when using ILSAC category oils.

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



Change the oil with the oil filter.

SAE, API, ACEA
classes

OEM
specifications

Careful selection of engine oil.

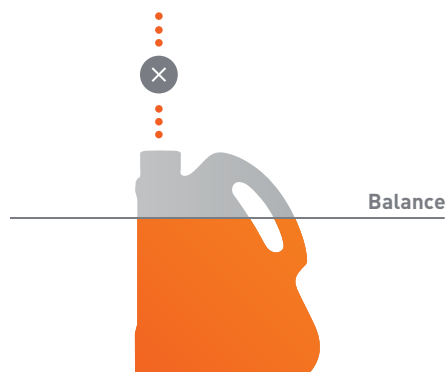


Shorten oil change intervals and avoid overruns.

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?

Racing oils may have a high viscosity grade according to SAE J300, e.g. 10W-60, 15W-50, because the oils are subjected to extremely high loads at which they must retain their viscosity-temperature properties. Also in racing conditions the heat intensity of the engine is higher. In normal operation, depending on the engine, the pumpability of such oils may be impaired and, as a consequence, the oil flow to the friction units may be reduced.

However, there are also universal racing oils that have standard viscosity grades and a set of specifications that are recommended by vehicle manufacturers. Such oils on the one hand are suitable for modern driving, and on the other hand — have a reserve of properties that can protect the engine in case of increased load and tougher operating conditions.

! The use of G-Energy Racing 10W-60 and 15W-50 racing oils in everyday conditions is possible only in vehicles where the automaker allows the use of viscosity classes xW-60, xW-50. G-Energy Racing 5W-40 is a more universal oil, which is also suitable for most passenger cars.



14. DO I NEED A SPECIAL OIL FOR AN ENGINE RUNNING ON GAS?

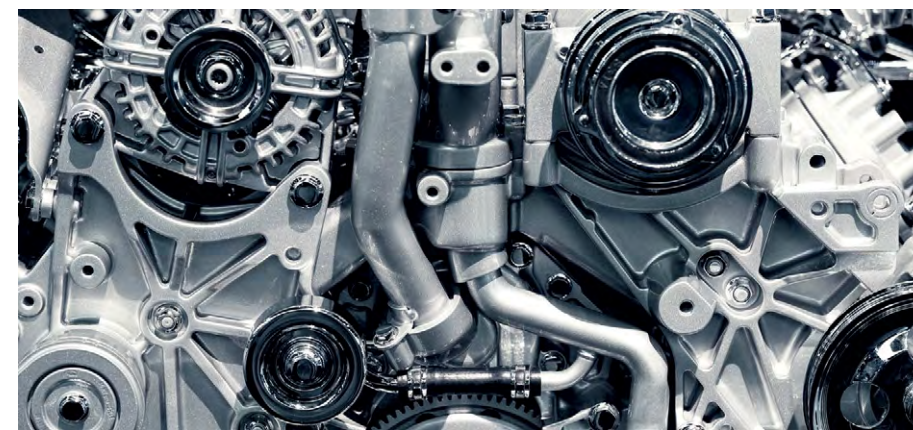
Installation of gas injection system in a gasoline powered engine requires highly professional skills but in this recommendation we do not consider unprofessional rebuild.

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**

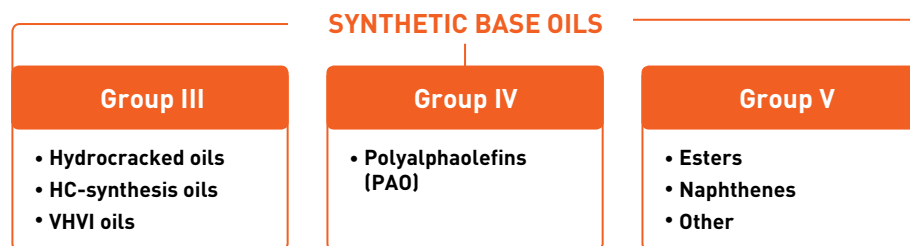
Oil properties	Petrol powered engines	Gas powered engines
Detergency (alkalinity)	+++	++
Viscosity-Temperature	+++	+++
Oxidation inhibition	++	+++

! 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 OILS ONLY OILS BASED ON POLYALPHAOLEFINS (PAOS) AND ESTERS (ESTERS)?

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



Each of the groups has its own key features.

GROUP III BASE OILS

Advantages

- Wide application range of oils.
- Stability to thermal oxidation (decomposition).
- Reduced sulfur and unsaturated hydrocarbons content.

Disadvantages

- Not suitable for extremely low and high temperatures.

GROUP IV BASE OILS

Advantages

- Extended temperature range of the applications
- Excellent low temperature properties
- High oxidation stability

Disadvantages

- Weak adhesion
- Insufficient additive solvency
- High cost

GROUP V BASE OILS

Advantages

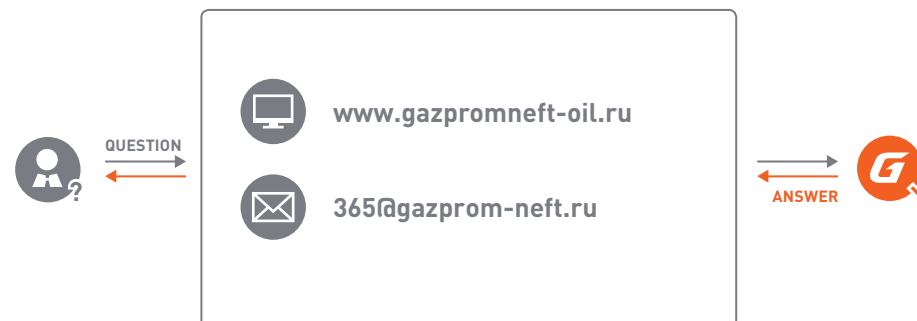
- Good adhesion
- Excellent additive solvency
- Low volatility
- High thermal stability

Disadvantages

- Highest price
- Low stability in the presence of water

16. 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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