

T-5 Oils, lubricants and fluids

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INTRODUCTION

Operation of equipment in the present modern and especially mobile times, qualitatively adequate assortment of oils depend on the type of operated equipment. We can tell, that oils have an irreplaceable role for lubricating components operating equipment.

Diesel oil is technologically very complicated product, whose attributes are classiflicated by many technical parameters. For select of optimal diesel oil is required to monitor and evaluate parameters, whose are characterizing quality and are of oil use.

1. BASIC TERMS

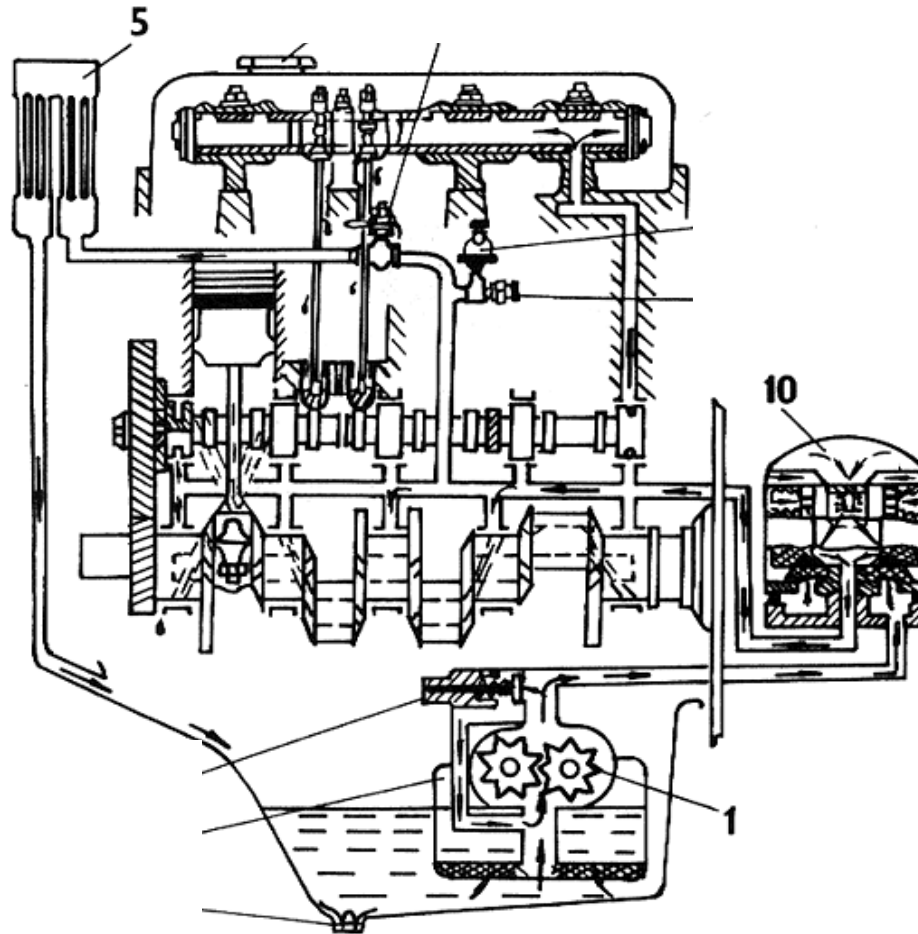
Additives – Chemicals added to the oil for improving its attributes.

Detergents – additives added to the oil for suppressing high temperature sediments, preventing of corrosion and protecting of engine against corrosion. As detergents are commonly used sulfonates, Alkylphenols or alkylsalicates calcium or magnesium.

Dispersants – added to oils, for keeping solid dirt in suspended state for suppressing formation of sludges, which can block sieve of oil pump, filter or lubricating channels. At excessive formation of dirt can be piston rings baked.

2. DETERMINATION OF LUBRICANTS AND THEIR PRODUCTION

Oil System



- 1 Oil pump
- 5 Oil cooler
- 10 Oil filter

2. DETERMINATION OF LUBRICANTS AND THEIR PRODUCTION

Functions of oil

- Reduces the friction of moving parts
- Taking heat away
- Clearing inner part of engine
- Protects metal surface of engine against corrosion
- Sealing
- Silencing

2. DETERMINATION OF LUBRICANTS AND THEIR PRODUCTION

Degradation of oil during operation

Engine oil degrades when operating in several ways: The scope and depth of oil degradation is influenced by following factors: okolnosti:

- oxidative stability of the oil, the remaining amount of antioxidants in the oil;
- Remaining amount of lubricating and anti-graze additives;
- Acidity and remain of alcalic reserve of oil;
- Change of viscosity attributes;
- Amount of the mechanical dirt in oil (soot, dust, etc.);
- Content of the fuel in oil, the presence of glycol etc.

3. LIQUID LUBRICANTS

Viscosity classification of oils

Physical attribute viscosity (do not change with density!) Is one of the fundamental characteristics that must be considered when choosing a suitable lubricant. The viscosity of the lubricating oil (expressing the size of internal friction, and therefore its fluidity) is not a constant value, but depends on environmental conditions. During engine operation is changing temperature and pressure and it's necessary to protect viscosity of oil against its changes.

3. LIQUID LUBRICANTS

Index of viscosity

Dependence of viscosity on temperature of the oil is expressed by the so-called **Viscosity Index** (VI). If value of VI is high, is changing lesser during temperature changes in engine. The viscosity index characterizes the engine oil and is dependent on the type of base oil and viscosity modifier.

Viscous classes and their descriptions and characteristics are standardized. The viscosity grade of oil for motor vehicles are defined by SAE J300 (SAE - Society of Automotive Engineers) viscosity grades for industrial oils ISO VG (ISO - International Organization for Standardization - Viscosity Grade).

3. LIQUID LUBRICANTS

Grades of Viscosity

According to use of oils, the oils are divided on all season and summer. All season oils has number mark **xxW//yy**. Classification is dividing oils by viscosity to six winter grades (**0W, 5W, 10W, 15W, 20W, 25W** – there is W behind every number, winter) and five summer grades (**20, 30, 40, 50, 60**).

VI values clearly set out when there is an overall warming of the engine at optimum operating temperature. The coolant heats up after driving about 4 km. The complex warm up will income after 18 kilometers of driving . This time is clearly influenced by outside temperature, driving style, type of oil, including the technical condition of the vehicle.

3. LIQUID LUBRICANTS

For personal vehicles are recommended oils of lower viscosity classes, typically SAE 0W a 5W/30, resp. 40. These oils are marked as „light-duty“, enabling fuel saving.

To mark the performance category of motor oils, are used the following standards :

- ❑ Classification of API(American Petroleum Institute, USA),
- ❑ Classification of ACEA(Association des Constructeurs Européens d'Automobile, EU),
- ❑ Classification of CCMC (Comité des Constructeurs d'Automobile du Marché Commun, EU),
- ❑ Company standards of engine and vehicle makers(VW, MB, MAN atd.),
- ❑ Classification of MIL-L (standards of american army).

3. LIQUID LUBRICANTS

API

- Petrol marked by letter "S" (= Service)
- Diesel marked by letter "C" (= Commercial).

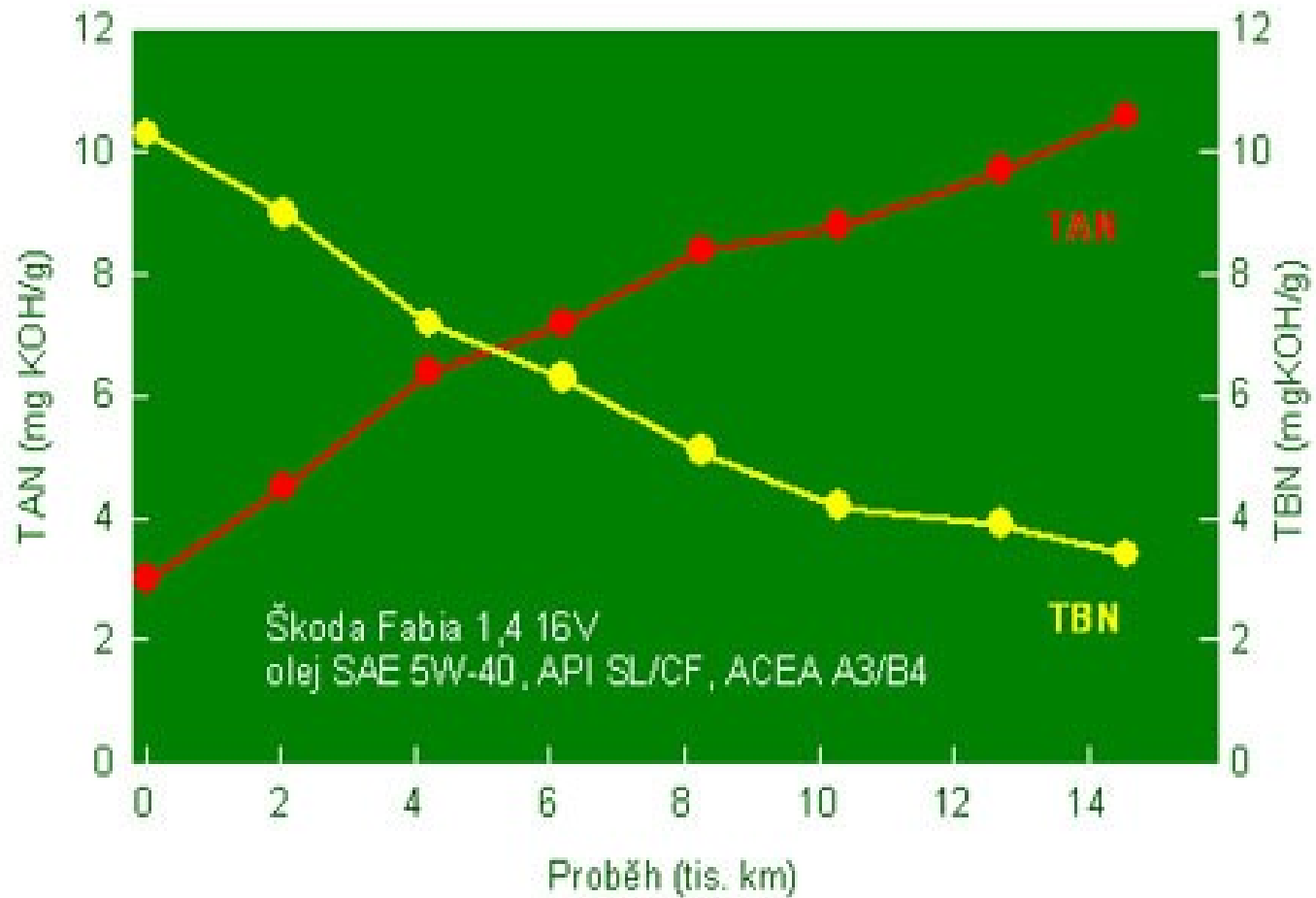
The performance level is expressed for the engine type by the next letter (from "A" above) It is true that this is the letter later in the alphabet, the oil is better then. If first specification is "S", oil is mainly for petrol engines, if "C", then it is designed for diesel engines.

For example

SJ/CF – Priority is for petrol engines, usable for diesel engines

CE/SG – Priority is for diesel engines, usable for petrol engines

3. LIQUID LUBRICANTS



4. PLASTIC LUBRICANTS

Plastic lubricants

Lubricants, together with oil and solid lubricants makes significant group of lubricants for mobile military equipment.

Plastic lubricants are defined according to ASTM (American Society of Testing Materials) as solid up to half liquid product with a thickener scattered in liquid lubricants

4. PLASTIC LUBRICANTS

Furthermore, they are successfully used in many other applications, where we can use their attributes, as:

- long re-lubrication and replacement time,
- small demands on operation and maintenance,
- very low consumption of lubricants,
- additional sealing the lubrication points (reduced lubricant leakage and limit the penetration of dirt event. water)

CONCLUSION

Plastic lubricants are good for lubrication of places, where is high load and slow movement speed, where lubricant must being for long time because of poorly accessible places. They are used also for lubricating of places, where is need higher protection against corrosion and where is not required to take heat away.

Knowledge of the fundamental attributes of distributed range of lubricants should be a basic requirement of staff in warehouses of PLO in Army of Czech Republic.