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The determination of the outane rating is effected in a special engine, which has a variable compression ratio. For this purpose the engine is at first started on the fuel being tested. They gradually the compression ratio is increased until knocking occurs. Thereafter, without changing the compression ratio, the operation of the engine is switched over to a fuel composed of hydrocarbons of isocotame and heptame, which is accepted as a standard. Isocotame hardly ever knocks and its octame rating is accepted as 100, while heptame knocks easily and its octame rating is accepted as equal to zero. By adding heptame to isocotame a mixture is formed which gives rise to knocking of the same intensity as the fuel being tested. The number representing the percentage of isocotame in the standard mixture of isocotame and heptame is the octame rating of the fuel being tested. For instance, if a certain fuel being tested knocks at the same compression ratio as a mixture of 60% isocotame and 40% heptame, the octame rating of the fuel will be 60. In the USSR they use as an anti-knock compound, an ethyl fluid consisting of tetraethyl lead (TES), to which are added compounds which will aid in reducing the deposit of lead orides (ethyl bromide and bromo-ethame) on the parts of the engines. Such gasoline is called ethylated gas. Usually 1/3 cubic centimeter of fluid is added per liter of fuel. The color of ethylated gasoline is usually blue or violet.

B-60 gasoline has an octane rating of 55-60 and is used for engines with a compression ratio of four to five. B-74 gasoline has an octane rating of 74 and is used for engines with a compression ratio of six to seven. B-100 gasoline has an octane rating of 100 and is used for engines with a high compression ratio.

Usually the specific gravity of heavy gasoline grade II is 0.745 and the calcrific value is 10,200 kilogram calcries per kilogram.

The specific gravity of smacked gasoline is 0.755 and the calcrific value is 10.200 kilogram calories per kilogram.

(b) Ligroin

Ligrein is to some degree heavy gaseline made up of heavy fractions which boil away at temperatures of  $150^\circ$  C to  $230^\circ$  C. It is used chizfly as tractor fuel. The average chemical content is C=85%, H=15%.

Specific gravity Calcrific value Octame rating 0.755 - 0.790 10,000 kg cal/kg 54

(c) Kerogene

Kerosene is obtained by distillation of gasoline-ligroin fractions. It is made up of petroleum distillates which boil away at temperatures of  $200^\circ$  to  $315^\circ$  C. The average chemical context is C=86% and H=14%. Two kinds of kerosene, tractor and illuminating, are used in the USSR. Tractor kerosene has a yellowish color while illuminating kerosene is clear with a light bluish tint.

Specific gravity Calorific value Octave racing 0.825 - 0.825 10,200 kg cel/kg 46

- (d) Benzene and alcohol are seldon used av fuel in the USSR.
- 4. There are several different grades of Piezel fuels in use in the Soviet Union.
  - (a) Ge- oil 9

Specific gravity 0.876
Flash point 700 C
Raglar viscosity at 500 C 1.4
Solidification point -700 C
This fuel is used for high speed Diesel engines.

(b) Solar oil

Specific gravity 0.871 · 0.881
Flash point 130° C
Engler viscosity 1.3 - 1.75
Solidification point -20° C
This fuel is used for high speed Disel engines.

(c) Light motor fuel (Diesel M-1)

Specific gravity 0.851 - 0.896

Flash point 45° C

Engler viscosity 1.1 - 1.2

Solidification poin\* -5° C

This fuel is used for Diesel engines which require light fuels.

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(d) Medium motor fuel (Dissel M-2)

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- (2) Summer grade M-2
  Specific gravity 0.875
  Flash point 65° 65° C
  Engler viscosity 1.2 3.
  Solidification point -10° C
  This fuel is used for Diesel engines when the temperature of the air is not lower than 5° C.
- (e) Heavy motor fuel
  - (1) Diesel M-3A
    Specific gravity
    C.895 0.926
    Flash point
    Solidification point
    This fuel is used for low speed Diesels.
  - (2) Dissel 14-3B
    Specific gravity 0.895 0.926
    Flash point 90° C
    Solidification point 5° C
    This fuel is used for low speed Diesels.
  - (3) Diesel M-3G
    This fuel is used for stationary Diesel installations.

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