# CRUDE OILS OF THE GEORGIAN SSR

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A study has been made of Georgian SSR (Gruziya) crude oil, consisting of a mixture of crudes from the Samgori, Norio, Mirzani, Supsa, and Chaladidi fields. Georgian crude is low sulfur, medium resin, and medium wax. The characteristics of this crude are as follows:

| | |
|---|---|
| Density $\rho_4^{20}$ | 0.8528 |
| Molecular weight | 204 |
| Kinematic viscosity, cSt | |
| at 20°C | 8.44 |
| at 50°C | 3.65 |
| Solid point, °C | |
| without thermal treatment | −4 |
| with thermal treatment | 0 |
| Flash point, closed cup, °C | 18 |
| Content, % | |
| sulfur | 0.17 |
| nitrogen | 0.11 |
| silica gel resins | 3.50 |
| asphaltenes | 1.37 |
| wax | 4.20 |
| Carbon residue, % | 2.33 |
| Ash content, % | 0.013 |
| Acid no., mg KOH/g oil | 0.25 |
| Content of fractions, wt. % | |
| below 200°C | 26.3 |
| below 350°C | 61.0 |
| below 500°C | 86.8 |

It will be seen from the data of Table 1 that the hydrocarbon group composition of the fractions of Georgian crude distilling below 200°C is characterized by a predominance of paraffinic hydrocarbons (87–56%) over naphthenes (13–42%) and aromatics (0–14%).

A study of the 28–150°C cut by gas–liquid chromatography showed that, out of the total quantity of paraffins in this cut (8.59% calculated on crude), the branched-chain paraffins account for 5.22% and n-paraffins for 3.37%. The branched-chain paraffins consist mainly of hydrocarbons with a single methyl group, such as 2-methylheptane (0.53%), 2-methylhexane (0.48%), and 3-methylhexane (0.40%). Of the straight-chain paraffins, the largest percentages are those of n-octane (1.10%) and n-heptane (0.95%).

The content of naphthenic hydrocarbons in the cut is 6.01% (calculated on crude), with more cyclohexane derivatives (3.28%) than cyclopentanes (2.73%). The individual cyclopentane derivative present in largest amount is methylcyclopentane (0.38%), the cyclohexane derivative methylcyclohexane (1.25%).

The naphtha cuts are good feedstocks for catalytic reforming, since the content of naphthenic hydrocarbons in these cuts ranges from 27.4 to 41.5%, calculated on the cut. These cuts are essentially sulfur-free.

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TABLE 1. Hydrocarbon Group Composition of 28-200°C Cuts

| | Cut points, °C | | | | | |
|---|---|---|---|---|---|---|
| | 28–62°C | 62–95°C | 95–122°C | 122–150°C | 150–200°C | 28–200°C |
| Yield on crude, % | 0,8 | 3,3 | 4,7 | 6,6 | 10,7 | 26,1 |
| Density $\rho_4^{20}$ | 0,6618 | 0,7063 | 0,7341 | 0,7558 | 0,7872 | 0,7590 |
| Refractive index $n_D^{20}$ | 1,3707 | 1,3921 | 1,4087 | 1,4210 | 1,4377 | 1,4232 |
| Content of hydrocarbons, % | | | | | | |
| aromatics | 0 | 3 | 5 | 9 | 14 | 9 |
| naphthenes | 13 | 32 | 42 | 28 | 30 | 32 |
| paraffins | 87 | 65 | 53 | 63 | 56 | 59 |
| normal structure | 45 | 29 | 25 | 22 | 20 | 23 |
| iso structure | 42 | 36 | 28 | 41 | 36 | 36 |

A kerosene cut was obtained in amount of 29.3% (calculated on crude), characterized by low contents of total sulfur (0.01%) and mercaptan sulfur (0.0003%) and rather high thermal stability.

The kerosene distillates are characterized by poor burning qualities (the 150-320°C cut has a smoke point below 20 mm); these distillates can be used as diesel fuel components.

The diesel fuel distillates are distinguished by high cetane numbers; these materials meet the GOST specification requirements for summer-grade diesel fuel.

The residue boiling above 350°C was treated by adsorptive separation and subsequent dewaxing of the mixture of paraffinic-naphthenic and Group I aromatic hydrocarbons, obtaining a lube base stock in yield of 16.7% (on crude) with a viscosity on the order of 48.08 cSt at 50°C and 9.03 cSt at 100°C, a V.I. of 86, and a solid point of −26°C.

In accordance with GOST 11954-66, the Georgian crude cannot be recommended for asphalt production.

# INFLUENCE OF FEEDSTOCK DISTILLATION RANGE ON HYDROCARBON CONVERSION AND CHANGES IN LUMINOMETER NUMBER UPON DEAROMATIZATION OF DISTILLATES FROM NIZHNEVARTOVSK CRUDE OIL

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Today, the use of effective hydrogenation catalysts makes it possible to dearomatize sulfur-containing kerosine distillates at relatively low pressures, on the order of 50 kg/cm$^2$ [1-3]. The process of catalytic hydrogenation is of considerable interest in producing fuels for gas-turbine engines from crude oils with high contents of aromatic hydrocarbons. Nizhnevartovsk crude oil is a promising material for the production of gas-turbine fuels, but it is impossible to obtain fuel with less than 20% aromatic hydrocarbons from this crude by the use of conventional hydrotreating processes.

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