

Institute of Petroleum Refining and Petrochemistry

HIGH-VISCOSITY OIL REFINING TECHNOLOGIES

2020

Introduction into the problem

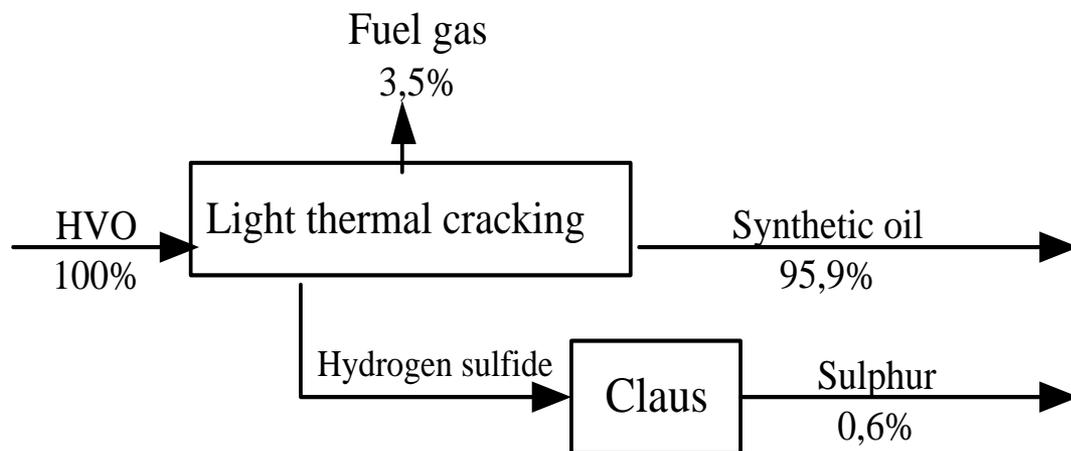
Saudi Arabia is currently producing high-quality light and heavy Arabian oil

However, due to the reduction of their reserves, in the near future, there may be a need for the extraction and processing of super-heavy high-viscosity oils, which are hard-to-recover oil resources

Developed and implemented into production high-viscosity oil refining technologies on the example of Bashkortostan, Tatarstan and Udmurtiya are brought to notice

Synthetic oil production

Implemented in PJSC Tatneft



HVO - high-viscosity oils

HVO feedstock

density – 969 kg/m³

sulphur contents – 4.1%

viscosity at 20°C – 2140 cSt

Synthetic oil

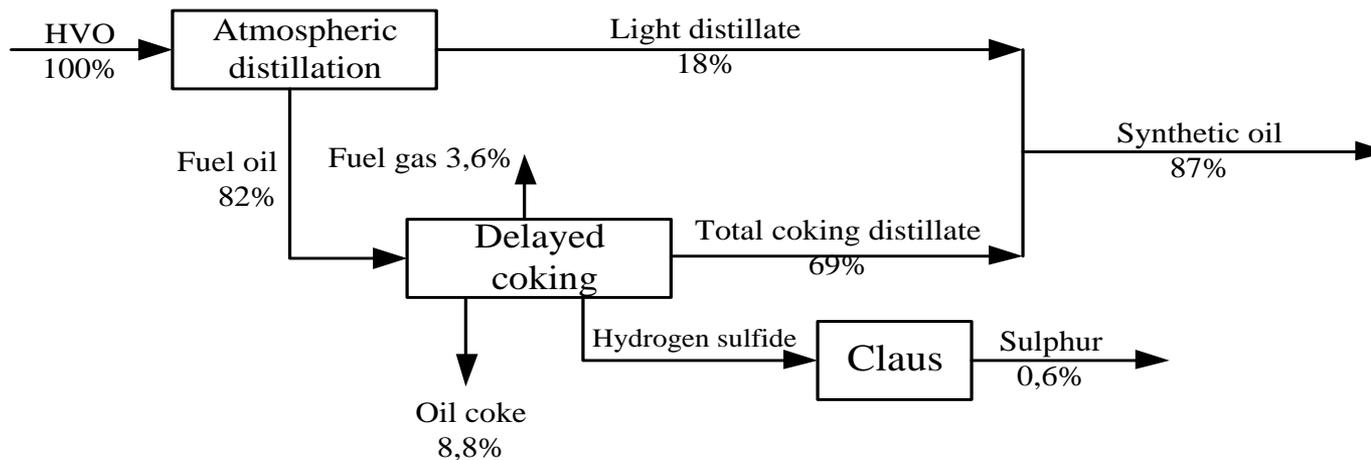
density – 943 kg/m³

sulphur contents – 3.7%

viscosity at 20°C – 88 cSt

Synthetic oil and coke production for aluminium production

Implemented in MTC Shelf and in the Republic of Iran



HVO - high-viscosity oils

HVO feedstock

density – 941 kg/m³

sulphur contents – 0.7%

viscosity at 20°C – 1550 cSt

Synthetic oil

density – 907 kg/m³

viscosity at 20°C – 42 cSt

sulphur – 0.3%

vanadium – 2 ppm

nickel – 1 ppm

Petroleum coke

volatile-matter content – 9%

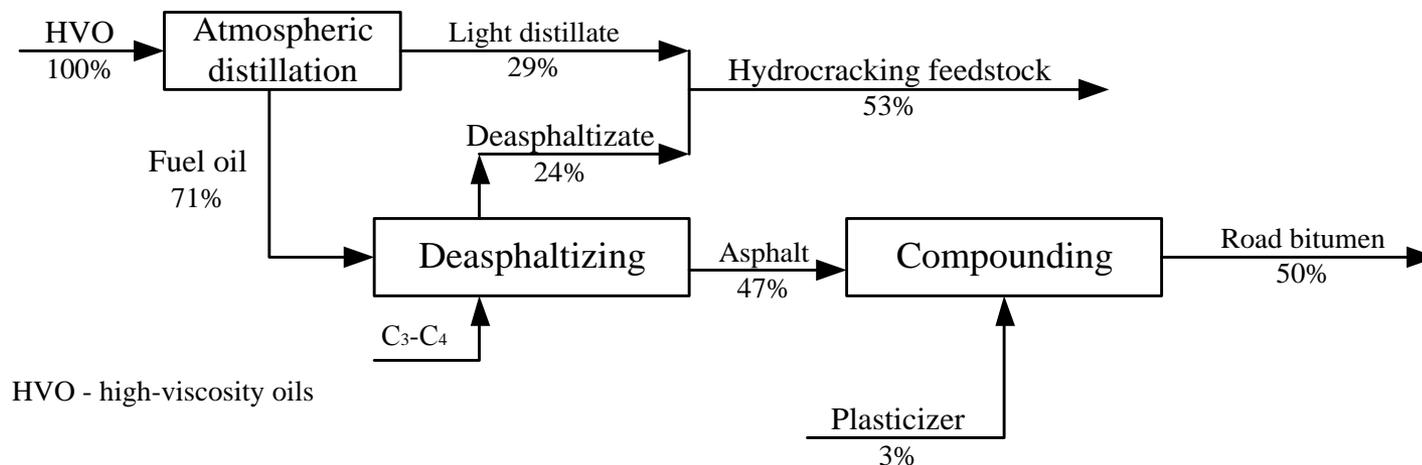
sulphur – 0,8%

vanadium – 120 ppm

nickel – 70 ppm

Feedstock production for hydrocracking and road bitumen

Implemented in PJSC Tatneft



HVO feedstock

density – 969 kg/m³
sulphur – 4.1%
viscosity at 20°C – 2140 cSt

Hydrocracking feedstock

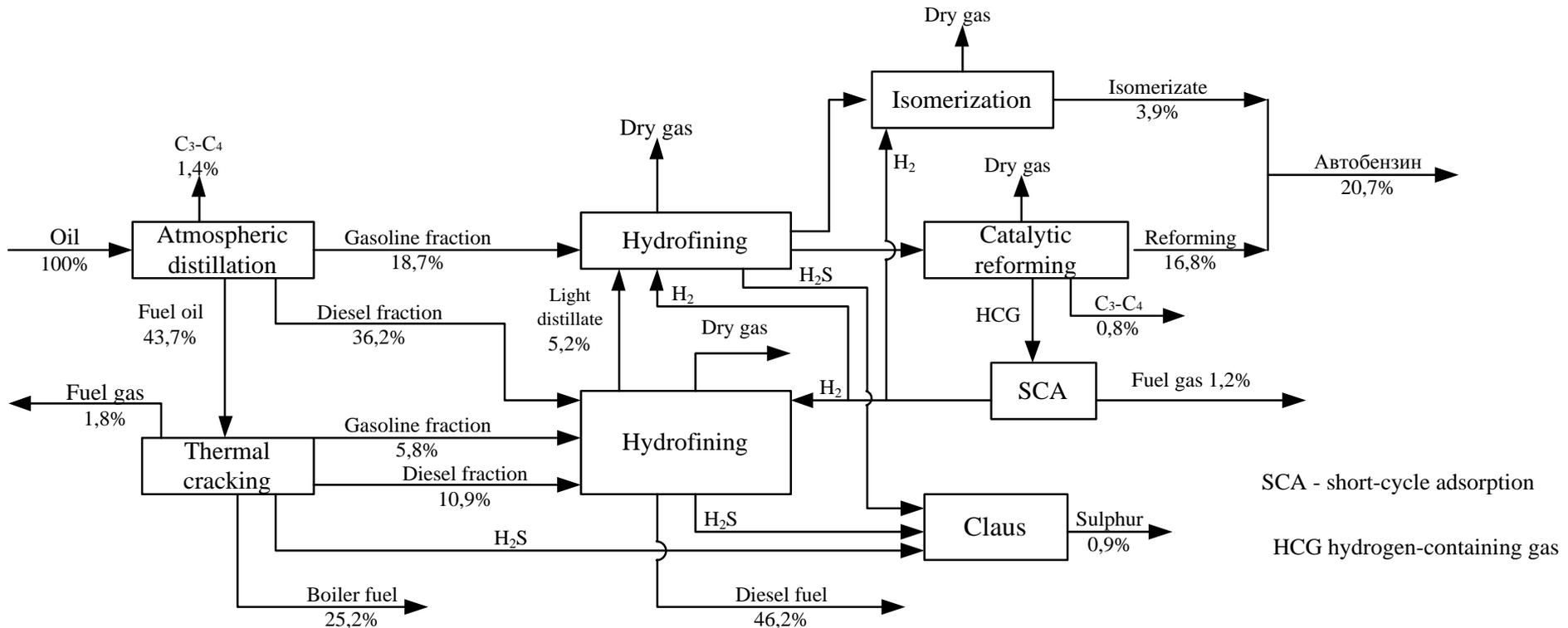
density – 903 kg/m³
sulphur – 2.6%
vanadium – 11 ppm
nickel – 8 ppm
coking capacity – 1.3%

Road bitumen

penetration at 25°C – 74 dmm
softening temperature – 47°C
expansibility – 65 cm

Oil refinery (1.5 mln. t/year) flow chart by a fuel option

Implemented in the Republic of Iraq



Feedstock (100%)
density – 856 kg/m³
sulphur contents – 2.1%
coking capacity – 4.8%

Gasoline (20.7%)
density – 775 kg/m³
sulphur contents – 0.5 ppm
aromatic hydrocarbons contents – 52%
octane number (IM) – 94

Diesel fuel (46.2%)
density – 875 kg/m³
sulphur contents – 45 ppm
PCA (polycyclic aromatics) contents – 3.3%
cetane index – 55
pour point – minus 11°C

Boiler fuel (25.2%)
density – 990 kg/m³
sulphur contents – 4.5%
viscosity at 80°C – 57 cSt
flash point – 225°C