ATTACHMENT 3

Bitumen Plant

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Bitumen Production Plant

The bitumen production unit is designed to produce bitumen of specific quality by direct oxidation of the tar from the fuel oil vacuum distillation unit.
The capacity of the bitumen production unit of the fuel oil vacuum distillation unit is defined in the specifications and is equal to **100.000 tons of bitumen per year**. With a certain number of working hours per year – (24 h * 365 days = 8. 760 hours) the estimated nominal bitumen capacity of the plant will be 10,416 tons of bitumen per hour.
The bitumen production module works in two ways:

- production of road bitumen BND 90/130 (100/130);

The capacity range of the plant for raw materials should be between 50 and 110% of the nominal.
The mode of operation of the fuel oil vacuum distillation unit is continuous. The revision period of the unit is 24 months.

Material balance

The synthetic material balance of the bitumen production module is shown in Table 10.1

Table 1 - Consolidated material balance of the vacuum distillation unit for fuel oil

Name of raw materials, petroleum products	Surrender % mass. from raw materials	Consumpti on, T/hour	Quantity t/day
Input			
tar	89,41	11,581	277,9
Aria technical	10,59	1,371	32,9
Total:	100,00	12,952	310,8
Output			
Bitumen	88,14	11,416	274,0
Oxidation gas	11,30	1,463	35,1
Black solar oil (when burning)	0,56	0,073	1,7
Total:	100,00	12,952	310,8

Coefficients of consumption of raw and auxiliary materials

The raw material of the oxidation unit of the vacuum distillation unit for fuel oil - tar in the oxidation process is almost completely processed to obtain the specified target products.
Consumption coefficients are taken on the basis of the productivity of the bitumen block of the vacuum distillation unit of fuel oil - 11,416 t / h (100.000 tons per year) of oxidized bitumen.

Table 2 - Consumption coefficients of raw and auxiliary materials

Name of raw materials and materials	Consumption coefficient	Note
tar	1,014 t/t	Raw material for the bitumen production module
Air technical	100 nm3/t	Air for bitumen oxidation
Air according to measuring and control instrument	0.876* nm3/t	For the operation of DCS and ESD actuators
inert gas	1.051* nm3/t	For nitrogen suppression and purging of devices before repair
combustible gas	3.503* nm3/t	For burners of an afterburner of a vacuum distillation unit fo mazut
transformer oil	0.876* t/t	For heating devices and piping

* - The coefficients of consumption of auxiliary materials and energy resources are determined during the design process when choosing the main and auxiliary equipment