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INVESTIGATION OF THE APPLICATION OF PLANT RESIDUE GAS GENERATOR SYSTEMS FOR SUPPLYING SYNTHESIS GAS TO AGRICULTURAL MACHINERY

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When calculating the gas generator, if the performance and fuel analysis results are given, the main dimensions of the gas generator are determined by the parameters that characterize the gasification process.

These parameters include the following:

1. The intensity or tension of the gasification process, which is estimated by the amount of fuel heat released during 1 hour per 1 m ^{2} of the cross-sectional area of the nozzle belt of the gasification chamber or mine section. This value is denoted by *B* and is measured in kcal/m ^{2} h.

Very often, the intensity of the process is estimated not in heat units, but in weight units - kg/m ^{2} · hour, that is, it is estimated by the amount of fuel gasified within 1 hour on the area of 1 m ^{2} of the tuyere belt of the gas generator in the reverse (or mine in the forward) gasification process.

The intensity of the process, expressed in weight units, is not constant, since the calorific value of 1 kg of fuel changes, therefore it is advisable to express the tension of the gasification process in thermal units (kcal/m ^{2} h).

2. Obtaining gas from 1 m ^{2} cross-sectional area of the nozzle belt of the gasification chamber or gas generator shaft in 1 hour. This parameter is denoted by *C* and is measured in nm ^{3} /m ^{2} ·hour.

3. Height of the active fuel layer. Its value depends on the size of the pieces of fuel in the gas generators of the direct gasification process and on the size of the pieces of briquettes and pellets formed during dry distillation of the fuel in the gas generators of the reverse gasification process.

For wood chips, pellets and briquettes from plant remains, the height of the active layer is taken as 250-300 mm; for anthracite and semi-coke gasified by the direct process, the height of the layer is 450-600 mm.

Other parameters depend on the type of gasification process.

For the gas generator of the reverse gasification process, the dimensions of which are shown in fig. 1, is a characteristic ratio of the area of the tufted belt F_f to the area of the neck f_z located below the tufted belt,

$$m = \frac{F_f}{f_z},$$

The value of t during gasification of wood is taken differently for different gas generators. The most appropriate value of this value should be considered to be t =5. In the G-19 gas generator of the KhTZ-T2G tractor, the accepted value t (t = 9.2) is unreasonably large; later, it was reduced to 5.14 on KT-12 tractors equipped with a similar gas generator.

When gasifying pellets and briquettes from plant residues, t = 4 is taken.

The distance h_z from the nozzle belt to the throat is of great importance for the production of tar-free gas, because the lower the throat, the more the throat temperature drops and, therefore, the more resin vapors can pass through the throat undecomposed. The ratio of D_k to h_z during wood gasification is within 2.25-3.

The speed of air inflation, as already mentioned above, does not affect the quality of the gas. In gas generators of the reverse process, the inflation speed ω = 14-16 m/s.

From 5 to 24 tufts are made in the air belt. 10 lances are usually used in the designs of the gasification chambers of tractor gas generators.

Less than five lances are not made, as in this case the content of resins in the gas increases. They are found in practice, as, for example, in the gas generator designed by V.Ya. Mother, cameras with two-way air intake through air nozzles (sometimes called "air nozzles"), which have six holes for the passage of air.

According to the experiments of N.G. Yudushkin, during the gasification of pellets and briquettes from plant residues, when 20 lances are introduced into the air zone, the fuel deposit improves and the resistance of the peat coke layer decreases. At the same time, the coke layer does not need to be scraped for 5-6 hours. While with 10 tuyeres, it is necessary to scrap after 20-30 minutes. due to an increase in the gas passage resistance in the layer.

The parameters for selecting the dimensions of the gas generator with a direct gasification process regarding the intensity of the process, the height of the active layer and gas removal from a unit of the cross-sectional area of the mine are the same as for the gas generator with the reverse gasification process.

The speed of air blowing in these gas generators is assumed to be even lower - 1.5-2 m/s. The intensity of the direct gasification process, despite the high calorific value of the gasified fuel, does not differ in magnitude from the reverse process.

A distinctive feature of gasification of lean fuels is the addition of steam to air inflation.

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