Coal gasification as an effective method of gas production

The problem of providing the population with sufficient gas plays an important role in society. It can be avoided or solved by **coal gasification**, a method that is becoming increasingly popular in many countries.

Its essence is to convert coal into gas, and helps specialists in this field to extract **mine methane**, or it is also called coal bed methane. It is this gas that helps to use natural resources correctly and rationally. **Coal gasification** is the process of converting a coal product into a gaseous substance by incomplete oxidation at high temperature and different pressures. The gas is produced in gas generators, which serve as a so-called mini power plant, in which various processes of endo- and exothermic reactions take place. What types of coal can be used? In fact, the gaseous product can be obtained from any type of coal - from brown, anthracite and even oil sludge, which have different indicators of moisture and ash content. In all cases, important components of the gas produced at the outlet are CO, H2 and CH4. However, their number and ratio, as well as the overall efficiency of the process, can vary widely and depend on the conditions and mode of **underground gasification of coal**, as well as the characteristics of the coal used.

How is the process of gasification of mine methane?

The conversion of coal into gas occurs through the use of a controlled thermochemical process in the heat wave mode. Complete conversion of organic coal or oil sludge into a gaseous substance (obtaining 97% of gas) is carried out in two stages:

1. 1. in the first stage, volatile substances formed from saturated low molecular weight compounds are converted into the gas phase. **Coal gasification** is carried out using air blasting technology of different intensity in the reverse heat wave mode. Coal is ignited from above, the maximum temperature, according to the indicators of **energy metering and control systems**, should be kept within 750-850 degrees Celsius, which allows to avoid the formation of harmful gaseous oxides of nitrogen and sulfur;
2. complete gasification of **mine methane** is carried out during the second stage. During this period, high-molecular organic components are converted into the gas phase, which form a "rigid framework" of condensed aroma nuclei. The process is carried out on a steam-air blast of different intensity on **the oil sludge** in the mode of a direct heat wave. The maximum temperature should reach 800-900 degrees Celsius.

During this process, **light vapor recovery plants** are used. Thanks to them, the gasification of coal components is more efficient. Sometimes specialists use an inverter to obtain comfortable conditions during work.

The efficiency of the method of underground coal gasification

Thanks to **energy accounting and control systems**, it is possible to most accurately determine the effectiveness of this process. Note that the estimated composition of the gas produced is obtained at the enterprise of underground gasification of **oil sludge** is characterized by the following indicators of changes in the content of individual components:

	Using air blast technology	Using steam-oxygen blast technology
CO2	12,0-15,3%	-
CmHn	0,1-0,7%	1,2%
O2	0,2%	0,3%
CO	10,0-14,0%	35,0%
H2	12,1-16,2%	50,0%
CH4	2,0-4,0%	7,5%
N2	55,0-60,0%	5,0%

H2S	0,01-0,06%	-

The use of air blast during injection into the coal seam, which is gasified - **mine methane**, allows to obtain low-calorie gas with the ability to reproduce heat of about 4 MJ / m3. Such fuel can be used in gas turbines or boilers and CHP. In the case of using the technology of **gasification of coal** using steam-oxygen blast, you can get medium-calorie gas. It has the ability to reproduce heat is 10-13 MJ / m3. What are the main advantages of **underground coal gasification**?

- Preservation of the earth's surface and fertile soil layer.
- Avoiding the creation of areas for the storage of **mine methane**, which in traditional methods of processing coal seams are one of the main sources of environmental pollution.
- When consuming products similar to the final product from the solar energy system, most environmental impact factors are considered less harmful than solid fuels.

In general, the environmental situation and the possible negative consequences of **underground coal gasification** are predictable, they can be controlled and solved by engineering methods. This makes the gasification process efficient and with minimal negative impact on the environment, ensuring the ecological purity of underground **gasification of coal**.

Features of equipment for recovery of light fraction steam

Equipment for recovery of light fraction steam makes it possible to fully provide optimal conditions during the conversion of a coal product into gas. Thus, **oil sludge** will be one of the main components of processing, from which it is possible to obtain a high quality product. During the **gasification of coal**, the process of separation of liquid components into fractions - heavy and light, with their subsequent use as needed.

1. Heavy fractions can be processed for further use in the manufacture of cast iron.
2. Light fractions of **mine methane** often become environmentally friendly building materials.

In addition, due to the low temperature in the **light fraction recovery plants**, low emissions are maintained and this makes it possible to dispose of various wastes - combustible and non-combustible. Also, with the simultaneous production of building materials from slag melts, the overall economic effect of the use of such equipment will be much higher than that of modern steam and gas devices. Therefore, the use of **energy accounting and control system** is important, it depends on the overall assessment of the work and the passage of all processes. In addition, it is often used by specialists before servicing boilers. Thus, **underground gasification of coal** is considered a complex physico-chemical process that takes place under natural conditions. It is influenced not only by technological but also by natural factors, which are related to the location of the coal seam, its composition, strength and depth of placement. These and many other nuances directly affect the quality and rate of conversion of coal products, as well as the subsequent use of the **equipment for recovery of light fraction steam**.