SEPARATE HEATING AND COOLING UNITS USED IN OIL DEHYDRATION

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ANNOTATION

Providing natural gas to the population and consumers of our country is one of the urgent issues. The President's decision of January 9, 2020 "On measures to implement the investment program of the Republic of Uzbekistan for 2020-2022" is of great importance in increasing the scope of work in this regard. In this article, we will discuss "separate heating and cooling units used in oil dehydration".

Keywords*: gas, raw material, security, natural gas, law, molecule.*

АННОТАЦИЯ

Обеспечение природным газом населения и потребителей нашей страны является одним из актуальных вопросов. Большое значение в увеличении объёмов работы в этом направлении имеет решение Президента от 9 января 2020 года «О мерах по реализации инвестиционной программы Республики Узбекистан на 2020-2022 годы». В этой статье мы обсудим «отдельные установки нагрева и охлаждения, используемые при обезвоживании нефти».

Ключевые слова: *газ, сырье, безопасность, природный газ, закон, молекула.*

INTRODUCTION

In the initial stages of gas preparation for transportation, simple separation devices are used. The composition of such a device uses high-pressure primary separators that clean liquid droplets and mechanical impurities, the secondary

separator is used to separate the gas-liquid mixture and control the removal of gas condensate and gas throttling. The device is equipped with a multi-level adjusting and main throttle valve; adjusters are used to release water and release gaseous condensate from the separator. Devices of this type are installed on wells that do not have a large flow rate. PHA (low-temperature separation) technology is widely used in gas condensate fields when there is condensate in the gas and absorption and adsorption drying are carried out. Low-temperature absorption is also used when the amount of condensate in 1 m3 of gas is more than 100 cm3. Two methods are used for gas and gas condensate cooling in PHA: gas throttling and use of special cooling machines. The throttling method is based on the throttling effect or the Joule-Thomson method. The purpose of this effect is based on reducing the pressure in the throttle by changing the temperature of the gas, using the energy of the local resistance of the gas flow.

METHODS

GPHAQ ¾ queue 1 technical network 210 m. m^3 in 1 hour

9 technical networks 1,890 million m^3in 1 hour

5,040 million m^3 in 1 day

45.36 million m^3 in 1 day

1.68 billion in 1 year.

In 1 year, 15,120 bln. m^3per section (3+5 mln. calculated) 16 technical networks 2,765 mln. in 1 hour. m^3

66,360 million $m^{3м}$in 1 day

22,120 billion m^3in 1 year Note: GPHAQ ¾ 1,2,9 tex. lines

(when 4 mln. is calculated) (when 4+5 mln. is calculated) 1 tech. network 167 m. m^3 in 1 hour

9 technical networks 1,760 million m^3in 1 hour

(4 million) 4 million m^3in 1 day

42,240 million m^3in 1 day

1.336 billion m^3in 1 year

14,080 billion m^3in 1 year

According to this section (3+4+5 mln. calculated) 16 technical networks 2,635 mln. m^3in 1 hour

63,240 million m^3in 1 day

21,080 billion m^3in 1 year

RESULTS

Natural gas is sent to the first stage separator S-1 through a Ø300 mm pipe from block I. S-1 consists of a horizontal, cylindrical device that enters the gas flow through a separator and a vertical swirler (zavikhritel). In the swirler, the gas flow rotates due to the guide vanes of the mobile cylinder.

In the swirler, the flow rate is adjusted according to the change in the size of the gap in the slots of the movable cylinder. Droplet liquid and mechanical mixtures hit the walls of the incoming tube due to centrifugal forces and flow to the horizontal part of the apparatus, and the gas is directed from the separator to the T-1 heat exchanger through the nozzle located in the center of the flow.

In the horizontal part of the S-1 apparatus, the liquid separated from the flow of gas is divided into liquid, formation water and hydrocarbon condensate according to the difference in specific gravity.

The gas separated from droplet liquid and mechanical mixtures is directed from the separator S-1 to the tubular area of the double heat exchanger T-1, and here it is cooled to a temperature of 30-45°C in the circulation of the dried gas passing through the inter-tube area.

The flow of gas cooled to a temperature of 30-45°C in the T-1 heat exchanger is sent directly to the second-stage separator S-2 at a pressure of 7.0-10.0 MPa. The structure and working principle of the S-2 separator is similar to the first-stage separator S-1.

DISCUSSION

Molecular sieves are used for deep drying of gas, that is, they are usually called zeolite. Zeolites are polymers with a complex inorganic crystal lattice, and the shape of the zeolite crystal is volumetric. All six sides of them are made with cracks, through which moisture enters the interior of the space. Each zeolite is made up of oxygen atoms. (from 3*10-7 to 10*10-7 μm). Due to this, zeolite has the ability to absorb small molecules, that is, as a result of the diffusion of very small molecules during the adsorption process, large molecules appear. Small molecules seep into the inner space of the crystal and get stuck (caught) in it, while large molecules do not pass, so absorption does not occur.

Zeolites are used in the form of powder or granules, the size of which is up to 3 mm, with high porosity (up to 50%) and the surface of the pores is large. Their absorption activity is 100%, zeolite absorbs 14–16 g of water under a partial pressure of 50 Pa, and its activity is about 4 times greater than that of silica gel and aluminum oxide. It should be noted that the possibility of zeolite absorption is high at relatively low humidity of the gas or at a small partial pressure of water vapor. Therefore, the gas dries to a very low dew point (up to 173 k).

The advantage of the molecular mesh is that it does not lose its absorption property even at high temperature (at a temperature of 373K, its absorption property also decreases). The absorption property of silicate and bauxite decreases several times at the temperature of 311K, and at the temperature of 373K the absorption becomes zero.

Well gas heated to a temperature of 473-573 K is used in the regeneration of molecular networks, and it is passed through the mold layer in the opposite direction to the temperature flow of the drying gas. A two-stage drying scheme (lithol and bauxite) and a molecular mesh are used for deep drying of gases. Zeolites withstand 5000 cycles, losing 30% of their absorbency in the process.

Gas goes through several stages of purification from the mine to the consumer. The first step is to install a filter inside the well to limit the flow of particles from the bottom of the well.

The gas is passed a second time through a separator installed on the ground in the mine, where the liquid (water and condensate) is separated and the gas is cleaned of particles of rock and dust.

CONCLUSION

Degassing of oil under reduced pressure is a situation where the properties of oil in formation and surface conditions differ from each other. Chemical properties of oil, selection of the number of stages for optimal separation of oil from gas, determination of the number of the optimal separation device is carried out through very complex calculations, issues of ensuring its complete and accurate separation into components during stabilization of oil, control of deep extraction using rectification in the stabilization device on the basis of obtaining one or another type of components (deparaffinization, butaneization and pentanization) were studied in the graduation qualification work. In the process of rectification, the establishment of the equilibrium state of the vapor and liquid phase is the main issue, and the work of temperature and pressure equalization and redistribution of components with each other is analyzed.

1. The proposed method for the separation of hydrocarbon mixtures provides an opportunity to adjust the vapor flows in the main column and the stripping column and ensures the quality separation of products and is used in industry.

2. Using this proposed method, the energy costs of hydrocarbon mixture separation are reduced and the drying process and hydrocarbon separation are carried out in one column, used in the technical industry. A method of separating multicomponent mixtures by means of rectification

3. This proposed method of separating multicomponent mixtures reduces capital and energy costs through rectification, the initial mixture is recirculated between the feed tank and the dephlegmator as a coolant before being fed to the column, heated in the dephlegmator, extracted and fed to the column or raw materials are transferred as a vaporizer and used in industry.

REFERENCES

1. file:///C:/Users/Acer/Downloads/4280-Article%20Text-83aМурин В.И., Киселенко Н.Н. «Перспективы переработки природных газов. Повышение эффективности процессов переработки газов и газового конденсата. Сб. научных трудов. - М. ВНИИГаз. 1995, с.-3-6.3-1-10-20221027.pdf
2. Сатторов, М. О., Хасанов, А. С., Неьматов, Ж. Ж., & Артыкова, Р. Р. (2013). УСТАНОВКА ОЧИСТКИ УГЛЕВОДОРОДНЫХ ГАЗОВ ОТ СЕРОВОДОРОДА РАСТВОРАМИ ЭТАНОЛАМИНОВ. In СОВРЕМЕННЫЕ МАТЕРИАЛЫ, ТЕХНИКА И ТЕХНОЛОГИЯ (pp. 189-199).
3. Хайдаров, С. Ж., Ражабов, А. С., & Сатторов, М. О. (2021). КОНТРОЛЬ ФИЗИКО-ХИМИЧЕСКИХ СВОЙСТВ И КАЧЕСТВА ПРОДУКЦИИ ГАЗОВОГО ПРОМЫСЛА. Science and Education, 3.
4. Хайдаров, С. Ж., Ражабов, А. С., & Сатторов, М. О. (2021). КОНТРОЛЬ ФИЗИКО-ХИМИЧЕСКИХ СВОЙСТВ И КАЧЕСТВА ПРОДУКЦИИ ГАЗОВОГО ПРОМЫСЛА. Science and Education, 2(3).Хайдаров, С. Ж., Ражабов, А. С., & Сатторов, М. О. (2021). КОНТРОЛЬ ФИЗИКО-ХИМИЧЕСКИХ СВОЙСТВ И КАЧЕСТВА ПРОДУКЦИИ ГАЗОВОГО ПРОМЫСЛА. Science and Education, 2(3).