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MAIN CHARACTERISTICS OF NATURAL GAS AND DRYING GAS BY ABSORPTION METHOD

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Abstract The article presents an analysis of the main characteristics of natural gas, the density of natural gas in the gaseous state and its composition, methods of natural gas purification and gas dehydration by absorption.

Plant includes gas separation unit, having at least one fractioning reservoir. Adsorption layers for adsorption kinetic separation are used in the separation unit. Adsorption layers release methane-rich flow of initial gas. Plant also includes refrigeration system with expander cycle of high pressure. Refrigeration system compresses the methane-rich gas flow to absolute pressure making more than approximately 1,000 pounds per square inch (6895 kPa). Refrigerating system also cools down the flow of methane-rich initial gas in one or more refrigerators and then extends the flow of cooled natural gas, forming a flow of liquefied product. Methods of initial natural gas flow liquefaction using AKP and refrigerating system with expander cycle of high pressure are also proposed in this invention.

Keywords: *gas, dehydration, method, absorption, ethane, propane, butane, carbon dioxide, helium, hydrogen sulphide, ethylene*...

INTRODUCTION

Natural gas is a mixture of such gases that were formed in the earth's interior during the decomposition of various organic substances. Natural gas is one of the most important minerals actively used in industry and in everyday life. In the conditions of occurrence (or, as gas workers say, in reservoir conditions), natural gas is exclusively in a gaseous state or in the form of the so-called

"Gas cap" in common oil and gas fields, either in the form of gas deposits (that is, separate accumulations), or in a dissolved form - in water or oil. True, under certain conditions natural gas can be not only in a gaseous state, but also in a solid state in the form of crystals.

Up to 98% of natural gas is methane, and it also contains methane homologues - ethane, propane and butane. Occasionally, carbon dioxide, hydrogen sulfide and helium may be present. Methane (CH4) is a colorless, odorless gas lighter than air. It is flammable, but it can still be stored fairly easily.

Ethane(C2H6) is a colorless, odorless and colorless gas, slightly heavier than air. Also

combustible but not used by how fuel. Ethane Propane (C3H8) is a colorless, odorless gas, poisonous. He has a useful property:

propane liquefied it is at small pressure, What allow easy

separate his from impurities and to transport. *Ethane Propane Butane* (C4H10) - similar in properties to propane, but has a higher density. Doubled heavier air.

Ethane Propane Butane Carbon dioxide(CO2) is a colorless, odorless gas with a sour taste.

Unlike other components in natural gas (with the exception of helium), carbon dioxide does not burn. Carbon dioxide is one of the least toxic gases.

Ethane Propane Butane Carbon dioxide Helium(He) - colorless, very light (the second of the

lightest gases, after hydrogen), colorless and odorless.

It is extremely inert and does not react with any of the substances under normal conditions. Does not burn. It is not toxic, but at elevated pressure it can cause anesthesia, like other inert gases. Ethane Propane Butane Carbon dioxide Helium Hydrogen sulfide (H2S) is a colorless heavy gas with the smell of rotten eggs.

Gas dehydration by absorption method based on the use of special liquid reagents that absorb water from the gas. This happens by direct contact inside a special installation.

In this method, solutions of ethylene glycol or triethylene glycol are most often used as reagents that absorb moisture. During absorption, the gas to be dried enters the lower part of the installation. At the same time, the absorber solution flows towards it from the top of the column. Then the desiccant, by that time already saturated with moisture, is fed into the separator. There, gas is first released from it, which is absorbed inside the installation.

Then ethylene glycol is heated and sent for regeneration, which is a rather complicated process (given the limited scope of the article, we will not dwell on it in more detail now). The moisture absorbed by the desiccant is released there. Then the cycle is repeated.

The indisputable practical advantages of the absorption method include the fact that it allows you to remove moisture from a gas mixture containing poisonous solid absorbers (primarily the very common hydrogen sulfide). In addition, it is easy to automate and allows drying to an acceptable dew point of -70 degrees Celsius in most cases.

The mention of solid moisture absorbers is no coincidence. On their use, another widespread technology for drying gases is built - the method of adsorption.

Here, the absorption of moisture is carried out by solid granular substances. Such adsorbents can be, in particular, alumina, zeolites, and silica gel. The moisture is subsequently removed from the pores using external influences. The adsorption method has a number of undeniable advantages. In particular, it allows you to achieve a much lower "dew point": -90 degrees Celsius.

However, the choice of this method, as well as the specific adsorbent, strongly depends on the composition of the dried gas. As noted above, it may contain components that negatively affect the solid reagents of the installation.

In addition, there are also technical and economic difficulties. The adsorption process is much more difficult to automate than absorption. And the choice of this method means the need to incur significant additional capital costs.

Silica gels

In modern industry and science, a special place among sorbents belongs to silica gel, which is a dried gel of silicic acid. Chemical inertness, high thermal stability, ease of regulation of the porous structure - all this complex of properties makes it possible to prepare sorbents, catalysts and carriers with a high specific surface area on the basis of silica gel and with an optimal porosity of the structure.

One of the most practically important silicon compounds is silicon dioxide SiO2. A distinctive feature of silicon dioxide is the tendency to form colloidal solutions and form gels with water, called silica gels.

Silica gel is a dried silica gel of a porous structure with a highly developed inner surface. This feature determines the most valuable properties of silica gel - an adsorbent, a carrier of a catalytically active substance and a catalyst.

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Silica gel always contains more or less adsorbed water. In addition, technical silica gel contains other oxides, primarily aluminum oxide, and iron, which gives technical silica gel a yellowish or even brown color. Silica gel has a different surface, usually 100-600 m2 / g, and a significant pore volume (0.5-1.2 ml / g) with a predominance of pores with a diameter of 5 to 15 nm. Silica gel moisture content 30%. Bulk density 0.9 g / cm3 Before use, silica gel should be dried in running hot air or gas at 180-200 for 3-4 hours.

Conclusion

In this article, I studied the characteristics of natural gas, methods of drying it. I also studied silica gels and their properties. I got acquainted with a natural gas dehydration plant. Now I am faced with the task of developing an apparatus for purifying gas from moisture by adsorption using silica gels. Required productivity: 1000m / h. Required degree of purification: 99.99%.

List of sources used

1. Zainullin V.F. Improvement of the process of natural gas adsorption drying.
2. Kolokoltsev Sergey Nikolaevich. Improvement of the technology for the preparation and processing of hydrocarbon raw materials.
3. Davletov Kasim Mukhametgareevich. Scientific and practical foundations of technology and techniques for cooling natural gas during its preparation for transport in the fields of Siberia
4. Perfilyev Alexander Vladimirovich. Preparation and properties of silica gels based on silicic acid
5. Ethane(C2H6) is a colorless, odorless and colorless gas, slightly heavier than air. Also combustible but not used by how fuel. Ethane Propane (C3H8) is a colorless, odorless gas, poisonous. He has a useful property: propane liquefied it is at small pressure, What allow easy separate his from impurities and to transport. Ethane Propane Butane (C4H10) - similar in properties to propane, but has a higher density. Doubled heavier air.