

Explore the Storage and Application Technology of Liquefied Natural Gas

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Abstract

Liquefied natural gas is one of the clean energy sources that people use more with the development of The Times, but because of the low temperature of liquefied natural gas is generally below-160 degrees Celsius, so the storage of liquefied natural gas brings certain difficulty. The storage and application technology of liquefied natural gas is discussed with the characteristics of liquefied natural gas.

Keywords

Liquefied Natural Gas; Storage Method; Application Technology.

1. Introduction

The onshore storage and transportation of liquefied natural gas is an important part of the natural gas industry chain. For the natural gas industry, better preservation of liquefied natural gas is necessary in order to make more efficient use of liquefied natural gas. However, due to the low temperature of liquefied natural gas, it is difficult to transport or store liquefied natural gas, so many domestic LNG manufacturers have brought technical challenges. At present, common storage technologies for LNG include gas storage, gas storage tank, metal tank and so on. As the development of technology has further improved the storage requirements of liquefied natural gas, so it is very meaningful to explore a new efficient liquefied natural gas storage technology.

2. Basic concept of liquefied natural gas

2.1. Liquefied natural Gas

Liquefied natural gas LNG is natural gas under atmospheric temperature to 162 °C in a liquid form of liquefied natural gas LNG with high calorific value, high performance, etc Because has the characteristics of in liquefied natural gas LNG transport way can save a lot of space, but because of liquefied natural gas (LNG) cryogenic properties, also in transit has certain security hidden danger Risk is higher.

2.2. The hazardous properties of liquefied natural gas.

2.2.1. Danger of frostbite.

Liquefied natural gas LNG is natural gas compressed, cooled to 162 degrees Celsius, and so on in the process of storage and transportation are in danger of frostbite, especially in the process of transportation in the event of LNG leakage will absorb the air from the outside world for gasification reaction to absorb a lot of heat, forming a frost, the liquefied natural gas LNG have frostbite, liquefied natural gas LNG tanker transportation to LCN/G, when unloading treatment is carried out, it is found that the rebalancing pressure will find the gasification reaction at the back of the tank, and a lot of frost will form at the back of the tank. Relevant staff also need to carry out anti-freezing measures. LNG leakage after cold vapor cloud, too late to gasification spillage of liquid or liquid, will make contact with some material brittle or produce cold shrinkage, material to brittle fracture and cold shrinkage will cause harm to LPG station

equipment especially the LNG storage tank happens outside cylinder brittle crack or deformation, results in the decrease of vacuum failure for cold sex can lead to serious accident.

2.2.2. Explosion hazard

Natural gas not only there is a risk of frostbite, understand the natural gas is inflammable and explosive dangerous goods, and gas leak explosion is a major event, due to the density of liquefied natural gas LNG is smaller than room air tightness, so once the liquefied natural gas leakage will be floating in the above points so liquefied natural gas LNG easy to ignite or explosion, gas concentration in the air can reach more than 15% Normal combustion in the air, if natural gas in the air concentration of 5%-15% in the range of open fire can be exploded, the concentration range is extremely natural gas explosion limit. The explosion produces high pressure and high temperature instantaneously, which is very destructive and dangerous. And this explosion limit is the explosion limit of methane in air, but the main component of natural gas is dethane. Because natural gas contains other gases, the explosion limit is slightly lower than this value, about 5%-14%. If the content of air is lower than the explosion range or higher than the explosion range, there will be no explosion. You have to be in that range for an explosion.

3. Liquefied natural gas storage technology

If you want to have a good storage of natural gas, you need to know the characteristics of natural gas. First of all, you should understand the storage method fliquefied natural gas. There are two main storage methods of liquefied natural gas, namely atmospheric pressure storage and high-pressure storage.

3.1. Gas storage

Gas storage is the main way to store a large amount of LNG. There are two common forms of gas storage, one is above-ground storage and the other is underground storage. From the point of view of environmental protection and economy, underground gas storage has many advantages. As the liquefied natural gas is at a low temperature of -162 degrees Celsius, the temperature around its storage environment should also be at -162 degrees Celsius. However, as the basic structure of the gas storage is the surrounding rock structure, the long-term low temperature of the surrounding rock will cause rupture, and once the rupture will cause LNG leakage and lead to serious accidents.

3.2. Gasholder

The gas storage tank is mainly divided into two types: the above-ground gas storage tank and the underground gas storage tank. But from the perspective of the manufacturing materials of the cans, the structure of the two and the manufacturing of their insulation layer are basically similar. At present, the most common gas storage tank materials are stainless steel aluminum alloy or nickel steel containing 9%. The insulation material is mainly perlite and polyurethane foam. The surface of the gas tank should be concrete. Considering the safety performance, the underground gas storage tank is safer. The underground wrong gas tank covers a small area, which can better realize the saving of land resources. Moreover, the anti-dew performance of the underground gas tank is particularly good and it will not be damaged by environmental changes under the ground.

3.3. Metal storage tank.

Metal storage tanks is also one of the most common way to store LNG gas storage devices such as large caverns are metal tank metal storage tanks according to tank metal materials into concrete is made and thin-film metal tank, storage tank is the main difference work ING is different, the size of metal storage tanks are mainly used for mass concrete work, film metal is

mainly used to do small. At present, most of the metal gas storage tanks in China are small conventional pressure tanks.

4. Application of liquefied natural gas.

4.1. Automotive utilization of liquefied natural gas.

With the rapid development of social economy, the use of cars has appeared widely in people lives. However, the emission of automobile exhaust is becoming more and more serious, which seriously affects the environment. Therefore, the automobile exhaust problem has been attached importance to by various countries. Studies from all walks of life have found that natural gas is a high-quality fuel for automobiles. The main component of natural gas is methane, which itself is a kind of clean energy. The combustion products of methane are carbon dioxide and water. In addition, methane can be converted in the process of use and no waste water or residue will be generated in this process. On the other hand, the gas produced by methane decomposition will not cause air pollution. Therefore, from the perspective of energy pollution, liquefied natural gas can replace gasoline as fuel for automobiles. But because of the variety of natural gas storage, so natural gas vehicles are not used. China attaches great importance to the development of natural gas vehicles. In view of the automobile exhaust problem, China is looking for a variety of environmentally friendly fuels. Nowadays, the development of liquefied natural gas is far higher than that of other fuel energy sources. Therefore, the core advantage of natural gas is that it can be high in heat and low pollution of combustion products after combustion. This also laid the foundation of natural gas in the development of automotive fuel position. Due to the rapid development of the city now we can see the construction of L-CNG station. Therefore, we can not see the future development prospects of natural gas vehicles, and natural gas vehicles will receive more and more attention with the development of economy.

4.2. Utilization of liquefied natural gas in cold energy

Liquefied natural gas has many uses. With the development of modern technology, liquefied natural gas has important uses in load peak regulation, commercial and industrial household power generation, industrial and commercial electricity consumption and so on. Liquefied natural gas LNG is mainly in the aspect of freezing liquefied storage technology, so you can see from the Angle of cryopreservation of liquefied natural gas LNG tank working effect is the same as the working effect of low temperature refrigerator, need to get energy from the more energy, cold can release again use this part of the energy, in this way can reduce costs in order to control the economic benefits. With the development of liquefied natural gas LNG people awareness of liquefied natural gas LNG is becoming more and more profound, whether in real life or in the industrial production, the application of liquefied natural gas LNG is very extensive, we all learned that, in the process of liquefied natural gas, liquefied natural gas will release a lot of heat, the heat will lead to natural gas from gas into a liquid state, which is why he is called The reason for doing LNG, this part of the energy is called cold energy. The application of cold energy in life is also very extensive, can use cold energy for power generation, and sewage purification treatment. Through the use of this energy can be energy to achieve multiple utilization, to prevent energy waste. The cold energy utilization of liquefied natural gas is generally divided into direct utilization and indirect utilization. Direct use mainly at low temperature power generation, production of solid carbon dioxide, as well as the separation of light hydrocarbons, low temperature aquaculture. Indirect utilization is mainly to produce liquid nitrogen and oxygen.

5. Conclusion

They are widely used in recent years, natural gas as a clean energy, but has a lot to the difficulty of the storage technology of natural gas, if the liquefied natural gas storage in accident will cause losses in the mouth, in order to give better storage of liquefied natural gas (LNG) to better understand the characteristics of liquefied natural gas (LNG), as people understanding of liquefied natural gas (LNG), commonly used to improve the gas Development. Natural gas will do better and will boost the economy.

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