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ANALYSIS OF PRESSURE SEALING TECHNOLOGY RESEARCH

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ARTICLE DETAILS

ABSTRACT

Article History:

Received 26 June 2018 Accepted 2 July 2018 Available online 1 August 2018 The principle of pressure sealing technology is briefly summarized through understanding of the technical definition of pressure sealing. The research mainly includes the premise of pressure sealing and the classification of pressure sealing. In this paper, three common pressure sealing techniques are introduced: injection pressure sealing, bonding technology with pressure packing and strong tape seal technology. The principle, composition and characteristics of three technologies are introduced respectively. In order to enumerate two innovative research results, this paper expounds the significance of pressure-sealing technology in engineering practice.

KEYWORDS

Pressure sealing technique, principle, injection, packing bonding, strong tape.

INTRODUCTION

In the late 1950s, China's pressure-sealing technology was established in the petrochemical industry. At this time, people sealed the leak with the form of electric welding. From the 1980s to the present, China's pressuresealing technology has obtained a variety of patents at China and abroad and has published a variety of academic monographs. With pressure seal technology in China has successfully solve all kinds of large equipment or leakage accident of small and medium-sized family more than 60. This phenomenon is managed to avoid the explosion, poisoning, peoples' deaths. This technology brings to our country each big enterprise have brought a lot of economic benefits. Up to now, the technology of pressure seal has been applied to all kinds of large equipment rapidly. With the gradual formation of pressure sealing technology, and the development of a discipline, we know more and more deeply.

DEFINITION AND PRINCIPLE OF PRESSURE SEALING TECHNOLOGY

In fact, the pressure-sealing technology studies the pressure, temperature and non-stopping conditions of the original sealing structure without changing the original seal structure [1]. Including the basic component of online leak sealing clamp, sealing agent injection, hydraulic tools, injection pressure under the action of a strong human by external force is greater than the medium pressure, leakage only form a powerful pressure difference on both sides can promote medium leakage to another direction, so as to achieve to seal, can be understood as a new kind of detection and plugging technology [2]. Study the technology of online leak sealing needs certain theory basis for math, chemistry, dynamics, sealing, bonding, welding technology, fluid mechanics, etc are all need certain time to study [3].

CONDITIONS FOR SEALING TECHNOLOGY WITH PRESSURE 3.

3.1 Leakage

Leakage refers to the mass transfer of the fluid medium through the isolation of the barrier due to pressure difference [4]. From then on, the cause leakage reason lies in the defects appeared on the spacer, so that the fluid flow from one side to the other, resulting in leakage, the driving fluid flow dynamics depends on the size of the pressure difference on both sides of the spacer, the more the greater the pressure leak. Due to a certain leakage, we need to conduct a certain field trip to the defect site and survey.

3.2 Survey

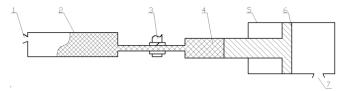
To be able to use the pressure sealing technology to operate, first must need to conduct a certain investigation on the site. Survey is to understand the purpose of the site environment and situation, know the leakage of medium physical properties, chemical properties, through the precise survey to find accurate defect parts, so as to select the corresponding method of online leak sealing, achieve personal safety protection of surveyors and fully prepared for the seal.

4. CLASSIFICATION OF PRESSURE SEALING TECHNOLOGY

Injection type with pressure sealing technology 4.1

The basic principle of injection pressure sealing technology is: to inject the sealing injection into a specific closed cavity, and to create a new sealing structure for the purpose of a technical means.

The basic composition of the injection pressure sealing technology is: sealed injection, fixture design, injection tool and field operation method [5].



- 1- leakage medium 2- protector clamp 3- injection plug valve
- 4- seal injection 5- agent 6- squeeze piston 7- pressure oil to take over

Figure 1: Schematic diagram of injection pressure sealing technology

Will push oil cavity in artificial way, squeezes the piston to the internal drive, sealing agent injection into the fixture after valve open, this entire process is pressure difference, thus forming a kind of driving force, to fill the sealing agent injection in the jig fixture, so as to realize the complete sealing (figure 1) [6]. The application of injection-type belt pressure sealing technology can guarantee the safety of the sealing personnel, and the use range is very wide, the economic benefit is high.

4.2 Tape filling and bonding technology

With pressure filling adhesive technology basic principle is: to rely on artificial methods, previous prepared some adhesive on the defective parts, forming a layer of protective film, adhesive in the defect areas after a short time, achieve curing, achieve the equilibrium of the adhesive and the leakage of medium. Technical classification of pressure filling adhesion: hot melt adhesive filling technology, plugging adhesive technology and sealant packing technology [7]. For example, sealing adhesive technology is used as an example:

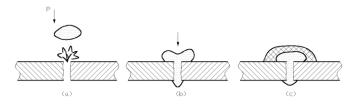
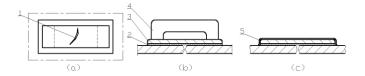


Figure 2: Schematic diagram of sealing and bonding technology of sealant

According to the nature of the leakage of medium so as to choose the type of sealant, first of all, the leakage defect parts must be clean, such as the sealant groundwork, direct contact with leaking ontology will allocate good sealant has direct effect on defect (as shown in figure 2 a), wait for after curing sealant, pulling force (as shown in figure 2 b), stop leak, finally for secondary processing, to a certain amount of adhesive is not strong (as shown in figure 2 c). This method is easy to use, has wide application range, can be detachable, safe and effective, cheap and effective.

4.3 Strong magnetic tape sealing technology

Strong tape is the basic principle of pressure sealing technology: using magnet to produce powerful suction, make coated with adhesive or glue to seal the nonmagnetic material and leak adhesive, achieve the purpose of online leak sealing.



- 1- leakage defect 2- adhesive or sealant
- 3- non-magnetic material 4-magnet 5- adhesive and glass cloth

Figure 3: Schematic diagram of pressure and solid bonding technology with compression force

The strong magnetic force of the magnet will hold the sealant on the non-magnetic material firmly, and add a secondary seal to the outer layer, thus improving the efficiency more effectively (figure 3). The application of this technique is simple, but the scope is limited, for example, for defects caused by magnetic materials [8].

5. THE FUTURE DEVELOPMENT TREND OF PRESSURE SEALING TECHNOLOGY

Today's technology has reached mature level, of online leak sealing in

injection agent type, the online leak sealing to the leakage of different shapes, the application of different jig seal can already to solve, but for sealing agent injection, due to the working conditions (such as high temperature and high pressure, whether or not poisonous, and the leakage of chemical reaction), and choose a different note agent is difficult. It can improve working time and efficiency [9].

In strong tape pressure sealing technology, the limitation of application scope needs to be improved, how can let the non-magnetic material also can produce the characteristics of magnetic materials, is more difficult to breakthrough in the technology [10].

6. CONCLUSION

- (1) "pressurized seal technology" is a new subject that is about to be developed, and it will take a long time to study and explore, thus achieving more efficient sealing requirements.
- (2) for the condition of "technology" of online leak sealing, leakage and exploration is still a very difficult task, for the accurate positioning of leakage defect performance, and for each survey personnel safety, all need further exploration and protection.
- (3) there are a lot of methods for "pressure-sealing technology". This paper only introduces three kinds, and there are some limitations to the principle and application introduction.
- (4) each new type of "pressure-sealing technology" innovation will bring about certain technological progress. At present, the content of innovation in our country is too one-sided to meet the demand of large equipment

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