Bellows Packless Valve, type NBV

SAGINOMIYA SEISAKUSHO, INC.

1. Bellows packless valve

Bellows packless valve (fig. 1) is the valve for manual opening-closing operation for fluids, such as refrigerants, air, or oil. There is no packing which leads external leakage because it opens and closes by valve disc through metal bellows.

Besides, fuluorocarbon polymer is adopted as the material of valve to achieve low valve leakage as well as chemical resistance. NBV is highly reliable and durable manual opening-closing valve that eliminates internal and external leakages for long term use.

Fig.1 Bellows packless valve, type NBV

2. Structure and design

・Bellows type

Saginomiya is founded in 1940 as Bellows Institute. As the result of investigation for over many years, Saginomiya accomplished the development of world superior performance bellows (fig. 2) in 1944. As one of the products using the bellows, packless valve was released in 1949.

Fig.2 Bellows

To prevent external leakage of fluid, valve body is operated through flexible bellows that is soldered to ensure airtightness. Packless valves include several types like diaphragm other than bellows, but bellows have higher extension amount than diaphragm, which increases the stroke of valve and reduces pressure drop. Bellows also benefits in high withstand pressure because of its small pressure receiving area. In addition, durability increases due to distributing stress with by many folds. It is difficult to produce bellows that holds both high withstand pressure and durability. It is important that how element tube forms uniformly and how folds form without stress connection. It is needed the both technique for expanding and technique for hydroforming at rising.

・Low valve leakage

The valve body is made with fluorocarbon polymer for high chemical resistance and thus applicable to various fluid types. Because of the flexibility of fluorocarbon polymer, it ensures high sealing capability. NBV is designed not to remain indentation on the valve seat. With this structure, the sealing performance is maintained even if connecting position deviates between valve body and valve seat all the time.

・Frosting countermeasures

Condensation may occur on outer surface when fluid temperature is lower than atmosphere temperature. Moreover, if fluid temperature is below 0°C, frosting or ice forming happens. If bellows is moved while ice or frost is attached on the surface of the bellows, it may be destructed and busted. This packless valve prevents frosting (ice forming) onto bellows due to shutting structure from air by using of cap nut or O-ring (fig. 3).

・Space saving

Screws connected to handle converts rotary motion to linear motion and expand or contract the bellows. This structure accomplishes to avoid the handle itself to move up or down even it is rotated, and saves installation space.

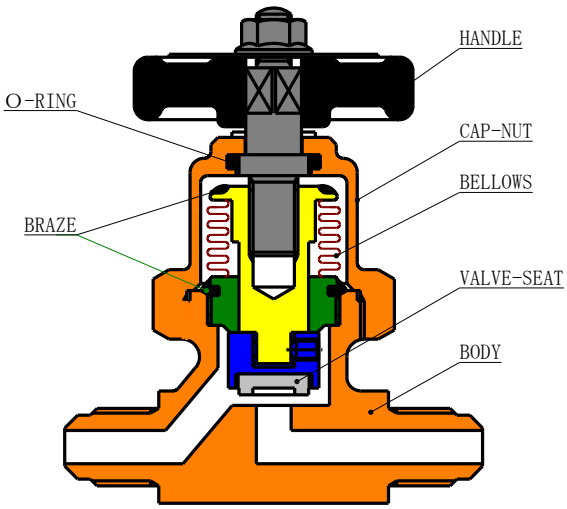

Fig. 3 Sectional drawing of bellows packless valve

3. Sales performance

Saginomiya has been producing it total over one million pieces in 65 years from 1949.

4. Summary

Bellows packless valve contributes to global environmental protection for over many years by absolute prevention of gas leakage, such as CFC, or gas including high ODP (ozone depletion potential) or high GWP (global warming potential) in refrigeration systems, substation and so on.