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Triple offset butterfly valves (TOBV); Are they future valves?

Saeid Rahimi Mofrad

Senior Specialty Process Engineer at Fluor

In my current project, all ball valves selected in FFED stage are being replaced with triple offset butterfly valves. We do this specifically for valves above 10". When I was surfing the web I found out that TOBVs are (as per valve vendor):

- Available above 2"
- Tight shut off (bidirectional zero leakage)

- Low cost
- Less weight
- Less space
- Metal seated
- Fire safe.
- etc

I need to know:

What is the main application of TOBVs? Are they suitable for any service or process conditions?

Is there any limitation in using them? Any disadvantage?

Can we consider them as ideal replacement for ball valves in all applications?

Regards

Saeid

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4 comments



Lionel

Lionel Sheikboudhou

Process Engineer

My little experience with those valves was in the LNG industry. If I remember well, the client had replaced its old Mecaneral isolation valves by TOBVs in both LNG and NG (vaporized LNG) services.

From a discussion with the vendor, I learned that, in spite of nominally being bi-directional TSO valves - the TOBVs are not. They seal better from one side than from the other.

By the way, the arrow on the body of the valve was a "pressure arrow" pointing from higher to lower pressure" and not a "flow direction arrow".

Regards.

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Rafael

Rafael Enrique Ramos

Senior Process Engineer PERENCO UK

Interesting I have never seen before this valves I understood some advantages given by the triple offset arrangement, but in general I it is not obvious for me the following:

What about the drop pressure, are higher than for the ball valves?

Not possible to be used in pipelines as impossible to be pigables

Is it possible use it as ESDV or as part as of HIPPS?, What about the open/close times?

If someone could give additional elements...

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Saeid Rahimi Mofrad

Senior Specialty Process Engineer at Fluor

Rafael,

You rightly pointed out some of the major disadvantages of TOBVs. They cannot be used in pipeline since they are not piggable. They should be carefully used in low pressure systems and places where pressure drop is important (limited) such as relief valve or pump inlet line. Crane TP-410 reports flow resistance coefficient (K value) of 218 ft (for TOBV size from 50 to 200 mm) which is considerably higher than K for full bore ball valve (K for FB ball valve = 3 FT)

Their use should be minimized in combustible, flammable or LPG services. This type of valve is usually supplied with no integral flanges for bolting to the pipe or vessel flanges. They are installed between two pipe flanges using long bolts, so they are called long bolt valves, sandwich, or wafer valves. During fire, the long bolts expand rapidly and lengthen, allowing both gaskets to leak. The leaking material then adds fuel to the fire and if under pressure it causes a large spraying fire that results in much more damage.

For your information, we have already used them as SDV.

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Saeid Rahimi Mofrad

Senior Specialty Process Engineer at Fluor

According to latest findings, flanged (not wafer) type TOBVs can be used in sour and non-sour services except for:

- 1) Places where Full Bore valve is required – e.g. relief valve inlet valves and piggable pipeline valves
- 2) Free draining lines where liquid condensation and accumulation causes process /corrosion problems (flare lines and heavy saturated gases)
- 3) Low pressure systems where pressure drop is limited such atmospheric and vacuum column overhead, atmospheric tank vapor recovery system

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