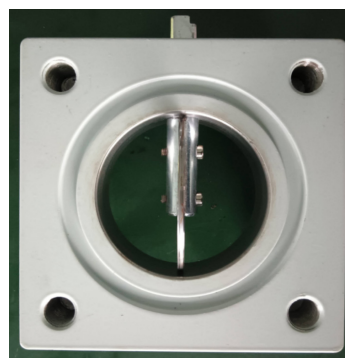


General Introduction

Butterfly valves are widely used valves in oil immersed transformers and gas insulated transformers. Due to their simple structure, easy installation, easy operation, small space occupation, and great cost advantages, they are usually the first - choice valves for the radiator pipes of oil immersed transformers. Common butterfly valves for transformer radiator pipes are divided into two types. One is a metal to metal seated butterfly valve with a symmetrical mid- line structure and all-metal sealing. The other is a single-eccentric structure butterfly valve with a rubber sealing ring installed on the butterfly plate. The two types of butterfly valves have their own characteristics.



For the metal to metal seated butterfly valve, due to its symmetrical mid - line structure and the metal disc of the butterfly plate, the resistance coefficient is small, and the transformer oil can pass through smoothly. Since its passage is all - metal sealed, there is no need to worry about the aging problem of the rubber sealing ring, and its service life can be as long as several decades. However, because its sealing method is metal - to - metal sealing and it adopts a mid - line structure, it is difficult for this butterfly valve to achieve zero leakage. There are relatively lenient maximum allowable leakage standards in the BS/EN50216 - 8 standard for reference.

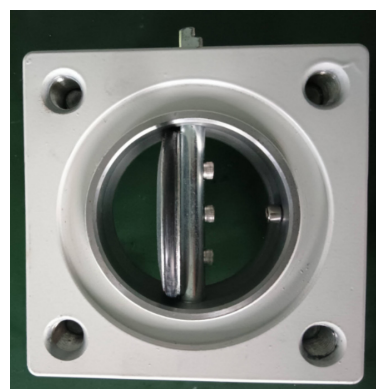
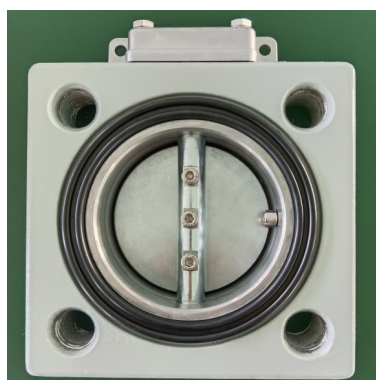
6.2 Tightness of the butterfly blade

Leakage is admitted at the closed butterfly; the following Table 2 shows the admitted leakage according to the nominal diameter. The values of Table 2 apply with oil at 20 °C, 100 kPa and viscosity of 30,5 cSt.

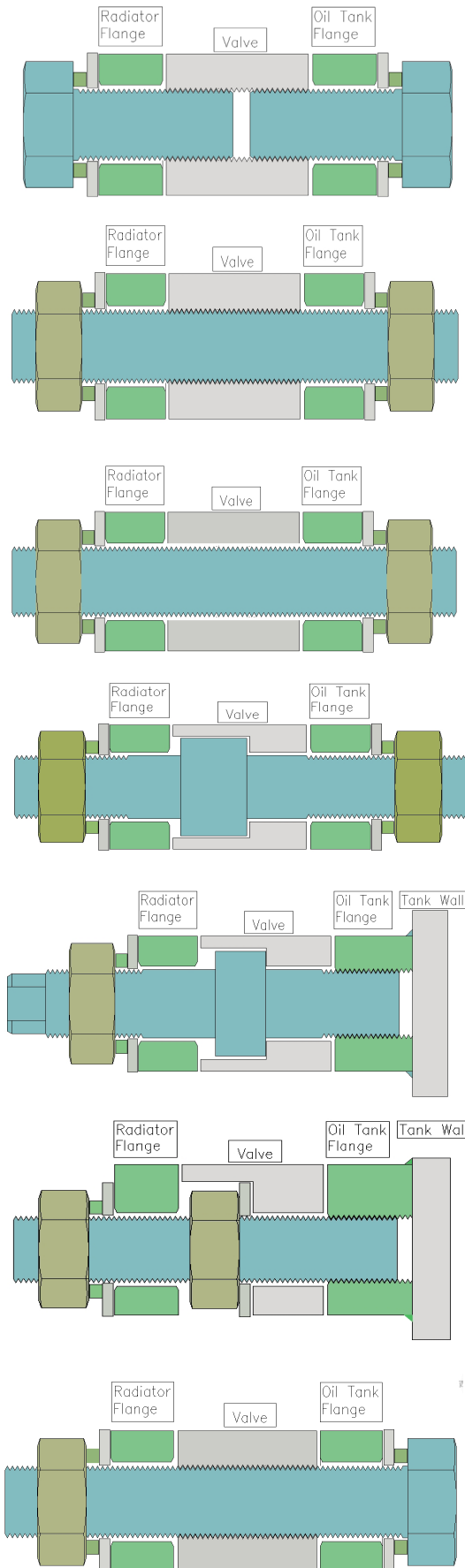
Table 2 – Maximum admissible leakage value

Nominal diameter of valve in mm	≤ 100	>100 - ≤175	>175
Admitted leakage in dm ³ /h measured in 1 hour	≤ 0,5	≤ 1,0	≤ 2,0

The single - eccentric soft - seal butterfly valve, also known as the vacuum butterfly valve, can achieve complete zero leakage and even vacuum sealing because there is an oil - resistant rubber sealing ring on the butterfly plate. Its weakness is the problem of sealing failure caused by the aging of the rubber sealing ring on the butterfly plate after many years. Our company has been continuously conducting research and development and experiments, optimizing the structure and screening out high - performance seals through strict tests such as hot transformer oil tests and UV aging tests on materials.



Different Bolting Assembly Method



Type: BA1. Hex. headed Screw install from both sides this type of installation suitable for our full thread type bolting holes. When installation or disassembly the radiators, there will be no influence on another side of screw. it will be easy for both installation and disassembly. our valve body thickness is about 35 ~ 40mm for 3"(80), it is a installation method by ZeeYi Valves.

Type:BA2. Full threaded bolts vs full thread bolting holes,when fasten the nut from one side another side nut shall be fixed to avoid rotation of bolt. This type of installation suitable for thin valve body.

Type:BA3.Full threaded bolts vs through bolting hole,Same as BA2, when fasten the nut from one side , another side nut shall be fixed to avoid rotation of bolts.

Type:BA4. This bolting hole is though type bolting hole with oval counter sunk hole. the bolt is special made,with oval shaped bulge in middle of the bolt. the advantage of this bolt is, when fasten the nut from one side, the bolt will not rotate, and the nut on another side will not loosen.

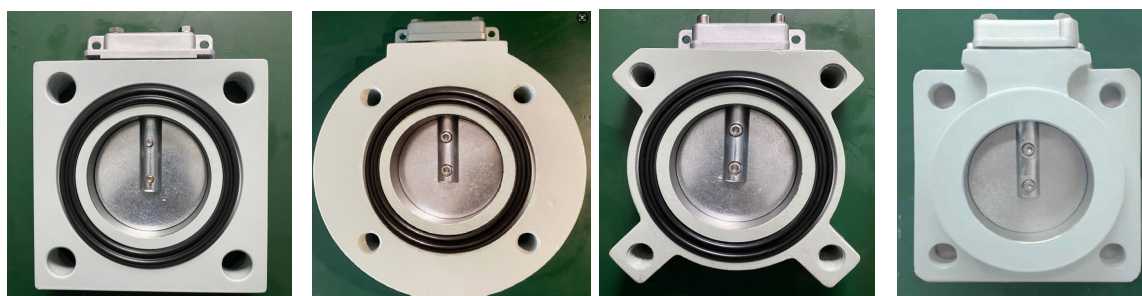
Type:BA5. This bolting hole is though type bolting hole with round concentric sunk hole, the sunk hole is bigger than though bolting hole. the bolt with round shaped bulge in middle, and with a tail on the end of bolt.the tail with flat face on both side for wrench.This type of bolts and bolting hole mainly install on the type of flange with threaded bolting holes, and directly weld on transformer tank wall.

Type:BA6. This installation only available for our die casting version radiator butterfly valve. Bolting hole is through type, the bolting area valve body is thin,so there are room for the nuts.this type of installation mainly suitable for the tank flange direct weld on transformer tank wall, rather than through a tube.

Type: BA7. Hex. headed Screw install from tank side flange, this type of installation suitable for our full thread type bolting holes.When installation or disassembly the radiators,it is very convenient.However when the radiators been installed, and fasten the nuts, the bolts may rotate, in this case, a wrench to fix the hex head of bolt is necessary, This type is easier for radiator installation when compare with BA-1.

Metal Seated Butterfly Valve

Shapes of butterfly valves(Square, Round, X shape, Retangle)



Body Material: Carbon steel, Stainless Steel, Ductile Iron

Design and testing standard: BS/EN50216-8

Suitable temperature: -30~80 °C /120 °C , -46~80 °C /120 °C , -60~ 120 °C

Locking: Option

Standard coating grade:C4, (C5,C5M, CX available on our Marine enviroment series)

Customize :Available

Options of shaft sealing (assembly inside of the valve, resistant to transformer hot oil shall be take into consideration)

NBR HNBR Suitable temperature -30/-45~105 °C economical

Braided PTFE Packing -50~160 °C Good sealing property, be resistant to aging, economical

Viton -20~180 °C

Fluorosilicon Rubber -60~250 °C

Options of Flange gaskets (assembly between transformer tank flange and radiator flange, resistant to transformer hot oil , and UV light resistance shall be take into consideration)

NBR/HNBR Suitable temperature -30/-45~105 °C economical, disadvantage: Poor resistance to UV aging. Not recomand to be Flange gaskets, except indoor installation where sunshine can not reach.

ACM Rubber: -30~105 °C resistant to UV aging, recomand

Viton -20~180 °C

Fluorosilicon Rubber -60~250 °C

Dimensions Table. for dimensions out of this table please contact ZeeYi sales

Dimensions	OD	PCD	Thickness	Gasket groove	Bolting type	Bolting Quantity	Bolting Hole		
							Metric	None-tapped hole	UNC
DN25 1" Round	Φ115	85	35	with/without	TH/FT	4	M12	Φ14	1/2"UNC
DN40 1.5" Square	90*90	85	35	with/without	TH/FT	4	M12	Φ14	1/2"UNC
DN50 2" Square	125*125	125	35	with/without	TH/FT	4	M12	Φ14	1/2"UNC
DN50 2" Round	Φ165	125	35	with/without	TH/FT	4	M16	Φ18	5/8"-11UNC
DN80 3" Square	150*150	160	40/35	with/without	TH/FT/AR/XP	4	M16	Φ18	5/8"-11UNC
DN80 3" Square	160*160	160	40/35	with/without	TH/FT/AR/XP	4	M16	Φ18	5/8"-11UNC
DN80 3" Square	150*150	150	40/35	with/without	TH/FT/AR/XP	4	M16	Φ18	5/8"-11UNC
DN80 3" Round	Φ200	160	40/35	with/without	TH/FT/AR/XP	4 or 8	M16	Φ18	5/8"-11UNC
DN80 3" X shape	-	160	40/35	with/without	FT	4	M16	Φ18	5/8"-11UNC
DN100 4" Square	170*170	180	40	with/without	FT/AR/XP	4	M16	Φ18	5/8"-11UNC
DN100 4" Round	Φ220	180	40	with/without	FT/AR	8	M16	Φ18	5/8"-11UNC
DN125 5" Round	Φ250	210	45	with/without	FT/AR	8	M16	Φ18	5/8"-11UNC
DN125 5" Round	Φ235	200	45	with/without	FT/AR	8	M20	Φ23	3/4"-10UNC
DN150 6" Round	Φ285	240	45	with/without	FT/AR	8	M20	Φ23	3/4"-10UNC
DN175 7" Round	Φ315	270	45	with/without	FT/AR	8	M20	Φ23	3/4"-10UNC
DN200 8" Round	Φ340	295	45	with/without	FT/AR	8	M20	Φ23	3/4"-10UNC
DN250 10" Round	Φ395	350	50	with/without	FT/AR	12	M20	Φ23	3/4"-10UNC
DN300 12" Round	Φ445	400	60	with/without	FT/AR	12/16	M20	Φ23	3/4"-10UNC
DN350 14" Round	Φ500	460	70	with/without	FT	16	M20	Φ23	3/4"-10UNC

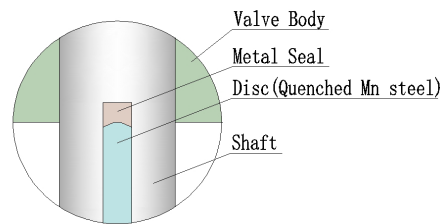
Metal to Metal Seated Radiator Butterfly Valve

Design Feature and advantages

Zeeyi valves staff pay highly attention on the aging and anti-corrosive issues of transformer valves, when design the radiator butterfly valves, we had done a lot of tests on different sealing materials, such as UV aging tests, Ozone aging tests, most important hot transformer oil tests. when we design the metal to metal seated radiator butterfly valves, we had take long service life as the most important target. Following are our basic design features which make sure long term reliable service.

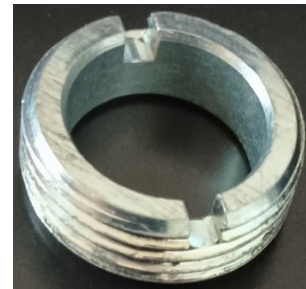
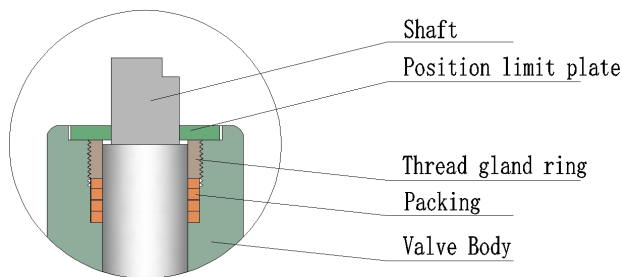
1. Shaft & disc Sealing

Shaft & disc sealing area is the joint of disc and forked shaft, it is a place where leakage easy happend. most of radiator butterfly valve manufacturers use rubber as sealing material here. Our sealing material here is soft metal extrusion seal, which aging problem will never happen here. Our disc material is chilled spring steel.



2. Stem Packing Design

Our Stem sealing design is rely on valve stuffing box, this sealing design is popular in high pressure general industrial valves, it turn out to be a very reliable design. On one hand, by fastner the screwed gland ring, the sealing materials been compressed tightly and form as vacuum tight sealing. on the other hand, the sealing materials can be replace in case of aging, after many years of using. and besides, the sealing material can be braided PTFE packing, which is a durable material with good sealing property. compare with the design shaft with O-ring grooves, our shaft seals can be with higher compress rate and adjustable, replaceable features.



Thread Gland Ring

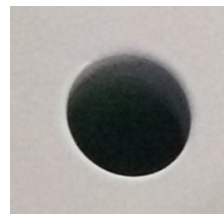
3. Multiple bolting hole design of choose

In order to suit different design of transformer tank and radiator flanges, we can supply butterfly valves with different type of bolting holes.

A. Full threaded Bolting hole. (FT type)



B. Through type Bolting hole (TH type)



C. Elliptical sunken anti-rotation bolting hole (AR type)



D. Round sunken concentric bolting hole (XP type)

