
Fugitive Emission Test

TRITEC



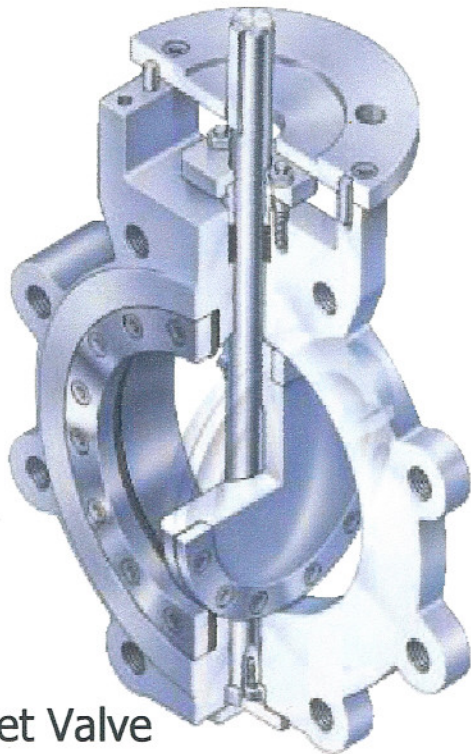
November, 2007

Fugitive Emission Test



Harmful gas emission comes to critical concern in petroleum and petrochemical industries these days. Since 80% of plant gas leakage is caused by valve, low emission valve is focused.

Under such market demand, we executed emission test based on EPA Method 21 with our process valve "TRITEC" to prove its emission efficiency.



Triple offset Valve
"TRITEC"

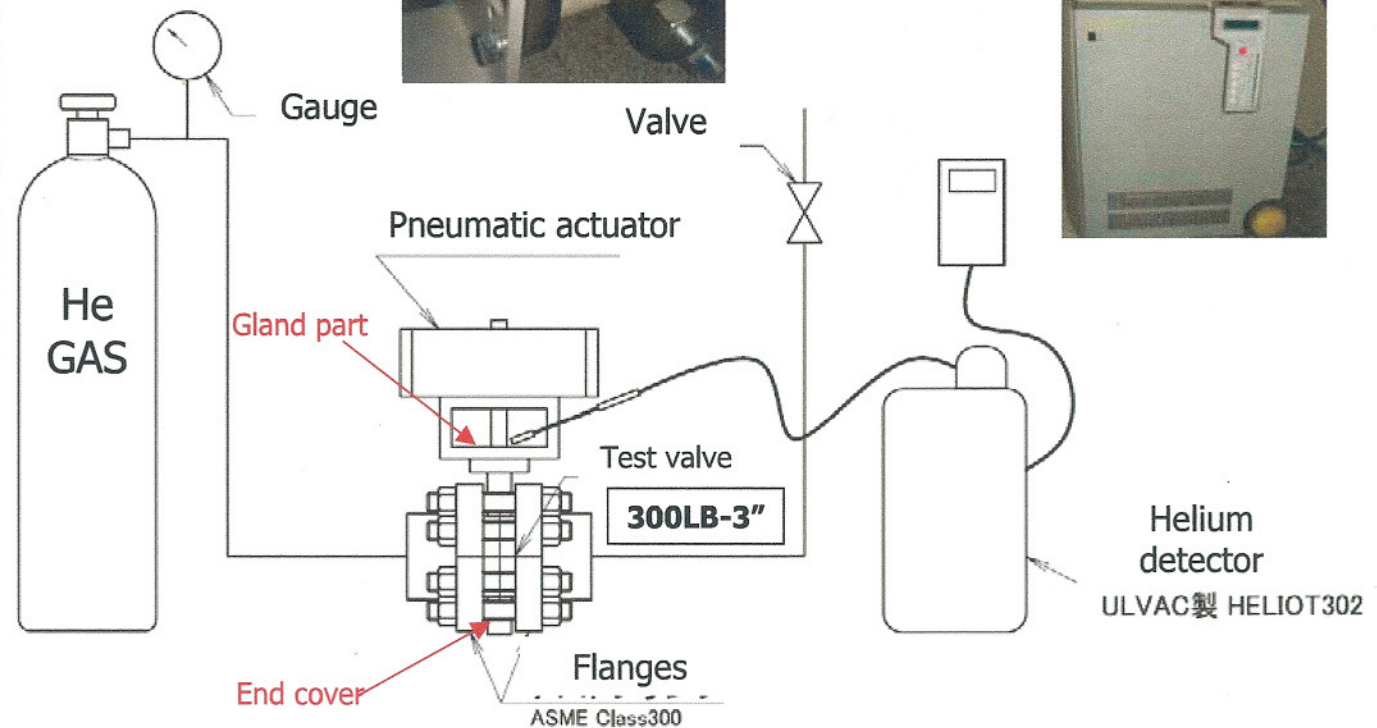
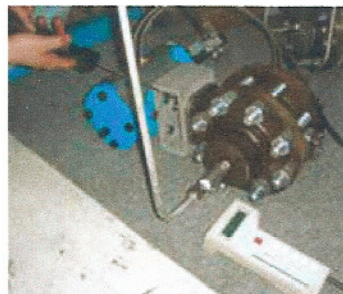


Fugitive Emission Test



Opening/closing ("full open→full close→full open" is taken as 1 cycle) is repeated. Helium leak detector (ULVAC HELIOT302) is used to measure the leakage from gland and bottom area as shown below. For procedure, keep the test valve full open, then apply helium gas pressure into the inside of test flange.

Source: EPA Method 21)



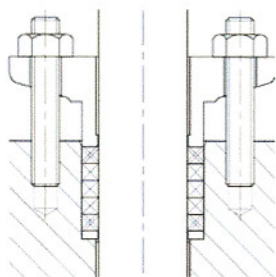
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Test Result

Test Valve 1 Standard Gland Packing

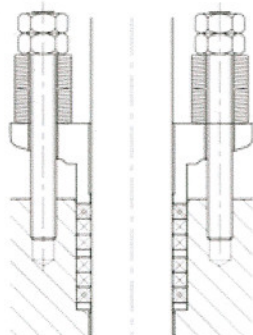
Unit : ppm



Pressure	Cycle	0	50	100	200	300	400	500	600	700	800	900	1000	2000	3000
2.55MPa	Ambiance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gland part	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	Flange gasket	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	End cover part	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.1MPa	Ambiance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gland part	0	0	0	0	0	0	0	0	0	0	0	0	0	60
	Flange gasket	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	End cover part	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Test Valve 2 : Double Gland Packing + Live Loading

Unit : ppm



Pressure	Cycle	0	50	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000
2.55MPa	Ambiance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gland part	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Flange gasket	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	End cover part	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.1MPa	Ambiance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gland part	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.3
	Flange gasket	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	End cover part	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

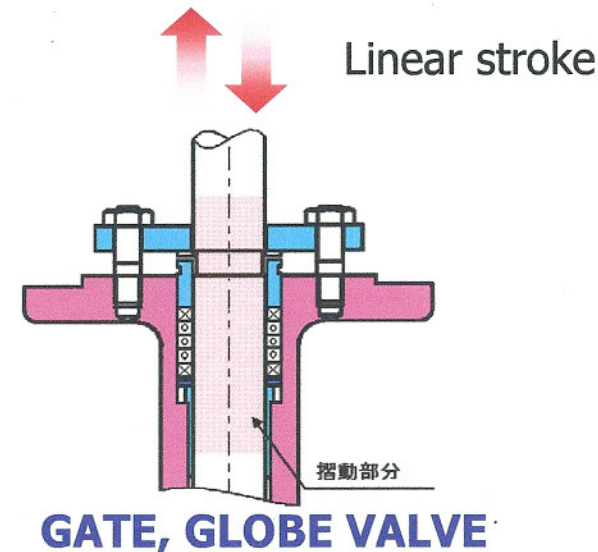
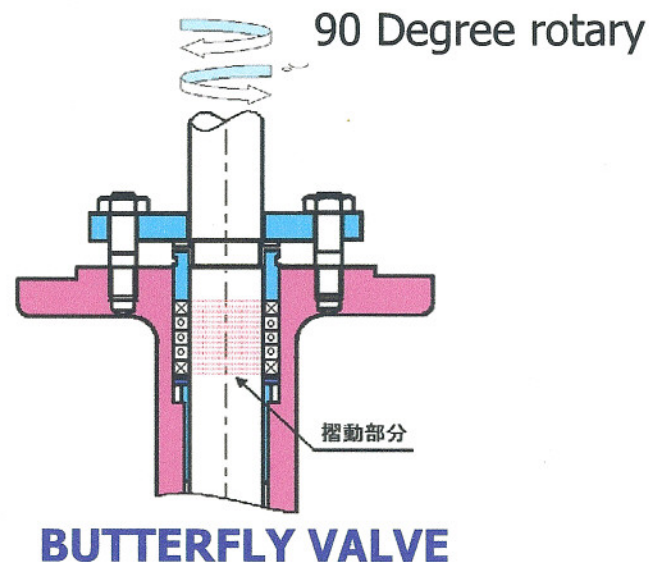
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Test result was excellent:

1. With standard type, no leak up to 2000 times and 60ppm leak up to 3000 times.
2. With double gland type, no leak up to 4000 times and 7.3 ppm leak up to 5000 times.

Number of opening/closing times and leakage level is not mentioned in EPA Method.
100 times for On-Off valve and 500 times for control valve in Shell standard.



Rotary typed valve "Tritec" have been known for less load to gland packing and low emission comparing with gate and globe valve. It was proved from this test result.

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User case and requirement level:

- FORMOSA CHEMICAL PTA PLANT Acid Gas / Less than 100 ppm (number of opening/closing time is not specified.)
- NAN YA PLASTICS: Trueness Gas / Less than 50 ppm (number of opening/closing time is not specified.)
- DAIKIN KASHIMA: Fluorine / Less than 50 ppm (100 times of opening/closing)
- EXXON MOBILE BERGIUM: Sulfur gas / Less than 100 ppm (100 times of opening/closing)
- CONOCO-PHILLIPS: Hydrocarbon gas / Less than 100 ppm (number of opening/closing time is not specified.)
- CITGO PETROLEUM: Hydrocarbon gas / Less than 100 ppm (number of opening/closing time is not specified.)
- LG PETROCHEMICAL: Hydrocarbon gas / Less than 100 ppm (number of opening/closing time is not specified.)

From the test results and user reference, Tomoe recommend:

1. Standard gland packing type for leakage limit of 100 ppm and less.
2. Double gland+live load type for leakage limit of 50 ppm and less or control valve.

Tomoe also can satisfy special demand such as gland O-ring type.