

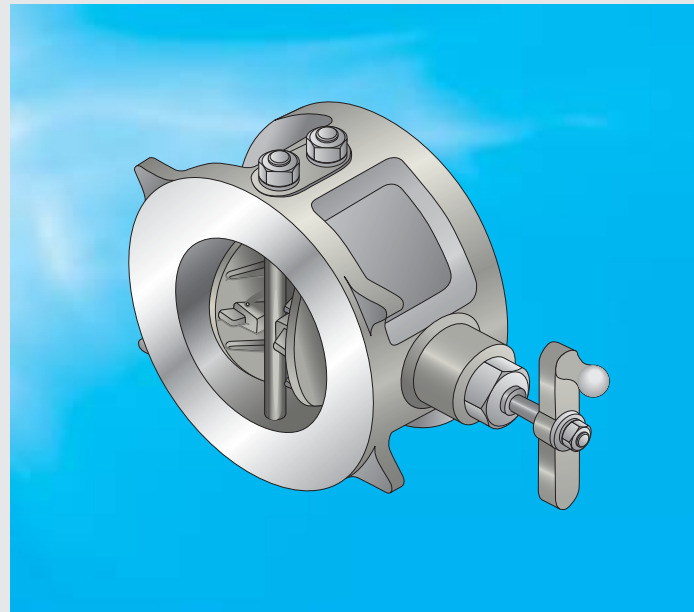
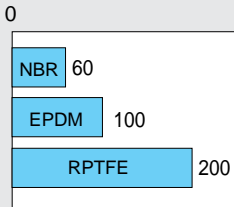
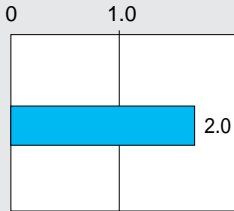
MKT Series

Valve nominal size

50 to 300mm

Max. working pressure MPa

Working temperature range °C



Butterfly Valves

TRITEC

TT2

334A

302A/303Q

304A/304Q

302Y/304Y

304M(HLV)

507V/508V

846T/847T/847Q

841T/842T

773Z(NAV-Z)

700G/704G/705G

731P/732P
732X/731X

700E/700K

704G/722F/720F

LRV

227P

MKT

903C/904C

Complete prevention of chattering.

A new generation of check valves that reduce piping space and allow direct attachment of the pump.

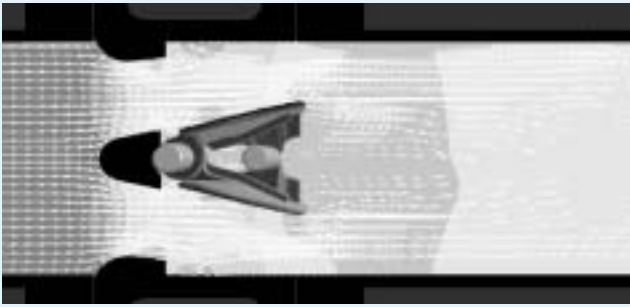
MKT Standard specifications	
Valve Design	Wafer-type double-plate check valve
Valve nominal size	50, 65, 80, 100, 125, 150, 200, 250, 300mm <small>Valve size below 50mm and above 300mm are manufacture to order.</small>
Valve type	Check valve with bypass
Applicable flange standard	JIS 10K, 16K, 20K, ASME B16.5 Class125/150
Face-to-face dimensions	JV8-1 (stainless steel valves, wafer-type check valves), SAS358
Max. working pressure	2.0MPa
Allowed flow velocity	0.5 m/s to 10 m/s
Seat leakage	Tight shut
Test pressure	Pressure resistance of body
	Valve seat leak
Working temperature range (without freezing)	NBR sheet : 0 to 60 degrees C EPDM sheet : 0 to 100 degrees C
Standard materials	Main body
	Plate
	Pin
	Spring
	Seat ¹
Pipe gasket	Required (please purchase a commercially available gasket that satisfies the flange standards)
Coating	Resin baked finish (Munsell 2.5BG 6/12-Green) CF8 valve body is without coating

Main body: stainless steel. Seat: Regarding Teflon®, we will inform you when decided at the time of product launch.

1. A rubber seat has been baked onto the valve seat surface.

* Never use an EPDM rubber seat is ring if the valve being used for oil or for a fluid containing even a slight amount of oil.

MKT Series



Note: The colors indicate the pressure distribution. Red indicates high pressure and blue indicates low pressure. Flow speed is indicated by arrow size.

High pressure ← → Low pressure

Based on fluid theory and vibration analysis, we have achieved a new mechanism that does not allow chattering even at high flow speeds and during fluid fluctuations.

MKT Theory of chattering prevention

Based on laboratory work centering on the chattering phenomenon in conventional check valves, we revealed the nature of the various mechanical problems that cause chattering. By means of a theoretical quantification of the factors that affect chattering based on fluid analysis and vibration analysis, we have succeeded in developing a check valve that provides stable operation without chattering even at high flow speeds and during fluid fluctuations.

When conventional check valves are used at high flow speeds or during speed fluctuations, the fluid force causes rotational movement of the disc and changes its angle. The change of angle in turn changes the action of the fluid force on the disc. This cyclical change in the fluid force continuously causes the rotational vibration of the disc that is called chattering. Using our self-developed TOMOE OAM33 fluid analysis program (based on the Navier-Stoke equations with the addition of reverse-flow analysis capability), we obtained the fluid force for a variety of shapes, and by combining these with vibration equations for the disc system, we were able to obtain a quantitative understanding of the chattering phenomena in check valves.

The angle of rotation of the disc is given by

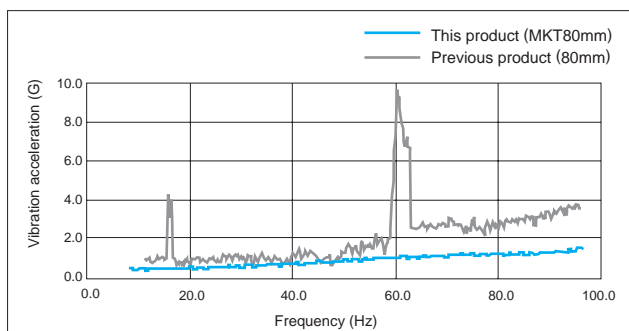
$$I \frac{d^2}{dt^2} + \left\{ C - \left(\rho V^2 \right) \right\} \frac{d}{dt} + K = 0 \dots\dots\dots (1)$$

where I is the moment of inertia of the disc, C is the damping coefficient of the disc support, K is the elastic modulus of the disc spring, V is the flow velocity, and ρ is the coefficient of variation of the fluid which varies depending on the angle of rotation of the disc and the fluid velocity. When $\rho > C$ in the second term on the left side of Equation (1), self-excited vibration occurs.

By quantifying the effects of various factors (flow path shape, stopper position, etc.) on the coefficient of variation of the fluid based on fluid analysis and laboratory work, we were able to create an optimum design. Based on this optimum design, we have developed the MKT Series of Anti-Vibration Check Valves. In addition to preventing chattering at high flow speeds and during speed fluctuations, these valves dramatically reduce cavitation.

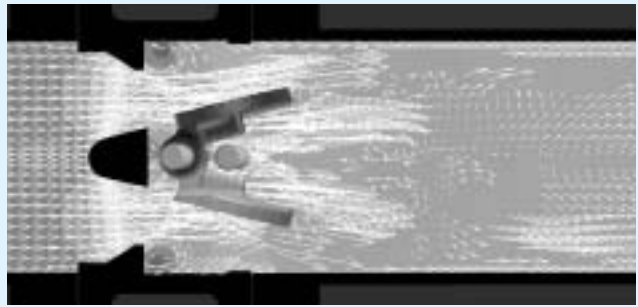
* Patent are pending for this product in 126 countries throughout the world.

Vibration frequency characteristics



As indicated above, there are no vibration peaks at any of the frequencies and damage due to vibration is prevented.

Previous product



Helps reduce installation space, resulting less cost and lesser time.

MKT Features

Over 80% of piping space reduced around pump

Designed for anti-vibration, that previously found on the upstream side of check valves is no longer necessary and the piping space around the pump has been greatly reduced.

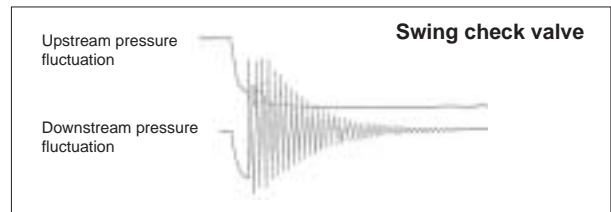
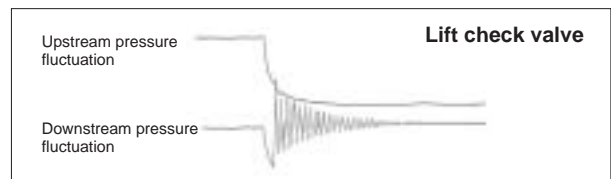
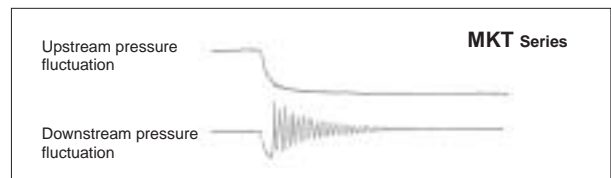
Direct pump installation possible

Designed for anti-vibration, the pump can now be installed directly. In fact, it achieved a smaller bore diameter that is 2 to 3 sizes smaller than previous one.

Prevents water hammer

The combination of a light, compact plate with a small moment of inertia and an optimized spring quickly stop the flow when the pump is turned off, preventing water hammer.

The figure below contains measurement data of pressure fluctuations when the pump is suddenly stopped. Compared to other models, the MKT series has a smaller pressure fluctuation amplitude on the downstream side which makes it effective in preventing water hammer.



Suitable for all needs

Being able to handle water, steam, gases, and other fluids, all needs can be met. Also, use of a fluorocarbon resin sheet and stainless steel body allows chemicals, corrosive fluids and high temperature liquids (200 degrees C max.) to be used which means a wide range of application environments can be covered.

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MKT Expanded view of components

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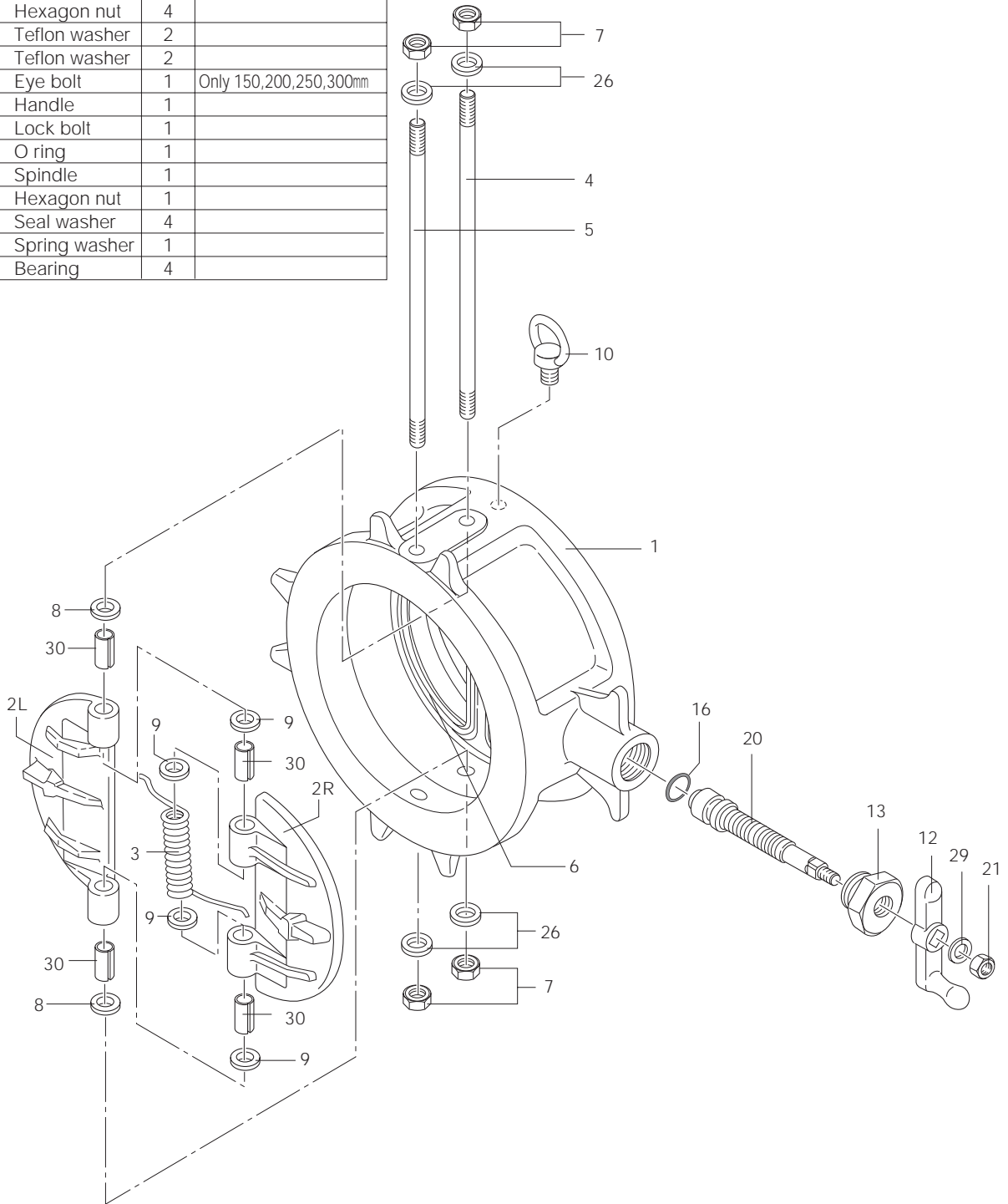
227P

MKT

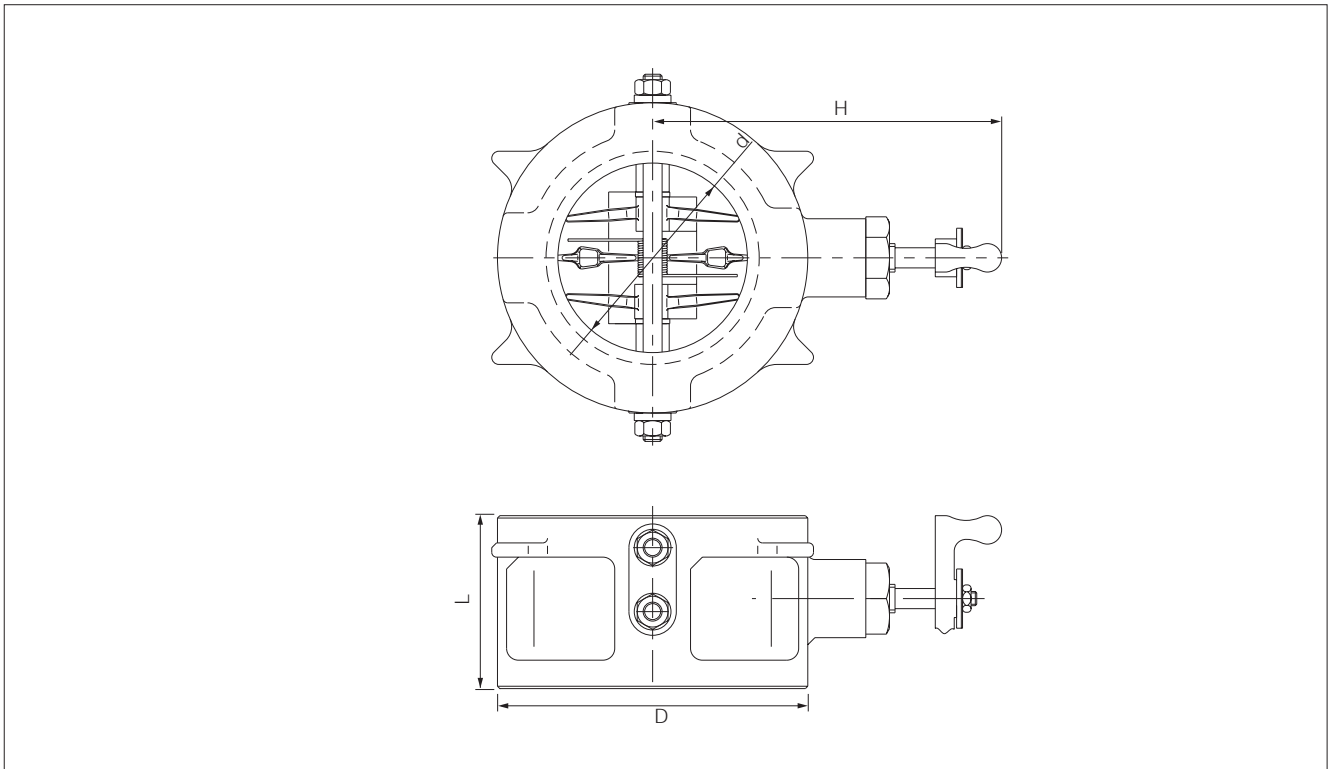
903C/904C

MKT Disc Expanded View/ Parts List

No.	Description	Q'ty	Remarks
1	Body	1	
2L	Left plate	1	
2R	Right plate	1	
3	Spring	1	200 mm, 250 mm, 300 mm: 2 pieces
4	Hinge pin	1	
5	Stop pin	1	Same dimensions as No. 4
6	Seat	1	Adhering to body
7	Hexagon nut	4	
8	Teflon washer	2	
9	Teflon washer	2	
10	Eye bolt	1	Only 150,200,250,300mm
12	Handle	1	
13	Lock bolt	1	
16	O ring	1	
20	Spindle	1	
21	Hexagon nut	1	
26	Seal washer	4	
29	Spring washer	1	
30	Bearing	4	



MKT Principal dimensions



MKT Dimension

Nominal size		Dimension(mm)				Approx.weight (kg)	
mm	inch	d	D	L	H	SCS	FCD
50	2	58	101	60	149	2.7	2.5
65	2 1/2	72	121	67	156	3.7	3.5
80	3	84	131	73	163	4.7	4.4
100	4	105	156	73	200	6.2	5.9
125	5	131	187	86	214	9.2	8.7
150	6	157	217	98	227	13.1	12.4
200	8	205	267	127	253	22.6	21.5
250	10	254	330	146	298	37.5	35.6
300	12	305	375	181	324	56.2	53.4

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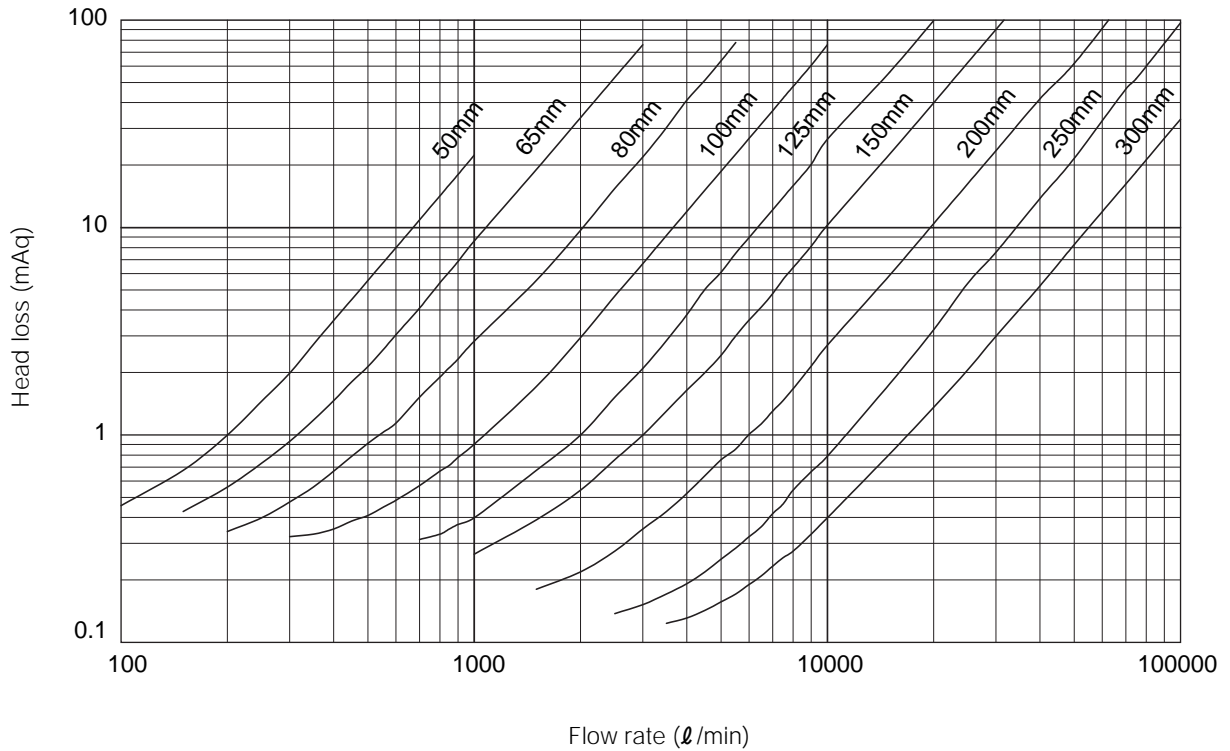
LRV

227P

MKT

903C/904C

MKT Head loss vs. Flow



Butterfly Valves





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- 903C/904C

MKT SPRING SELECTION CRITERIA

Spring type	Applicable fluid	Line pressure	Ave. flow rate in pipe	Flow direction
Low torque spring	Gas (air)	0.01 M Pa or more	—————	Up flow 
		Within 0.05 M Pa	Between 0.5 m/s and 2 m/s	
Standard torque spring	Liquid	Between 0.05 M Pa and 2 M Pa	Between 0.5 m/s and 2 m/s	Up flow 
				Horizontal piping 
High torque spring (Special specification)		Between 0.05 M Pa and 2 M Pa	Between 1m/s and 5m/s	Down flow (*1) 

*1: Depending on conditions, valve seat leakage may occur during check valve when there is down flow. Please inquire with one of our sales personnel.

MKT Applicable pipe list in case of A

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
mm	inch					
50	2					
65	2 1/2					
80	3					
100	4					
125	5					
150	6					
200	8					
250	10					
300	12					

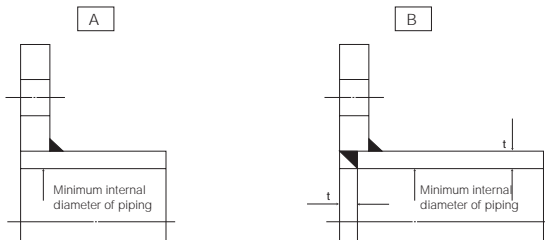
MKT Applicable pipe list in case of B

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
mm	inch					
50	2					
65	2 1/2					
80	3					
100	4					
125	5					
150	6					
200	8					
250	10					
300	12					

Minimum internal diameters of piping (mm)

Nominal size		Minimum internal diameters of piping (mm)
mm	inch	
50	2	35.0
65	2 1/2	45.5
80	3	56.0
100	4	80.6
125	5	98.2
150	6	122.1
200	8	156.8
250	10	204.7
300	12	222.9

Remark: : Installation possible, -: No standard



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LRV
227P
MKT
903C/904C

MKT CRACKING PRESSURE (OPENING PRESSURE)

Butterfly Valves

Minimum required pressure difference for flowing in forward direction

	Nominal size		CV value	Standard torque spring		Low torque spring	
	mm	inch		mmAq	MPa	mmAq	MPa
TRITEC							
TT2							
334A	50	2	46.0	116	0.00114	12	0.00012
302A/303Q	65	2 1/2	74.5	113	0.00111	13	0.00013
304A/304Q	80	3	138	160	0.00157	22	0.00022
302Y/304Y	100	4	251	82	0.00080	16	0.00016
304M(HLV)	125	5	435	49	0.00048	12	0.00012
507V/508V	150	6	685	58	0.00057	15	0.00015
846T/847T/847Q	200	8	1340	79	0.00077	16	0.00016
841T/842T	250	10	2330	59	0.00058	12	0.00012
773Z(NAV-Z)	300	12	3760	50	0.00049	10	0.00010

MKT Piping bolt and nut sizes

	Nominal size		JIS10K	JIS16K	JIS20K	ASME B16.5 Class150
	mm	inch				
731P/732P 732X/731X	50	2	4-M16×140×35	8-M16×140×35	8-M16×140×35	4-U5/8-11×145×40
700E/700K	65	2 1/2	4-M16×150×40	8-M16×150×40	8-M16×150×40	4-U5/8-11×160×40
704G/722F/720F	80	3	8-M16×160×40	8-M20×175×50	8-M20×175×50	4-U5/8-11×170×40
LRV	100	4	8-M16×160×40	8-M20×175×50	8-M20×175×50	8-U5/8-11×170×40
227P	125	5	8-M20×180×50	8-M22×200×50	8-M22×200×50	8-U3/4-10×190×50
MKT	150	6	8-M20×200×50	12-M22×215×50	12-M22×215×50	8-U3/4-10×205×50
903C/904C	200	8	12-M20×230×50	12-M22×240×50	12-M22×240×50	8-U3/4-10×240×50
	250	10	12-M22×260×50	12-M24×275×60	12-M24×275×60	12-U7/8-9×265×55
	300	12	16-M22×300×50	16-M24×315×60	16-M24×315×60	12-U7/8-9×305×55

The bolt lengths are in accordance with JIS and thickness of steel flanges.

Remark: *Use a hexagon nut with 80% threading.
*Material: *SS400* (Unichrome plating)

Long bolts and nuts

Example

Long bolts: 16 - M22 x 300 x 45

