

# NDV SANITARY VALVES



**NIPPON DAIYA VALVE CO., LTD.**



## SANITARY VALVES

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## Bio-Clean Diaphragm Valves

### Manually Operated Valves



Stainless Steel Handle  
B400N  
DN8-100



Aluminum Handle  
BC400  
DN15-50



Quick Open/Close Handle  
BQL400N  
DN8-80

### Pneumatically Operated ON-OFF Valves



BPO (PC, PN) 1400NB  
DN15-50



Opening Limit Device with Special Limit Switch Box



BPO (PC, PN) 1400N  
DN65-100

### Pneumatically Operated ON-OFF Valves (Stainless Steel Actuator)



BPO (PC, PN) 1400N  
DN8-10



BPO (PC, PN) 1400N  
DN15-50



Product List

○: Standard ☆: Option —: Not Applied

Bio-Clean Diaphragm Valve Series

Simplified Code														
Main Body Material														
Standard Nominal Size Range*														
Connection Standard	ISSC	Ferrule (Clamp Joint)	○	○	—	○	○	○	—	—	○	○	○	○
	JT	Astro (TIG) Welding	☆	☆	—	—	—	☆	—	—	☆	☆	☆	☆
	J10KFF (RF)	Flange	☆	☆	○	○	—	☆	—	—	☆	☆	☆	☆
	ISSU	Union Screw	☆	—	—	—	—	☆	—	—	☆	☆	☆	☆
Main Body Surface Finish Classification	B1	#400 Buffing: Inner/Outer Surfaces	☆	○	—	—	—	☆	—	—	☆	○	○	○
	B2	#400 Buffing: Inner Surface	○	—	—	—	—	○	—	—	○	☆	☆	☆
	B3	#400 Buffing: Outer Surface (No-Burnt Color)	☆	—	☆	Painted Outer Surface (white)	☆	☆	☆	☆	☆	☆	☆	☆
	B4	#400 Buffing: Outer Surface (Burnt Color)	—	—	☆	Painted Outer Surface (white)	☆	—	☆	—	—	—	—	—
	E1	Inner Surface Electropolishing after #400 Buffing on Inner/Outer Surfaces	☆	—	—	Painted Outer Surface (white)	—	☆	☆	—	☆	☆	☆	☆
	E2	Inner Surface Electropolishing after #400 Buffing on Inner Surface	☆	—	—	Painted Outer Surface (white)	—	—	☆	—	—	☆	☆	☆
Diaphragm	TX/CE	New PTFE/EPDM	○											
	TX/CX	New PTFE/EPDM + α	☆											
Operation Type	Manual	Stainless Steel Handle	○											
		Aluminum Handle	○											
		Quick Open/Close Handle	☆											
	Auto	Pneumatically Operated ON-OFF Valve	○											
		Two Stage Open/Close Actuator	☆											
		Electronic Flow Control Valve	☆											
Pneumatically Operated Control Valve	☆													
Electrically Operated Valve	☆													

\* Please contact us for a possibility of producing a product other than the standard. \*\* With a manufacturing record of special clamp type. Please contact us for details. \*\*\* Other than this, specific orders for special valves and related products are welcome.

Please contact our sales dept. or local representative for materials and nominal sizes other than those listed in this table.

# Bio-Clean Diaphragm Valves

## 1-1. Features of Bio-Clean Diaphragm Valves

### 1-2. Standard Specifications

- ① Valve Main Body Specifications
- ② Diaphragm Specifications
- ③ Working Temperature Range and Max. Working Pressure

### 1-3. Manually Operated Valves

- ① Handle Specifications: B400N, BC400 (B400NB), BQL400N
- ② Major Dimensions

### 1-4. Pneumatically Operated ON-OFF Valves (Standard): BPO1400NB(N)

- ① Features of Actuator
- ② Actuator Selection Table
- ③ Major Dimensions

### 1-5. Pneumatically Operated ON-OFF Valves (Stainless Steel Actuator): BPO1400N

- ① Features of Actuator
- ② Actuator Selection Table
- ③ Major Dimensions

## 1-1. Features of Bio-Clean Diaphragm Valves

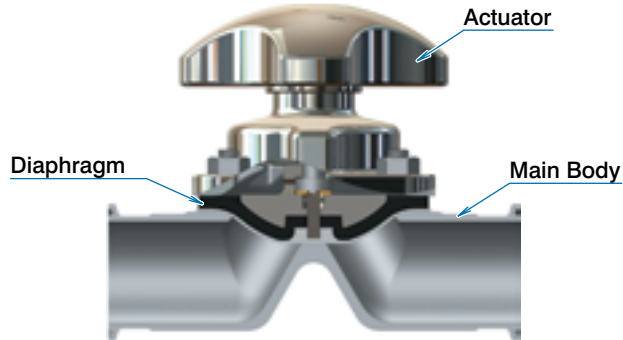
Optimum valves for manufacturing equipment for medicine, bioprocesses, cosmetics, foods and semiconductors

### ① Excellent Air-tightness

- A highly airtight structure perfectly separating the fluid and actuator by a diaphragm. The structure (Packless) that does not require a gland packing with high possibility of leakage as a general valve, is excellent for maintaining air tightness and prevention of contamination by various bacteria.

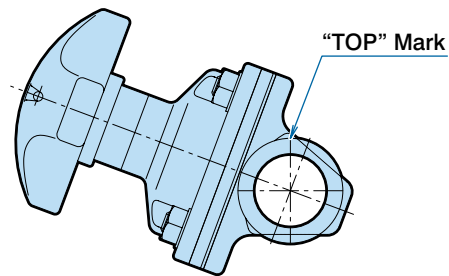
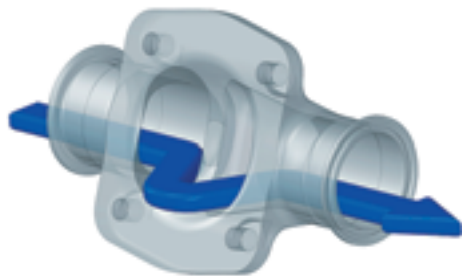
### ② A Structure not Contaminating the Fluid

- The flow path consists only of main body and diaphragm and is an optimum structure preventing the contaminant materials or lubricants from contacting the fluid.
- The valve seat sealing method to press the diaphragm to the weir of main body does not require the rotational parts or sliding parts required for ball valves and butterfly valves, accordingly almost no abrasion particle is expected.



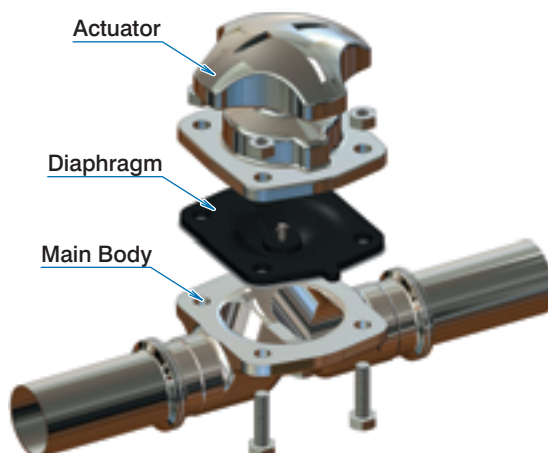
### ③ Excellent Washability

- The streamlined flow path eliminating the dead space (pockets or fluid accumulation) is excellent in washability and is a superior structure for CIP (cleaning in place) or SIP (sterilization in place) for its effectiveness and washing time.
- When attaching a valve on a horizontal pipework, installation with "TOP" mark in upper side will prevent the fluid, rinse solution, etc., from remaining inside.



### ④ Excellent Maintainability

- A simple structure of diaphragm valve consisting of only three units "Actuator", "Diaphragm" and "Main Body"
- Disassembling is just to remove the bolts and nuts fastening the "Actuator", "Diaphragm" and "Main Body" and that provides the excellent maintainability. In addition, the top-entry structure allows the maintenance work without removing the valve body from piping.
- As one of the features of diaphragm valves, the original performance will be restored by replacing the diaphragm by new parts.
- The standard exchangeability of various units will provide the ease of changing actuators.

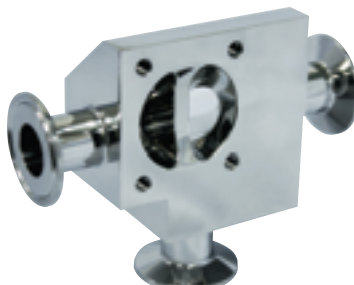


## 5 Manufacturing of Valve Main Unit Tailored to Applications and Specifications

- The streamlined flow path for main body made of stainless steel is buff finished (#400) and that allows further electropolishing facilitating the prevention of fluid accumulation, prevention of adhesion of substances in the fluid, and the improved washability. The outside surface of main body and actuator are ground as designated.
- A pocket free compact special shape for sampling valves, 3-way valves, and tank bottom valves are available while preserving the features of bio-clean diaphragm valves as they are.
- The tailored manufacturing for fitting various joints such as ferrule joint (clamp joint) or welded types used in the fields of medical drugs, bio processes, semiconductors, etc., are available.



Sampling Valve: Type-P



3-Way Valve: Type-K



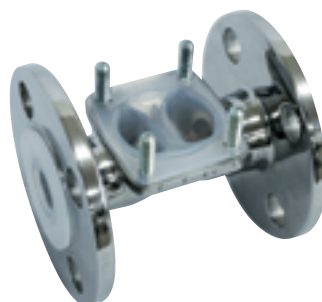
Tank Bottom Valve: Type-T

## 6 Products Excellent for Corrosion-Proof and Chemical Resistance

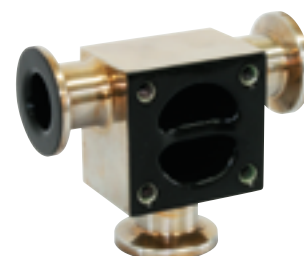
- The valve main bodies with optimum lining for countermeasures for corrosive fluids, crevice corrosion, and metal ion elution for sanitary pipework are available.
- The "New PFA" applied for PFA lined main body conforms to the FDA of the USA and Food Sanitation Act of Japan.  
(Ref. ⑧ Various Certificates in 5. Technical Materials)



SUS316L + ETFE Lined Main Body  
(Clamp Connection)



SCS13 + PFA Lined Main Body  
(Flange Connection)



SUS316L + PFA Coated Main Body  
Sampling Valve: Type-P  
(Special Clamp Connection)

## 7 Sanitary Specification Diaphragms

- High-quality and safe sanitary specification diaphragms developed based on our knowledge cultivated through the years of manufacturing of diaphragms.
- Our New PTFE diaphragm is approved by the FDA in the USA\* as safe for contacting use for food processing, cooking, etc.
- Conforming to USP (US Pharmacopeia) Class VI\*\*
- Conforming to the standards and criteria of Food Sanitation Act of Japan.

\* Food and Drug Administration, HHS 21 CFR Ch.1 (4-1-94 Edition) §177, 1550  
(HHS: Department of Health and Human Services)  
(CFR: Code of Federal Regulations)

\*\* The conformance is recommended in ASME BPE (Bio Processing Equipment), "POLYMER" construction materials used for contacting surfaces with product material (contacting surface with product and fluid).

(Ref. ⑧ Various Certificates in 5. Technical Materials)



## 8 Environment Friendly

- Environment friendly paints are used for coating of actuator for bio-clean diaphragm valves.
- Diaphragm valves have less number of parts compared to other valve types owing to a simple unit structure; accordingly, there is no waste of wearing parts.

## 9 Integrated Manufacturing System in Clean Room

Bio-Clean Diaphragm Valves are manufactured in the clean room with processes "1. Cleaning of fluid contacting parts", "2. Assembly", "3. Inspection" and "4. Packing" and finished to a clean product and delivered to the customers.



## 1-2. Standard Specifications

### 1 Valve Main Body Specifications

#### Stainless Steel Body

##### Manufactured Main Bodies

Name	Main Material	Material Code	Connection Standard and Manufacturing Range			
			Ferrule	Astro (TIG) Welding*	Union Screw*	Flange*
			Nominal Size (DN)	Nominal Size (DN)	Nominal Size (DN)	Nominal Size (DN)
<b>Stainless Steel Forged</b>	SUS316L	14	8–100	8–100	25–100	8–100
<b>Stainless Steel Cast</b>	SCS16	13	8–50	8–50	—	15–100

\* Option

##### Main Body Surface Finish Classification

Please designate from table below:

Classification Code	Process
<b>B1</b>	#400 Buffing: Inner/Outer Surfaces
<b>B2</b>	#400 Buffing: Inner Surface*
<b>B3</b>	#400 Buffing: Outer Surface*
<b>E1</b>	Inner Surface Electropolishing after #400 Buffing on Inner/Outer Surfaces*
<b>E2</b>	Inner Surface Electropolishing after #400 Buffing on Inner Surface*

\* For main bodies of forged stainless steel only



Standard Main Body  
(Ferrule)

#### Lined Main Bodies

##### Manufactured Main Bodies

Name	Base Material	Material Code	Connection Standard and Manufacturing Range	
			Ferrule	Flange
			Nominal Size (DN)	Nominal Size (DN)
<b>PFA Lining ★</b>	SCS13	59 (2S)/59 (S)	—	15–80
	FCD-S	59 (M)*	—	15–100
<b>ETFE Lining ★</b>	SUS316L	60 (S)	25–65	—

\* Standard external painting (white)

• PFA Lining: The lining material "New PFA" conforms to FDA of the USA and Food Sanitation Act of Japan.  
(Ref. ⑧ Various Certificates in 5. Technical Materials)

★: In case of export, export license stipulated in the Foreign Exchange and Foreign Trade Control Law of Japan and/or if necessary, export-related laws and regulations of the United States of America and other countries is required.



PFA Lining  
(Flange)

##### Main Body Surface Finish Classification (Option)

Please designate from table below:

Classification Code	Process
<b>B3</b>	#400 Buffing: Outer Surface (Burnt Color)
<b>B4</b>	#400 Buffing: Outer Surface (No Burnt Color)

(For base material FCS-S: White painting for standard external painting, no grinding)

##### Detailed Dimensions of Main Body

In accordance with P. 42 "Valve Main Body Dimension List"

##### Others

PFA Lining: Please contact us for special clamp connection types.

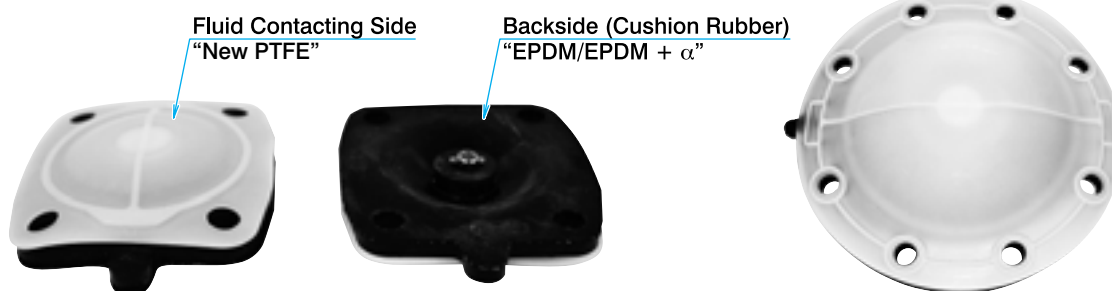
P.28



ETFE Lining  
(Ferrule)

## 2 Diaphragm Specifications

The “New PTFE” diaphragm is adopted for fluid contacting side, and the cushion rubber (EPDM or EPDM +  $\alpha$ ) is applied for the backside for improved sealing performance of valve.



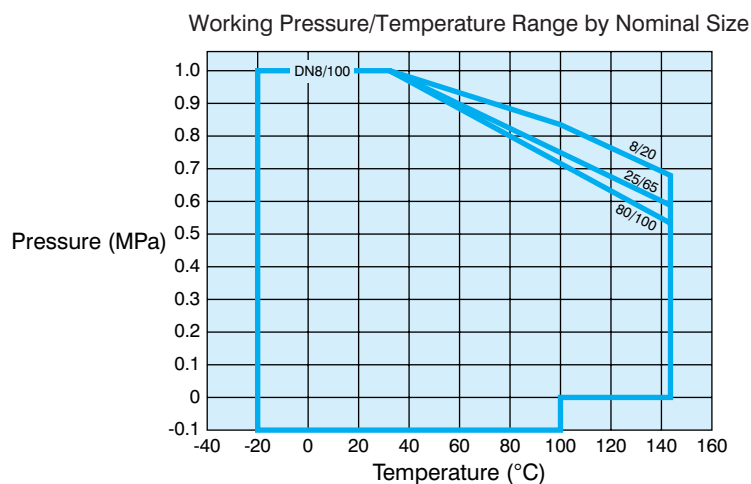
Diaphragm/Cushion Rubber Material	Material Code	Nominal Size (DN)	Working Temperature Range	Max Working Pressure
New PTFE/EPDM	TX/CE	8–100	-20–143°C	1.0MPa
New PTFE/EPDM + $\alpha$	TX/CX	8–100	-20–151°C	1.0MPa

- EPDM +  $\alpha$  is developed by our company for enhanced thermal durability of EPDM.
- Our “New PTFE” diaphragm conforms to FDA of the USA, USP class VI and Food Sanitation Act of Japan. (Ref. ⑧ Various Certificates in 5. *Technical Materials*)
- Option: Fluorine Cushion Rubber, Hastelloy Diaphragm Fixing Bayonet Pin

## 3 Working Temperature Range and Max. Working Pressure

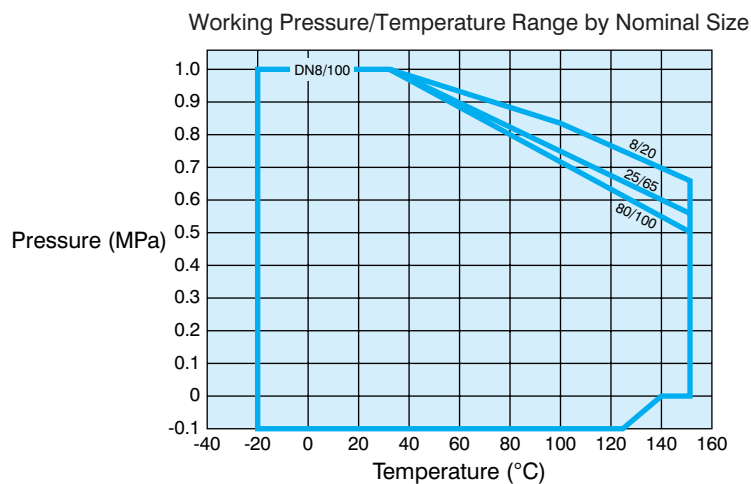
### New PTFE/EPDM (TX/CE), Stainless Steel · PFA Lined Main Body\*

Working Temperature Range: -20–143°C



### New PTFE/EPDM + $\alpha$ (TX/CX), Stainless Steel · PFA Lined Main Body\*

Working Temperature Range: -20–151°C (max. working temperature for continuous use)



\* Lower limit temperature for PFA lined main body made of base material FCD-S is -10°C

## 1-5. Pneumatically Operated ON-OFF Valves (Stainless Steel Actuator): BPO1400N

### 1 Features of Actuator

Actuator excellent in corrosion-proof and cleaning performances



DN8-10



DN15-50

#### Excellent Corrosion-Proof Performance / All Stainless Steel

- Exposed surfaces are all made of stainless steel. More excellent in corrosion proof performance compared to standard aluminum actuator (BPO1400NB (N)).
- No requirement for coating prevents the occurrence of foreign substances due to peeling of coated films.

#### Excellent Cleanability / External Shape

- A retaining ring is adopted for fixing the bonnet and cylinder similarly as standard aluminum actuator (BPO1400NB).
- Compactness & buffing, excellent in cleanability.

#### Significantly Enhanced Smoothness of Action and Durability

- The adopted outer wear ring for piston and bearing\* for spindle sliding zone have significantly enhanced the smoothness of action and durability. (\* Excluding actuator code 05S)

### Actuator Specifications

<b>Types</b>	BPO (BPC, BPN) 1400N
<b>Actuator Code</b>	05S, 07S, 09S, 12S, 16S
<b>Types of Operation</b>	Single Acting: Reverse Acting BPO (Air to Open / Spring to Close), Direct Acting BPC (Air to Close / Spring to Open), Double Acting: BPN (Air to Open / Air to Close)
<b>Nominal Size (DN)</b>	8-50
<b>Actuator Materials</b>	Cylinder: SCS13 #300 Buffing Bonnet: SCS13 #200 Buffing or Precision Cast Surface
<b>Operating Pressure</b>	0.4 <sup>+0.1</sup> / <sub>0</sub> MPa • Direct Acting and Double Acting types shall be in accordance with a separate actuator selection table.
<b>Max. Shutoff Differential Pressure</b>	1.0MPa
<b>Lubricants</b>	Cassida Grease HDS2 (Standards regarding food additives: FDA21CFR178.3570. Lubricants with permission of incidental contact with food: NSF Class H1 conforming product)
<b>Options</b>	Opening limit device, Special limit switch box (Eco-friendly type, white baked finish)

## 2 Actuator Selection Table

### Reverse Acting: BPO1400N

Operating Pressure:  $0.4 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$  MPa

New PTFE Diaphragm		Working Pressure (MPa)									
Nominal Size (DN)	Actuator	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
8	05S										
10	05S								(*)		
15	07S										
20	09S										
25	09S								(*)		
40	12S										
50	16S										

\* Option

### Direct Acting: BPC1400N

Operating Pressure: In table below, MPa  
(Operating pressure of 05S: Same as reverse acting)

New PTFE Diaphragm		Working Pressure (MPa)									
Nominal Size (DN)	Actuator	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
8	05S										
10	05S										
15	07S				0.3			0.35			
20	09S										
25	09S		0.25		0.3			0.35		0.4	
40	12S							0.3			
50	16S										

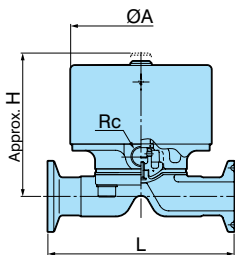
### Double Acting: BPN1400N

Operating Pressure: In table below, MPa  
(Operating pressure of 05S: Same as reverse acting)

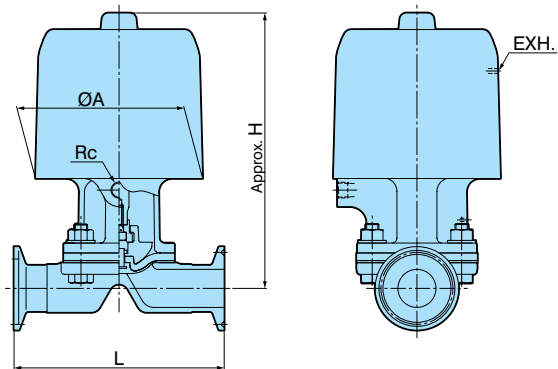
New PTFE Diaphragm		Working Pressure (MPa)									
Nominal Size (DN)	Actuator	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
8	05S										
10	05S										
15	07S					0.3					
20	09S										
25	09S		0.25			0.3				0.4	
40	12S							0.3			
50	16S										

## 3 Major Dimensions

BPO1400N-DN8-10



BPO1400N-DN15-50



Unit: mm

Nominal Size		Actuator	L	Approx. H	Rc	ØA	Mass (Approx. kg)
DN	S			BPO BPC BPN			BPO
8	—	05S	90	70	1/8	68	1.1
10	—	05S	90	70		68	1.1
15	—	07S	102	127		102	2.3
20	—	09S	118	155		118	3.4
25	1	09S	127	168		127	3.9
40	1.5	12S	159	192		159	7.5
50	2	16S	191	220		191	15.1

• The above table is based on Ferrule main body made of SUS316L. Contact us for detailed dimensions for each valve.