# The Proven Mixproof Range

## Alfa Laval SMP-BCA Mixproof Valve with PTFE Diaphragm

### Concept

SMP-BCA is an aseptic double seat valve with PTFE diaphragm. It is available as a stop- or divert valve. The valve is suited for aseptic operating conditions such as high sterilisation temperatures. SMP-BCA is specially designed for aseptic applications with the highest hygienic demands.

### Working principle

SMP-BCA is operated by means of compressed air. The valve is a normally closed (NC) valve. Sterile stem sealing towards the atmosphere is ensured by a special designed PTFE/rubber diaphragm unit. The PTFE diaphragm does not allow product residues to build up on the product contact surface. The product lines are separated by two sealings and a sterile barrier chamber to avoid mixing of product and to ensure immediate indication in case of a leak from one of the plug seals. Two small pneumatic normally open (NO) valves control flow to and from the sterile barrier chamber. The barrier chamber must be clean and sterile when the main valve is closed.The lower product lines on change over valves are separated by a single seal plug, without sterile barrier chamber.

### TECHNICAL DATA

| | |
|---|---|
| Pressure range: | 0-800 kPa (0-8 bar). |
| Temperature range: | -10°C to 140°C (EPDM). |
| Optimum process conditions: | >50 kPa (0.5 bar), >20°C. |
| Max. sterilization temperature (steam - short time) | 150°C - 380 kPa (3.8 bar). |
| Air pressure: | 500-800 kPa (5-8 bar). |

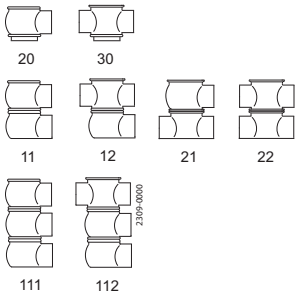
### Note!

Vacuum is not recommended in aseptic applications.

### PHYSICAL DATA

| | |
|---|---|
| Product wetted steel parts: | 1.4404 (316L). |
| External surface finish | Semi-bright (blasted) |
| Internal surface finish | Bright (polished), Ra < 1.6 µm |
| Other steel parts: | 1.4301 (304). |
| Product wetted seals: | EPDM and PTFE. |
| Other seals: | NBR, EPDM. |

### Valve body combination




**Type 20 and 30 body versions are on request available in following configurations:**

- Tee welded on lower port in 0 or 90 deg. version
- Bend welded on lower port in 0, 90, 180 or 270 deg. version

**The three body version is on request available in following configurations:**

- Type 121, 122, 211, 212, 221 & 222

### Standard design

SMP-BCA is based on the SMP-BC valve design. It consists of actuator, bonnet, stem with diaphragm unit and valve bodies. The divert version is a three body design.

The valve is assembled by means of clamp rings and a stem clip system for easy maintenance.

### Options

A. Male parts or clamp ends in accordance with required standard.
B. Control and Indication: IndiTop, ThinkTop or ThinkTop Basic.
C. Larger actuator for valve sizes 38-51 mm/DN 40-50.
D. CIP installation kits.
E. Other valve body combinations.
F. Surface roughness, product wetted parts: Ra ≤ 0.8 µm.
G. Product wetted seals of NBR and PTFE or FPM and PTFE.
H. Service tool for actuator.
I. Tool for plug seals (Necessary for changing the seals).

**Note!**
For further details, see also ESE01563 and instruction IM 70811.

| Air consumption (litres free air) | | |
|---|---|---|
| Size | 38 mm, 51 mm/DN40,50<br>Actuator ø89 | 63.5, 76.1,101.6 mm/DN 65, 80,100<br>Actuator ø133 |
| Stop valve/Divert valve | 0.2 x Air pressure (bar) | 0.7 x Air pressure (bar) |

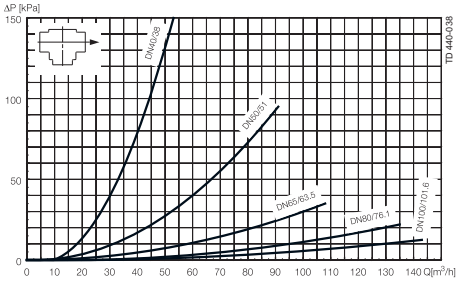
**Expected lifetime of diaphragm unit under normal conditions:**
**(no pressure shocks or cavitation).**

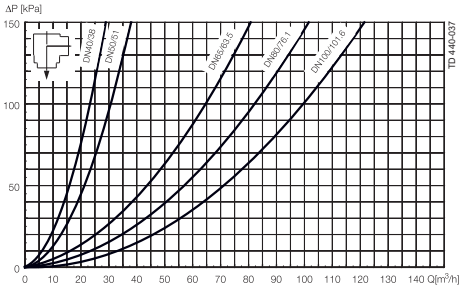
| Size/Type | Stop valve activations | Divert valve activations |
|---|---|---|
| 38mm/DN40 | 12.000 | 10.000 |
| 51mm/DN50 | 12.000 | 10.000 |
| 63.5mm/DN65 | 12.000 | 5.000 |
| 76.1mm/DN80 | 5.000 | 5.000 |
| 101.6mm/DN100 | 5.000 | 5.000 |

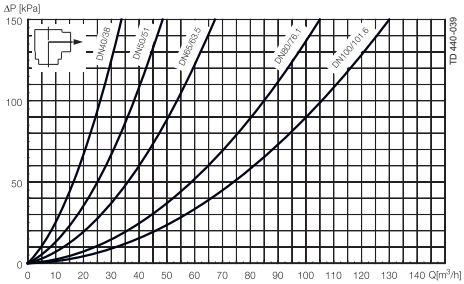
**Note!** Activating the valve without internal product pressure reduces lifetime of diaphragm unit.

## Pressure drop/capacity diagrams

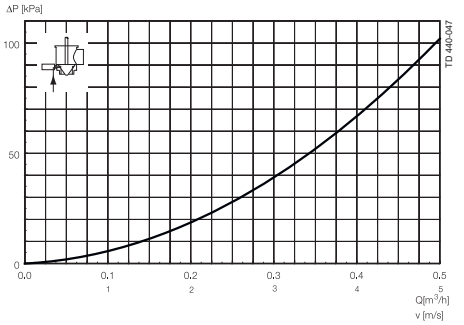
### Stop valve:



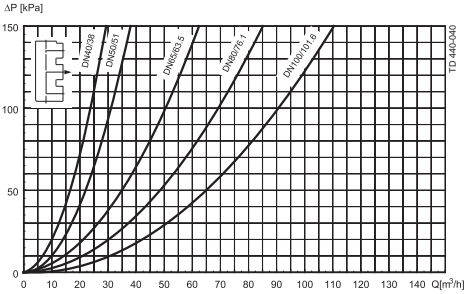



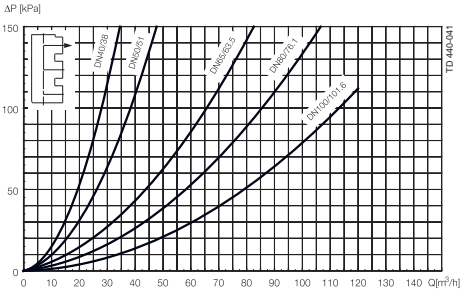



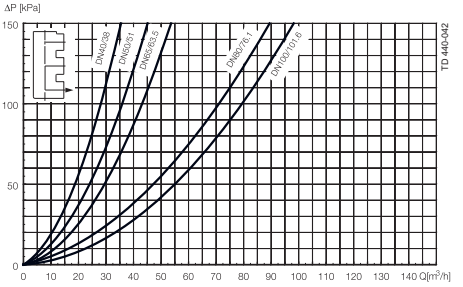

### CIP chamber:

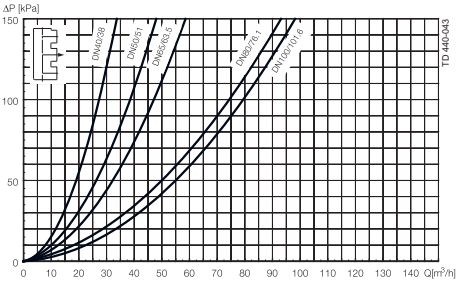



### Divert valve:



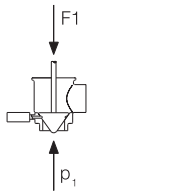
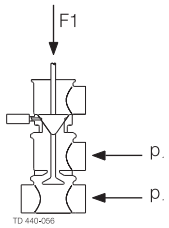




NOTE! For the diagrams the following applies:
Medium: Water (20°C).

Measurement: In accordance with VDI 2173.

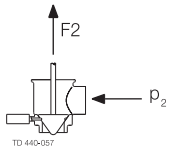
Pressure data for SMP-BCA

1. Upper plug. Max. product pressure $P_1$ without leakage due to pressure shocks, as a function of support air pressure.

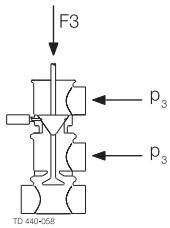
| Direction of pressure | Valve size | Actuator size | Spring type | Support air pressure (bar) 0 | 3 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
|   | 38mm/ | ø89 | Normal | 6.0 | 16.0 | 22.5 | 26.2 | 29.5 |
| | DN40 | ø89 | Strong | 9.6 | 19.5 | 26.3 | 30.0 | 30.0 |
| | | ø133 | Normal | 16.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| | | ø133 | Strong | 22.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| | 51mm/ | ø89 | Normal | 6.0 | 16.0 | 22.5 | 26.2 | 29.5 |
| | DN50 | ø89 | Strong | 9.6 | 19.5 | 26.3 | 30.0 | 30.0 |
| | | ø133 | Normal | 16.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| | | ø133 | Strong | 22.0 | 30.0 | 30.0 | 30.0 | 30.0 |
|   | 63.5mm/ | ø133 | Normal | 9.6 | 25.5 | 30.0 | 30.0 | 30.0 |
| | DN65 | ø133 | Strong | 16.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| | 76.1mm/ | ø133 | Normal | 6.5 | 14.5 | 19.5 | 22.4 | 26.8 |
| | DN80 | ø133 | Strong | 9.2 | 17.5 | 23.5 | 26.2 | 29.5 |
| | 101.6mm/ | ø133 | Normal | 4.0 | 11.0 | 16.0 | 18.4 | 20.6 |
| | DN100 | ø133 | Strong | 6.5 | 14.4 | 19.6 | 22.2 | 25.0 |

F1 = Spring + support Air

2. Upper plug. Max. product pressure $P_2$ against which the valve can open, as a function of air pressure.

| Direction of pressure | Valve size | Actuator size | Spring type | Support air pressure (bar) 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| | 38mm/ | ø89 | Normal | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | DN40 | ø89 | Strong | - | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Normal | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Strong | - | 8.0 | 8.0 | 8.0 | 8.0 |
| | 51mm/ | ø89 | Normal | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
|   | DN50 | ø89 | Strong | - | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Normal | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Srong | - | 8.0 | 8.0 | 8.0 | 8.0 |
| | 63.5mm/ | ø133 | Normal | 4.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | DN65 | ø133 | Strong | - | 1.4 | 8.0 | 8.0 | 8.0 |
| | 76.1mm/ | ø133 | Normal | 2.8 | 7.0 | 8.0 | 8.0 | 8.0 |
| | DN80 | ø133 | Strong | - | 2.0 | 5.4 | 8.0 | 8.0 |
| | 101.6mm/ | ø133 | Normal | 2.2 | 4.6 | 7.2 | 8.0 | 8.0 |
| | DN100 | ø133 | Strong | - | 1.6 | 4.2 | 6.6 | 8.0 |

3. Upper valve. Max. product pressure $P_3$ in upper valve body at which the valve can close.

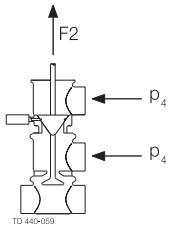
| Direction of pressure | Valve size | ø89, Normal | Actuator size, spring type ø89, Strong | ø133, Normal | ø133, Strong |
|---|---|---|---|---|---|
|   | 38mm/DN40 | 2.7 | 4.5 | 8.0 | 8.0 |
| | 51mm/DN50 | 2.4 | 4.0 | 6.0 | 8.0 |
| | 63.5mm/DN65 | - | - | 7.0 | 8.0 |
| | 76.1mm/DN80 | - | - | 7.0 | 8.0 |
| | 101.6mm/DN100 | - | - | 5.0 | 8.0 |

F2 = Air - spring

F3 = Spring

Pressure data for SMP-BCA

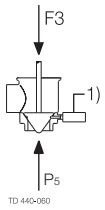
4. Lower valve, change-over. Max. product pressure $P_4$ without leakage, as a function of air pressure.

| Direction of pressure | Valve size | Actuator size | Spring size | Air pressure (bar) 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
|  | 38mm/ | ø89 | Normal | * | 8.0 | 8.0 | 8.0 | 8.0 |
| | DN40 | ø89 | Strong | * | * | 8.0 | 8.0 | 8.0 |
| | | ø133 | Normal | 8.6 | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Strong | * | * | 8.0 | 8.0 | 8.0 |
| | 51mm/ | ø89 | Normal | * | 8.0 | 8.0 | 8.0 | 8.0 |
| | DN50 | ø89 | Strong | * | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Normal | 8.6 | 8.0 | 8.0 | 8.0 | 8.0 |
| | | ø133 | Strong | * | * | 8.0 | 8.0 | 8.0 |
| | 63.5mm/ | ø133 | Normal | 3.4 | 8.0 | 8.0 | 8.0 | 8.0 |
| | DN65 | ø133 | Strong | * | * | 8.0 | 8.0 | 8.0 |
| | 76.1mm/ | ø133 | Normal | * | 7.6 | 8.0 | 8.0 | 8.0 |
| | DN80 | ø133 | Strong | * | * | 5.6 | 8.0 | 8.0 |
| | 101.6mm/ | ø133 | Normal | * | 4.6 | 9.2 | 8.0 | 8.0 |
| | DN100 | ø133 | Strong | * | * | 3.8 | 7.2 | 8.0 |



* = Valve cannot close

5. Upper valve. Max. CIP pressure $P_{CIP}$ without leakage to product area as a function of product pressure below plug.

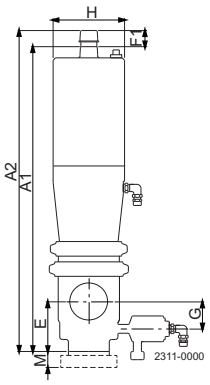
| Direction of pressure | Valve size | Actuator size | Spring size | Product pressure $P_5$ below plug (bar) 0 | 2 | 4 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
|  | 38mm/ | ø89 | Normal | 9.0 | 6.3 | 3.5 | 0.8 | - |
| | DN40 | ø89 | Strong | 10.0 | 9.9 | 7.2 | 4.6 | 2.0 |
| | | ø133 | Normal | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | | ø133 | Strong | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | 51mm/ | ø89 | Normal | 9.0 | 6.3 | 3.5 | 0.8 | - |
| | DN50 | ø89 | Strong | 10.0 | 9.6 | 6.7 | 3.8 | 1.0 |
| | | ø133 | Normal | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | | ø133 | Strong | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | 63.5mm/ | ø133 | Normal | 10.0 | 10.0 | 9.3 | 5.8 | 2.5 |
| | DN65 | ø133 | Strong | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | 76.1mm/ | ø133 | Normal | 10.0 | 10.0 | 8.5 | 4.7 | 1.0 |
| | DN80 | ø133 | Strong | 10.0 | 6.8 | 2.3 | - | - |
| | 101.6mm/ | ø133 | Normal | 10.0 | 6.0 | - | - | - |
| | DN100 | ø133 | Strong | 10.0 | 10.0 | 6.5 | 1.4 | - |



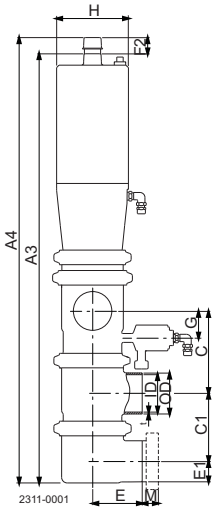
F2 = Air - spring

F3 = Spring

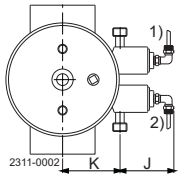
NOTE! Max. recommended CIP pressure = 100 kPa (1 bar).




a. Stop valve




b. Divert valve




c. Top view

1) CIP valve - 2) Detecting valve

Dimensions (mm)

| Size | | 38 | 51 | 63.5 | 76.1 | 101.6 | 40 | 50 | 65 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | DN | DN | DN | DN | DN |
| $A_1$ | | 371 | 381 | 459 | 481 | 553 | 369 | 379 | 456 | 482 | 552 |
| $A_2$ | | 385 | 395 | 473 | 501 | 573 | 383 | 393 | 470 | 502 | 572 |
| $A_3$ | | 511 | 532 | 642 | 677 | 778 | 511 | 532 | 642 | 693 | 778 |
| $A_4$ | | 525 | 546 | 662 | 697 | 798 | 525 | 546 | 662 | 713 | 798 |
| C | | 90 | 102 | 124 | 129 | 157 | 90 | 102 | 124 | 134 | 157 |
| $C_1$ | | 80 | 84 | 108 | 115 | 150 | 80 | 84 | 108 | 120.5 | 150 |
| OD | | 38 | 50.8 | 63.5 | 76.1 | 101.6 | 41 | 53 | 70 | 85 | 104 |
| ID | | 34.9 | 47.6 | 60.3 | 72.1 | 97.6 | 38 | 50 | 66 | 81 | 100 |
| t | | 1.6 | 1.6 | 1.6 | 2.0 | 2.0 | 1.5 | 1.5 | 2.0 | 2.0 | 2.0 |
| E | | 49.5 | 61.5 | 82.3 | 87.3 | 133.5 | 49.5 | 61.5 | 82.3 | 87.3 | 133.5 |
| $E_1$ | | 20.5 | 26.8 | 33.2 | 39.1 | 51.8 | 22 | 28 | 36 | 43.5 | 53 |
| $F_1$ | | 14 | 14 | 14 | 20 | 20 | 14 | 14 | 14 | 20 | 20 |
| $F_2$ | | 14 | 14 | 20 | 20 | 20 | 14 | 14 | 20 | 20 | 20 |
| G | | 27 | 33.3 | 39.7 | 45.6 | 58.3 | 28.5 | 34.5 | 42.5 | 50 | 59.5 |
| H | | 89 | 89 | 89 | 133 | 133 | 89 | 89 | 89 | 133 | 133 |
| J | | 46.7 | 46.7 | 57 | 66.6 | 84.3 | 46.7 | 46.7 | 57 | 66.6 | 84.3 |
| K | | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| M/ISO | clamp | 21 | 21 | 21 | 21 | 21 | | | | | |
| M/ISO | male | 21 | 21 | 21 | 21 | 21 | | | | | |
| M/DIN | male | | | | | 22 | 23 | 25 | 25 | 30 | |
| M/SMS | male | | 20 | 20 | 24 | 24 | 35 | | | | |
| M/BS | male | 22 | 22 | 22 | 22 | 27 | | | | | |
| Weight (kg): | Stop valve | 6.5 | 6.8 | 13.3 | 14.9 | 18.2 | 6.5 | 6.8 | 13.3 | 15.6 | 18.2 |
| | Divert valve | 8.2 | 8.6 | 15.5 | 18.6 | 24.6 | 8.2 | 8.6 | 15.5 | 19.6 | 24.6 |

**Air Connections Compressed air:**
R 1/8" (BSP), internal thread.

**CIP connection:**
R 3/8" (BSP), external thread.

**Leakage connection:**
R 3/8" (BSP), external thread.

**Caution, opening/closing time:**
**Opening/closing time will be affected by the following:**

- The air supply (air pressure).
- The length and dimensions of the air hoses.
- Number of valves connected to the same air hose.
- Use of single solenoid valve for serial connected air actuator functions.
- Product pressure.

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ESE00282EN 1612

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