



# Alfa Laval Unique Mixproof Tank Outlet Valve (Unique-TO)

## One for All - Unique Mixproof

### Concept

The exceptional concept of this mixproof valve is characterized by excellent unmatched flexibility - yet still being very simple. The modular design gives you the perfect valve for your exact needs in all mixproof tank outlet operations allowing two different products in pipeline and tank.

### Working Principle

Unique is remote-controlled by means of compressed air. The valve is a normally closed (NC) valve. The valve has two independent plug seals, forming a leakage chamber. In the leakage chamber there is only atmospheric pressure during every working condition. In case of rare accidental leaking of product, this will flow into the leakage chamber and be discharged through the leakage outlet. When the valve is open, the leakage chamber is closed. The product can then flow from tank to pipeline. The valve is water hammer protected in the pipeline due to the balanced plug that prevent the plug from closing too fast, when closing in the direction of product flow. The valve can be cleaned to any level according to the needs in the specific process. There is virtually no spillage of product when operating the valve.



### TECHNICAL DATA

Max. product pressure in pipeline: . . . . . 1000 kPa (10 bar)  
 Min. product pressure: . Full vacuum.  
 Temperature range: . . . . -5°C to +125°C (Depending on rubber quality)  
 Air pressure: . . . . . Max. 800 kPa (8 bar).

### PHYSICAL DATA

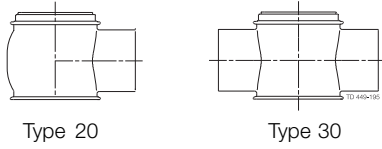
Product wetted steel parts: . . . . . 1.4404 (316L).  
 Other steel parts: . . . . . 1.4301 (304).

Surface finish - choose from the following:  
 Internal/external Matt (blasted) . . . . . Ra<1.6  
 Internal Bright (polished) . . . . . Ra<0.8  
 Internal/external Bright (internal polished) . . Ra<0.8  
**Note!** The Ra values are only for the internal surface.

Product wetted seals: . . . . . EPDM.

Other seals:  
 CIP seals: . . . . . EPDM.  
 Actuator seals: . . . . . NBR.  
 Guide strips: . . . . . PTFE

### Valve Body Combinations



Type 20

Type 30

### Standard design

The valve consists of one valve body, which is connected to either a tank flange or a stub flange with a clamp. The body can be turned in any position if the clamp is slightly loosened. The tank flange is welded directly into the tank. (Important! Observe welding guideline in instruction manual). The tank flange is supplied with TÜV approval AD 2000 and inspection certificate 3.1 according to EN10204. The design allows the Unique-TO to be installed in a horizontal position.

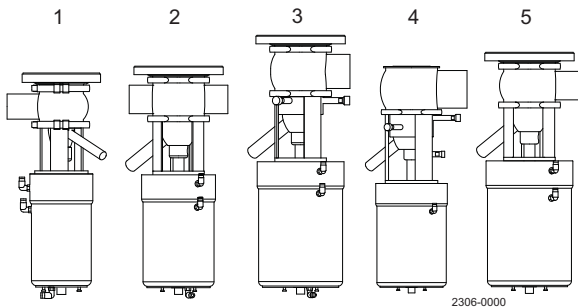
### SpiralClean

The Alfa Laval SpiralClean system to clean the balanced plug and leakage chamber. The system cleans more efficiently, uses less cleaning fluid by ensuring that a directional flow of CIP fluid reaches all the surfaces in much less time than with conventional systems.

### Selection guide

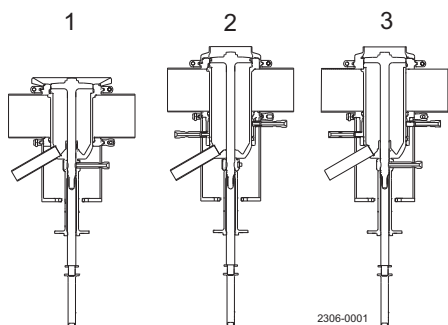
The drawings below gives an overview of all options when choosing the valve to fit your process, thus demonstrating the actual flexibility of the Unique Mixproof tank outlet valve. The Unique-TO concept offers balanced plug in pipe line, seat lift, CIP for the plugs and leakage chambers and any combination in between.

### Unique-TO size flexibility



1. DN50 with tank flange, group 3 actuator including seat lift and seat push
2. ISO63.5 (2½") with tank flange, group 4 basic actuator including seat lift and seat push
3. ISO76.1 (3") with spiral on upper balanced plug and tank flange, group 5 basic actuator including seat lift and seat push
4. DN150 with spiralclean on leakage chamber upper balanced plug and group 4 basic actuator
5. ISO 63.5 (2½") with tank flange, group 4 basic actuator including seat lift

### Unique-TO hygienic flexibility (spiral clean options)



1. External CIP of leakage chamber
2. External CIP of upper balanced plug
3. External CIP cleaning of leakage chamber and upper balanced plug

### Standard configurations

To assist you in the selection we have included some standard configurations:

- Unique-TO
- Unique-TO with external cleaning.

You can either choose these directly or add additional features ensuring that the valve suits your specific needs.

Unique-TO meets the typical demands of a process valve in the food and drink industry.

- Actuator with seat lift integrated.
- Standard balanced plug in pipeline.

Unique-TO with external cleaning meets the highest demands for hygienic processing.

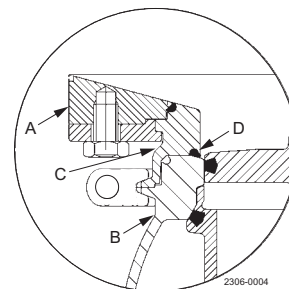
- Actuator with seat lift integrated.
- Standard balanced plug in pipeline.
- SpiralClean of leakage chamber and balanced plug

### Options

- Male parts or clamp liners in accordance with required standard.
- Control and Indication: IndiTop, ThinkTop or ThinkTop Basic.
- Side indication for detection of upper seat lift
- Product wetted seals in HNBR, NBR or FPM
- Various internal/external surface finish
- 3A (hygienic standard) on request
- Blind flange
- Conversion flange that enables replacement of an SMP-TO valve though reusing the existing SMP-TO tank flange - see fig. 1.
- Tank connection supplied separately

Fig. 1

### Converting from SMP-TO valve to Unique-TO valve in tank flange



- A. SMP-TO tank flange
- B. Unique Mixproof TO valve
- C. Conversion flange
- D. O-ring for conversion flange

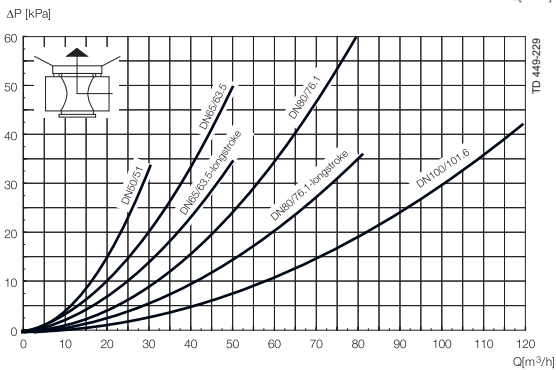
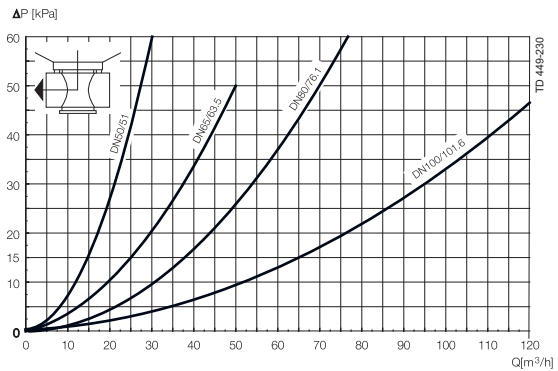
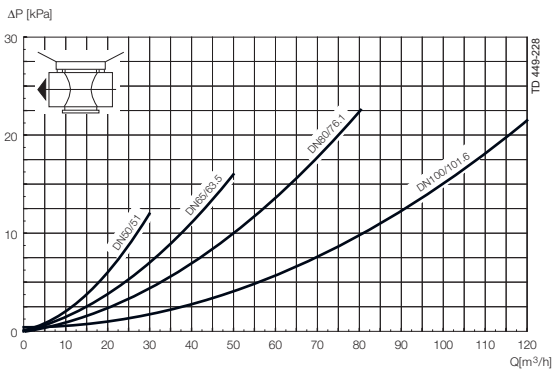
When Unique-TO is mounted on a SMP-TO flange via the Alfa Laval conversion flange add 28 mm to valve height dimensions (A1-A4)

| Size  |       | Max. size of particle (mm) | Max. tank pressure (kPa) | Actuator size 3-Basic (ø120x230) | Actuator size 4-Basic (ø157x252) | Actuator size 5-Basic (ø186x281) | Opening pressure in pipe line at 6 bar air pressure (kPa) |
|-------|-------|----------------------------|--------------------------|----------------------------------|----------------------------------|----------------------------------|---|
| inch  | DIN   |                            |                          |                                  |                                  |                                  |   |
| 51    | DN50  | ø9                         | 400                      | Standard                         |                                  |                                  | 1000  |
| 63.5  | DN65  | ø15                        | 450                      |                                  | Standard                         |                                  | 1000  |
| 63.5  | DN65  | ø31                        | 600                      |                                  |                                  | Long stroke                      | 1000  |
| 76.1  | DN80  | ø15                        | 450                      |                                  | Standard                         |                                  | 1000  |
| 76.1  | DN80  | ø31                        | 600                      |                                  |                                  | Long stroke                      | 1000  |
| 101.6 | DN100 | ø31                        | 450                      |                                  | Standard                         |                                  | 1000  |
| 101.6 | DN100 | ø15                        | 350                      |                                  | Option                           |                                  | 1000  |
|       | DN125 | ø33                        | 350                      |                                  |                                  | Standard                         | 1000  |
|       | DN125 | ø15                        | 250                      |                                  | Option                           |                                  | 1000  |
|       | DN150 | ø33                        | 350                      |                                  |                                  | Standard                         | 1000  |
|       | DN150 | ø15                        | 250                      |                                  | Option                           |                                  | 1000  |

**Notes:**

Max. pressure in tank means that a higher pressure in tank will open the valve. It is possible to open with 10 bar (1000 kPa) in pipe line. When closing the valve the pressure cannot be higher than "Max. Tank pressure".

**Pressure drop/capacity diagrams**



**Note!**

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

Measurement: In accordance with VDI 2173

## Air and CIP Consumption

| Size  | DN/OD   |      |      |      | DN    |      |      |      |      |      |      | Longstroke |      |      |      |
|---|---------|------|------|------|-------|------|------|------|------|------|------|------------|------|------|------|
|   | ISO-DIN | 51   | 63.5 | 76.1 | 101.6 | 50   | 65   | 80   | 100  | 125  | 150  | DN/OD      |      | DN   |      |
|   |         |      |      |      |       |      |      |      |      |      |      | 63.5       | 76.1 | 65   | 80   |
| Air consumption for Balanced Seat-lift<br>Litre = volume at atmosphere pressure | 0.20    | 0.40 | 0.40 | 0.62 | 0.20  | 0.40 | 0.40 | 0.62 | 0.62 | 0.62 | 0.62 | 0.40       | 0.40 | 0.40 | 0.40 |
| Air consumption for Tank Seat-lift<br>Litre = volume at atmosphere pressure     | 1.10    | 0.13 | 0.13 | 0.21 | 1.10  | 0.13 | 0.13 | 0.21 | 0.21 | 0.21 | 0.21 | 0.13       | 0.13 | 0.13 | 0.13 |
| Air consumption for Main Movement<br>Litre = volume at atmosphere pressure      | 0.86    | 1.63 | 1.63 | 2.79 | 0.86  | 1.62 | 1.62 | 2.79 | 2.79 | 2.79 | 2.79 | 1.63       | 1.63 | 1.62 | 1.62 |
| Kv-value for Balanced CIP Seat-lift<br>[m <sup>3</sup> /h]                      | 1.50    | 2.50 | 2.50 | 1.90 | 1.50  | 2.50 | 2.50 | 1.90 | 3.70 | 3.70 | 3.70 | 2.50       | 2.50 | 2.50 | 2.50 |
| Kv-value for Tank Seat-lift<br>[m <sup>3</sup> /h]                              | 0.90    | 1.90 | 1.90 | 1.40 | 0.90  | 1.90 | 1.90 | 1.40 | 3.10 | 3.10 | 3.10 | 1.90       | 1.90 | 1.90 | 1.90 |
| Kv-value for SpiralClean Spindle CIP<br>[m <sup>3</sup> /h]                     | 0.12    | 0.12 | 0.12 | 0.12 | 0.12  | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12       | 0.12 | 0.12 | 0.12 |
| Kv-value for SpiralClean External CIP in<br>leakage chamber [m <sup>3</sup> /h] | 0.25    | 0.29 | 0.29 | 0.29 | 0.25  | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29       | 0.29 | 0.29 | 0.29 |

### Note:

Recommended min. pressure for SpiralClean: 2 bar.

### Formula to estimate CIP flow during seat lift:

(for liquids with comparable viscosity and density to water):

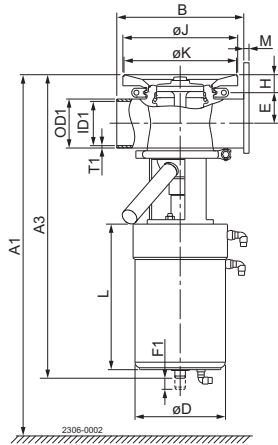
$$Q = K_v \cdot \sqrt{\Delta p}$$

Q = CIP - flow (m<sup>3</sup>/h).

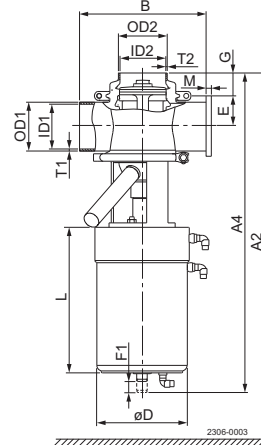
Kv = Kv value from the above table.

Δ p = CIP pressure (bar).

Unique-TO connected to tank flange



Unique-TO connected to stub flange



A1 + A2 = Min. clearance to allow that actuator and internal valve parts can be lifted out of the valve body. If ThinkTop is mounted, add 180 mm.

| Size  | DN/OD |      |      |       |      |      |      |     |      |     | Longstroke |      |     |      |
|---|-------|------|------|-------|------|------|------|-----|------|-----|------------|------|-----|------|
|   | 51    | 63.5 | 76.1 | 101.6 | 50   | 65   | 80   | 100 | 125  | 150 | DN/OD      | DN   |     |      |
| ISO-DIN   | 51    | 63.5 | 76.1 | 101.6 | 50   | 65   | 80   | 100 | 125  | 150 | 63.5       | 76.1 | 65  | 80   |
| A1 min. dimension. Unique-TO                        | 579   | 646  | 659  | 753   | 577  | 652  | 667  | 755 | 805  | 890 | 700        | 713  | 706 | 721  |
| A1 min. dimension. Unique-TO with external cleaning | 616   | 686  | 699  | 813   | 614  | 692  | 707  | 815 | 865  | --- | 740        | 753  | 746 | 761  |
| A2 min. dimension Unique-TO                         | 588   | 655  | 668  | 762   | 586  | 661  | 676  | 764 | 814  | 899 | 709        | 722  | 715 | 730  |
| A2 min. dimension Unique-TO with external cleaning  | 625   | 695  | 708  | 822   | 623  | 701  | 716  | 824 | 874  | --- | 749        | 762  | 755 | 770  |
| A3 Unique-TO  | 468   | 526  | 526  | 594   | 468  | 526  | 526  | 594 | 620  | 680 | 575        | 575  | 575 | 575  |
| A3 Unique-TO with external cleaning                 | 505   | 566  | 566  | 654   | 505  | 566  | 566  | 654 | 680  | --- | 615        | 615  | 615 | 615  |
| A4 Unique-TO  | 477   | 535  | 535  | 603   | 477  | 535  | 535  | 603 | 629  | 689 | 584        | 584  | 584 | 584  |
| A4 Unique-TO with external cleaning                 | 514   | 575  | 575  | 663   | 514  | 575  | 575  | 663 | 689  | --- | 624        | 624  | 624 | 624  |
| B   | 220   | 220  | 220  | 300   | 220  | 220  | 220  | 300 | 300  | 300 | 220        | 220  | 220 | 220  |
| OD1   | 51    | 63.5 | 76.1 | 101.6 | 53   | 70   | 85   | 104 | 129  | 154 | 63.5       | 76.1 | 70  | 85   |
| ID1   | 47.8  | 60.3 | 72.9 | 97.6  | 50   | 66   | 81   | 100 | 125  | 150 | 60.3       | 72.9 | 66  | 81   |
| t1  | 1.6   | 1.6  | 1.6  | 2.0   | 1.5  | 2.0  | 2.0  | 2.0 | 2.0  | 2.0 | 1.6        | 1.6  | 2.0 | 2.0  |
| E   | 36.9  | 43.2 | 49.5 | 61.8  | 38   | 46   | 53.5 | 63  | 75.5 | 88  | 43.2       | 49.5 | 46  | 53.5 |
| F1  | 31.5  | 38   | 38   | 59    | 31.5 | 38   | 38   | 59  | 59   | 59  | 59         | 59   | 59  | 59   |
| F2 (Tank plug)                                      | 5     | 5    | 5    | 5     | 5    | 5    | 5    | 5   | 5    | 5   | 5          | 5    | 5   | 5    |
| G   | 40    | 40   | 40   | 40    | 40   | 40   | 40   | 40  | 40   | 40  | 40         | 40   | 40  | 40   |
| H   | 31    | 31   | 31   | 31    | 31   | 31   | 31   | 31  | 31   | 31  | 31         | 31   | 31  | 31   |
| øD  | 120   | 157  | 157  | 186   | 120  | 157  | 157  | 186 | 186  | 186 | 186        | 186  | 186 | 186  |
| L   | 230   | 252  | 252  | 281   | 230  | 252  | 252  | 281 | 281  | 281 | 281        | 281  | 281 | 281  |
| OD2   | 51    | 63.5 | 76.1 | 101.6 | 53   | 70   | 85   | 104 | 129  | 129 | 63.5       | 76.1 | 70  | 85   |
| ID2   | 47.8  | 60.3 | 72.9 | 97.6  | 50   | 66   | 81   | 100 | 125  | 125 | 60.3       | 72.9 | 66  | 81   |
| t2  | 1.6   | 1.6  | 1.6  | 2.0   | 1.5  | 2.0  | 2.0  | 2.0 | 2.0  | 2.0 | 1.6        | 1.6  | 2.0 | 2.0  |
| øJ  | 159   | 199  | 199  | 199   | 159  | 199  | 199  | 199 | 199  | 199 | 199        | 199  | 199 | 199  |
| øK  | 155   | 195  | 195  | 195   | 155  | 195  | 195  | 195 | 195  | 195 | 195        | 195  | 195 | 195  |
| M/ISO clamp   | 21    | 21   | 21   | 21    | ---  | ---  | ---  | --- | ---  | --- | 21         | 21   | --- | ---  |
| M/DIN clamp   | ---   | ---  | ---  | ---   | 21   | 21   | 21   | 21  | 28   | 28  | ---        | ---  | 21  | 21   |
| M/ISO male  | 21    | 21   | 21   | 21    | ---  | ---  | ---  | --- | ---  | --- | 21         | 21   | --- | ---  |
| M/DIN male  | ---   | ---  | ---  | ---   | 23   | 25   | 25   | 30  | 46   | 50  | ---        | ---  | 25  | 25   |
| M/SMS male  | 20    | 24   | 24   | 35    | ---  | ---  | ---  | --- | ---  | --- | 24         | 24   | --- | ---  |
| M/BS male   | 22    | 22   | 22   | 27    | ---  | ---  | ---  | --- | ---  | --- | 22         | 22   | --- | ---  |
| Weight [kg]* Unique TO                              | 12.5  | 22.5 | 22.5 | 33    | 12.5 | 22.5 | 22.5 | 33  | 36   | 38  | 28         | 28   | 28  | 28   |
| Weight [kg]* Unique TO with external cleaning       | 13    | 23.5 | 23.5 | 34    | 13   | 23.5 | 23.5 | 34  | 37   | --- | 29         | 29   | 29  | 29   |

\* = without tank flange



Alfa Laval reserves the right to change specifications without prior notification.

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