Pressure surge absorption
Product range for drinking water, waste water and the chemical industry

“With remote monitoring, everything is fully under control.”
Willy Zahnd, WARET AG
A pressure surge (also called water hammer) is a brief high increase or drop in pressure. It only lasts for fractions of a second, but the pressure peaks occurring can be many times the operating pressure. The peak values that arise can come in the form of both overpressure and negative pressure (cavitation). The propagation speed of the pressure waves can be up to 1400 m/s and depends on the material and the wall thickness of the pipe.

How do pressure surges arise?
Pressure surges in pipework occur due to sudden changes in liquid flow:

- Acceleration of liquid mass when pumps are switched on
- Breakdown in the delivery flow when pumps are switched off
- Abrupt stopping of a liquid that was in motion due to a quick-closing valve
- Sudden change in the direction of flow due to solenoid valves
- Abrupt change in the pipe cross-section due to narrowing or restriction

What effects do pressure surges have?
- High increase in pressure or negative pressure (cavitation)
- Disturbing noises
- Signs of material fatigue

The consequences are:

- Damage to integrated instruments and fittings
- Breaks in pipework, noise and vibrations
- Loosening or unsealing of joints

How do we prevent pressure surges?
In every system where pressure surges are to be expected or already present, they can be prevented by mounting a correctly dimensioned and low-maintenance ORELL Tec shock absorber.
**OPERATION AND ADVANTAGES**

**Function**

The bladder fulfils an important function in pulsation dampers. As an elastic component it guaranties a complete separation between the nitrogen cushion and the fluid. The gas cushion can therefore not flow into the main line.

The whole damper volume can be used to capture the surplus or deliver additional energy. The precharge pressure, the gas filling $P_0$, has to be calculated and indicated on the damper’s rating plate. The water exchange occurs through pressure variations in the system.

**Forced Flow**

Forced flow induces an additional water exchange through the external line as soon as the pump is running.

By inserting a short pipe elbow turned against the flow of the main line, a small reduction of the main line cross section is created. 1 to 2 % of the flow rate passes through the small pipe into the damper and returns to the main line through the main connection. This is enough to renew the water in the vessel every 1 to 2 days.

**Accessories**

- Digital level indicator according to OLD 1120
- Stand extension according to OLD 1140
- Forced Flow

**Damper advantages**

- Operates without external energy
- Minimum space requirements
- Cost saving on the building
- No vessel corrosion
- Long service life
- Low maintenance
- Controlled water exchange in vessel (Forced Flow)

**Digital level indicator advantages**

- Easy monitoring of the water level with one glimpse
- Permanent remote monitoring with interface
- Precharge pressure readjustable during operation
- Maximum safety for the installation operator

For perfect drinking water!
Product Range

Quality that does what it promises

Since 1969 we stand for engineering, sales and servicing of products and systems for storing, cooling and filtering of fluids!

In addition to our main products in the hydraulic fields – hydraulic accumulators, heat exchangers and hydraulic filters – we have specialised for several decades in the calculation of pulsations, in producing and supplying corresponding dampers for drinking water and used water installations.

During that period, we have acquired a wide application know-how around shock absorbing for your full benefit. Our engineering department offers you customized solutions, which meet current requirements.

Proven technology and constant development are the basis of our products and guaranty their reliability. The compliance of the applicable rules, directives and standards with the corresponding declaration of conformity and acceptance tests is natural to us.

Customer satisfaction, safety and after-sales service are of primary importance to Orell Tec AG.

Shock absorbers for drinking water

These are used to prevent pressure surges caused by the direct switching on and off of pumps, power failures in pumping stations and by closing hydrants in fire-fighting lines.

- Volume range: Standard 100 to 5000 litres
  Capacities up to 35 m³
- Pressure range: Standard 12/25/40 bar
  Other ranges on request
- Construction: Coated steel or stainless steel
- Bladder material: Depends on type of liquid

Shock absorbers for untreated waste water

Shock absorbers with bladder can be used with purified water.
In case of untreated water shock absorbers without bladder but with floater switch and compressed air boosting.
They prevent from water hammering and negative pressure in long transport pipes.

- Volume range: Standard 100 to 5000 litres
  Capacities up to 35 m³
- Pressure range: Standard 10, 12 or 25 bar
  Other ranges on request
- Construction: Coated steel or stainless steel
- Bladder material: Depends on type of liquid
Pulsation dampers for domestic and industrial use

These dampers prevent pulsations in sanitary installations such as kitchens, bathrooms, laundries, etc.) caused by rapid closing of mixer taps or valves.

They are also used as pressure and expansion vessels in heating, as well as in energy storage and pulsation damper applications.

| Volume range  | 0.1 to 50 litres |
| Pressure range | Up to 690 bar |
| Construction   | Coated steel or stainless steel |
| Bladder material | Depends on type of liquid |

Pressure and expansion vessels

Pressure vessels are used to maintain the pressure in pressure booster equipment and to optimise the switching on of pumps.

Expansion vessels allow for expansion of medias subject to temperature variations.

| Volume range       | Standard 100 to 5000 litres |
|                   | Capacities up to 35 m³ |
| Pressure range     | 12 or 25 bar |
|                   | Other ranges on request |
| Construction       | Coated steel or stainless steel |
| Bladder material   | Depends on type of liquid |

Level indicator

The digital level indicator allows for easy monitoring of the water level in pulsation dampers.

The water column is displayed in cm water columns in the container by means of a differential pressure measurement. The display unit is electrically supplied using an internal accumulator or through an interface with an external power supply for constant monitoring.

The separating diaphragm in the pressure sensor prevents the nitrogen from escaping when releasing the water from the vessel.
Bleeder and degassing valves

Bleeder and degassing valves have to satisfy various requirements. Primarily they are used for degassing while filling or emptying pipes. Degassing should also be possible under pressure. Most valves combine these functions.

The use of these valves must be carefully planned - especially with suddenly varying flow rates for instance at emergency shut downs of pumps. Pipes will have to support the vacuum and tend to collapse.

All valves can be fitted with softly closing devices, ventilation or air-intake lock in case of flooding. Special attention should be also given to maintenance and accessibility.

The following types are available:

**Drinking water***

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<thead>
<tr>
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<th>Degassing capacity</th>
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<tbody>
<tr>
<td>S-050/1</td>
<td>Degassing unit under pressure</td>
</tr>
<tr>
<td>D-040/1</td>
<td>3-port bleeder and degassing valve</td>
</tr>
<tr>
<td>D-040/2</td>
<td>3-port bleeder and degassing valve</td>
</tr>
<tr>
<td>D-050</td>
<td>3-port bleeder and degassing valve</td>
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* Additional models available on request.

**Waste water***

<table>
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<td>S-025</td>
<td>Degassing unit under pressure</td>
</tr>
<tr>
<td>D-020</td>
<td>3-port bleeder and degassing valve</td>
</tr>
<tr>
<td>D-030-XL</td>
<td>3-port bleeder and degassing valve</td>
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</tbody>
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**Non return valves without valve hammering**

Clasar non return valves are available for pipe diameters from DN 80 to DN 1800 and operating pressures from PN 10 to PN 50.
Technical advice and simulations with the latest calculation program

We provide simulations, calculations and proposals for shock absorbers, as well as carrying out pressure measurements on site (with final report). Using our flow simulation system, we carry out calculations and simulations of pressure surges in pumping stations, piping networks, etc. Any problems that arise can be seen immediately in a clearly laid-out graphic display.

Service and maintenance on site

Checking and maintenance form part of our service. By simply signing a maintenance contract, you can forget about your shock absorbers. ORELL Tec takes over the responsibility for regular maintenance and checking of this important protective equipment in your system.

„Proper planning, the first step towards a safe installation.“

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