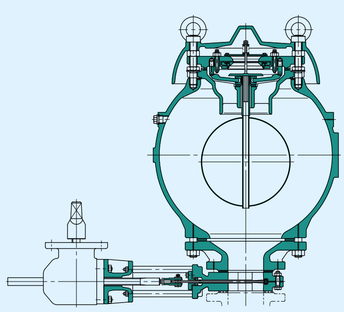
ERHARD
BY TALIS

# ERHARD BEV
## sewage air valves

# AIR VALVES FOR EXTREME CONDITIONS



*With ERU K1 knife gate valve with bevel gearbox and sqare cap, acting as isolation valve*

Although the same conditions as in clear-water water are existing in waste-water transport plants both in hydrostatic and hydrodynamic respects, the air valves approved for drinking water are not suitable for this purpose. Sewage fluids contain inorganic and organic substances, having sedimentary form, floating and/or colloidal suspended matters of different concentration. Air valves used in such flow media must be able to work optimally despite those dirt.

Air valves for waste water and sewage were developed for these special requirements, their simple and robust construction especially adapted to these conditions of use:

- The large nozzle of the body cover (item 17 – drawing p. 8) closes automatically in case of excessive air outflow. This feature protects the nozzle against deposits.
- Operating thanks to the aerocinetic principle, with high safety of the floating body.
- The precised adjustment of the air flow level triggers the surge absorption and protects from contamination.
- Free distance designed between floating part and internal body (>100 mm) (item 3), in order to avoid dirt to block the floating part.
- Spherical shape of the ball makes it extremely stable, having also no parallel surface with the body.
- The lower part of the chamber (item 1) is funnel-shaped, in order to avoid deposition of suspended solids.
- The three ventilation nozzles (one large nozzle in item 17 + two venting screws, item 23) are placed in an upper chamber equipped with a reduced inlet. The floating body almost abuts on this connection in its upper position, which avoids the penetration of dirt, even in case of turbulences.
- The valve geometry and the center of gravity of the float are designed in order that, even with compressed air, the water level does not reach the upper chamber.
- The ventilation cross sections are characterized by their high capacity. Air is discharged through two nozzles (item 23) under full operating pressure : high air throughput means high safety.

# RANGE OF APPLICATION, MATERIALS, HEIGHTS

| Nominal size DN | Pressure rating PN | Hydr. test pressure in bars for | | Admissible working pressure in bars at a working temp. up to 60° C for water |
|---|---|---|---|---|
| | | Body | Seat | |
| 80 - 200 | 16 | 24 | 16 | 0,1 - 16 |
| 200 | 10 | 15 | 10 | 0,1 - 10 |

When ordering, please specify flow medium, working pressure and working temperature.
Flanges DN 80-150, PN 16, GG, Type 21, EN 1092-2
Flanges DN 200, PN 16[1] GG, Type 21, EN 1092-2
Flanges DN 200, PN 10[1] GG, Type 21, EN 1092-2

## Materials

- **Body components and bonnet:** Laminar graphite cast iron EN-GJL-250
- **Floating body, seat rings, nozzles and connecting bolts:** Stainless steel
- **Ball guide bush and switching ring:** Plastic material
- **Seals and O-rings:** Perbunan, resistant to methane gas
- **Protection against corrosion:** Inside and outside Epoxy coating blue color

## Height for air valve mounted with a gate valve

| Nominal size DN | INFINITY resilient seated gate valve | ERU K1 knife gate valve |
|---|---|---|
| 80 | 895 | 762 |
| 100 | 905 | 767 |
| 150 | 925 | 772 |
| 200 | 860 | 690 |

Weight: approx. 140 kg
DN 200 will be supplied without inlet piece
PN 16 = 12 studs M 20
PN 10 = 8 studs M 20

# AIR CAPACITY DIAGRAMS

### Diagram 1: Air evacuation through small nozzles (under pressure)

- **Example:** Pressure in the pipeline: $P_e$ = 1.2 bar
- Air rate for small nozzles referring to normal conditions:
  $Q_N$ = 7,5 l/s (from diagram 1)
- Working temperature: $T_R$ = 293,15° (corr. 20° C)
- Working pressure (abs.): $P_R = P_{amb} + P_e$ = 2,2 bar
- Air rate according to operating conditions:

$$Q_R = \frac{1.01325 \cdot 293{,}15}{273{,}15 \cdot 2{,}2} \cdot 7{,}5$$

$$Q_R = 3{,}7 \text{ l/s}$$

### Diagram 2: Air evacuation through the large orifice (during pipe filling)

Air rate $Q_R$ is equivalent to the rate of water flowing in. We recommend to fill the pipeline at such a velocity that the air volume to be discharged per valve does not exceed the limits shown in the diagram.

### Diagram 2: Air admission through large orifice (during pipe emptying)

Air rate $Q_R$ is equivalent to the rate of water flowing out. The number of valves required is to be fixed considering the limits shown in the diagram.

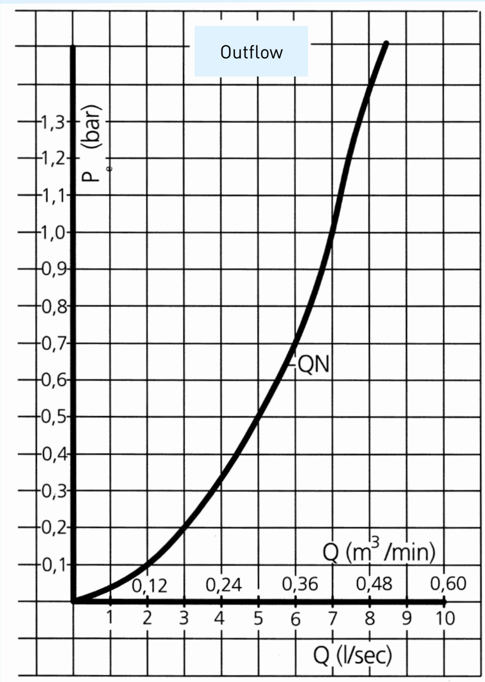



Diagram 1

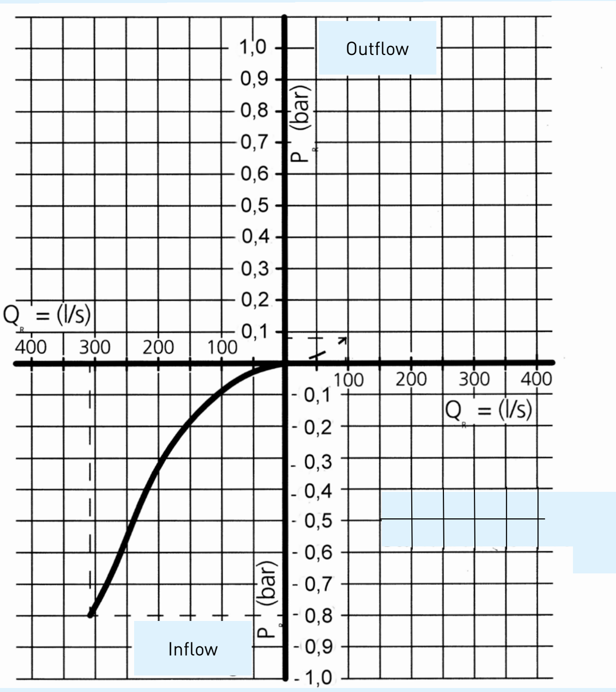



Diagram 2

# AIR CAPACITY – EXAMPLES OF CALCULATION

The diagram values $Q_N$ refer to normal operating conditions ($T_N$ = 273,15° K, P = 1,01325 hPa).

Diagram values $Q_R$ refer to working condition

Working temperature: $T_R$ = 293,15° K (corr. 20° C)

Ambient pressure (abs.): $P_{amb}$ = 1 bar

Working pressure (abs.): $P_R = P_{amb} + P_e$ = 1,3 bar

Air rate referring to working conditions:

$$Q_R = \frac{P_N \cdot T_R}{T_N \cdot P_R} \cdot Q_N$$

The air capacity may be gathered from diagrams 1 and 2. A distinction is to be made between:

- Air evacuation through large nozzle
- Air evacuation through small nozzles
- Air admission through large nozzle

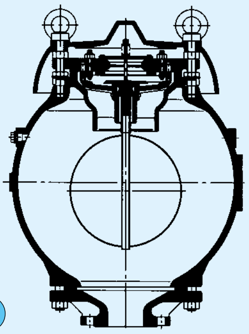
If the air rate determined for air admission or evacuation cannot be obtained thanks to one valve, an adequate number of valves is to be installed in series at each necessary point of the pipeline.

### Approximate data

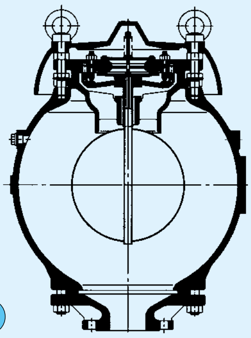
Air evacuation when filling the pipeline: 21 l/s[1)]
Air inflow when emptying the pipeline 310 l/s
Air release under pressure 4 l/s

1) For setting range, see operating instructions

# AUTOMATIC OPERATION



1



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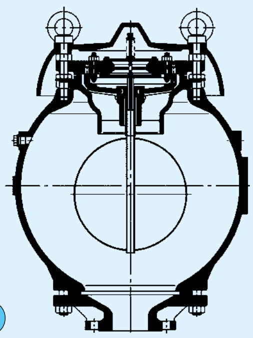


3

### In pressureless conditions

When the pipeline is not filled with liquid and not subject to pressure, all valve nozzles are opened **[1]**.

### During the pipe filling

When the pipeline is filled with liquid, the air in front of the liquid is pushed ahead and can freely flow out through the nozzles. The air-discharge volume depends on the pressure upstream the valve (see diagram 2, page 4). During the filling process, when the front of the liquid column reaches the floating point of the float, the float is raised by the increasing liquid level. Then the central main nozzle is closed by the valve disc whereas two small nozzles are shut by means of the ruber plugs located in the actuating lever **[2]**.

### During air evacuation

If under full working pressure the liquid level decreases due to accumulation of air, the floating body drops after the floating point has been reached. At the same time, the actuating levers of the small nozzles are moved downward so that the air can escape **[3]**. In this case the air capacity depends on the working pressure referring to the small nozzles. However, prerequisite to this is that the head of liquid is flowing on adequately. As a consequence of air evacuation the liquid level in the air valve rises and the floating body moving upward closes again the small nozzles. During this process, the large valve disc loosely supported in the float tube remains in the closed position due to the differential pressure (difference between working pressure and atmospheric pressure).

### During emptying

During operation, if the pipeline pressure drops to or below the atmospheric pressure, the nozzles open due to the falling water level and air is aspirated through the nozzle opening. The air inflow depends on the negative pressure occurring in the pipeline (see diagram 2, page 4).

**With all operational functions the liquid is retained in the valve without any loss.**

# INSTALLATION AND ASSEMBLY

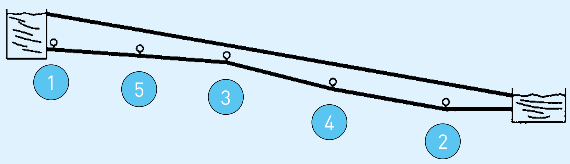
Air valves should be located at the following points in a pipeline:

- At each absolute high point **[1]**
- At each high point where pipe section has an ascending run compared to the hydraulic gradient, or when the slope decreases **[2]**
- At each point where a pipeline slope starts **[3]**
- At each pipeline point endangered by negative pressure **[4]**
- On long, rising or sloping pipeline sections at distances of approx. 800 m **[5]**

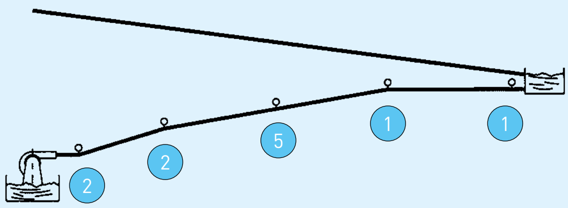
The mounting location on the pipeline should be chosen so that the pressure difference is not lower than 4 m water column in comparison to the pressure line. Otherwise, the sealing pressure required for tightness is unsufficient. For lower pressures open rising pipes are to be used.

We recommend to install a shut-off valve between pipe socket and air valve and this shut-off valve must remain open during operation.

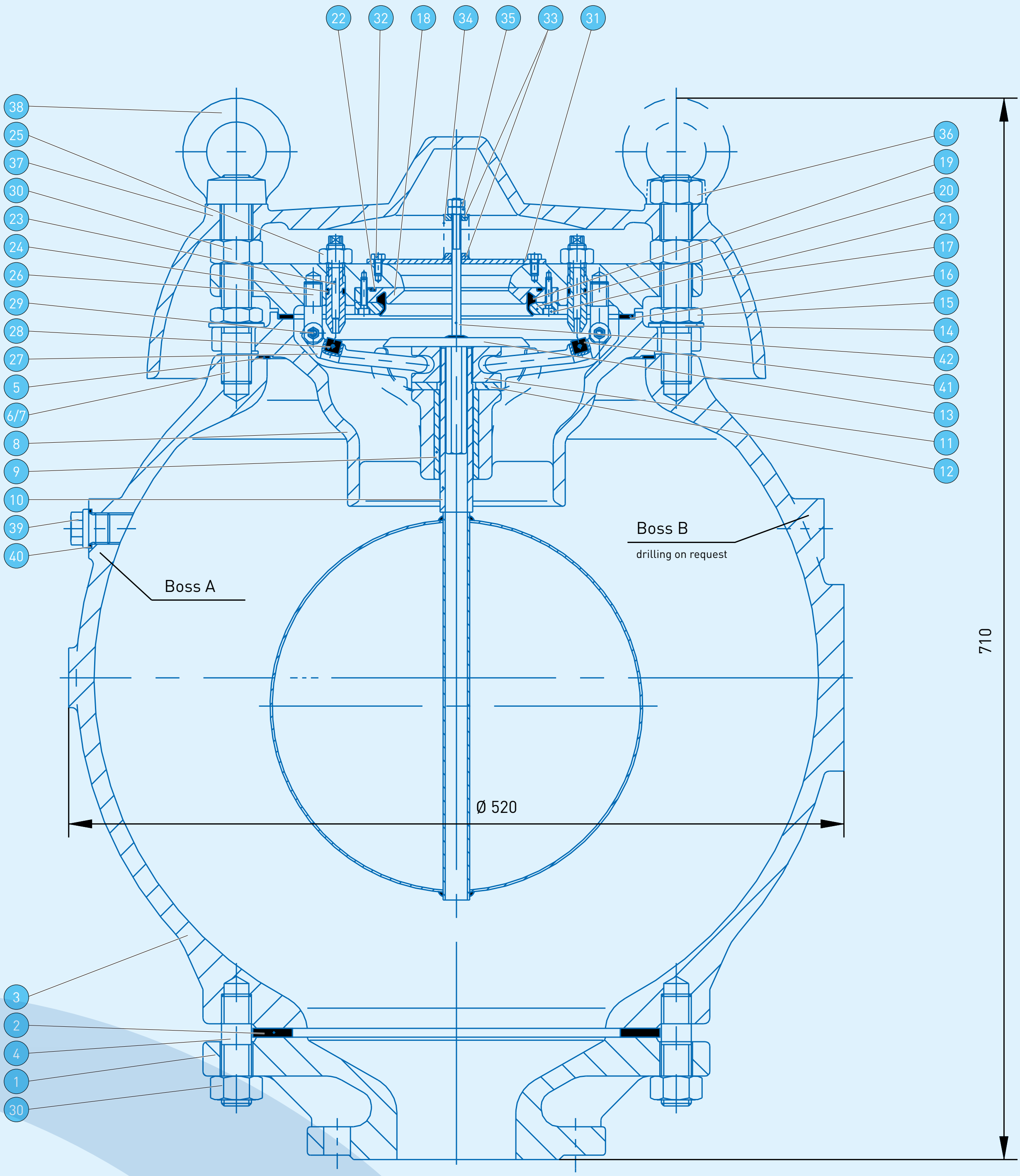
*Sloping pipe*




*Rising pipe*



# COMPONENTS AT A GLANCE



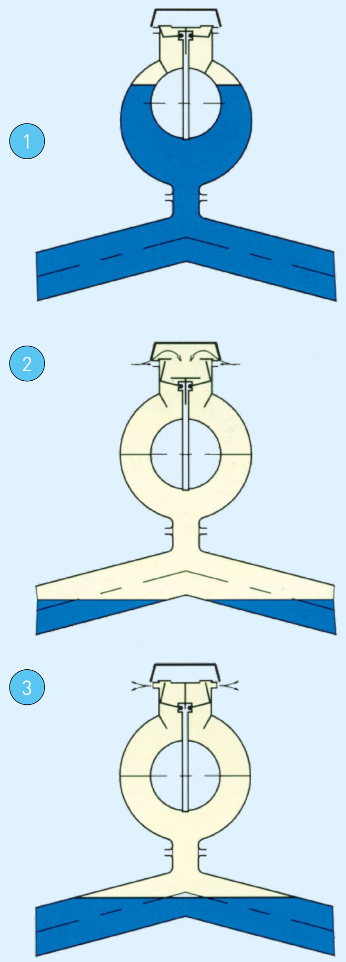
| No. | Component | No. | Component |
|---|---|---|---|
| 1 | Body | 22 | O-ring |
| 2 | Seal | 23 | Venting screw |
| 3 | Body | 24 | O-ring |
| 4 | Studs | 25 | Hexagon nut |
| 5 | Gasket | 26 | Fork bolt |
| 6 | Studs | 27 | Lever |
| 7 | Studs | 28 | Seal |
| 8 | Guide insert | 29 | Adjusting screw with nut |
| 9 | Bush | 30 | Hexagon nut |
| 10 | Float | 31 | Guide crosspiece |
| 11 | Threaded ring | 32 | Hexagon nut |
| 12 | Gasket | 33 | Spring plate |
| 13 | Valve disc | 34 | Pressure spring |
| 14 | Washer | 35 | Hexagon nut |
| 15 | Hexagon nut | 36 | Hexagon nut |
| 16 | Gasket | 37 | Bonnet |
| 17 | Body cover | 38 | Eye nut |
| 18 | Fastening ring | 39 | Screw plug |
| 19 | V-ring | 40 | Sealing ring |
| 20 | Clamping ring | 41 | Straight grooved pin |
| 21 | Socket head cap screw | 42 | Special nut |

# USE FOR REDUCTION OF PRESSURE FLUCTUATIONS

Typical modes of plants operation for the transport of waste water and sewage are:

- Intermittent pumping operation according to sewage volume.
- Direct and uncontrolled starting and operating of the pumps against the water column (without pump discharge valve).

These modes occur in the transport plant on pump start and stop, with positive and negative pressure waves results (waterhammer phenomena).




### Operation

Simple but very efficient:

- Under normal operating conditions the floating body is in its top position. The nozzle valves are closed **[1]**.
- In case of negative pressure wave the floating body drops. The nozzle valves open and air is sukked into the pipeline. The liquid level lowers accordingly **[2]**.
- As soon as the pressure wave is converted into positive pressure, the central valve disc closes the large nozzle. On this occasion the freely movable valve disc acts like a non-return valve. The air thus entrapped can now escape only through the two small nozzles – slowly and in a controlled manner. The two water columns are damped in this way and slowly flow towards each other. Their collision and the resultant consequences are avoided **[3]**.

### Protection against soiling

Under high air outflow conditions, soil particles are transported into the nozzles. For this reason the valve is set at the factory in such a way that the large nozzle will close automatically at about 21 l/sec. The remaining air will then be evacuated through the small nozzles at a reduced rate.

By arranging several sewage air valves in one pipeline, and thanks to the air cushion created, the pressure waves due to start or stop of pumps are attenuated and negative effects strongly reduced.

# ERHARD VALVES –
# FOR EACH APPLICATION

## Isolation valves

*ERHARD INFINITY*
*resilient seated gate valve*

*ERHARD ERU K1*
*knife gate valve*

*ERHARD*
*ball valve*

*ERHARD ECLI*
*butterfly valve*

*ERHARD*
*diaphragm valve*

## Security and control

*ERHARD RKV*
*needle valve*

*ERHARD DVP4*
*pressure reducing valve*

*ERHARD TWIN-AIR*
*air valve*

*ERHARD non slam*
*nozzle check valve*

*ERHARD SWING*
*check valve*

## Hydrants

*ERHARD Industrial*
*Hydrant 150*

*ERHARD*
*CITY hydrant*

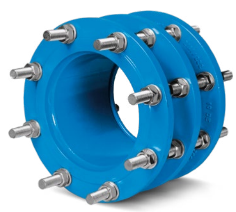
*ERHARD*
*post fire hydrant*

*ERHARD under-*
*ground fire hydrant*

## House connection

*ERHARD ABS Premium*
*service valve*

## Connection and repair



*ERHARD*
*dismantling joint*

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TALIS is the undisputed Number One for water transport and water flow control. TALIS has the best solutions available in the fields of water and energy management as well as for industrial and communal applications. We have numerous products for comprehensive solutions for the whole water cycle – from hydrants, butterfly valves and knife gate valves through to needle valves. Our experience, innovative technology, global expertise and individual consultation processes form the basis for developing long-term solutions for the efficient treatment of the vitally important resource "water".

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