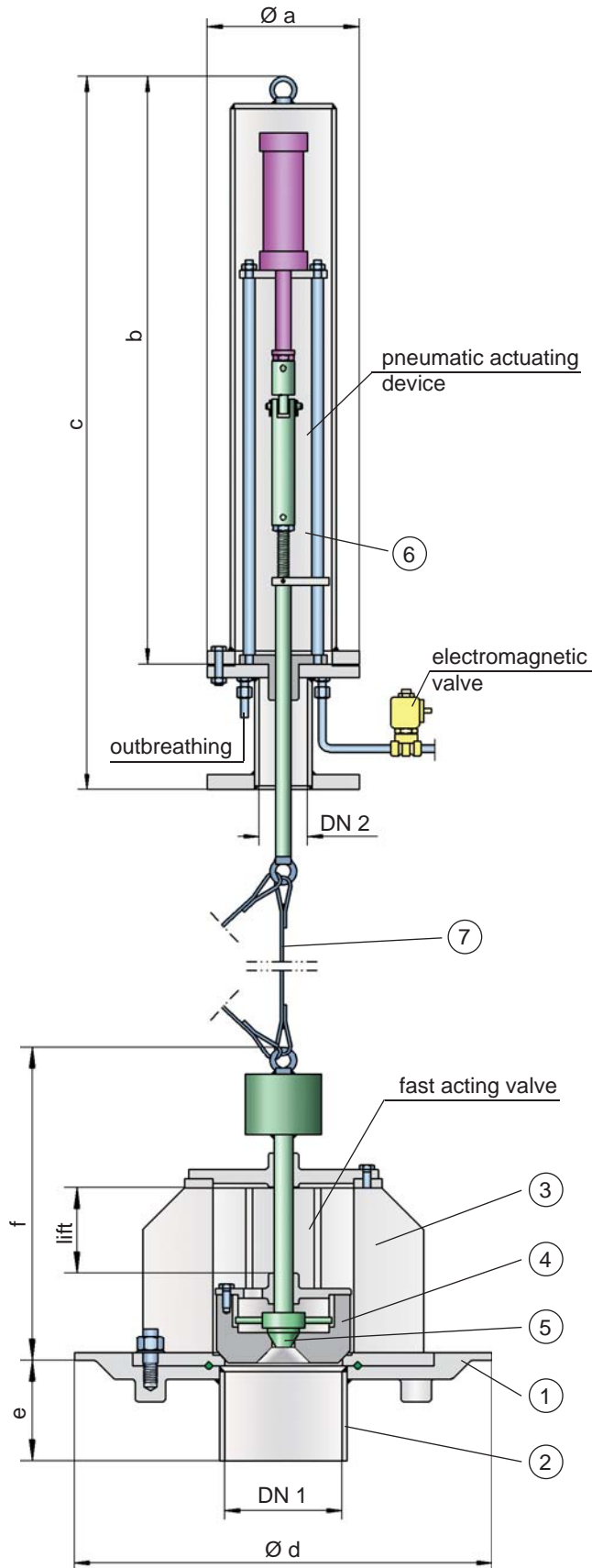




# In-tank Valve

with pneumatic actuator

## PROTEGO® NB/AP



### Function and Description

In-tank valves type NB/AP from PROTEGO® are applied to tank seal draining nozzles to avoid leakage during hazardous situations (pipe bursting). For this reason the devices are also called “Quick Shut off Bottom Drain Valves”. They are mainly used for low temperature liquefied medium (down to -196°C / -321°F) storage tanks.

The device essentially consists of the bottom plate (1), which has to be welded onto the vessel bottom, a nozzle (2), which is to be welded to the emptying line and the flanged fast acting valve (3) with valve piston (4) and release valve cone (5) and the complete pneumatic actuating device (6), which is mounted to the roof of the vessel. Through lapped metallic valve pallet and release vent cone the required leak tightness is achieved.

The fast acting valve (3) and the actuator system (6) are connected by an actuator rope (7). An additional emergency rope allows the opening of the fast acting valve if the main actuator rope is damaged.

During normal operation a pneumatic cylinder holds the device in the open position. The piston in the pneumatic cylinder is actuated by a control line. The piston rod is retracted with the actuation spindle to lift the valve piston and keeps the valve open during normal operation. In the emergency case a remote release through a control valve closes the bottom drain valve. To close the bottom drain valve the control valve is actuated to vent the pneumatic cylinder. The dead weight of the valve piston lets it fall down and closing the valve. The control function has to be designed in such a way that the valve closes by itself even during loss of energy (Fail-Safe-Concept).

The design of the device is independent of the nominal diameter. The nominal diameter DN 1 is preset by the emptying line – standard is DN 150mm / 6”.

Under normal operation the valves are working unpressurized. To re-open the valve after a quick-shut-off a pressure is considered which is resulting of the liquid column above and the pressure in the gas head space.

Material selection is in accordance to the product and the operating temperature.

The bottom plate is welded in the tank bottom. Size and weld seam must consider the engineering requisition.

If fast acting valve is open, drag coefficient amounts to 1,5

## Design Types and Specifications

**Table 1: Dimensions**

							Dimensions in mm / inches	
DN 1	DN 2	a	b	c	d	e	f	Hub
150 / 6"	80 / 3"	200 / 7.87	1130 / 44.49	1430 / 56.30	550 / 21.65	175 / 6.89	465 / 18.31	160 / 6.30
200 / 8"	80 / 3"	200 / 7.87	1130 / 44.49	1430 / 56.30	600 / 23.62	175 / 6.89	470 / 18.50	160 / 6.30
250 / 10"	80 / 3"	200 / 7.87	1130 / 44.49	1430 / 56.30	740 / 29.13	175 / 6.89	485 / 19.09	160 / 6.30

**Table 2: Material of fast action bottom drain valve**

Bottom plate with nozzle	*
Valve housing with valve cone	Stainless Steel
Gasket	*
Actuator rope	Stainless Steel

\* upon request

**Table 3: Material of actuating device**

Housing	Stainless Steel
Actuator spindle	Stainless Steel
Guide bushing	Copper
Gasket	PTFE
Protective cap	Stainless Steel
Pneumatic cylinder	Aluminium

**Table 4: Flange connection type DN 2**

EN 1092-1, Form B, PN 40 or upon request

### Selection and Design

The main process data and product properties of the stored medium as well as the temperature of the stored product determine the material for the specific valve. Subsequently the **nominal diameter** and the **type of connection** are checked and selected.

The in-tank valve is available in nominal diameters of DN 150 mm / 6" and DN 200 mm / 8", whereas the connection for the pneumatic actuating device has a nominal diameter of DN 80 mm / 3".

The length of the actuator rope and of the emergency rope is determined by the height of the tank. The final adjustment is completed during installation. The material for the gasket is determined based on the operating conditions and/or other special requirements.

The material of the valve bottom plate needs to be compatible to the material of the tank bottom plate. If the material of the bottom plate is provided by the tank manufacturer, then close coordination between manufacturing planning and installation planning is necessary.

For special requirements the valve and the actuation system (e.g. with inductive position indicator) can be supplied with a special design.

Deviations from our standard design will be sized and specified with the support of our engineers for the specific application.

### Necessary Data for Specification

Stored medium

Operating temperature T (°C or °F)

Operating pressure p (bar or psi)

Connection size DN 1

Tank height (m or ft)

### Application Example

