

# Waterworks



# BERMAD

Surge protection solutions

Water Control Solutions



## Surge protection solutions

Pressure Surge phenomena, caused by a sudden change in the speed of flow, may damage water systems and pipelines.

Start-up, shut-down or power-failure in pumping stations, sudden opening and closing of large valves and fire hydrants can create pressure surges that may end up causing significant leaks, serious breakdowns or accidents with consequences entailing heavy financial costs and even loss of life.

Pressure surge can also occur in the course of steady state flow due to a sudden break that creates positive and negative water gush in the water system.

Therefore protection of water supply networks against pressure surge damage is a must. This is a complicated issue, which requires an educated decision that combines knowledge and experience in selecting the most efficient technologies such as; air valves, control valves and surge tanks.

With more than 50 years of experience BERMAD provides comprehensive solutions. BERMAD's Application Engineers offer Surge Analysis services, using the most advanced water transient software to support optimal systems' designs with better surge protection.

This brochure provides you with an overview of the total package solution that BERMAD has to offer for protection against water surge.

For further detailed information please visit the BERMAD website [www.bermad.com](http://www.bermad.com) or contact your BERMAD representative.



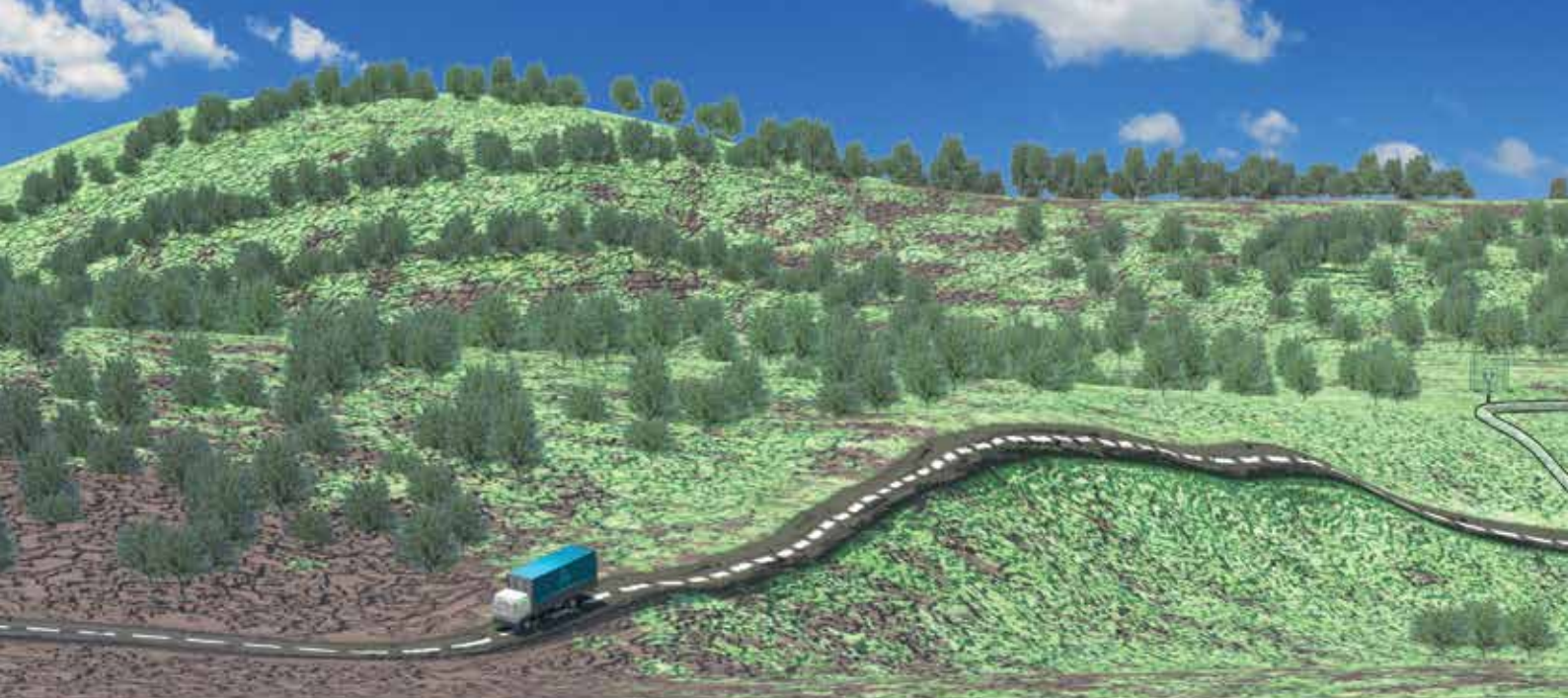


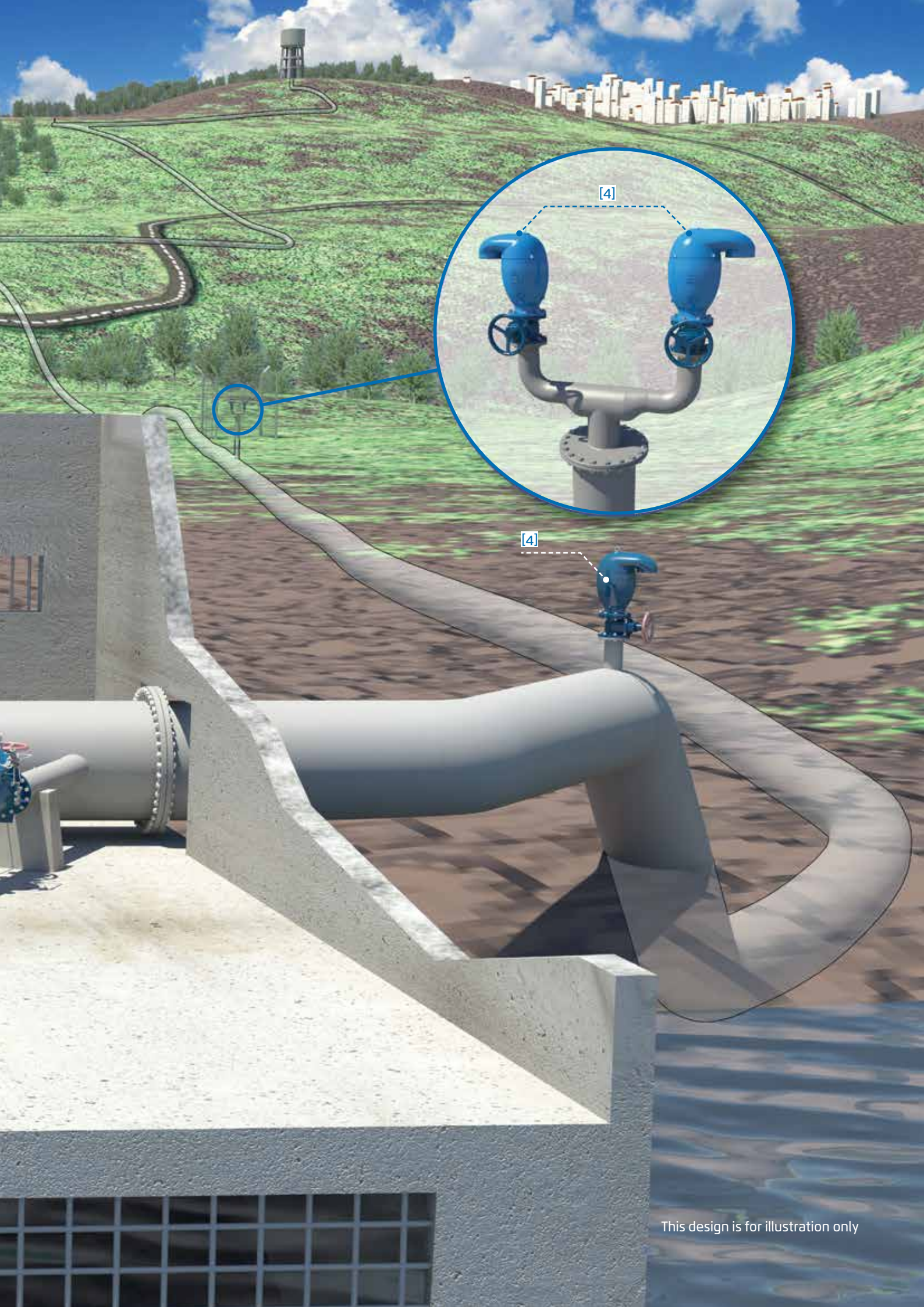
[5]

[4]

[6]

[2]





[4]

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This design is for illustration only

## [1] Active Check Pump Control Valve

Double chambered, hydraulically operated, active check pump control valve that opens fully or shuts off in response to electric signals.

It isolates the pump from the system during pump startup and shutdown, thereby preventing pipeline surges.



## [2] Circulating Pump Control Valve

Hydraulically operated, circulating pump control valve, that branches off the main line and synchronizes with the pump's electric control.

The valve operates during pump startup and shutdown, prevents startup flow debris penetration and pipeline surges.



## [3] Surge Anticipating Control Valve

Hydraulically/Electrically operated, off-line, excessive pressure relief and surge anticipating valve. The valve can be hydraulically operated by sensing line pressure and opens in response to a pressure drop associated with abrupt pump stoppage or electrically operated to open immediately at pump trip.

The pre-opened valve dissipates the returning high pressure wave, eliminating the surge, and then it smoothly closes as quickly as the relief feature allows preventing the closing surge.



## [4] Combination Air Valve with Surge Protection

The BERMAD C70-SP/AS is a combination air valve which evacuates air during pipeline filling, efficiently releases air pockets from pressurized pipes, and enables large volume air intake during network draining and vacuum conditions. In the event of a pressure surge, the surge protection disc device will decelerates the approaching water column. C70-SP/AS is typically used on pump stations and at specific pipeline locations to minimize pressure surges during pipe filling or power failure conditions at the pump station.



## [5] Surge Tank

The Pressure Bladder Tank (vessel) is designed to prevent surge (water hammer) in water supply or sewage systems. The vessel provides protection from both positive and negative pressure surges.

The bladder in the Tank creates a full separation between the air and the liquid; enabling the tank to operate longer and with no required maintenance.



## [6] Pump & Valve Controller

BERMAD's Controller synchronizes the control components of pumping stations. The controller is easy to install and operate; it includes several pre-programmed operation-modes that are based on BERMAD's vast accumulated know-how in pump stations control.



## Surge Anticipating UPS Controller

BERMAD's Controller, for surge anticipating valves in pump stations, is equipped with Un-interruptible Power Source (UPS) and rechargeable batteries. The controller is easily installed at the pump control panel and upon power failure it immediately energizes the solenoid for a preset time, allowing the system to eliminate the pressure surge.



# Design Tools

BERMAD Application Engineers offer surge analysis services and Air Valves sizing using the most advanced water transient software and BERMAD's internally developed and dedicated software to support optimal system design, with better surge protection.

## Main Softwares, used by BERMAD Engineers:

- KYPipe - Surge Software
- BERMAD AIR - Air Valves Sizing Program
- BERMAD SIZING - Valves Sizing Program
- BERSOFT

### KYPipe - Surge Software

Performing surge analysis in order to determine the required optimal protection measures to ensure effective and safe system operation in steady state and transient events.

The surge analysis procedure includes the following steps:

- Modeling and data verification (steady state regime)
- Transient analysis without any protection
- Running interactions with various protection measures to achieve optimal solution

A comprehensive analysis report is provided; includes recommended products and their settings.

### BERMAD AIR - Air Valves Sizing Program

Developed in house by BERMAD, this software optimizes the location and sizing of air valves in a specific project.

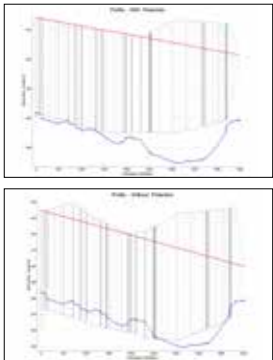
The Software has been designed as an engineering tool; enabling every air valve designer to make an informed decision regarding model selection for each air valve.

Combined with a simple interface and a clear and open calculation, the results enable the user to better understand the final results.

#### KYPipe Model



#### Profile - With / Without Protection




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