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Dynamic Pressure Variations in Water Supply Systems

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Warning

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Preamble

Every change in the operating conditions of water supply systems induces dynamic pressure and flow variations. These dynamic changes must be taken into account during the planning and operation of water supply systems as they may give rise to considerable damage.

The purpose of this Code of practice is to facilitate an understanding of unsteady flows in water supply systems and to give practical advice on the planning and operation of such systems with respect to dynamic variations of pressure. Furthermore, it contains information on requirements relating to the calculation and measurement of pressure surge.

As there is a wide variety of different water supply systems, approximation formulae for the calculation of unsteady flow processes beyond the determination of pressure surge according to Joukowsky have deliberately not been included. Experience has shown that the numerous pathways of approximation have only a limited scope of application and therefore cannot possess general validity. Application outside the boundaries of validity can lead to considerable faults in measurements. That is why it is as a rule advisable to call in proven experts.

The DVGW Instruction Bulletin W 303, first published in February 1993, was well received by expert circles. When reviewing the Instruction Bulletin in December 1990, the DVGW Working Group on "Problems of Pressure Surge" noted that some additions and amendments would be desirable while the overall concept should be retained. The amendments deal with structural vibrations as well as pumps which in counter-rotation are operated as turbines. In addition, an evaluation of measures aimed at controlling pressure surge was included. The revised Instruction Bulletin was published in the year 1994.

Since 1998, the members of the Working Group/Project Team "Problems of Pressure Surge" have completely revised the entire Instruction Bulletin in the endeavour to facilitate the understanding and enhance the precision of the information given.

The chapters:

- 5 Causes and effects of dynamic pressure variation on water supply systems
- 6 Measures aimed at limiting dynamic pressure variation
- 7 Advice on planning practice
- 8 Measurement of unsteady flows
- 9 Comments on operating practice

have been completely re-edited. As a result, it has now become much easier to clearly allocated and describe devices and measures mitigating pressure surge, furthermore, repetitions have been avoided. Thanks to the restructuring of chapters, readers will now be able to tell at a glance where to find information on specific issues such as on how and where pressure surge can occur, which measures are required to control pressure transients and on points to be noted with regards to unsteady flow during planning or operation. New parts to this document include information on controllers, on air and vacuum valves, process control technology, maintenance, inspection, repairs and on function tests of surge control devices.

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DVGW The German Technical and Scientific Association for Gas and Water