

ICS 23.060.40; 25.040.40
CCS N 16



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 17213.16-2015

Replacing GB/T 17213.16-2005

**Industrial-process control valves -- Part 8-4: Noise
considerations -- Prediction of noise generated by
hydrodynamic flow**

工业过程控制阀 第8-4部分：噪声的考虑 液动流流经控制阀产生的噪声预测方法
(English Translation)

Issued on: December 10, 2015

Implemented on: July 1, 2016

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

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Foreword

GB/T 17213 consists of the following parts, under the general title Industrial-process control valves.

- Part 1: Control valve terminology and general considerations (GB/T 17213.1);
- Part 2-1.Flow capacity - Sizing equations for fluid flow under installed conditions (GB/T 17213.2);
- Part 2-3.Flow capacity - Test procedures (GB/T 17213.9);
- Part 2-4.Flow capacity - Section Four. Inherent flow characteristics and rangeability (GB/T 17213.10);
- Part 2-5.Flow capacity - Sizing equations for fluid flow through multistage control valves with interstage recovery (GB/T 17213.17);
- Part 3-1.Dimensions - Face-to-face dimensions for flanged, two-way, globe-type, straight pattern and centre-to-face dimensions for flanged, two-way, globe-type, angle pattern control valves (GB/T 17213.3);
- Part 3-2.Dimensions - Face-to-face dimensions for rotary control valves except butterfly valves (GB/T 17213.11);
- Part 3-3.Dimensions - End-to-end dimensions for butt weld, two-way, globe-type, straight pattern control valves (GB/T 17213.12);
- Part 4: Inspection and routine testing (GB/T 17213.4);
- Part 5: Marking (GB/T 17213.5);

- Part 6-1.Mounting details for attachment of positioners to control valves - Section 1: Positioner mounting on linear actuators (GB/T 17213.6);
- Part 6-2.Mounting details for attachment of positioners to control valves - Positioner mounting on rotary actuators (GB/T 17213.13);
- Part 7: Control valve data sheet (GB/T 17213.7);
- Part 8-1.Noise considerations - Laboratory measurement of noise generated by aerodynamic flow through control valves (GB/T 17213.8);
- Part 8-2.Noise considerations - Laboratory measurement of noise generated by hydrodynamic flow through control valves (GB/T 17213.14);
- Part 8-3.Noise considerations - Control valve aerodynamic noise prediction terminology and general considerations (IEC 60534-1:2005, IDT)
- GB/T 17213.14-2005 Industrial-process control valves - Part 8-2.Noise considerations - Laboratory measurement of noise generated by hydrodynamic flow through control valves (IEC 60534-8-2:1991, IDT)
- GB/T 17213.15-2005 Industrial-process control valves - Part 8-3.Noise considerations - Control valve aerodynamic noise prediction method (IEC 60534-8-3:2000, IDT)

1 Scope

This Part of GB/T 17213 establishes a method to predict the noise generated in a control valve by liquid flow and the resulting noise level measured downstream of the valve and outside of the pipe. The noise may be generated both by normal turbulence and by liquid cavitation in the valve. Parts of the method are based on fundamental principles of acoustics, fluid mechanics, and mechanics. The method is validated by test data. Noise generated by flashing flow is not considered in this standard.

The transmission loss (TL) equations are based on analysis of the interaction between the sound waves inside the pipe and the coincidence frequencies in the wall of the pipe taking into account that commercial pipe tolerances allow a relatively wide variation in the thickness of the pipe wall. Ideal straight piping is assumed.

This Part is applicable to all conventional control valve styles including globe, butterfly, cage-type, eccentric rotary, and modified ball valves. Tests so far have only been conducted with water. The applicability of this method for fluids other than water is not known at this time.

This Part considers only noise generated by hydraulic turbulence and fluid cavitation.

It does not consider any noise that might be generated by mechanical vibrations, unstable flow patterns, and unpredictable behaviour. In the typical installation, very little noise travels

through the wall of the control valve body. The noise is measured at the standard measuring point of 1 m downstream of the valve and 1 m away from the outer surface of the pipe.

This prediction method has been validated with test results based on water covering more than 90 % of all known valve types at inlet pressures of up to 15 bar. This method is considered accurate within ± 5 dB (A) except in the range of $x_F = x_{FZ} \pm 0.1$ [when x_{FZ} is calculated using equations (3a) or (3b)].

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references,