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

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NATIONAL FOREWORD

See Eesti standard EVS-EN 60534-8-4:2015 sisaldab Euroopa standardi EN 60534-8-4:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 60534-8-4:2015 consists of the English text of the European standard EN 60534-8-4:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 04.12.2015.	Date of Availability of the European standard is 04.12.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Vannes de régulation des processus industriels - Partie 8-4: Considérations sur le bruit - Prévisions du bruit généré par un écoulement hydrodynamique (IEC 60534-8-4:2015)

Stellventile für die Prozessregelung - Teil 8-4: Geräuschbetrachtungen - Vorausberechnung der Geräuschemission für flüssigkeitsdurchströmte Stellventile (IEC 60534-8-4:2015)

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European foreword

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This document supersedes EN 60534-8-4:2005.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60534-1	-	Industrial-process control valves - Part 1: Control valve terminology and general considerations	EN 60534-1	-
IEC 60534-2-3	-	Industrial-process control valves - Part 2-3: Flow capacity - Test procedures	EN 60534-2-3	-
IEC 60534-8-2	-	Industrial-process control valves - Part 8-2: Noise considerations - Laboratory measurement of noise generated by hydrodynamic flow through control valves	EN 60534-8-2	-
IEC 60534-8-3	-	Industrial-process control valves - Part 8-3: Noise considerations - Control valve aerodynamic noise prediction method	EN 60534-8-3	-

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Symbols 7
5 Preliminary calculations 9
5.1 Pressures and pressure ratios 9
5.2 Characteristic presssure ratio x_{FZ} 9
5.3 Valve style modifier F_d 10
5.4 Jet diameter D_j 10
5.5 Jet velocity 10
5.6 Mechanical power W_m 10
6 Noise predictions 10
6.1 Internal sound pressure calculation 10
6.2 Transmission loss 13
6.3 External sound pressure calculation 14
7 Multistage trim 14
7.1 General 14
7.2 Preliminary calculations 15
7.3 Prediction of noise level 15
7.3.1 General criteria 15
7.3.2 Multistage devices (see Figures 1 and 3) 15
7.3.3 Fixed multistage devices with increasing flow areas (see Figure 2) 16
Annex A (informative) Examples of given data 21
Bibliography 31

Figure 1 – Examples of multistage trim in globe and rotary valves 16
Figure 2 – Example of fixed multistage device with increasing flow area 17
Figure 3 – Example of multistage trim in globe valve 17
Figure 4 – Globe valve (Cage trim, V-port plug) 18
Figure 5 – Globe valves (parabolic-plug) 18
Figure 6 – Multihole trims 19
Figure 7 – Eccentric rotary valves 19
Figure 8 – Butterfly valves 20
Figure 9 – Segmented ball valve – 90°travel 20
Figure A.1 – The influence of the x_{FZ} value on prediction accuracy 30

Table 1 – Numerical constants N 9
Table 2 – Typical values of $A\eta$ 11
Table 3 – Indexed third octave center frequencies and “A” weighting factors 13
Table A.1 – Calculation: Examples 1 to 3 22

INTRODUCTION

It is valuable to predict the noise levels that will be generated by valves. Safety requirements, such as the occupational health standards require that human exposure to noise be limited. There is also data indicating that noise levels above certain levels could lead to pipe failure or affect associated equipment. See IEC 60534-8-3. Earlier hydrodynamic noise standards relied on manufacturer test data and were neither generic nor as complete as desired. The method can be used with all conventional control valve styles including globe, butterfly, cage type, eccentric rotary, and modified ball valves.

A valve restricts flow by converting pressure energy into turbulence, heat and mechanical pressure waves in the fluid contained within the valve body and piping. A small portion of this mechanical vibration is converted into acoustical energy. Most of the noise is retained within the piping system with only a small portion passing through the pipe wall downstream of the valve. Calculation of the mechanical energy involved is straightforward. The difficulties arise from determining first the acoustic efficiency of the mechanical energy to noise conversion and then the noise attenuation caused by the pipe wall.

This part of IEC 60534 considers only noise generated by normal turbulence and liquid cavitation. It does not consider any noise that might be generated by mechanical vibrations, flashing conditions, unstable flow patterns, or unpredictable behaviour. In the typical installation, very little noise travels through the wall of the control valve body. The noise predicted is that which would be measured at the standard measuring point of 1 m downstream of the valve and 1 m away from the outer surface of the pipe in an acoustic free field. Ideal straight piping is assumed. Since an acoustic free field is seldom encountered in industrial installations, this prediction cannot guarantee actual results in the field.

This prediction method has been validated with test results based on water covering a majority of control valve types, in the DN 15 to DN 300 size range, at inlet pressures up to 15 bar. However, some types of low noise valves may not be covered. This method is considered accurate within ± 5 dB(A), for most cases, if based on tested values of x_{FZ} using the method from IEC 60534-8-2. The applicability of this method for fluids other than water is not known at this time.