SLOVENSKI STANDARD
SIST EN 60534-2-3:2016

01-julij-2016

Nadomešča:
SIST EN 60534-2-3:1998

Regulacijski ventili za industrijske procese - 2-3. del: Kapaciteta pretoka - Preskusni postopki (IEC 60534-2-3:2015)

Industrial-process control valves -- Part 2-3: Flow capacity - Test procedures (IEC 60534 -2-3:2015)

Stellventile für die Prozessregelung - Teil 2-3: Durchflusskapazität - Prüfverfahren (IEC 60534-2-3:2015)

Vannes de régulation des processus industriels - Partie 2-3: Capacité d'écoulement - Procédures d'essais (IEC 60534-2-3:2015)

Ta slovenski standard je istoveten z: **EN 60534-2-3:2016**

ICS:

23.060.40	Tlačni regulatorji	Pressure regulators
25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control

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EUROPEAN STANDARD

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EN 60534-2-3

April 2016

ICS 23.060.40; 25.040.40

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English Version

Industrial-process control valves - Part 2-3: Flow capacity - Test procedures (IEC 60534-2-3:2015)

Vannes de régulation des processus industriels -
Partie 2-3: Capacité d'écoulement - Procédures d'essais
(IEC 60534-2-3:2015)

Stellventile für die Prozessregelung -
Teil 2-3: Durchflusskapazität - Prüfverfahren
(IEC 60534-2-3:2015)

This European Standard was approved by CENELEC on 2016-01-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

The text of document 65B/1025/FDIS, future edition 3 of IEC 60534-2-3, prepared by SC 65B “Measurement and control devices” of IEC/TC 65 “Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60534-2-3:2016.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2016-10-20
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-01-20

This document supersedes EN 60534-2-3:1998.

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Endorsement notice

The text of the International Standard IEC 60534-2-3:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60751:2008	NOTE	Harmonized as EN 60751:2008 (not modified).

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 60534-2-1	2011	Industrial-process control valves - Part 2-1: Flow capacity - Sizing equations for fluid flow under installed conditions	EN 60534-2-1	2011
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 61298-1	-	Process measurement and control devices - General methods and procedures for evaluating performance - Part 1: General considerations	EN 61298-1	-
IEC 61298-2	-	Process measurement and control devices - General methods and procedures for evaluating performance - Part 2: Tests under reference conditions	EN 61298-2	-

IEC 60534-2-3

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INTERNATIONAL STANDARD

colour inside

Industrial-process control valves – Part 2-3: Flow capacity – Test procedures

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL-PROCESS CONTROL VALVES –

Part 2-3: Flow capacity – Test procedures

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60534-2-3 has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation.

The third edition cancels and replaces the second edition published in 1997, of which it constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Addition of informative Annexes B, C, D, E and F.
b) Organizational and formatting changes were made to group technically related subject matter.

The text of this standard is based on the following documents:

FDIS	Report on voting
65B/1025/FDIS	65B/1028/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60534 series, published under the general title *Industrial-process control valves*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INDUSTRIAL-PROCESS CONTROL VALVES –

Part 2-3: Flow capacity – Test procedures

1 Scope

This part of IEC 60534 is applicable to industrial-process control valves and provides the flow capacity test procedures for determining the following variables used in the equations given in IEC 60534-2-1:

a) flow coefficient C;

b) liquid pressure recovery factor without attached fittings F_L;

c) combined liquid pressure recovery factor and piping geometry factor of a control valve with attached fittings F_{LP};

d) piping geometry factor F_P;

e) pressure differential ratio factors x_T and x_{TP};

f) valve style modifier F_d;

g) Reynolds number factor F_R.

2 Normative references

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.

IEC 60534-1, *Industrial-process control valves – Part 1: Control valve terminology and general considerations*

IEC 60534-2-1:2011, *Industrial-process control valves – Part 2-1: Flow capacity – Sizing equations for fluid flow under installed conditions*

IEC 60534-8-2, *Industrial-process control valves – Part 8-2: Noise considerations – Laboratory measurement of noise generated by hydrodynamic flow through control valves*

IEC 61298-1, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 1: General considerations*

IEC 61298-2, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 2: Tests under reference conditions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60534-1, IEC 60534-2-1, IEC 61298-1, and IEC 61298-2 apply.

4 Symbols

Symbol	Description	Unit
C	Flow coefficient (K_v, C_v)	Various (see IEC 60534-1)
C_R	Flow coefficient at rated travel	Various (see IEC 60534-1)
d	Nominal valve size (DN)	mm
F_d	Valve style modifier	1
F_F	Liquid critical pressure ratio factor	1
F_L	Liquid pressure recovery factor of a control valve without attached fittings	1
F_{LP}	Combined liquid pressure recovery factor and piping geometry factor of a control valve with attached fittings	1
F_P	Piping geometry factor	1
F_R	Reynolds number factor	1
F_γ	Specific heat ratio factor	1
M	Molecular mass of flowing fluid	kg/kmol
N	Numerical constants (see Table 3)	Various (see Note 1)
p_c	Thermodynamic critical pressure	kPa or bar (see Note 2)
p_v	Vapour pressure of liquid at inlet temperature	kPa or bar
p_1	Inlet absolute static pressure measured at the upstream pressure tap	kPa or bar
p_2	Outlet absolute static pressure measured at the downstream pressure tap	kPa or bar
Δp	Differential pressure ($p_1 - p_2$) between upstream and downstream pressure taps	kPa or bar
Δp_{max}	Maximum pressure differential	kPa or bar
$\Delta p_{max(L)}$	Maximum effective Δp without attached fittings	kPa or bar
$\Delta p_{max(LP)}$	Maximum effective Δp with attached fittings	kPa or bar
Q	Volumetric flow rate	m^3/h (see Note 3)
Q_{max}	Maximum volumetric flow rate (choked flow conditions)	m^3/h
$Q_{max(L)}$	Maximum volumetric flow rate for incompressible fluids (choked flow conditions without attached fittings)	m^3/h
$Q_{max(LP)}$	Maximum volumetric flow rate for incompressible fluids (choked flow conditions with attached fittings)	m^3/h
$Q_{max(T)}$	Maximum volumetric flow rate for compressible fluids (choked flow conditions without attached fittings)	m^3/h
$Q_{max(TP)}$	Maximum volumetric flow rate for compressible fluids (choked flow conditions with attached fittings)	m^3/h
Re_v	Valve Reynolds number	1
T_1	Inlet absolute temperature	K
t_s	Reference temperature for standard conditions	°C
X	Ratio of pressure differential to inlet absolute pressure ($\Delta p/p_1$)	1
x_T	Pressure differential ratio factor of a control valve without attached fittings for choked flow	1
x_{TP}	Pressure differential ratio factor of a control valve with attached fittings for choked flow	1
Y	Expansion factor	1
Z	Compressibility factor (Z = 1 for gases that exhibit ideal gas behaviour)	1
γ	Specific heat ratio	1
ν	Kinematic viscosity	m^2/s (see Note 4)
ζ	Velocity head loss coefficient of a reducer, expander or other fitting attached to a control valve	1
ρ_1/ρ_o	Relative density (ρ_1/ρ_o = 1 for water at 15 °C)	1