

Industrial-process control valves —

Part 2: Flow capacity —

Section 3: Test procedures

The European Standard EN 60534-2-3:1993 has the status of a British Standard

UDC 621.646.2-553.4:681.523:681.533.38:620.1

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Industrial-process Measurement and Control Standards committee (PCL/-) to Technical Committee PCL/1 upon which the following bodies were represented:

- British Gas Corporation
- British Pressure Gauge Manufacturers' Association
- Department of Energy (Gas Standards)
- Electricity Supply Industry in England and Wales
- Energy Industries Council
- Engineering Equipment and Materials Users' Association
- GAMBICA (BEAMA Ltd)
- Institution of Gas Engineers
- National Coal Board
- STC Water Regulations and Fittings Scheme

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Chemical Engineering Contractors' Association
- British Valve Manufacturers' Association Ltd.
- Department of Trade and Industry

This British Standard, having been prepared under the direction of the Industrial-process Measurement and Control Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 October 1984

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Amendments issued since publication

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National foreword

This Part of BS 5793 has been prepared under the direction of the Industrial-process Measurement and Control Standards Committee. It is identical with IEC Publication 534-2-3:1983 “*Industrial-process control valves. Part 2 Flow capacity Section 3 Test procedures*” published by the International Electrotechnical Commission (IEC). This Section of BS 5793, together with Section 2.1, supersedes BS 4740-1, which is withdrawn.

In 1993 the European Committee for Electrotechnical Standardization (CENELEC) accepted IEC 534-2-3:1993 as European Standard EN 60534-2-3:1993. As a consequence of implementing the European Standard this British Standard is renumbered as BS EN 60534-2-3 and any reference to BS 5793-2.3 should be read as a reference to BS EN 60534-2-3.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards.

Cross-references

International Standard	Corresponding British Standard
IEC 534-2-1:1978	BS 5793 <i>Specification for industrial-process control valves Part 2: Flow capacity</i> Section 2.1:1979 <i>Sizing equations for incompressible fluid flow under installed conditions</i> (Identical)
IEC 534-2-2:1980	Section 2.2:1981 <i>Sizing equations for compressible fluid flow under installed conditions</i> (identical)

The Technical Committee has reviewed the provisions of IEC Publication 534-1, to which reference is made in the text, and has decided they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Industrial-process, control valves, flow coefficient, test procedures of flow coefficient for control valves

English version

Industrial-process control valves

Part 2: Flow capacity

Section 3: Test procedures

(IEC 534-2-3:1983)

Vannes de régulation des processus industriels
Deuxième partie: Capacité d'écoulement
Section trois: Procédures d'essai
(CEI 534-2-3:1983)

Stellventile für die Prozeßregelung
Teil 2: Durchflußkapazität
Hauptabschnitt drei: Prüfverfahren
(IEC 534-2-3:1983)

This European Standard was approved by CENELEC on 1992-12-09. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 534-2-3:1983 could be accepted without textural changes, has shown that no common modifications were necessary for the acceptance as a European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60534-2-3 on 9 December 1992.

The following dates were fixed:

- latest date of publication of
an identical national standard (dop) 1993-12-01
- latest date of withdrawal of
conflicting national standards (dow) 1993-12-01

Annexes designated “normative” are part of the body of the standard. In this standard, Annex ZA is normative.

1 Scope

This standard 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 Publications 534-2: Industrial-process Control Valves, Part 2: Flow Capacity, Section 1. Sizing Equations for Incompressible Fluid Flow under Installed Conditions, and 534-2-2: Part 2: Flow Capacity, Section 2. Sizing Equations for Compressible Fluid Flow under Installed Conditions:

- flow coefficient C ;
- liquid pressure recovery factor F_L ;
- combined liquid pressure recovery factor and piping geometry factor F_{LP} ;
- piping geometry factor F_P ;
- pressure differential ratio factors x_T and x_{TP} .

Test procedures are not given for the liquid critical pressure ratio factor F_F , and Reynolds number factor F_R ; however, comments regarding their determination are included.

2 Definitions

For the purpose of this standard, the definitions given in IEC Publications 534-1: Industrial-process Control Valves, Part 1: General Considerations, 534-2 and 534-2-2, shall apply.

3 Nomenclature

<i>Symbol</i>	<i>Description</i>	<i>Unit</i>
C	Flow coefficient (A_v , K_v , C_v)	Various (see IEC Publication 534-1)
d	Nominal valve size (DN)	mm
F_F	Liquid critical pressure ratio factor	Dimensionless
F_L	Liquid pressure recovery factory of a control valve without attached fittings	Dimensionless
F_{LP}	Combined liquid pressure recovery factor and piping geometry factor of a control valve with attached fittings	Dimensionless
F_P	Piping geometry factor	Dimensionless
F_R	Reynolds number factor	Dimensionless
F_Y	Specific heat ratio factor	Dimensionless
M	Molecular mass of flowing fluid	Dimensionless
N_1, N_9	Numerical constants (see Table III)	Various
p_c	Thermodynamic critical pressure	kPa or bar (see Note 1)
p_v	Vapour pressure of liquid at inlet temperature	kPa or bar
p_1	Inlet absolute pressure measured at the upstream pressure tap	kPa or bar
p_2	Outlet absolute pressure measured at the downstream pressure tap	kPa or bar
Δp	Pressure differential between upstream and downstream pressure taps ($p_1 - p_2$)	kPa or bar
$\Delta p_{\max}$	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 2)