

Process measurement and control devices — General methods and procedures for evaluating performance —

Part 2: Tests under reference conditions

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- British Gas plc
- British Nuclear Fuels plc
- Electrical Contractors Association
- Electricity Association
- Energy Industries Council
- GAMBICA (BEAMA Ltd.)
- Health and Safety Executive
- Institution of Gas Engineers

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

- British Pressure Gauge Manufacturers' Association
- Department of Trade and Industry (National Engineering Laboratory)
- Department of Trade and Industry (Services Management Division)
- Engineering Industries Association
- Institute of Materials
- Institution of Electrical Engineers

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National foreword

This British Standard has been prepared by Technical Committee GEL/65, and is the English language version of EN 61298-2:1995 *Process measurement and control devices — General methods and procedures for evaluating performance — Part 2: Tests under reference conditions*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 1298-2:1995 published by the International Electrotechnical Commission (IEC).

IEC 1298 consists of the following parts under the general title *Process measurement and control devices — General methods and procedures for evaluating performance*.

- *Part 1: General considerations;*
- *Part 2: Tests under reference conditions;*
- *Part 3: Tests for the effects of influence quantities;*
- *Part 4: Evaluation report content.*

Additional information. The notes in Annex A have been added by CENELEC.

Cross-references

Publication referred to	Corresponding British Standard
EN 60546-1:1993 (IEC 546-1:1987)	BS EN 60546 <i>Controllers with analogue signals for use in industrial-process control systems.</i> BS EN 60546-1:1993 <i>Methods for evaluating performance</i>
EN 61010-1:1993 (IEC 1010-1:1990)	BS EN 61010 <i>Safety requirements for electrical equipment for measurement, control and laboratory use</i> BS EN 61010-1:1993 <i>General requirements</i>
EN 61298-1:1995 (IEC 1298-1:1995)	BS EN 61298 <i>Process measurement and control devices — General methods and procedures for evaluating performance</i> BS EN 61298-1:1996 <i>General considerations</i>

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 18, 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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English version

Process measurement and control devices
General methods and procedures for evaluating
performance
Part 2: Tests under reference conditions
(IEC 1298-2:1995)

Dispositifs de mesure et de commande de
processus
Méthodes et procédures générales d'évaluation
des performances
Partie 2: Essais dans les conditions de référence
(CEI 1298-2:1995)

Prozeßmeß-, -steuer- und -regelgeräte
Allgemeine Methoden und Verfahren für die
Bewertung des Betriebsverhaltens
Teil 2: Prüfungen unter Referenzbedingungen
(IEC 1298-2:1995)

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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.

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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

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Foreword

The text of document 65B/229/DIS, future edition 1 of IEC 1298-2, prepared by SC 65B, Devices, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61298-2 on 1995-09-20.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-07-01

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. In this standard, Annex ZA is normative and Annex A is informative. Annex ZA has been added by CENELEC.

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Introduction

This standard is not intended as a substitute for existing standards, but is rather intended as a reference document for any future standards developed within the IEC or other standards organizations, concerning the evaluation of process instrumentation. Any revision of existing standards should take this standard into account.

This common standardized basis should be utilised for the preparation of future relevant standards, as follows:

- Any test method or procedure, already treated in this standard, should be specified and described in the new standard by referring to the corresponding clause of this standard.
- Any particular method or procedure, not covered by this standard, should be developed and specified in the new standard in accordance with the criteria, as far as they are applicable, stated in this standard.
- Any conceptual or significant deviation from the content of this standard, should be clearly identified and justified if introduced in a new standard.

1 Scope

This International Standard specifies general methods and procedures for conducting tests and reporting on the functional and performance characteristics of process measurement and control devices. The methods and procedures specified in this standard are applicable to any kind of test or to any type of process measurement and control device. The tests are applicable to any such devices characterized by their own specific input and output variables, and by the specific relationship (transfer function) between the inputs and outputs, and include analogue and digital devices. For devices that require special tests, this standard shall be used, together with any product specific standard specifying special tests.

This part covers tests made under reference conditions.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 1298. At the time of the publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1298 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standard.

IEC 546-1:1987, *Controllers with analogue signals for use in industrial-process control systems — Part 1: Methods of evaluating the performance.*

IEC 902:1987, *Industrial-process measurement and control — Terms and definitions.*

IEC 1010-1:1990, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements.*
Amendment No. 1 (1992)

IEC 1298-1, *Process measurement and control devices — General methods and procedures for evaluating performance — Part 1: General considerations.*

3 Definitions

For the purpose of this part of IEC 1298 the following definitions apply. Those marked with an asterisk (*) are identical with those given in IEC 902, but that document has additional notes.

3.1 DUT

the device under test

3.2 variable*

a quantity or condition whose value is subject to change and can usually be measured (e.g., temperature, flow rate, speed, signal, etc.)

3.3 signal*

physical variable, one or more parameters of which carry information about one or more variables which the signal represents

3.4 range*

region of the values between the lower and upper limits of the quantity under consideration

3.5 span*

algebraic difference between the upper and lower limit values of a given range

3.6
set point*

a signal representing the reference variable

NOTE It may be manually set, automatically set, or programmed.

3.7
inaccuracy*

maximum positive and negative deviation from the specified characteristic curve observed in testing a device under specified conditions and by a specified procedure

3.8
error*

algebraic difference between the measured value and the true value of the measured variable

NOTE The error is positive when the measured value is greater than the true value. The error is generally expressed as a percentage of the relevant ideal span.

3.9
maximum measured error

largest positive or negative value of error of the average upscale or downscale value at each point of measurement

3.10
non-conformity

deviation from conformity

NOTE Conformity is defined in IEC 902.

3.11
non-linearity

deviation from linearity

NOTE 1 Linearity is defined in IEC 902.

NOTE 2 Non-conformity and non-linearity do not include hysteresis.

3.12
non-repeatability

See definition of repeatability error in IEC 902.

3.13
hysteresis

property of a device or instrument whereby it gives different output values in relation to its input values depending on the directional sequence in which the input values have been applied

3.14
dead band*

finite range of values within which variation of the input variable does not produce any noticeable change in the output variable

3.15
adjustability

smallest possible change in output produced by a change to the adjusting mechanism

3.16
dead time*

time interval between the instant when the variation of an input variable is produced, and the instant when the consequent variation of the output variable starts (see IEC 902, Figure 1-2)

3.17
rise time*

for a step response, the time interval between the instant when the output signal, starting from zero, reaches a small specified percentage (for instance 10 %) of the final steady-state value, and the instant when it reaches for the first time a specified large percentage (for instance 90 %) of the same steady state value (see IEC 902, Figure 1-2)

3.18
settling time

time interval between the step change of an input signal, and the instant when the resulting variation of the output signal does not deviate more than a specified tolerance from its final steady state value. For this standard, a tolerance of 1 % is adopted

3.19
step response time

time from a step change in the input signal to a system for the change in output of the system to reach for the first time 90 % of its final steady state value (see IEC 902, Figure 1-2)

3.20
time constant*

time required to complete 63,2 % of the total rise or decay of the output of a first-order linear system, initiated by a step or an impulse to the input

3.21
transient overshoot*

for a step response, the maximum transient deviation from the final steady state value of the output variable, expressed in % of the difference between the final and the original steady state values

3.22
unexpected event

device breakdown, failure to work, anomaly, or inadvertent damage occurring during an evaluation which requires correction by the device manufacturer