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TEISENDUS

Gas meters - Conversion devices - Part 1: Volume
conversion

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12405-1:2021 sisaldab Euroopa standardi EN 12405-1:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 12405-1:2021 consists of the English text of the European standard EN 12405-1:2021.
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English Version

Gas meters - Conversion devices - Part 1: Volume conversion

Compteurs de gaz - Dispositifs de conversion - Partie 1
: Conversion de volume

Gaszähler - Umwerter - Teil 1: Volumenumwertung

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword.....	16
1 Scope.....	18
2 Normative references.....	18
3 Terms, definitions and symbols.....	21
3.1 Terms and definitions.....	21
3.2 Symbols.....	25
3.3 Classification.....	27
3.3.1 Mechanical classes.....	27
3.3.2 Electromagnetic environmental classes.....	27
4 Principle of measurement.....	27
4.1 Conversion as a function of temperature.....	27
4.2 Conversion as a function of pressure and temperature.....	27
4.3 Conversion as a function of pressure, temperature and deviation from the ideal gas law.....	28
4.4 Correction of the volume at measurement conditions.....	28
5 Rated operating conditions.....	29
5.1 Specified field of measurement.....	29
5.1.1 General.....	29
5.1.2 Specified measurement range for gas pressure.....	29
5.1.3 Specified measurement range for gas temperature.....	29
5.1.4 Gas characteristics.....	29
5.1.5 Base conditions.....	30
5.2 Environmental conditions.....	30
5.2.1 Ambient temperature range.....	30
5.2.2 Humidity range.....	30
5.2.3 Mechanical environment.....	30
5.2.4 Electromagnetic environment.....	30
5.3 Power supply.....	30
6 Construction requirements.....	30
6.1 General.....	30
6.2 Casings.....	32
6.3 Indications.....	32
6.3.1 General.....	32
6.3.2 Electronic indicating device.....	34
6.4 Inputs for volume conversion.....	34
6.5 Battery powered conversion device.....	34
6.6 Security devices and alarms.....	35
7 Installation requirements.....	36
7.1 General.....	36
7.2 Temperature transducer.....	37
7.3 Pressure transducer.....	37
8 Performance.....	37
8.1 Reference conditions.....	37

8.2	Rated operating conditions.....	38
8.3	Maximum permissible errors	38
8.3.1	General	38
8.3.2	Error of conversion.....	39
8.3.3	Specific errors for a gas-volume conversion device, type 2	39
8.4	Conditions of matching the constituent elements of a conversion device type 2	40
8.5	Influence factors	40
8.6	Disturbances.....	40
8.7	Durability.....	41
8.8	Repeatability.....	41
8.9	Reliability.....	41
9	Tests of conformity	41
9.1	Verification of the construction requirements.....	41
9.2	Verification of the performance requirements (type tests).....	41
9.2.1	Test conditions	41
9.2.2	Samples of gas volume conversion device type 1 required for testing.....	42
9.2.3	Samples of gas volume conversion devices type 2 required for testing.....	46
9.2.4	Test report	46
10	Marking.....	46
11	Installation and operating instructions	47
Annex A	(normative) Type test.....	48
A.1	General conditions	48
A.1.1	General	48
A.1.2	Additional conditions specific to gas volume conversion devices type 1	48
A.1.3	Additional conditions specific to gas-volume conversion devices type 2	48
A.1.4	Test procedures	49
A.1.4.1	Test procedure 1 (PR1)	49
A.1.4.1.1	Test conditions.....	49
A.1.4.1.2	Performance of the test.....	49
A.1.4.1.2.1	T conversion.....	49
A.1.4.1.2.2	PT and PTZ conversion.....	49
A.1.4.2	Test procedure 2 (PR2)	50
A.1.4.3	Test procedure 3 (PR3)	50
A.1.4.4	Test procedure 4 (PR4)	50
A.1.4.5	Test procedure 5 (PR5)	50
A.1.5	Verification of the construction requirements.....	50
A.2	Accuracy tests under reference conditions.....	50
A.2.1	Objective	50
A.2.2	Reference to documents.....	51
A.2.3	Procedure	51
A.2.4	Acceptance criteria	51
A.3	Effect of ambient temperature.....	51

A.3.1	Objective.....	51
A.3.2	Reference to documents	51
A.3.3	Procedure.....	51
A.3.4	Acceptance criteria.....	51
A.4	Effect of damp heat, steady-state test	51
A.4.1	Objective.....	51
A.4.2	Reference to documents	51
A.4.3	Procedure.....	51
A.4.4	Acceptance criteria.....	52
A.5	Effect of damp heat, cyclic test.....	52
A.5.1	Objective.....	52
A.5.2	Reference to documents	52
A.5.3	Procedure.....	52
A.5.4	Acceptance criteria.....	52
A.6	Electrical power variation	53
A.6.1	Objective.....	53
A.6.2	Reference to documents	53
A.6.3	Procedure.....	53
A.6.4	Acceptance criteria.....	53
A.7	Short time power reductions.....	53
A.7.1	Objective.....	53
A.7.2	Reference to documents	53
A.7.3	Procedure.....	53
A.7.4	Acceptance criteria.....	54
A.8	Electrical bursts.....	54
A.8.1	Objective.....	54
A.8.2	Reference to documents	54
A.8.3	Procedure.....	54
A.8.4	Acceptance criteria.....	54
A.9	Electromagnetic susceptibility.....	54
A.9.1	Objective.....	54
A.9.2	Reference to documents	54
A.9.3	Procedure.....	54
A.9.4	Acceptance criteria.....	55
A.10	Electrostatic discharges.....	55
A.10.1	Objective.....	55

A.10.2 Reference to documents.....	55
A.10.3 Procedure	55
A.10.4 Acceptance criteria	55
A.11 Overload of pressure (only for type 1 and pressure transducers).....	55
A.11.1 Objective	55
A.11.2 Reference to documents.....	55
A.11.3 Procedure.....	55
A.11.4 Acceptance criteria	56
A.12 Effect of vibrations	56
A.12.1 Objective	56
A.12.2 Reference to documents.....	56
A.12.3 Procedure	56
A.12.4 Acceptance criteria	56
A.13 Effect of shocks	56
A.13.1 Objective	56
A.13.2 Reference to documents.....	56
A.13.3 Procedure	56
A.13.4 Acceptance criteria	57
A.14 Overload of pressure (mechanical)	57
A.14.1 Objective	57
A.14.2 Reference to documents.....	57
A.14.3 Procedure	57
A.14.4 Acceptance criteria	57
A.15 Durability	57
A.15.1 Objective	57
A.15.2 Reference to documents.....	57
A.15.3 Procedure	58
A.15.4 Acceptance criteria	58
A.16 Alarms operation.....	58
A.16.1 Objective	58
A.16.2 Reference to documents.....	58
A.16.3 Procedure	58
A.16.4 Acceptance criteria	58
A.17 Repeatability.....	59
A.17.1 Objective	59
A.17.2 Reference to standards.....	59

A.17.3	Procedure.....	59
A.17.4	Acceptance criteria.....	59
A.18	Short time DC power variations.....	59
A.18.1	Objective.....	59
A.18.2	Reference to standards.....	59
A.18.3	Procedure.....	59
A.18.4	Acceptance criteria.....	59
A.19	Surges on supply lines and/or signal lines.....	60
A.19.1	Objective.....	60
A.19.2	Reference to standards.....	60
A.19.3	Procedure.....	60
A.19.4	Acceptance criteria.....	60
A.20	Power frequency magnetic field.....	60
A.20.1	Objective.....	60
A.20.2	Reference to standards.....	60
A.20.3	Procedure.....	60
A.20.4	Acceptance criteria.....	60
A.21	Functionality “Error curve correction” of a gas meter (optional).....	61
A.21.1	Objective.....	61
A.21.2	Reference to documents.....	61
A.21.3	Procedure.....	61
A.21.4	Acceptance criteria.....	61
Annex B (normative)	Pressure transducers.....	62
B.1	Scope.....	62
B.2	Rated operating conditions.....	62
B.2.1	Specified measurement range for pressure.....	62
B.2.2	Environmental class.....	62
B.2.3	Power supply.....	62
B.3	Construction requirements.....	62
B.3.1	General.....	62
B.3.2	Casings.....	62
B.3.3	Indications.....	62
B.3.3.1	General.....	62
B.3.3.2	Electronic indicating device.....	63
B.4	Performances.....	63
B.4.1	Reference conditions.....	63

B.4.2	Rated operating conditions.....	63
B.4.3	Maximum permissible errors	63
B.4.4	Influence factors	63
B.4.5	Disturbances.....	63
B.4.6	Durability	63
B.5	Tests of conformity	64
B.5.1	Test conditions	64
B.5.2	Tests	64
B.5.3	Sample of pressure transducers required for testing.....	64
B.6	Marking.....	64
Annex C	(normative) Platinum resistance thermometer sensors	65
C.1	Scope	65
C.2	Operating rated conditions.....	65
C.2.1	Specified measurement range for temperature.....	65
C.2.2	Environmental class	65
C.3	Construction requirements	65
C.4	Performances.....	65
C.5	Marking.....	66
C.5.1	Required markings	66
C.5.2	Verification mark.....	66
C.6	Metrological verifications.....	66
C.6.1	Type approval.....	66
C.6.2	Initial verification.....	66
C.7	Verification procedure	67
C.7.1	Visual inspection.....	67
C.7.2	Type testing (type approval).....	67
C.7.3	Samples of PRT required for testing.....	67
C.7.4	Initial verification.....	67
Annex D	(normative) Temperature transducers	69
D.1	Scope	69
D.2	Rated operating conditions.....	69
D.2.1	Specified measurement range for temperature.....	69
D.2.2	Environmental class	69
D.2.3	Power supply.....	69
D.3	Construction requirements	69
D.3.1	General	69

D.3.2	Casings	69
D.3.3	Indications	69
D.3.3.1	General	69
D.3.3.2	Electronic indicating device	70
D.4	Performances	70
D.4.1	Reference conditions	70
D.4.2	Rated operating conditions	70
D.4.3	Maximum permissible errors	70
D.4.4	Influence factors	70
D.4.5	Disturbances	70
D.4.6	Durability	70
D.5	Tests of conformity	71
D.5.1	Test conditions	71
D.5.2	Tests	71
D.5.3	Sample of temperature transducers required for testing	71
D.6	Marking	71
Annex E (informative)	Model type test report for conversion devices	72
E.1	General	72
E.1.1	General remarks	72
E.1.2	Number of pages	72
E.1.3	Laboratory's identification	72
E.1.4	Applicant	72
E.1.5	Identification of device(s) submitted for testing	72
E.2	Accuracy tests under reference conditions	72
E.2.1	Ambient temperature during the test	72
E.2.2	Test equipment used	73
E.2.3	Test results	73
E.3	Ambient temperature	74
E.3.1	Effect of dry heat	74
E.3.1.1	Ambient temperature during the test	74
E.3.1.2	Test equipment used	74
E.3.1.3	Test results	74
E.3.2	Effect of cold	75
E.3.2.1	Ambient temperature during the test	75
E.3.2.2	Test equipment used	75
E.3.2.3	Test results	75

E.4	Effect of damp heat, steady-state test.....	76
E.4.1	Ambient temperature during the test.....	76
E.4.2	Test equipment used.....	76
E.4.3	Test results.....	77
E.4.3.1	Before the application of the test.....	77
E.4.3.2	During the application of the test.....	77
E.4.3.3	After the application of the test.....	78
E.5	Effect of damp heat, cyclic test.....	78
E.5.1	Ambient temperature during the test.....	78
E.5.2	Test equipment used.....	78
E.5.3	Test results.....	78
E.5.3.1	Before the cyclic test.....	78
E.5.3.2	After the cyclic test.....	79
E.6	Electrical power variation.....	79
E.6.1	AC power supply.....	79
E.6.1.1	Test equipment used.....	79
E.6.1.2	Test results.....	79
E.6.1.2.1	Variation in voltage.....	79
E.6.1.2.2	Variation in frequency.....	80
E.6.2	DC power supply or battery supply.....	81
E.6.2.1	Test equipment used.....	81
E.6.2.2	Test results.....	81
E.7	Short time power reductions.....	82
E.7.1	Test equipment used.....	82
E.7.2	Test results.....	82
E.7.2.1	Before the application of the perturbation.....	82
E.7.2.2	During the application of the perturbation.....	83
E.7.2.3	Error shift calculation.....	83
E.8	Electrical bursts.....	83
E.8.1	Test equipment used.....	83
E.8.2	Test results.....	83
E.8.2.1	Mains power.....	83
E.8.2.1.1	Before the application of the perturbation.....	83
E.8.2.1.2	During the application of the perturbation.....	84
E.8.2.1.3	Error shift calculation.....	84
E.8.2.2	In/out connections.....	84

E.8.2.2.1	Before the application of the perturbation	84
E.8.2.2.2	During the application of the perturbation.....	84
E.8.2.2.3	Error shift calculation	84
E.9	Electromagnetic immunity	85
E.9.1	Test equipment used.....	85
E.9.2	Test results.....	85
E.9.2.1	Before the application of the perturbation.....	85
E.9.2.2	During the application of the perturbation	85
E.9.2.3	Error shift calculation	85
E.10	Electrostatic discharges.....	85
E.10.1	Test equipment used.....	85
E.10.2	Test results	86
E.10.2.1	Before the application of the perturbation	86
E.10.2.2	During the application of the perturbation.....	86
E.10.2.3	Error shift calculation	86
E.11	Effect of an overload of static pressure.....	86
E.11.1	Ambient temperature during the test	86
E.11.2	Test equipment used.....	86
E.11.3	Test results	86
E.11.3.1	Before the application of the perturbation.....	86
E.11.3.2	After the application of the perturbation	87
E.11.3.3	Error shift calculation	87
E.12	Effect of vibrations.....	87
E.12.1	Ambient temperature during the test	87
E.12.2	Test equipment used.....	87
E.12.3	Test results	88
E.12.3.1	Before the application of the test.....	88
E.12.3.2	After the application of the test	88
E.13	Effect of shocks.....	88
E.13.1	Ambient temperature during the test	88
E.13.2	Test equipment used.....	89
E.13.3	Test results	89
E.13.3.1	Before shocks	89
E.13.3.2	After the application of the perturbation	89
E.13.3.3	Error shift calculation	89
E.14	Mechanical resistance to overload of static pressure.....	89

E.14.1 Ambient temperature during the test.....	89
E.14.2 Test equipment used.....	89
E.14.3 Test results.....	90
E.15 Durability	90
E.15.1 Ambient temperature during the test.....	90
E.15.2 Test equipment used.....	90
E.15.3 Test equipment used.....	90
E.15.3.1 Before durability	90
E.15.3.2 After durability	91
E.15.3.3 Error shift calculation.....	92
E.16 Alarms operation.....	93
E.16.1 Ambient temperature during the test.....	93
E.16.2 Test equipment used.....	93
E.16.3 Test results.....	93
E.17 Repeatability.....	93
E.18 Short time DC power variations	93
E.18.1 Test equipment used.....	93
E.18.2 Test results.....	94
E.18.2.1 Before the application of the perturbation.....	94
E.18.2.2 During the application of the perturbation.....	94
E.18.2.3 Error shift calculation.....	94
E.19 Surges on supply lines and/or signal lines.....	94
E.19.1 Test equipment used.....	94
E.19.2 Test results.....	95
E.19.2.1 Before the application of the perturbation.....	95
E.19.2.2 After the application of the perturbation.....	95
E.19.2.3 Error shift calculation.....	95
E.20 Power frequency magnetic field	95
E.20.1 Test equipment used.....	95
E.20.2 Test results.....	96
E.20.2.1 Before the application of the perturbation.....	96
E.20.2.2 During the application of the perturbation	96
E.20.2.3 Error shift calculation.....	96
Annex F (informative) Model type test report for associated transducers	97
F.1 General	97
F.1.1 General remarks	97

F.1.2	Number of pages.....	97
F.1.3	Laboratory's identification.....	97
F.1.4	Applicant.....	97
F.1.5	Identification of device(s) submitted for testing.....	97
F.2	Accuracy tests under reference conditions.....	97
F.2.1	Ambient temperature during the test.....	97
F.2.2	Test equipment used.....	97
F.2.3	Test results.....	98
F.3	Ambient temperature.....	98
F.3.1	Effect of dry heat.....	98
F.3.1.1	Ambient temperature during the test.....	98
F.3.1.2	Test equipment used.....	99
F.3.1.3	Test results.....	99
F.3.2	Effect of cold.....	99
F.3.2.1	Ambient temperature during the test.....	99
F.3.2.2	Test equipment used.....	99
F.3.2.3	Test results.....	100
F.4	Effect of damp heat, steady-state test.....	100
F.4.1	Ambient temperature during the test.....	100
F.4.2	Test equipment used.....	100
F.4.3	Test results.....	100
F.4.3.1	Before the application of the test.....	100
F.4.3.2	During the application of the test.....	101
F.4.3.3	After the application of the test.....	101
F.5	Effect of damp heat, cyclic test.....	101
F.5.1	Ambient temperature during the test.....	101
F.5.2	Test equipment used.....	101
F.5.3	Test results.....	102
F.5.3.1	Before the application of the test.....	102
F.5.3.2	After the cyclic test.....	102
F.6	Electrical power variation.....	102
F.6.1	AC power supply.....	102
F.6.1.1	Test equipment used.....	102
F.6.1.2	Test results.....	102
F.6.1.2.1	Variation in voltage.....	102
F.6.1.2.2	Variation in frequency.....	103

F.6.2 DC power supply or battery supply.....	103
F.6.2.1 Test equipment used.....	103
F.6.2.2 Test results.....	104
F.7 Short time power reductions.....	104
F.7.1 Ambient temperature during the test.....	104
F.7.2 Test equipment used.....	104
F.7.3 Test results.....	104
F.7.3.1 Before the application of the perturbation.....	104
F.7.3.2 During the application of the perturbation.....	104
F.7.3.3 Error shift calculation.....	105
F.8 Electrical bursts.....	105
F.8.1 Ambient temperature during the test.....	105
F.8.2 Test equipment used.....	105
F.8.3 Test results.....	105
F.8.3.1 Mains power.....	105
F.8.3.1.1 Before the application of the perturbation.....	105
F.8.3.1.2 During the application of the perturbation.....	105
F.8.3.1.3 Error shift calculation.....	105
F.8.3.2 In/out connections.....	106
F.8.3.2.1 Before the application of the perturbation.....	106
F.8.3.2.2 During the application of the perturbation.....	106
F.8.3.2.3 Error shift calculation.....	106
F.9 Electromagnetic immunity.....	106
F.9.1 Ambient temperature during the test.....	106
F.9.2 Test equipment used.....	106
F.9.3 Test results.....	106
F.9.3.1 Before the application of the perturbation.....	106
F.9.3.2 During the application of the perturbation.....	107
F.9.3.3 Error shift calculation.....	107
F.10 Electrostatic discharges.....	107
F.10.1 Ambient temperature during the test.....	107
F.10.2 Test equipment used.....	107
F.10.3 Test results.....	107
F.10.3.1 Before the application of the perturbation.....	107
F.10.3.2 During the application of the perturbation.....	107
F.10.3.3 Error shift calculation.....	108

F.11	Effect of an overload of static pressure	108
F.11.1	General	108
F.11.2	Ambient temperature during the test	108
F.11.3	Test equipment used.....	108
F.11.4	Test results	108
F.11.4.1	Before the application of the perturbation	108
F.11.4.2	After the application of the perturbation	109
F.11.4.3	Error shift calculation	109
F.12	Effect of vibrations.....	109
F.12.1	Ambient temperature during the test	109
F.12.2	Test equipment used.....	109
F.12.3	Test results	110
F.12.3.1	Before the application of the test.....	110
F.12.3.2	After the application of the test	110
F.13	Effect of shocks.....	110
F.13.1	Ambient temperature during the test	110
F.13.2	Test equipment used.....	110
F.13.3	Test results	111
F.13.3.1	Before shocks	111
F.13.3.2	After shocks	111
F.13.3.3	Error shift calculation	111
F.14	Mechanical resistance to overload of static pressure.....	111
F.14.1	General	111
F.14.2	Ambient temperature during the test	111
F.14.3	Test equipment used.....	111
F.14.4	Test results	111
F.15	Durability	112
F.15.1	Ambient temperature during the test	112
F.15.2	Test equipment used.....	112
F.15.3	Test results	112
F.15.3.1	Before durability.....	112
F.15.3.2	After durability	113
F.15.3.3	Error shift calculation	113
F.16	Repeatability.....	114
Annex G (normative)	Individual testing before putting into service	115
G.1	Objective.....	115

G.2	Reference to documents.....	115
G.3	Procedure	115
G.4	Acceptance criteria	115
Annex ZA (Informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2014/32/EU Measuring Instruments Directive	117
Bibliography		122

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European foreword

This document (EN 12405-1:2021) has been prepared by Technical Committee CEN/TC 237 “Gas meters”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12405-1:2018.

The main changes in EN 12405-1:2021 compared with the previous edition EN 12405-1:2018 are:

- new table for relevant tests for the conversion device;
- reference added to natural gas according to EN 16726 and biomethane according to EN 16723-1;
- additional information on service life of battery;
- modification of parameters during installation and adjustment in the factory or on site;
- new optional functionality “Error curve correction” of a gas meter;
- new normative annex “Individual testing before putting into service”.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

EN 12405 consists of the following parts:

- Part 1: Volume conversion (this European standard);
- Part 2: Energy conversion;
- Part 3: Flow computer.

In the preparation of this European standard, the content of OIML Publication, “International Document 11 D11:2013”, and “International Recommendations 140” and the content of member bodies’ national standards on gas-volume electronic conversion devices have been taken into account.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This document specifies the requirements and tests for the construction, performance, safety and conformity of gas-volume electronic conversion devices associated to gas meters, used to measure volumes of fuel gases of the 1st and 2nd families according to EN 437.

This document is intended for type testing, the detailed relevant provisions of which are given in Annex A.

Only three kinds of conversion are treated in this document:

- conversion as a function of temperature only (called T conversion);
- conversion as a function of the pressure and of the temperature with constant compression factor (called PT conversion);
- conversion as a function of the pressure, the temperature and taking into account the compression factor (called PTZ conversion).

This document is not relevant to temperature conversion integrated into gas meters which only indicate the converted volume.

Gas-volume conversion devices consist of a calculator and a temperature transducer or a calculator, a temperature transducer and a pressure transducer locally installed.

For application of this document, a conversion device may be, as a choice of the manufacturer, considered as a complete instrument (Type 1) or made of separate elements (Type 2), according to the definitions given in 3.1.20.1 and 3.1.20.2.

In this last case, the provisions concerning pressure transducers, temperature sensors and temperature transducers are given in Annexes B, C and D respectively.

Any conversion device can provide an error curve correction for a gas meter.

NOTE When rendering an account to an end user the readings from the conversion device can be used in conjunction with the readings from a gas meter conforming to EN 1359, EN 12480, or EN 12261, as appropriate, or to any other appropriate and relevant international or national standard for gas meters, without prejudice of national regulations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 437:2018, *Test gases — Test pressures — Appliance categories*

EN 1776:2015, *Gas infrastructure — Gas measuring systems — Functional requirements*

EN 16723-1:2016, *Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network — Part 1: Specifications for biomethane for injection in the natural gas network*

EN 16726:2015+A1:2018, *Gas infrastructure — Quality of gas — Group H*

EN 55011:2016,¹⁾ *Industrial, scientific and medical equipment — Radio-frequency disturbance characteristics — Limits and methods of measurement (CISPR 11:2015, modified)*

¹⁾ As impacted by EN 55011:2016/A1:2017, EN 55011:2016/A11:2020.

- EN 60068-2-1:2007, *Environmental testing — Part 2-1: Tests — Tests A: Cold* (IEC 60068-2-1:2007)
- EN 60068-2-2:2007, *Environmental testing — Part 2-2: Tests — Tests B: Dry heat* (IEC 60068-2-2:2007)
- EN 60068-2-30:2006, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle)* (IEC 60068-2-30:2005)
- EN 60068-2-31:2008, *Environmental testing — Part 2-31: Tests — Test Ec: Rough handling shocks, primarily for equipment-type specimens* (IEC 60068-2-31:2008)
- EN 60068-2-64:2008,²⁾ *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance* (IEC 60068-2-64:2008)
- EN 60068-2-78:2013, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state* (IEC 60068-2-78:2012)
- EN 60068-3-1:2012, *Environmental testing — Part 3-1: Supporting documentation and guidance — Cold and dry heat tests* (IEC 60068-3-1:2011)
- EN IEC 60079-0:2018, *Explosive atmospheres — Part 0: Equipment — General requirements* (IEC 60079-0:2017)
- EN 60079-1:2014,³⁾ *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d"* (IEC 60079-1:2014)
- EN 60079-2:2014, *Explosive atmospheres — Part 2: Equipment protection by pressurized apparatus "p"* (IEC 60079-2:2014)
- EN 60079-5:2015, *Explosive atmospheres — Part 5: Equipment protection by powder filling "q"* (IEC 60079-5:2015)
- EN 60079-6:2015, *Explosive atmospheres — Part 6: Equipment protection by oil immersion "o"* (IEC 60079-6:2015)
- EN 60079-7:2015, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e"* (IEC 60079-7:2015)
- EN 60079-11:2012, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i"* (IEC 60079-11:2011)
- EN 60079-25:2010,⁴⁾ *Explosive atmospheres — Part 25: Intrinsically safe systems* (IEC 60079-25:2010)
- EN 60529:1991,⁵⁾ *Degrees of protection provided by enclosures (IP code)* (IEC 60529:1989)

²⁾ As impacted by EN 60068-2-64:2008/A1:2019.

³⁾ As impacted by EN 60079-1:2014/AC:2018-09.

⁴⁾ As impacted by EN 60079-25:2010/AC:2013.

⁵⁾ As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

EN 60730-1:2016,⁶⁾ *Automatic electrical controls — Part 1: General requirements (IEC 60730-1:2013, modified + COR1:2014)*

EN 60751:2008, *Industrial platinum resistance thermometer and platinum temperature sensors (IEC 60751:2008)*

EN 60950-1:2006,⁷⁾ *Information technology equipment — Safety — Part 1: General requirements (IEC 60950-1:2005, modified)*

EN 61000-4-2:2009, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test (IEC 61000-4-2:2008)*

EN 61000-4-3:2006,⁸⁾ *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3 COMPIL:2010)*

EN 61000-4-4:2013, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4:2012)*

EN 61000-4-5:2014,⁹⁾ *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (IEC 61000-4-5:2014)*

EN 61000-4-6:2014, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013)*

EN 61000-4-8:2010, *Electromagnetic compatibility (EMC) — Part 4-8: Testing and measurement techniques — Power frequency magnetic field immunity test (IEC 61000-4-8:2009)*

EN 61000-4-11:2004,¹⁰⁾ *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004)*

EN 61000-4-29:2001, *Electromagnetic compatibility (EMC) — Part 4-29: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests (IEC 61000-4-29:2000)*

EN ISO 12213-2:2009, *Natural gas — Calculation of compression factor — Part 2: Calculation using molar-composition analysis (ISO 12213-2:2006)*

EN ISO 12213-3:2009, *Natural gas — Calculation of compression factor — Part 3: Calculation using physical properties (ISO 12213-3:2009)*

⁶⁾ As impacted by EN 60730-1:2016/A1:2019.

⁷⁾ As impacted by EN 60950-1:2006/AC:2011, EN 60950-1:2006/A11:2009, EN 60950-1:2006/A1:2010, EN 60950-1:2006/A12:2011, EN 60950-1:2006/A12:2013.

⁸⁾ As impacted by EN 61000-4-3:2006/A1:2008 and EN 61000-4-3:2006/A2:2011.

⁹⁾ As impacted by EN 61000-4-5:2014/A1:2017.

¹⁰⁾ As impacted by EN 61000-4-11:2004/A1:2017.