



# SLOVENSKI STANDARD

## SIST EN 12405-3:2016

01-februar-2016

---

### Plinomeri - Korektorji - 3. del: Računalnik pretoka

Gas meters - Conversion devices - Part 3: Flow computer

Gaszähler - Umwerter - Teil 3: Ergänzendes Element

Compteurs de gaz - Dispositifs de conversion - Partie 3 : Calculateurs de débit

Ta slovenski standard je istoveten z: **EN 12405-3:2015**

[SIST EN 12405-3:2016](https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016)

<https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016>

#### **ICS:**

91.140.40      Sistemi za oskrbo s plinom      Gas supply systems

**SIST EN 12405-3:2016**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 12405-3:2016

<https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016>

EUROPEAN STANDARD

EN 12405-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2015

ICS 91.140.40

English Version

## Gas meters - Conversion devices - Part 3: Flow computer

Compteurs de gaz - Dispositifs de conversion - Partie 3:  
Calculateurs de débit

Gaszähler - Umwerter - Teil 3: Flowcomputer

This European Standard was approved by CEN on 19 September 2015.

CEN 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 CEN-CENELEC Management Centre or to any CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

[SIST EN 12405-3:2016](https://standards.iteh.ai/catalog/standards/sist/2fc8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016)

<https://standards.iteh.ai/catalog/standards/sist/2fc8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

<b>Contents</b>	<b>Page</b>
European foreword.....	5
Introduction .....	6
<b>1 Scope</b> .....	<b>8</b>
<b>2 Normative references</b> .....	<b>8</b>
<b>3 Terms, definitions and symbols</b> .....	<b>10</b>
3.1 Terms and definitions .....	10
3.2 Symbols and subscripts .....	16
3.3 Abbreviations .....	18
3.4 Environmental classification for flow computers .....	18
3.4.1 Climatic conditions.....	18
3.4.2 Mechanical conditions.....	18
3.4.3 Electrical and Electromagnetic conditions .....	18
<b>4 Principle of measurement</b> .....	<b>18</b>
4.1 General.....	18
4.2 Correction functions.....	19
4.2.1 General.....	19
4.2.2 Correction of the volume at measurement conditions.....	20
4.2.3 Temperature and pressure correction of USM body dimension.....	23
4.2.4 Temperature and pressure measurement correction for conversion .....	23
<b>5 Rated operating conditions</b> .....	<b>23</b>
5.1 Specified field of measurement.....	23
5.1.1 General.....	23
5.1.2 Specified measurement range for gas pressure.....	23
5.1.3 Specified measurement range for gas temperature.....	24
5.1.4 Gas characteristics.....	24
5.1.5 Base conditions.....	24
5.2 Environmental conditions .....	24
5.2.1 Ambient temperature range .....	24
5.2.2 Humidity range .....	24
5.3 Power supply .....	24
<b>6 Construction requirements</b> .....	<b>25</b>
6.1 General.....	25
6.2 Sealing.....	25
6.3 Time measuring functions .....	27
6.3.1 Clock.....	27
6.3.2 Time interval .....	27
6.4 Casings .....	28
6.5 Indications .....	28
6.5.1 General.....	28
6.5.2 Electronic indicating device .....	30
6.6 Inputs for volume conversion.....	30
6.7 Alarms in flow computer .....	31
6.7.1 Detection of defective operation situations .....	31

6.7.2	Handling of volumes during maintenance .....	31
6.7.3	Memorization of metrological data.....	31
6.7.4	Handling of alarms .....	31
6.8	Specific monitoring functions performed by flow computer.....	31
6.8.1	General .....	31
6.8.2	Turbine Meter health check (Mechanical meter) .....	33
6.8.3	USM health check (meter integrity check) .....	34
6.8.4	Gas analysis devices health check .....	35
6.8.5	<i>p</i> -T transducer health check.....	36
6.8.6	Self check of the Z algorithm.....	36
6.8.7	Volume comparison .....	36
6.8.8	Gas quality comparison .....	38
6.9	Cut-off function.....	38
6.10	Long-term data storage .....	38
6.10.1	General .....	38
6.10.2	Categories of data to be stored .....	39
6.10.3	Triggers and methods for storage .....	39
6.10.4	Clock-time stamps .....	40
6.10.5	Security (physical, electronic and software) .....	40
6.10.6	Error handling .....	41
6.10.7	Long term data storage – Security audit.....	41
7	Installation requirements .....	42
7.1	General .....	42
7.2	Calculator.....	43
7.3	Temperature transducer.....	43
7.4	Pressure transducer.....	43
8	Performance.....	44
8.1	Reference conditions.....	44
8.2	Rated operating conditions.....	44
8.3	Maximum permissible errors.....	44
8.3.1	General .....	44
8.3.2	Global approach: error of main indication.....	45
8.3.3	Modular approach: specific errors for a FC.....	45
8.4	Conditions of matching the constituent elements of a FC.....	45
8.5	Influence factors .....	46
8.6	Disturbances.....	46
8.7	Durability.....	46
8.8	Repeatability .....	46
8.9	Reliability .....	46
8.10	Adjustment and calibration of the transducers.....	47
9	Tests of conformity .....	47
9.1	Verification of the construction requirements.....	47
9.2	Verification of the performance requirements .....	48
9.2.1	Test conditions .....	48
9.2.2	Samples of FC required for testing .....	49
10	Marking .....	50
11	Installation and operating instructions .....	51
Annex A	(normative) Type test.....	52
A.1	General conditions .....	52
A.2	Accuracy tests under reference conditions.....	54

A.3	Effect of ambient temperature .....	55
A.4	Effect of damp heat, steady-state test .....	55
A.5	Effect of damp heat, cyclic test.....	56
A.6	Electrical power variation .....	56
A.7	Short time power reductions .....	57
A.8	Electrical bursts .....	58
A.9	Electromagnetic susceptibility.....	58
A.10	Electrostatic discharges.....	59
A.11	Overload of pressure (only for pressure transducers) .....	59
A.12	Effect of vibrations.....	60
A.13	Effect of shocks.....	60
A.14	Overload of pressure (mechanical) (only for pressure transducer).....	61
A.15	Durability .....	61
A.16	Alarms operation .....	62
A.17	Repeatability.....	63
A.18	Short time DC power variations.....	63
A.19	Surges on supply lines and/or signal lines .....	64
A.20	Power frequency magnetic field .....	64
Annex B	(normative) Pressure transducers.....	65
B.1	Scope .....	65
B.2	Rated operating conditions .....	65
B.3	Construction requirements.....	65
B.4	Performances .....	66
B.5	Tests of conformity.....	67
B.6	Marking.....	67
Annex C	(normative) Temperature transducers.....	68
C.1	Scope .....	68
C.2	Rated operating conditions.....	68
C.3	Construction requirements.....	68
C.4	Performances .....	69
C.5	Tests of conformity.....	70
C.6	Marking.....	70
Annex D	(normative) Requirements and testing of meter error correction.....	71
D.1	General.....	71
D.2	Verification of the volumetric flow rate determination.....	71
D.3	Verification of the gas density calculation procedure .....	71
D.4	Verification of the gas viscosity calculation procedures .....	72
D.5	Verification of the error transposition from $e(Q_i)$ to $e(Re_i)$ .....	72
D.6	Verification of the error function $\delta(Q)$ or $\delta(Re)$ interpolation or approximation.....	73
D.7	Verification of correction factor $F(Q)$ or $F(Re)$ , corrected flow rate and corrected volume determination.....	73
D.8	Verification of the activation and deactivation of error correction calculations on limits of its application.....	73
Annex E	(informative) Range of application of meter error correction with functions: $e(Q)$ or $e(Re)$ .....	74
E.1	General.....	74
E.2	Range of application.....	74
E.3	Example for turbine meters working at $p_{op}$ nearly constant.....	75
Bibliography	.....	77

## European foreword

This document (EN 12405-3:2015) 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 June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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

EN 12405 consists of the following parts:

- Part 1: Volume conversion (and its amendments EN 12405-1:2005/A1:2006 and EN 12405-1:2005+A2:2010 to allow the harmonization of the standard with the Measuring Instruments Directive 2004/22/EC);
- Part 2: Energy conversion;
- Part 3: flow computer (this European Standard).

In the preparation of this European Standard, the content of OIML Publication, “Recommendation 140 – measuring systems for gaseous fuel”, has been taken into account.

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

## Introduction

A high accuracy volume conversion device can be needed depending of the intended use. EN 12405-3 is established in order to meet severe requirements concerning accuracy and related functions.

For the purpose of this European Standard, functions are described, although these functions can be physically located in different components (e.g. calibration curve programmed in the measuring equipment itself or in the calculator).

Four main categories of functions are described to achieve data processing:

- Sensor signal Acquisition functions: to process signals from physical quantity provided by sensors and transducers to measurands;
- Sensor functions: to convert measurands to correct measurements, mostly based upon calibration results and filtering procedures;
- Metering functions: to calculate derived values such as volume, calorific value, compression factor etc. based upon international standards and formulas and to take care of the supervision and monitoring for the purpose of high accuracy and substitution values;
- Long Term Data Storage functions: to keep all relevant information necessary to construct or reconstruct calculated values:
  - for later legally relevant purposes (e.g. the conclusion of a commercial transaction);
  - for back up of the relevant data.

iTech STANDARD PREVIEW  
(standards.iteh.ai)  
SIST EN 12405-3:2016  
<https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016>



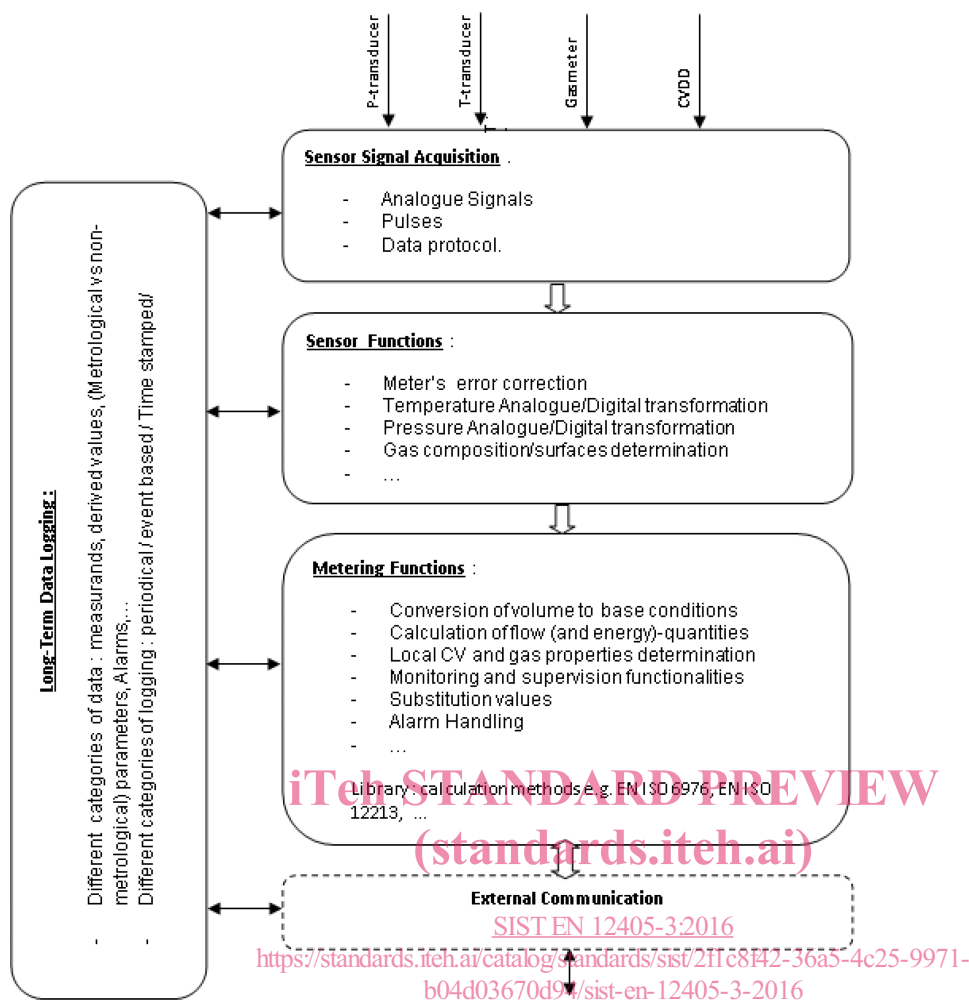


Figure 1 — Description of the functionalities of the flow computer calculator

### Modular and global approaches

In the modular approach, the flow computer is an assembly of separate associated measuring instruments and a calculator, which are verified separately. Each instrument is verified according to its testing procedure, using the indication available on the calculator or on the associated measuring instrument itself. In this case, the indication shall correspond to the indication of that measuring instrument, which is directly performing volume conversion. The verification of the functions consists in verifying the calculation concerning each characteristic quantity of the gas and/or the calculation for the volume conversion.

In case of external communication, sufficient resolution of required data is ensured during data transmission.

The associated measuring instruments are validated for or with a type calculator in order to ensure the interoperability of the association.

CVDD is covered in EN 12405-2.

In the global approach, the flow computer is tested as a package including the calculator and its associated measuring instruments and functions.

The testing procedures are given in Annex A.

**EN 12405-3:2015 (E)****1 Scope**

Part 3 of this European Standard specifies the requirements and tests for the construction, performance, safety and conformity of flow computers (FCs) used to meet the metrological and technical requirements of a high accuracy volume conversion device.

They are used to determine volume of fuel gases, including those of the first and second families according to EN 437.

For the purpose of this European Standard, only flow computers that are intended to operate with ultrasonic meters according to ISO 17089-1 or gas turbine meters conforming to EN 12261 are considered.

For the purpose of this European Standard only classification classes E2 and M1 are considered for the flow computer calculator.

FCs are equipped with external separate transducers for pressure and temperature which may be approved separately.

The provisions concerning pressure and temperature transducers are given in Annex B and C.

Requirements and tests are given for energy calculator in EN 12405-2.

**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.

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

SIST EN 12405-3:2016

EN 1776, *Gas supply systems — Natural gas measuring stations — Functional requirements*

<https://standards.globalspec.com/stds/iso/1776/1776-135-0071/b04d03670d94/sist-en-12405-3-2016>

EN 12261, *Gas meters — Turbine gas meters*

EN 12405-1:2005+A2:2010, *Gas meters — Conversion devices — Part 1: Volume conversion*

EN 12405-2, *Gas meters — Conversion devices — Part 2: Energy conversion*

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

EN 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold (IEC 60068-2-1)*

EN 60068-2-2, *Environmental testing — Part 2-2: Tests — Test B: Dry heat (IEC 60068-2-2)*

EN 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30)*

EN 60068-2-31, *Environmental testing — Part 2-31: Tests — Test Ec: Rough handling shocks, primarily for equipment-type specimens (IEC 60068-2-31)*

EN 60068-2-64, *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64)*

EN 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state (IEC 60068-2-78)*

- EN 60068-3-1, *Environmental testing — Part 3-1: Supporting documentation and guidance — Cold and dry heat tests (IEC 60068-3-1)*
- EN 60079-0, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0)*
- EN 60079-7, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e" (IEC 60079-7)*
- EN 60079-11, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11)*
- EN 60079-25, *Explosive atmospheres — Part 25: Intrinsically safe electrical systems (IEC 60079-25)*
- EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*
- EN 60751, *Industrial platinum resistance thermometers and platinum temperature sensors (IEC 60751)*
- EN 60947-5-6, *Low-voltage switchgear and controlgear — Part 5-6: Control circuit devices and switching elements — DC interface for proximity sensors and switching amplifiers (NAMUR) (IEC 60947-5-6)*
- EN 60950-1, *Information technology equipment — Safety — Part 1: General requirements (IEC 60950-1)*
- EN 61000-4-1, *Electromagnetic compatibility (EMC) — Part 4-1: Testing and measurement techniques — Overview of IEC 61000-4 series (IEC 61000-4-1)*
- EN 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test (IEC 61000-4-2)*
- EN 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3)*
- EN 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4)*
- EN 61000-4-5, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (IEC 61000-4-5)*
- EN 61000-4-6, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Section 6: Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6)*
- EN 61000-4-8, *Electromagnetic compatibility (EMC) — Part 4-8: Testing and measurement techniques — Power frequency magnetic field immunity test (IEC 61000-4-8)*
- EN 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11)*
- EN 61000-4-29, *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)*
- EN 62054-21, *Electricity metering (a.c.) — Tariff and load control — Part 21: Particular requirements for time switches (IEC 62054-21)*
- EN 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) (IEC 62262)*

**EN 12405-3:2015 (E)**

EN ISO 6976, *Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition (ISO 6976)*

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 12213-3:2006)*

EN ISO 15970, *Natural gas — Measurement of properties — Volumetric properties: density, pressure, temperature and compression factor (ISO 15970)*

IEC 61520, *Metal thermowells for thermometer sensors — Functional dimensions*

ISO 17089-1, *Measurement of fluid flow in closed conduits — Ultrasonic meters for gas — Part 1: Meters for custody transfer and allocation measurement*

ISO/IEC/IEEE 60559, *Information technology — Microprocessor Systems — Floating-Point arithmetic*

**3 Terms, definitions and symbols****3.1 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

**3.1.1****absolute pressure**

value of the pressure of the gas relative to vacuum

**3.1.2****associated measuring instrument**

instrument for measuring certain quantities which are characteristic of the gas, e.g. temperature, pressure, or calorific value, whose indications are used by the calculator with a view to making a correction and/or a conversion

Note 1 to entry: For the purpose of this European Standard, when dealing with the ECD in modular approach, the VCD and CVDD are considered as associated measuring instrument.

**3.1.3****base conditions**

fixed conditions used to express the volume of gas independently of the measurement conditions and the superior calorific value

Note 1 to entry: The pressure base for both volumetric metering and combustion is always 1,01325 bar. The temperature is specified.

EXAMPLE Temperature of 273,15 K and absolute pressure of 1,013 25 bar or temperature of 288,15 K and absolute pressure of 1,013 25 bar.

**3.1.4****calculator**

electronic device that receives the output signals from measuring and data acquisition systems, e.g. associated gas meter or transducers, and processes them

**3.1.5**  
**calorific value determining device**  
**CVDD**

associated measuring instrument for determining the calorific value of gas

Note 1 to entry: For the purpose of this European Standard, the CVDD is described as a gas chromatograph (GC) because of the needs of using the gas composition for checks and calculations.

**3.1.6**  
**compression factor**

parameter which indicates the deviation from the ideal gas

**3.1.7**  
**conversion factor**

factor equal to the volume at base conditions divided by the corrected volume, or if there is no gas meter error correction, equal to the volume at base conditions divided by the volume at measurement conditions

**3.1.8**  
**conventional true value**

value attributed to a particular quantity and accepted, sometimes by convention, as having an uncertainty appropriate for a given purpose

**3.1.9**  
**corrected volume**

volume at measurement conditions corrected for the error curve of the gas meter

**3.1.10**  
**correction**

value added algebraically to the uncorrected result of a measurement to correct the systematic error

**3.1.11**  
**correction factor**

numerical factor by which the measured volume is multiplied to correct it to compensate the error curve of the gas meter

**3.1.12**  
**display**

element or assembly of elements of the indicating device on which the results of measurement and memorized values are displayed

**3.1.13**  
**disturbance**

influence quantity having a value within the limits specified but outside the specified rated operating conditions of the measuring instrument

Note 1 to entry: An influence quantity is a disturbance if the rated operating conditions for that influence quantity are not specified.

**3.1.14**  
**durability**

ability of an instrument to maintain its performance characteristics over a specified period of use

iTeh STANDARD PREVIEW  
 (standards.iteh.ai)

SIST EN 12405-3:2016

<https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971->

uncorrected result of a measurement

## EN 12405-3:2015 (E)

## 3.1.15

**energy conversion device****ECD**

energy conversion device calculates, integrates and displays energy using volume at base conditions and the calorific value or the gas composition

## 3.1.16

**environmental class**

class referring to climatic, i.e. ambient temperature and humidity, mechanical and electromagnetic conditions

## 3.1.17

**error of conversion**

difference between the conversion factor  $C$  displayed by a conversion device and the conventional true value of the conversion factor  $C_{CT}$  expressed as a percentage of the conventional true value of the conversion factor

## 3.1.18

**error of indication**

indication of a measuring instrument minus the (conventional) true value of the corresponding input quantity

## 3.1.19

**flow computer****FC**

high accuracy gas-volume conversion device associating measuring instruments with a calculator integrating data processing and monitoring functions

Note 1 to entry: More information on functions can be found in the introduction.

## 3.1.20

**gas-volume conversion device****VCD**

device that computes, integrates and indicates the volume increments measured by a gas meter if it were operating at base conditions, using as inputs the volume at measurement conditions as measured by the gas meter, and other parameters such as gas temperature, pressure and gas composition

Note 1 to entry: The conversion device can also compensate for the error curve of a gas meter and associated measuring transducers.

Note 2 to entry: The deviation from the ideal gas law can be compensated by the compression factor.

## 3.1.21

**gauge pressure**

value of the pressure of the gas relative to the ambient atmospheric pressure

## 3.1.22

**global approach**

approach ensuring that the performances of the conversion device are verified and approved with a completely integrated package including the calculation, the associated measuring instruments and other functions

**3.1.23****HF**

high frequency pulse generator in accordance with EN 60947-5-6

Note 1 to entry: If the meter is fitted with a high frequency output, the high frequency signal at  $Q_{max}$  is in the range of 0,3 kHz to 5 kHz.

**3.1.24****indicating device**

part of a measuring instrument that displays an indication i.e. alphanumeric string

**3.1.25****influence factor**

influence quantity having a value within the specified rated operating conditions of the measuring instrument

**3.1.26****influence quantity**

quantity that is not a measurand but that affects the result of the measurement (e.g. ambient temperature)

**3.1.27****maximum operating pressure****MOP**

maximum pressure at which a system can be operated continuously under normal conditions

Note 1 to entry: Normal conditions are: no fault in any device or stream.

**3.1.28****maximum permissible error****MPE**

extreme value of the measurement error, with respect to a known reference quantity value, permitted by specifications or regulations for a given measurement, measuring instrument or measuring system

Note 1 to entry: Generally the two extreme values are taken together and are termed "maximum permissible errors" or "limit of error".

Note 2 to entry: The term "tolerance" should not be used to designate "maximum permissible error".

**3.1.29****measurand**

particular quantity subject to measurement

**3.1.30****measurement conditions**

conditions of the gas, the volume of which is measured at the point of measurement (e.g. the temperature and the pressure of the gas)

**3.1.31****measuring interval**

time interval in which a consumption of gas is determined by the meter

Note 1 to entry: To each measuring interval belongs a single value.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 12405-3:2016

<https://standards.iteh.ai/catalog/standards/sist/2f1c8f42-36a5-4c25-9971-b04d03670d94/sist-en-12405-3-2016>