



2026/706

20.3.2026

DIRECTIVE (EU) 2026/706 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 11 March 2026

amending Directive 2014/32/EU as regards measuring systems for electric vehicle supply equipment and compressed gas dispensers, and electricity, gas and thermal energy meters

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 114 thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee ⁽¹⁾,

Acting in accordance with the ordinary legislative procedure ⁽²⁾,

Whereas:

- (1) One of the objectives of Directive 2014/32/EU of the European Parliament and of the Council ⁽³⁾ is to guarantee the functioning of the internal market with regard to measuring instruments. Pursuant to Article 6 of that Directive, measuring instruments falling within the scope of that Directive are to meet the essential requirements set out in Annex I and in the relevant instrument-specific Annexes to that Directive.
- (2) The scope and the associated essential requirements covered by Directive 2014/32/EU were established by Directive 2004/22/EC of the European Parliament and of the Council ⁽⁴⁾, of which Directive 2014/32/EU is a recast. Technical requirements have remained unchanged for more than 20 years. In the meantime, new measuring instruments that do not fall within the scope of Directive 2014/32/EU have appeared on the market. That is the case, in particular, for measuring systems for electric vehicle supply equipment (EVSE) and measuring systems for compressed gas dispensers, which are important for the successful development of clean mobility. Moreover, Directive 2014/32/EU does not set out requirements for thermal energy meters for cooling applications. In addition, in relation to electricity and gas meters, Directive 2014/32/EU does not adequately provide for the use of direct current, hydrogen or other fuel gases that can be used as alternatives to more traditional fuel gases, nor does it allow for full advantage to be taken of smart metering which plays an important role in achieving the Union's climate objectives. Therefore, it is appropriate to amend both the scope of Directive 2014/32/EU and the essential requirements set out in the Annexes to that Directive in a targeted way in order to take technological developments into account. The placing on the market of measuring instruments should be addressed in a systematic and comprehensive way through a general revision of Directive 2014/32/EU, including a revision of Annex I and instrument-specific Annexes, such as Annex III covering water meters, to adapt the current Union framework to technological developments.
- (3) Annexes I, IV, V and VI to Directive 2014/32/EU should be amended as they are no longer technology-neutral and do not provide essential requirements corresponding to new technologies, which provide improved protection to consumers.

⁽¹⁾ OJ C, C/2025/1192, 21.3.2025, ELI: <http://data.europa.eu/eli/C/2025/1192/oj>.

⁽²⁾ Position of the European Parliament of 10 February 2026 (not yet published in the Official Journal) and decision of the Council of 26 February 2026.

⁽³⁾ Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (OJ L 96, 29.3.2014, p. 149, ELI: <http://data.europa.eu/eli/dir/2014/32/oj>).

⁽⁴⁾ Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments (OJ L 135, 30.4.2004, p. 1, ELI: <http://data.europa.eu/eli/dir/2004/22/oj>).

- (4) Annex I to Directive 2014/32/EU should be amended in order to take into account the rollout of smart gas and electricity meters and the new measuring instruments in the new instrument-specific Annexes.
- (5) Annex IV to Directive 2014/32/EU should be amended to take into account the growing use of hydrogen and other fuel gases that can be used as alternatives to more traditional fuel gases and the rollout of smart gas meters.
- (6) Annex V to Directive 2014/32/EU should be amended to take into account the rollout of smart electricity meters and to update that Directive with regard to instruments measuring direct current.
- (7) A new annex to Directive 2014/32/EU should be inserted in order to address the need for harmonised essential requirements with regard to measuring systems for EVSE, irrespective of their intended application, while ensuring that no retrofitting obligations are imposed as regards existing charging stations.
- (8) Annex VI to Directive 2014/32/EU should be amended to include thermal energy meters for cooling applications in order to avoid additional certification for such products at national level.
- (9) The increased use of compressed gases, such as hydrogen and natural gas, requires the insertion of a new annex to Directive 2014/32/EU as regards measuring systems for compressed gas dispensers, while ensuring that no retrofitting obligations are imposed as regards existing compressed gas dispensers.
- (10) Since the objective of this Directive, namely to ensure that measuring instruments on the internal market satisfy the requirements with regard to providing for a high level of protection of the public interests as set out in this Directive while guaranteeing the functioning of the internal market, cannot be sufficiently achieved by the Member States but can rather, by reason of its scale and effects, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve that objective.
- (11) In order to enable economic operators to supply stocks of measuring instruments that are in conformity with Directive 2014/32/EU, it is necessary to provide for reasonable transitional arrangements that allow the making available on the market and putting into use of measuring instruments that have already been placed on the market in accordance with that Directive before the date of application of the national measures transposing this Directive. Furthermore, specific transitional arrangements should be put in place to allow economic operators to prepare for the application of the harmonised requirements regarding measuring systems for EVSE and measuring systems for compressed gas dispensers.
- (12) In order to avoid any delay in the rollout of measuring instruments after the date of application of this Directive, it is important that, by the date of application of this Directive, a sufficient number of conformity assessment bodies are authorised to carry out conformity assessments applying the new requirements for measuring instruments and are therefore notified to the Commission accordingly. For the same reason, such notified bodies should be able to issue certificates for the measuring instruments defined in the instrument-specific Annexes II, III and V to this Directive before the date of application of this Directive.
- (13) In order to provide sufficient time for manufacturers to adapt their products to the essential requirements set out in the Annexes to this Directive, it is necessary to provide for reasonable transitional arrangements that allow the making available on the market and putting into use of measuring instruments that have been placed on the market for which national certificates were issued or for which a certificate was issued under Directive 2014/32/EU before the date of application of the national measures transposing this Directive, and that will fall within the scope of Directive 2014/32/EU from the date of entry into force of this Directive.
- (14) Directive 2014/32/EU should therefore be amended accordingly,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Directive 2014/32/EU is amended as follows:

(1) in Article 2, paragraph 1 is replaced by the following:

‘1. This Directive applies to the measuring instruments defined in the instrument-specific Annexes III to XII (instrument-specific Annexes) concerning water meters (MI-001), gas meters and conversion devices (MI-002), active electrical energy meters (MI-003), measuring systems for electric vehicle supply equipment (EVSE) (MI-011), thermal energy meters (MI-004), measuring systems for the continuous and dynamic measurement of quantities of liquids other than water (MI-005), measuring systems for compressed gas dispensers (MI-012), automatic weighing instruments (MI-006), taximeters (MI-007), material measures (MI-008), dimensional measuring instruments (MI-009) and exhaust gas analysers (MI-010).’;

(2) Annex I is amended in accordance with Annex I to this Directive;

(3) Annex IV is amended in accordance with Annex II to this Directive;

(4) Annex V is amended in accordance with Annex III to this Directive;

(5) the text set out in Annex IV to this Directive is inserted as Annex Va;

(6) Annex VI is amended in accordance with Annex V to this Directive;

(7) the text set out in Annex VI to this Directive is inserted as Annex VIIa.

Article 2

1. By way of derogation from Article 7(2) of Directive 2014/32/EU, Member States shall not impede the making available on the market and putting into use of measuring instruments that are in conformity with that Directive on 8 April 2026, and that have been placed on the market before 10 October 2028.

2. By way of derogation from Article 7(2) of Directive 2014/32/EU, Member States shall not impede the making available on the market and putting into use of measuring instruments defined in Annexes Va and VIIa of that Directive, as amended on 9 April 2026, that are in conformity with the national law of a Member State and that have been placed on the market before 10 April 2030.

3. By way of derogation from Article 7(2) of Directive 2014/32/EU, certificates covering measuring instruments that fall within the scope of that Directive, as amended on 9 April 2026, whether those certificates are issued pursuant to national law which transposes Directive 2014/32/EU or pursuant to other national law, before 10 October 2028, shall remain valid until the expiry of their validity, and in any case no longer than 10 April 2038.

Article 3

1. By 10 April 2028, Member States shall adopt and publish the measures necessary to comply with this Directive. They shall immediately inform the Commission thereof.

They shall apply those measures from 10 October 2028.

When Member States adopt those measures, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. Member States shall communicate to the Commission the text of the main measures of national law which they adopt in the field covered by this Directive.

Article 4

By way of derogation from Directive 2014/32/EU, conformity assessment bodies which comply with that Directive, as amended on 9 April 2026, may be notified in accordance with that Directive, as amended on 9 April 2026, before 10 October 2028. Such notified bodies may carry out the conformity assessment procedures laid down in that Directive, as amended on 9 April 2026, and issue certificates for measuring instruments defined in Annexes II, III and V to this Directive in accordance with that Directive as amended on 9 April 2026, before 10 October 2028.

Article 5

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 6

This Directive is addressed to the Member States.

Done at Strasbourg, 11 March 2026.

For the European Parliament

The President

R. METSOLA

For the Council

The President

M. RAOUNA

ANNEX I

Annex I to Directive 2014/32/EU is amended as follows:

(1) in the part 'DEFINITIONS', in the table, seventh row, second column, the third indent is replaced by the following:

— all the parties in the transaction accept the measurement result at that time and place; by way of derogation, for measuring systems for electric vehicle supply equipment (EVSE) and for measuring systems for compressed gas dispensers, all the parties in the transaction accept the measurement result at the time the measurement is concluded.;

(2) the part 'ESSENTIAL REQUIREMENTS' is amended as follows:

(a) point 10.2. is replaced by the following:

'10.2. The indication of any result shall be clear and unambiguous and accompanied by the marks and inscriptions necessary to inform the user of the significance of the result. Easy reading of the result presented shall be permitted under normal conditions of use. Additional indications may be shown provided they cannot be confused with the metrologically controlled indications. In addition, for gas meters and electricity meters, measuring systems for EVSE and measuring systems for compressed gas dispensers, the indication of any result shall be protected against accidental deletion or modification.;

(b) the following point is added:

'10.6. By way of derogation from points 10.1. and 10.5., for gas meters and electricity meters, the following shall apply:

The indication of the measurement result and other data relevant to that result shall be accessible without tools by one or more of the following means:

- (a) a metrologically controlled local display, print or record;
- (b) a remote display.

By way of derogation from points 10.1 and 10.5, for measuring systems for EVSE and measuring systems for compressed gas dispensers, the following shall apply:

The indication of the measurement result and other data relevant to that result shall be accessible without tools by one or more of the following means:

- (a) a metrologically controlled local display, print or record;
- (b) a remote display; or
- (c) a consumer or end-user device.

The measurement result referred to in this point shall be traceable to the measuring instrument under metrological control. Should tampering occur, security measures shall provide evidence of such tampering.

That measurement result shall serve as the basis for the price to pay, if applicable.'

ANNEX II

Annex IV to Directive 2014/32/EU is amended as follows:

(1) the title is replaced by the following:

‘GAS METERS AND CONVERSION DEVICES (MI-002);

(2) the first paragraph is replaced by the following:

‘The relevant requirements set out in Annex I, the specific requirements set out in this Annex and the conformity assessment procedures listed in this Annex apply to gas meters and conversion devices defined in this Annex, intended for residential, commercial and light industrial use.’;

(3) in the part ‘DEFINITIONS’, the table is amended as follows:

(a) in the first row, the second column is replaced by the following:

‘An instrument designed to measure and to ensure the memorisation and display of the quantity of fuel gas (volume or mass) that has passed through that instrument and, if applicable, the quantity of its energy.’;

(b) in the second row, the first column is replaced by the following:

‘Volume conversion device’;

(c) the following rows are added:

‘Gas calorific value determining device	An instrument connected to or integrated into the energy conversion device for determining the calorific value of gas that has passed through that instrument.
Energy conversion device	A device that converts the quantity measured into energy using the mass or the volume at base conditions, and the superior/gross calorific value.
Superior/gross calorific value	The amount of heat that would be released by the complete combustion with oxygen of a specified quantity of gas, in such a way that the pressure, p_1 , at which the reaction takes place remains constant, and all the products of combustion are returned to the same specified temperature, t_1 , equal to that of the reactants, all of those products being in the gaseous state, except for water, which is condensed to the liquid state at t_1 .’

(4) Part I is amended as follows:

(a) point 1.1 is replaced by the following:

‘1.1. The flowrate range of the gas shall fulfil at least the following conditions:

Class	Q_{\max}/Q_{\min}	Q_{\max}/Q_t	Q_t/Q_{\max}
1,5	≥ 150	≥ 10	1,2
1,0	≥ 10	≥ 5	1,2

If a gas meter has multiple gas application-dependent flowrate ranges, such flowrate ranges shall be inscribed on the meter, accompanied by a clear description of the gas application.’;

(b) in point 3.1.1, the introductory sentence is replaced by the following:

‘The effect of an electromagnetic disturbance on a gas meter, conversion device or gas calorific value determining device shall be such that:’;

(c) in point 6, the following paragraph is added:

‘The quantity of energy shall be displayed in joules or in watt-hours or their decimal multiples.’;

(5) Part II is amended as follows:

(a) the title is replaced by the following:

‘SPECIFIC REQUIREMENTS
CONVERSION DEVICES’;

(b) the first and second paragraphs are replaced by the following:

‘A conversion device constitutes a sub-assembly when it is together with a measuring instrument with which it is compatible.

For a conversion device, the essential requirements for a gas meter shall apply, if applicable. In addition, the requirements set out in points 7 to 9 shall apply.’;

(c) point 8 is replaced by the following:

MPE for volume conversion devices

- 0,5 % at ambient temperature $20\text{ °C} \pm 3\text{ °C}$, ambient humidity $60\% \pm 15\%$, nominal values for power supply,
- 0,7 % for temperature conversion devices at rated operating conditions,
- 1 % for other conversion devices at rated operating conditions.

Note:

The errors of the gas meter and, if applicable, of the gas calorific value determining device are not taken into account.

The conversion device shall not exploit the MPEs or systematically favour any party.’;

(d) the following point is inserted:

‘8a. MPE for energy conversion devices

The MPE of the conversion calculation of energy is equal to 0,05 %.’;

(6) the following Part IIa is inserted:

‘PART IIa

SPECIFIC REQUIREMENTS

GAS CALORIFIC VALUE DETERMINING DEVICES

A gas calorific value determining device sends, locally or remotely, signals to the energy conversion device.

For a gas calorific value determining device, the essential requirements for a gas meter shall apply, if applicable. In addition, the requirements set out in points 9a to 9f shall apply.

9a. Base conditions for converted quantities

The manufacturer shall specify the following:

- the range for gas chemical composition,
- the base conditions for calorific value and converted quantities.

9b. **MPE**

Class	0,5	1,0
MPE	0,5 %	1,0 %

The gas calorific value determining device shall not exploit the MPEs or systematically favour any party.

9c. **Permissible effect of disturbances**

The critical change value is the greater of the two following values:

- one fifth of the magnitude of the MPE for the calorific value,
- two scale intervals of the gas calorific value determining device.

9d. **Durability**

After an appropriate durability test, taking into account the period of time estimated by the manufacturer, has been performed, the following criteria shall be satisfied:

- the variation of the measurement result after the durability test when compared with the initial measurement result shall not exceed half of the magnitude of the MPE, and
- the error of indication after the durability test shall not exceed the MPE.

9e. **Suitability**

A gas calorific value determining device shall be capable of detecting when it is operating outside the operating ranges stated by the manufacturer and shall register the following for measurement accuracy:

- (a) that the gas calorific value is not relevant; and
- (b) that the gas calorific value determining device operates outside the operating range.

9f. **Units**

Calorific value shall be displayed in joules and/or watt-hours, or their decimal multiples, per unit of mass or volume at base conditions.'

—

ANNEX III

Annex V to Directive 2014/32/EU is amended as follows:

(1) the part 'DEFINITIONS' is amended as follows:

(a) the introductory sentence is replaced by the following:

'An active electrical energy meter is an instrument designed to measure and to ensure the memorisation and display of the active electrical energy consumed in a circuit or transferred between circuits.'

(b) the table is amended as follows:

(i) the third and fourth rows are replaced by the following:

I_{st}	=	the lowest declared value of I at which the meter registers active electrical energy, and, for AC only, also at unity power factor (polyphase measuring systems with balanced load);
I_{min}	=	the value of I above which the error lies within MPEs, and, for AC only, also polyphase meters measuring systems with balanced load.'

(ii) the ninth and eleventh rows are replaced by the following:

f	=	the frequency of the voltage supplied to the meter, for AC electrical energy meters only;
f_n	=	the specified reference frequency, for AC electrical energy meters only;
PF	=	power factor = $\cos\phi$ = the cosine of the phase difference ϕ between I and U, for AC electrical energy meters only.'

(2) the part 'SPECIFIC REQUIREMENTS' is amended as follows:

(a) in point 2, the last two paragraphs are replaced by the following:

'The operating ranges within which the meter shall satisfy the MPE requirements are specified in Table 2.

For AC electrical energy meters, the voltage, frequency and power factor ranges shall be at least:

$$— 0,9 \cdot U_n \leq U \leq 1,1 \cdot U_n;$$

$$— 0,98 \cdot f_n \leq f \leq 1,02 \cdot f_n;$$

$$— 0,5 \text{ inductive} \leq \text{PF} \leq 1 \text{ and } 0,8 \text{ capacitive} \leq \text{PF} \leq 1.$$

For DC electrical energy meters, the voltage range that can be measured by the meter shall be between the lowest and the highest rated voltage.'

(b) in point 3, the second paragraph is replaced by the following:

'When the meter is operating under rated operating conditions, the percentage errors shall not exceed the limits given in Table 2.'

(c) in point 3, Table 2 is amended as follows:

(i) in the third row, the fifth column is replaced by the following:

'below $-25\text{ }^{\circ}\text{C}$ or above $+55\text{ }^{\circ}\text{C}$;

(ii) the fifth row is replaced by the following:

'Single phase meter; polyphase meter if operating with balanced loads; DC electrical energy meter';

(d) in point 4.1, the first and second paragraphs are replaced by the following:

‘As electrical energy meters are directly connected to the electrical supply and as current is also one of the measurands, a special electromagnetic environment is used for electrical energy meters.

The meter shall comply with the electromagnetic environment E2 for AC electrical energy meters and DC electrical energy meters, as well as with the additional requirements set out in points 4.2 and 4.3.’;

(e) in point 4.2, Table 3 is amended as follows:

(i) the third row, first column is replaced by the following:

‘Reversed phase sequence, for AC electrical energy meters’;

(ii) the fifth row, first column is replaced by the following:

‘Harmonic contents in the current circuits (1) for AC electrical energy meters only’;

(iii) the sixth row, first column is replaced by the following:

‘DC and harmonics in the current circuit (1) for AC electrical energy meters only’;

(f) points 5.4 and 5.5 are replaced by the following:

5.4. Running with no load

When the voltage is applied without any current flowing in the current circuit, the meter shall not register any energy.

5.5. Starting

The meter shall start and continue to register at a rate of change of energy equal to the product of the smallest voltage within the rated operating conditions and I_{st} .

—

ANNEX IV

‘ANNEX Va

MEASURING SYSTEMS FOR ELECTRIC VEHICLE SUPPLY EQUIPMENT (MI-011)

The relevant requirements of Annex I, the specific requirements of this Annex and the conformity assessment procedures listed in this Annex apply to measuring systems for EVSE.

DEFINITIONS

A measuring system for EVSE is a system that includes all relevant metrological functions related to the conductive transfer (either direction), at a specified transfer point, of active electrical energy between EVSE (such as charging stations for electric vehicles) and electric vehicles (such as motor vehicles, rail engines, boats, vessels and aircraft).

Such measuring systems shall not be considered as utility measuring instruments as referred to in Annex I.

The metrological functions in a measuring system for EVSE can also be provided by an active electrical energy meter for which a conformity assessment procedure has been successfully completed in accordance with Annex V to this Directive. The result of that conformity assessment shall be taken into account when performing the conformity assessment for the measuring system for EVSE as set out in this Annex.

I	=	the electrical current flowing through the measuring system for EVSE at the transfer point;
I_{st}	=	the lowest declared value of I at which the measuring system for EVSE registers electrical energy, and, for AC only, also at unity power factor (polyphase measuring systems with balanced load);
I_{min}	=	the value of I above which the error lies within base maximum permissible errors (BMPEs), and, for AC only, also polyphase measuring systems with balanced load;
I_{tr}	=	the value of I above which the error lies within the smallest BMPE corresponding to the class index of the measuring system for EVSE;
I_{max}	=	the maximum value of I for which the error lies within the BMPEs;
U	=	for AC, root mean square (RMS) value of the electrical voltage applied by or to the measuring system for EVSE at the transfer point; for DC, value of the electrical voltage supplied to or from the measuring system for EVSE at the transfer point;
U_n	=	the specified reference voltage(s);
f	=	the frequency of the voltage supplied by or to the measuring system for EVSE, for AC measuring systems only;
f_n	=	the specified reference frequency, for AC measuring systems only;
PF	=	power factor = $\cos\phi$ = the cosine of the phase difference ϕ between I and U , for AC measuring systems only;
harmonic	=	part of a signal that has a frequency that is an integer multiple of the fundamental frequency of the power input to the measuring system for EVSE, the fundamental frequency being, generally, the nominal frequency, f_n , for AC measuring systems only;

d	=	distortion factor which is the ratio of the RMS value of the harmonic content to the RMS value of the fundamental term, and which is equal to the total harmonic distortion using the fundamental as the reference, for AC measuring systems only;
MMQ	=	minimum measured quantity of energy delivered in a transaction for which the manufacturer specifies that the measuring system for EVSE will meet the MPE of the measuring system for EVSE's accuracy class;
transfer point	=	point at which an electric vehicle is connected to the measuring system for EVSE;
critical fault	=	failure of the device when subjected to a disturbance in which the device appears to function correctly, but where the legally relevant data is incorrect or the shift in the accuracy of the measurements exceeds that specified in the tests;
Base Maximum Permissible Error (BMPE)	=	extreme values of the error (of indication) of the measuring system for EVSE, when the current (AC EVSE and DC EVSE) and voltage (DC EVSE) are varied within the intervals given by the rated operating conditions, and when that EVSE is otherwise operated at reference conditions.

SPECIFIC REQUIREMENTS

1. Accuracy

The manufacturer shall specify the class index of the measuring system for EVSE. The class indices are defined as: Class A, B and C.

Accuracy shall be determined at the transfer point.

If energy exchanged at the transfer point is in the form of DC, then DC energy shall be the measurand; if AC energy is exchanged at the transfer point, then AC active energy shall be the measurand.

For the purposes of Annex I, the overall MPE shall be determined as the root of the quadratic sum of BMPE and the allowable error shifts for variations in frequency, voltage and temperature.

2. Rated operating conditions

The manufacturer shall specify the rated operating conditions of the measuring system for EVSE, in particular, the values of f_n , U_n , I_{st} , I_{min} , I_{tr} and I_{max} , the temperature range, and, for DC measuring systems, also the output voltage range.

For the current values specified, the measuring system for EVSE shall fulfil the conditions given in Table 1.

Table 1

	Class A	Class B	Class C
I_{st}	$\leq 0,05 \times I_{tr}$	$\leq 0,04 \times I_{tr}$	$\leq 0,04 \times I_{tr}$
I_{min}	$\leq 0,5 \times I_{tr}$	$\leq 0,5 \times I_{tr}$	$\leq 0,3 \times I_{tr}$
I_{max}	$\geq 10 \times I_{tr}$	$\geq 10 \times I_{tr}$	$\geq 10 \times I_{tr}$

The voltage, frequency and power factor ranges within which the measuring system for EVSE shall satisfy the BMPE requirements are specified in Table 2.

For AC measuring systems:

(a) the voltage, frequency and power factor ranges shall be at least:

(i) $0,9 \cdot U_n \leq U \leq 1,1 \cdot U_n$;

(ii) $0,98 \cdot f_n \leq f \leq 1,02 \cdot f_n$;

(iii) $PF \geq 0,9$;

(b) the measuring system for EVSE shall operate correctly when the supply voltage distortion is less than 10 % and the load current distortion is less than 3 % at all harmonics indices;

(c) the MMQ shall be: $MMQ \leq 0,1$ kWh.

For DC measuring systems, the following shall apply:

(a) the output voltage range that can be measured by the measuring system for EVSE shall be between the lowest and the highest rated output voltage;

(b) the MMQ shall be: $MMQ \leq 1$ kWh.

3. BMPEs

When current (AC measuring systems and DC measuring systems) and voltage (DC measuring systems) are varied within the intervals given by the rated operating conditions, and when the measuring system for EVSE is otherwise operated at reference conditions, the percentage errors shall not exceed the limits given in Table 2 for the specified class index.

Table 2

		BMPEs in percent at reference conditions and defined load current levels		
Current	Power factor (only for AC)	A (2 %)	B (1 %)	C (0,5 %)
$I_{st} \leq I < I_{min}$	> 0,9	± 25	± 15	± 10
$I_{min} \leq I < I_{tr}$	> 0,9	± 2,5	± 1,5	± 1
$I_{tr} \leq I < I_{max}$	> 0,9	± 2	± 1	± 0,5

The measuring system for EVSE shall not exploit the BMPEs or systematically favour any party.

4. Operating requirements

For measuring systems for EVSE including a cable with its connector between the point at which the energy is measured and the transfer point ("cable with connector"), either of the following shall apply:

(a) the cable with connector is not replaceable and is secured by an appropriate hardware seal; or

(b) if the cable with connector is intended to be replaceable while the measuring system for EVSE is under seal, it shall be:

- identified in the relevant conformity assessment of the measuring system for EVSE as interchangeable and the measuring system for EVSE shall be marked with the characteristics of compatible cables with connectors,

- marked with its characteristics and unique identification; and its replacement units shall also bear such marking, and
- sealed separately in such a way that the replacement does not require access to, or breaking of, the metrologically sealed parts of the measuring system for EVSE.

The replacement of the cable with connector shall not affect the metrological properties of the measuring system for EVSE.

5. Permissible effects

5.1. General

The measuring system for EVSE shall be designed and manufactured in such a way that when exposed to disturbances critical faults do not occur and shifts in the accuracy of the measurements do not exceed the values given in points 5.2 and 5.3.

When there is a foreseeable high risk due to lightning or where overhead supply networks are predominant, the metrological characteristics of the measuring system for EVSE shall be protected.

5.2. Effect of disturbances

In the case of a disturbance, the legally relevant data shall be correct or the shift in the accuracy of the measurements shall not exceed 1,0 BMPE even if the measuring system for EVSE appears to function correctly. Ceasing to function is not a critical fault. If a disturbance interrupts a transaction, either of the following shall apply:

(a) the transaction is concluded when the disturbance occurs; or

(b) the transaction continues when the disturbance is removed.

5.3. Effect of influence quantities

When the load current is held constant at a point within the rated operating range with the measuring system for EVSE otherwise operated at reference conditions, and when any single influence quantity is varied from its value at reference conditions to its extreme values specified in Tables 3 and 4, the variation of error shall be such that the additional percentage error is not outside the values for error shift specified in Tables 3 and 4. The measuring system for EVSE shall continue to function after the completion of each of those tests.

Table 3

Influence quantity	Current	Limits for temperature coefficient (%/K) for the measuring system for EVSE of class			Type of Current
		A (2 %)	B (1 %)	C (0,5 %)	
Temperature coefficient, c , over any interval of the temperature range, which is not less than 15 K and not greater than 23 K (i)	$I_{tr} \leq I \leq I_{max}$	$\pm 0,1$	$\pm 0,05$	$\pm 0,03$	AC and DC

Table 4

Influence quantity	Value	Current	Maximum permissible error shift (%) for the measuring system for EVSE of class			Type of Current
			A (2 %)	B (1 %)	C (0,5 %)	
Self-heating	Continuous current at I_{\max}	I_{\max}	± 1	$\pm 0,5$	$\pm 0,25$	AC and DC
Conducted disturbances, low frequency	2 kHz–150 kHz	$I_{\text{tr}} \leq I \leq I_{\max}$	± 3	± 2	± 2	AC and DC
Continuous (DC) magnetic induction of external origin	200 mT at 30 mm from magnetic core surface	$I_{\text{tr}} \leq I \leq I_{\max}$	± 3	$\pm 1,5$	$\pm 0,75$	AC and DC
Magnetic field (AC, power frequency) of external origin (ii)	400 A/m	$I_{\text{tr}} \leq I \leq I_{\max}$	$\pm 2,5$	$\pm 1,3$	$\pm 0,5$	AC and DC
Radiated, RF, electro-magnetic fields	$f = 80 \text{ MHz} - 6\,000 \text{ MHz}$, Field strength $\leq 10 \text{ V/m}$	$I_{\text{tr}} \leq I \leq I_{\max}$	± 3	± 2	± 1	AC and DC
Conducted disturbances, induced by radio frequency fields (ii)	$f = 0,15 \text{ MHz} - 80 \text{ MHz}$, Amplitude $\leq 10 \text{ V}$	$I_{\text{tr}} \leq I \leq I_{\max}$	± 3	± 2	± 1	AC and DC
Operation of ancillary devices	Ancillary devices operated with $I = I_{\text{tr}}$ and I_{\max}	$I_{\text{tr}} \leq I \leq I_{\max}$	$\pm 0,7$	$\pm 0,3$	$\pm 0,15$	AC and DC
Voltage variation (ii)	$0,9 \times U_n$ to $1,1 \times$ highest U_n	$I_{\text{tr}} \leq I \leq I_{\max}$	± 1	$\pm 0,7$	$\pm 0,2$	AC
Frequency variation of mains (ii)	Each $f_n \pm 2 \%$	$I_{\text{tr}} \leq I \leq I_{\max}$	$\pm 0,8$	$\pm 0,5$	$\pm 0,2$	AC

Influence quantity	Value	Current	Maximum permissible error shift (%) for the measuring system for EVSE of class			Type of Current
			A (2 %)	B (1 %)	C (0,5 %)	
Harmonics in voltage and current circuits (ii)	d < 5 % I d < 10 % U	$I_{tr} \leq I \leq I_{max}$	± 1	± 0,6	± 0,3	AC
Reversed phase sequence (AC 3-phase only) (ii)	Any two phases interchanged	$I_{tr} \leq I \leq I_{max}$	± 1,5	± 1,5	± 0,1	AC

Table notes:

- (i) In the case of a measuring system for EVSE with an active electrical energy meter for which a conformity assessment procedure has been successfully completed in accordance with Annex V to this Directive, the temperature test can be limited to a check of correct functioning at the extreme temperatures foreseen in the measuring system for the EVSE enclosure.
- (ii) Not required for a measuring system for EVSE with an active electrical energy meter for which a conformity assessment procedure has been successfully completed in accordance with Annex V to this Directive if the specifications meet or exceed those of the accuracy class specified by the manufacturer.

6. Units

The electrical energy measured shall be displayed in kilowatt-hours or their decimal multiples.

7. Putting into use

Member States shall ensure that the intended use determines the foreseen and foreseeable practical working conditions, namely the rated operating conditions, so that the measuring system for EVSE is suitable for its use.

CONFORMITY ASSESSMENT

The conformity assessment procedures referred to in Article 17 that the manufacturer can choose between are:

B + F or B + D or G or H1.1.

ANNEX V

Annex VI to Directive 2014/32/EU is amended as follows:

(1) the part 'DEFINITIONS' is amended as follows:

(a) the first paragraph is replaced by the following:

'A thermal energy meter is an instrument designed to measure the energy which in a heat-exchange circuit is absorbed (cooling) and/or given off (heating) by a liquid called the thermal energy-conveying liquid.'

(b) in the table, the fourth row is replaced by the following:

$\Delta\vartheta$	=	the temperature difference $\vartheta_{in} - \vartheta_{out}$ with $\Delta\vartheta \geq 0$ for heating and $\Delta\vartheta \leq 0$ for cooling;
-------------------	---	---

(2) the part 'SPECIFIC REQUIREMENTS' is amended as follows:

(a) point 1.1 is replaced by the following:

'1.1. For the temperature of the liquid: ϑ_{max} , ϑ_{min} ,

— for the temperature differences: $\Delta\vartheta_{max}$, $\Delta\vartheta_{min}$, subject to the following restrictions:

$$\Delta\vartheta_{max} / \Delta\vartheta_{min} \geq 10$$

with the exception of cooling applications;

$\Delta\vartheta_{min}$ is a whole number in the range of 1 K and 10 K.;

(b) point 1.3 is replaced by the following:

'1.3. For the flow rates of the liquid: q_s , q_p , q_i , where the values of q_p and q_i are subject to the following restriction: $q_p / q_i \geq 5$.'

ANNEX VI

ANNEX VIIa

MEASURING SYSTEMS FOR COMPRESSED GAS DISPENSERS (MI-012)

The relevant requirements of Annex I, the specific requirements of this Annex and the conformity assessment procedures listed in this Annex apply to measuring systems intended for the continuous and dynamic measurement of quantities (mass and, if applicable, energy) of compressed gases, (CG).

Such measuring systems shall not be considered as utility measuring instruments as referred to in Annex I.

DEFINITIONS

Meter	An instrument designed to measure continuously and to ensure the memorisation and display of the quantity of gas, at metering conditions, flowing through the measurement transducer in a closed, fully charged conduit.
Calculator	A part of a meter that receives the output signals from the measurement transducers, and possibly from associated measuring instruments, and displays the measurement results.
Associated measuring instrument	An instrument connected to the calculator for measuring certain quantities, which are characteristic of the gas, with a view to making a correction and/or conversion.
Conversion device	A part of the calculator, which by taking into account the characteristics of the gas, automatically converts the mass of the gas into the amount of energy delivered or received.
Measuring system	A system that comprises, in addition to the meter itself, a transfer point, gas piping and all devices required to ensure correct measurement or intended to facilitate the measuring operations.
Compressed gas dispenser	A system intended for the fuelling of vehicles (such as motor vehicles, rail engines, boats, vessels and aircraft) with compressed gaseous fuel.
Transfer point	Physical location at which the gas is defined as being delivered or received.
Self-service arrangement	An arrangement that allows customers to use a measuring system for the purpose of obtaining gas for their own use.
Self-service device	A specific device that is part of a self-service arrangement and that allows one or more measuring systems to perform in that self-service arrangement.
Minimum measured quantity ("MMQ")	The smallest quantity of gas for which the measurement is metrologically acceptable for the measuring system.
Direct indication	The indication of mass and, if applicable, energy, corresponding to the measure that the meter is physically capable of measuring. Note: The direct indication may be converted into another quantity using a conversion device.

Interruptible	A measuring system is considered as interruptible when the gas flow can be stopped easily and rapidly.
Non-interruptible	A measuring system is considered as non-interruptible when the gas flow cannot be stopped easily and rapidly.
Flowrate range	The range between the minimum flowrate (Q_{\min}) and maximum flowrate (Q_{\max}).

SPECIFIC REQUIREMENTS

1. **Rated operating conditions**

The manufacturer shall specify the rated operating conditions for the measuring system, in particular:

1.1. *The flowrate range*

The flowrate range is subject to the following conditions:

- (a) the flowrate range of a measuring system shall be within the flowrate range of each of its elements, in particular the meter; and
- (b) the ratio between the maximum and minimum flow rate shall be no less than 10.

1.2. The properties of the gas to be measured by the instrument by specifying the name, the type or the following relevant characteristics of that gas such as:

- (a) temperature range;
- (b) pressure range;
- (c) the calorific value of the gas;
- (d) the nature and characteristics of the gas to be measured.

1.3. The nominal value of the AC voltage supply and/or limits of the DC voltage supply.

2. **Accuracy classification and MPEs**

2.1. The MPE on the indication of measured or converted amounts transferred at the transfer point is set out in Table 1.

Table 1

Type of compressed gas measuring systems	Accuracy Class (MPE [% of measured value])
Compressed hydrogen measuring systems	2,0
Other compressed gas measuring systems	1,5

The MPE on the MMQ equals twice the value given in Table 1.

2.2. The MMQ of a measuring system shall have the form 1×10^n , 2×10^n , or 5×10^n authorised units of mass or energy, where n is a positive or negative whole number, or zero.

The MMQ shall satisfy the conditions of use of the measuring system; except in exceptional cases, the measuring system shall not be used for measuring quantities less than that MMQ.

2.3. The measuring system shall not exploit the MPEs or systematically favour any party.

3. **Maximum permissible effect of disturbances**

- 3.1. The effect of an electromagnetic disturbance on a measuring system shall be one of the following:
- (a) the change in the measurement result is not greater than the critical change value pursuant to point 3.2;
 - (b) the indication of the measurement result shows a momentary variation that cannot be interpreted, memorised or transmitted as a measurement result; furthermore, in the case of an interruptible system, that can also mean the impossibility to perform any measurement; or
 - (c) the change in the measurement result is greater than the critical change value pursuant to point 3.2, in which case the measuring system shall permit the retrieval of the measurement result just before the critical change value occurred and cut off the flow.
- 3.2. The critical change value is the greater of the following values:
- 10 % of the MPE,
 - 3 % of the MMQ; in the case of a failure of the main power source, the critical change value shall be increased by 5 % of the MMQ.

4. **Durability**

For systems fitted with meters with moving parts, after an appropriate durability test, taking into account the period of time estimated by the manufacturer, has been performed, the following criterion shall be satisfied:

the variation of the measurement result after such durability test, when compared with the initial measurement result, shall not exceed two fifths of the MPE.

5. **Suitability**

- 5.1. For any measured quantity relating to the same measurement, the indications and, if applicable, printouts provided by various devices, including those devices that are part of a self-service arrangement, shall have the same scale interval and the results shall not deviate from one another.

The scale interval of a CG measuring system shall not exceed 1,5 % of the MMQ.

- 5.2. It shall not be possible to divert the measured quantity in normal conditions of use unless it is readily apparent.

- 5.3. During the warm-up time of the CG measuring system, no measurements shall take place.

5.4. *Instruments for direct sales*

- 5.4.1. A measuring system for direct sales shall be provided with means for resetting the display to zero.

It shall not be possible to divert measured gas downstream of the meter during a filling operation.

- 5.4.2. The display of the quantity on which the transaction is based shall remain until all parties in the transaction have accepted the measurement result.

- 5.4.3. Measuring systems for direct sales shall be interruptible.

- 5.4.4. Measuring systems for direct sales shall display measurement results in units of mass and, if applicable, energy.

5.5. *Additional requirements for the display*

- 5.5.1. It shall not be possible to reset displays on the measuring systems to zero during a measurement.

- 5.5.2. The start of a new measurement shall be inhibited until the display has been reset to zero.

- 5.5.3. Where a measuring system is fitted with a price display, the difference between the indicated price and the price calculated from the unit price and the indicated quantity shall not exceed the smallest currency unit. However, that difference is not required to be less than the smallest monetary value.

6. Power supply failure

A measuring system shall either be provided with an emergency power supply device that will safeguard all measuring functions during the failure of the main power supply device or be equipped with means to save and display the data present in order to permit the conclusion of the transaction in progress and with means to stop the flow of gas at the moment of failure of the main power supply device.

7. Units of measurement

The metered quantity shall be displayed in kilograms, or their decimal multiples or submultiples, and, if applicable, in joules or watt-hours, or their decimal multiples.

CONFORMITY ASSESSMENT

The conformity assessment procedures referred to in Article 17 that the manufacturer can choose between are:

B + F or B + D or H1 or G'.
