



STATUTORY INSTRUMENTS.

**S.I. No. 160 of 2007.**



LEGAL METROLOGY (EUROPEAN CONFORMITY ASSESSMENT OF  
MEASURING INSTRUMENTS) REGULATIONS 2007.

**(Prn. A7/0777)**

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I, MICHEÁL MARTIN T.D., Minister for Enterprise, Trade and Employment, in exercise of the powers conferred on me by section 3 (1) of the Metrology Act 1996 (No. 27 of 1996), and for the purpose of giving effect to Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments, hereby make the following Regulations—

Part I

*Citation and commencement*

1. These Regulations may be cited as the Legal Metrology (European Conformity Assessment of Measuring Instruments) Regulations 2007, and shall come into operation on the making thereof.

*Interpretation*

2. In these Regulations—

‘Act’ means the Metrology Act 1996 (No. 27 of 1996);

‘authorised officer’ means a person authorised in accordance with Regulation 14;

‘authorised representative’ has the same meaning as in Article 4 of the Directive;

‘category’, in relation to measuring instruments, means all devices and systems of a kind, or with a measuring function mentioned, in column 1 of the table to Schedule I, and which are subject to the provisions of any one Annex;

‘CE marking’ means the marking referred to as such in Regulation 11;

‘the Commission’ means the Commission of the European Communities;

‘conformity assessment procedures’ means the procedures allowing for conformity assessment made up from the modules described in Annexes A to H1 of the Directive;

‘the Directive’ means Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments (OJ L135/1 of 30 April 2004);

‘the Director’ means the Director of Legal Metrology established by section 7 of the Act;

‘EEA Member State’ means a State which is a contracting party to the EEA Agreement;

*Notice of the making of this Statutory Instrument was published in “Iris Oifigiúil” of 24th April, 2007.*

‘EEA Agreement’ means the Agreement on the European Economic Area signed in Oporto on 2 May 1992 as adjusted by the protocol signed at Brussels on 17 March 1993;

‘essential requirements’ means the requirements set out in Schedule III and in the instrument-specific provisions which apply to a measuring instrument and ‘relevant essential requirements’ means the essential requirements which apply to the measuring instrument concerned;

‘harmonised standard’ means a technical specification adopted by the European Committee for Standardisation (CEN), the European Committee for Electro-technical Standardisation (CENELEC), or the European Telecommunications Standards Institute (ETSI), or jointly by two or all of these organisations, at the request of the Commission pursuant to Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 (OJ L204/37 of 21 July 1998) laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services, as amended by Directive 98/48/EC (OJ L217/18 of 5 August 1998), and prepared in accordance with the General Guidelines agreed among CEN, CENELEC and ETSI and the Commission and the European Free Trade Association and adopted and signed on 28 March 2003 (OJ C91/7 of 16 April 2003);

‘instrument-specific provisions’ means any requirement in the Directive specifically relating to a category of measuring instrument and any requirement in these Regulations, or in any other regulations for the time being in force giving effect to the provisions of the Directive, that relate to a particular category of measuring instrument, and ‘relevant instrument-specific provisions’ means the instrument-specific provisions which apply to the category of measuring instruments concerned;

‘Legal Metrology Service’ means the body established under section 7 of the Act;

‘measuring instrument’ has the same meaning as in Article 4 of the Directive;

‘manufacturer’ has the same meaning as in Article 4 of the Directive;

‘Member State’ means an EEA Member State or Switzerland;

‘Minister’ means the Minister for Enterprise, Trade and Employment;

‘normative document’ means a document containing technical specifications adopted by OIML, subject to the procedure stipulated in Article 16(1) of the Directive, the reference of which is published by the Commission in the Official Journal of the European Communities pursuant to Article 16(1)(b) of the Directive;

‘notified body’ means a body designated by the Minister in accordance with the Directive and these Regulations to carry out tasks pertaining to one or more of the conformity assessment procedures and which has been notified as such to, and received an identification number from, the Commission for such task or

tasks and, where the context so admits or requires, includes a body designated in accordance with measures adopted to implement the Directive by an equivalent authority in another Member State, to carry out tasks pertaining to one or more of the conformity assessment procedures and which has been notified as such to, and received an identification number from, the Commission for such task(s);

‘OIML’ means the International Organisation for Legal Metrology (Organisation Internationale de Métrologie Légale) established by the Convention Establishing an International Organisation for Legal Metrology done at Paris on 12 October 1955;

‘placing on the market’ has the same meaning as in Article 4 of the Directive;

‘prescribed use’ means—

(a) in the case of a measuring instrument to which these Regulations apply, other than an exhaust gas analyser, use for the purpose of trade (within the meaning of section 2(1) of the Act), and

(b) in the case of an exhaust gas analyser, use for the purposes set out in Directive 2005/1955/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles (OJ L275/1 of 20 October 2005);

‘putting into use’ has the same meaning as in Article 4 of the Directive;

‘relevant national standard’ means a standard implementing a harmonised standard, the reference to which has been published in the *Iris Oifigiúil* or any procedure in another Member State having equivalent effect to a standard implementing a harmonised standard;

‘sub-assembly’ has the same meaning as in Article 4 of the Directive.

*Application, derogation and repeal*

3. (1) Subject to paragraphs (2), (3) and (4), Regulation 6 of these Regulations applies to the placing on the market and putting into use in the State of every measuring instrument in each category referred to in column 1 of the table in Schedule I that is intended for a prescribed use.

(2) By way of derogation from Regulation 6, a measuring instrument referred to in Article 1 of the Directive in respect of which there is for the time being in force a certificate issued or deemed to be issued under the Legal Metrology (Type Approval) Regulations 2006 (S.I. No. 207 of 2006) may be placed on the market or put into a prescribed use until—

(a) the date upon which such certificate (or such certificate as amended, replaced or renewed) expires, or

(b) 30 October 2016,

whichever is the earlier.

(3) Nothing in these Regulations shall prevent the showing of any measuring instrument of a category referred to in Article 1 of the Directive which does not conform to the requirements of these Regulations at a fair, exhibition, demonstration, or similar event, provided that a visible sign is affixed to, or placed next to such measuring instrument, which sign indicates clearly that the measuring instrument is not available for placing on the market or putting into use until it conforms with these Regulations.

(4) The provisions of the European Communities (Electromagnetic Compatibility) Regulations 1998 (S.I. No. 22 of 1998) shall not apply to requirements for electromagnetic immunity in respect of any measuring instrument of a category referred to in Article 1 of the Directive and the requirements for electromagnetic immunity specified by the Directive for such measuring instruments shall apply. The provisions of the European Communities (Electromagnetic Compatibility) Regulations 1998 shall be unaffected by these Regulations in so far as those provisions set out requirements in respect of electromagnetic emissions of measuring instruments to which these Regulations or the Directive apply.

(5) The provisions of paragraphs (1), (2), (3), (4), (5), (6) and (13) of Regulation 4 of the Legal Metrology (Type Approval) Regulations 2006 (S.I. No. 207 of 2006) shall not apply on and from 30 October 2006 to any measuring instrument to which these Regulations apply. For the avoidance of doubt, nothing in this Regulation shall prevent the application of the provisions of paragraphs (7), (8), (9), (10), (11), (12), (14) and (15) of Regulation 4 of the Legal Metrology (Type Approval) Regulations 2006 on and from 30 October 2006 to a type approval given under those Regulations before 30 October 2006 in respect of any measuring instrument to which these Regulations apply, or shall prejudice the validity or effectiveness of any certificate granted or deemed granted under those Regulations before 30 October 2006.

(6) The provisions of paragraph (5) shall not operate so as to prevent the making and determination of any application under paragraph (12) of the Legal Metrology (Type Approval) Regulations 2006 (S.I. No. 207 of 2006) on or after 30 October 2006.

(7) Save where inconsistent with the provisions of these Regulations or the Directive, the provisions of the Act and of any regulations (other than these Regulations) made thereunder which relate to control of any instrument (within the meaning of section 2(1) of the Act) which is in service shall apply to a measuring instrument in a category referred to in column 1 of the table in Schedule I (which is not anyway an instrument) as if such measuring instrument were an instrument.

4. (1) Where instrument-specific provisions lay down essential requirements for sub-assemblies, these Regulations apply to such sub-assemblies as if such sub-assemblies were measuring instruments.

(2) Sub-assemblies and measuring instruments may, at the option of the manufacturer, be assessed together or independently and separately for the purpose of establishing their conformity with the requirements of these Regulations and of any relevant instrument-specific provisions.

5. (1) The enactments referred to in Part A of Schedule II are repealed. Each of the enactments referred to in column 1 of the table in Part B of Schedule II is repealed to the extent indicated in column 2 of that table.

(2) Nothing in the repeals effected by paragraph (1) shall affect the validity of anything done under, or under any power conferred by, any enactment referred to in Schedule II before the repeal of that enactment.

## Part II

### *Essential requirements and conformity assessment*

6. (1) A measuring instrument in a category referred to in column 1 of the table in Schedule I which is intended for a prescribed use shall meet the essential requirements laid down in Schedule III and those essential requirements identified in column 2 of the table in Schedule I opposite the reference to that category of measuring instruments in column 1 of that table.

(2) The conformity of a measuring instrument referred to in paragraph (1) with the relevant essential requirements referred to in paragraph (1) shall be assessed in accordance with Regulation 7.

(3) A manufacturer may choose to use any technical solution that complies with the essential requirements referred to in paragraph (1).

(4) In order to benefit from any presumption referred to in Regulation 8, a manufacturer who relies on a relevant national standard or normative document must—

(i) correctly apply the solutions contained in the relevant national standard(s), or

(ii) correctly apply the solutions contained in the normative document(s)

which relate to the measuring instrument concerned.

### *Conformity assessment*

7. (1) The conformity assessment of a measuring instrument referred to in Regulation 6(1) with the relevant essential requirements shall be carried out by the application, at the choice of the manufacturer, of one of the conformity assessment procedures in the relevant instrument-specific provisions, (which shall include all of the modules making up any relevant conformity assessment procedure).

(2) Where the conformity assessment procedure requires that the manufacturer shall provide, where appropriate, technical documentation for specific measuring instruments, or groups of measuring instruments, that technical documentation shall include the materials and information set out in Schedule IV. If

so requested by a notified body, the manufacturer shall provide translations of the technical documentation into the Irish or English language.

*Presumption of conformity of relevant national standards and normative documents*

8. (1) A measuring instrument referred to in Regulation 6(1) shall be presumed to conform with the essential requirements referred to in Regulation 6(1) if it complies fully with those elements of the relevant national standards or with those elements of the normative documents which correspond to the relevant essential requirements.

(2) Where a measuring instrument referred to in Regulation 6(1) complies only in part with those elements of the relevant national standards or with those elements of the normative documents referred to in paragraph (1), it shall be presumed to conform with the essential requirements referred to in Regulation 6(1) which correspond to the elements of the relevant national standards or the elements of the normative documents with which the measuring instrument complies.

(3) Every notified body referred to in Regulation 12 that meets the criteria laid down in relevant national standards shall be presumed to meet the corresponding criteria specified in Schedule V.

(4) The Minister shall publish the reference to any relevant national standard and the reference to any relevant normative document to which paragraph (1) relates in *Iris Oifigiúil*.

(5) It shall be presumed that a measuring instrument referred to in Regulation 6(1) complies with the appropriate tests mentioned in point 3(i) of Schedule IV if the corresponding test programme has been performed in accordance with:

- (a) those elements of the relevant national standards or
- (b) those elements of the normative document(s)

which correspond to those essential requirements referred to in Regulation 6(1) and if the test results from the test programme undertaken ensure compliance with the essential requirements referred to in Regulation 6(1).

*Placing on the market and putting into use*

9. (1) Nothing in the Act, any instrument made thereunder or these Regulations shall—

- (a) prohibit or restrict,
- (b) authorise or empower the prohibition or restriction of, or
- (c) authorise or empower the refusal to authorise or permit, the placing on the market and/or putting into use of a measuring instrument of a category referred to in Article 1 of the Directive that properly bears the markings referred to in Regulation 10.

(2) Any measuring instrument to which these Regulations apply, that does not meet the requirements specified in these Regulations for the measuring instrument in question, may be seized by or on behalf of the Director and retained by the person seizing it, or may be taken out of use by sealing off the controls of the measuring instrument or by sealing off any premises, vehicle or vessel, or any part of any premises, vehicle or vessel, in which the measuring instrument is found, subject to any direction of any court in that regard.

*Marking and identification requirements*

10. (1) Application of the CE marking and the supplementary metrology marking specified in Regulation 11 shall indicate, in the case of prescribed instruments, conformity with Regulation 6(1).

(2) Any CE marking and supplementary metrology marking shall be affixed by, or under the responsibility of, the manufacturer. These markings may be affixed to the measuring instrument during the fabrication process, if justified.

(3) Any other marking may be affixed on or to a measuring instrument, provided that the visibility and legibility of the CE marking and the supplementary metrology marking is not thereby reduced, and provided that the affixing of any such marking shall not be likely to deceive third parties as to the meaning and/or form of the CE marking or the supplementary metrology marking.

11. (1) The CE marking referred to in Regulation 10 consists of the symbol 'CE' according to the design laid down in paragraph I.B (d) of the Annex to Council Decision 93/465/EEC (OJ No. L220/23 of 30 August 1993). The CE marking shall be at least 5 millimetres high.

(2) The supplementary metrology marking consists of the capital letter 'M' and the last two digits of the year of its affixing, surrounded by a rectangle. The height of the rectangle shall be equal to the height of the CE marking. The supplementary metrology marking shall immediately follow the CE marking.

(3) The identification number of the notified body concerned referred to in Regulation 12, if prescribed by the conformity assessment procedure, shall follow the CE marking and supplementary metrology marking.

(4) When a measuring instrument consists of a set of devices, not being sub-assemblies, operating together, the markings shall be affixed on the measuring instrument's main device.

(5) When a measuring instrument is too small or too sensitive to carry the CE marking and supplementary metrology marking, the markings shall be carried by the packaging, if any, and by the accompanying documents required by the Directive or these Regulations.

(6) The 'CE' marking and supplementary metrology marking shall be indelible. The identification number of the notified body concerned shall be indelible or self-destructive upon removal. All markings shall be clearly visible or easily accessible.



*Notified bodies*

12. (1) A natural or legal person with a place of establishment, or providing services, in the State may be designated by the Minister for the purposes of Article 11 of the Directive as a notified body to perform tasks pertaining to the conformity assessment modules referred to in paragraph (1) of Regulation 7, for any one or more measuring instrument category referred to in Article 1 of the Directive, provided that such person conforms to the requirements set out in Schedule V, and subject to any other limitation contained in any such designation.

(2) The Minister shall notify the Commission and the other Member States of any designation given under paragraph (1) and shall notify the other Member States of the identification number assigned by the Commission to the notified body concerned in accordance with Article 11(4) of the Directive. Any notification of a designation shall indicate, where relevant, the measuring instrument accuracy classes, the measuring range, the measurement technology and any other instrument characteristic limiting the scope of the notification in respect of the notified body.

(3) Each notified body, save where the said body is the Legal Metrology Service, referred to in Regulation 12(1) shall transmit to the Legal Metrology Service copies (or, as the case may be, written notification) of:

- (a) every EC-type examination and design examination certificate and their annexes, and every addition, amendment and withdrawal relating to every such certificate, issued by it,
- (b) every quality system approval issued, refused or withdrawn by it,
- (c) where requested by the Legal Metrology Service, any evaluation report established by it, and
- (d) any other document required of any notified body by the Legal Metrology Service in connection with the performance by the Legal Metrology Service of any responsibility imposed upon it by these Regulations.

(4) From time to time, the Minister shall carry out, or arrange to have carried out, an assessment of the performance of every notified body whose designation has been notified in accordance with paragraph (2) to ensure that the notified body continues to meet the criteria set out in Schedule V. A notified body shall produce promptly to the Minister such documents, records and information as the Minister may require for the purpose of any such assessment.

(5) If, following the assessment carried out in accordance with paragraph (4), the Minister is of the opinion that a notified body no longer conforms to the requirements of Schedule V, the Minister shall, subject to the provisions of these Regulations, revoke the designation given under paragraph (1) and shall withdraw every notification given to the Commission and the other Member States in respect of that notified body.

(6) The Minister shall not incur any liability for any act or default in the discharge or purported discharge, or performance by a notified body of any of the tasks pertaining to the conformity assessment procedures referred to in paragraph (1) of Regulation 7.

*Conformity with directives other than the Directive*

13. (1) Where a measuring instrument is subject to the provisions of any enactment (other than these Regulations) which gives effect to a directive other than the Directive which provisions require the affixing of the CE marking, the marking shall indicate that the measuring instrument in question is also presumed to conform to the requirements of that other directive or those other directives. In such a case, the publication reference of the other directive or directives, in the Official Journal of the European Union, must be given in the documents, notices or instructions required by the provisions of such enactment and accompanying the measuring instrument.

(2) Nothing in these Regulations shall remove any obligation in relation to the marking of any measuring instrument imposed by any enactment other than these Regulations (including any enactment giving effect to a directive other than the Directive).

### Part III

*Market surveillance and compliance*

14. (1) For the purpose of ensuring compliance with these Regulations and carrying out market surveillance required by Article 18 of the Directive, the Director may—

- (a) appoint any person for the time being assigned to or working in the Legal Metrology Service or any person for the time being appointed an inspector under section 9 of the Act to be an authorised officer for the purposes of these Regulations;
- (b) subject to paragraph (4), require any authorised officer to perform such tasks relating to these Regulations or to market surveillance specified by the Director for any category or categories of measuring instrument either exclusively, or in conjunction with any other duties performed by that person.

(2) Every person appointed under paragraph (1) to be an authorised officer shall be furnished with a certificate by the Director of his or her appointment.

(3) The Director may, at any time, revoke an appointment under paragraph (1), and, in such case, the person whose appointment is so revoked shall promptly surrender to the Director the certificate furnished under paragraph (2).

(4) The Director shall not require any authorised officer to carry out tasks relating to market surveillance for any category or categories of measuring instrument where, in the opinion of the Director, there would be a risk, or a substantial risk of, a conflict between such requirement and the performance of

the other duties of that person, including without limitation, duties relating to any activity undertaken by a notified body.

(5) Market surveillance shall be carried out for the purpose of ensuring that measuring instruments that breach any requirement of these Regulations are neither placed on the market nor put into use.

(6) For the purpose of carrying out tasks relating to market surveillance, an authorised officer may, or may be required by the Director, subject to the production, if so required, of his or her certificate of appointment, to—

- (a) at all reasonable times, visit any premises or place including a vehicle or vessel, where, in the opinion of the Director or the authorised officer, measuring instruments are, or are likely, to be found;
- (b) at all reasonable times, enter any premises or place, including a vehicle or vessel in which he or she reasonably believes there are, or are likely to be, for the time being any measuring instruments;
- (c) on entering any premises or place by virtue of this Regulation, be accompanied by any such other persons and take with him or her any such equipment as may appear to be necessary;
- (d) inspect such premises or place and examine or test any measuring instrument to satisfy himself as to its conformity or otherwise with the requirements of these Regulations or the Directive;
- (e) conduct any examination or testing which the Director considers necessary or desirable for the purpose of assisting a competent authority of another Member State to fulfil its obligations in accordance with Article 18 of the Directive;
- (f) take away for examination and testing any such measuring instrument,
- (g) report to the Director, as soon as possible, on the result of any examination or testing of any measuring instrument or on the results of such examinations or testing generally;
- (h) require the owner, person in charge or any employee of any premises or place entered, or any other person who appears to him or her to be in control of any measuring instrument, to provide him or her with such information or assistance as he or she considers necessary (including personal assistance, access to books, documents or other records, including any records kept on any computer, or other electronic means of storage or retrieval) to enable him or her to establish whether any device or thing is a measuring instrument, to examine or test any measuring instrument, or to carry out any other function under these Regulations;

- (i) inspect and copy or take extracts from any such books, documents or records, including, in the case of such records in a non-legible form, a copy of, or an extract from, such records in a permanent legible form;
  - (j) in the case of any vehicle or vessel, request the owner or operator thereof to bring the vehicle or vessel to the nearest location at which appropriate test facilities are available and at which an examination or test may be carried out.
- (7) When exercising any powers conferred on him or her by section 10 of the Act, an inspector who is an authorised officer may exercise any power conferred on him or her by these Regulations.
- (8) When exercising any powers conferred on him or her by these Regulations, an authorised officer who is an inspector may exercise any power conferred on him or her by section 10 of the Act.
- (9) An authorised officer who takes away a measuring instrument pursuant to paragraph (6) shall notify forthwith, and issue a receipt to, the person on whose premises the measuring instrument is taken, or that person's authorised representative, indicating that the measuring instrument is taken in pursuance of these Regulations.
- (10) An authorised officer may seize and retain—
- (a) any article, measuring instrument, stamp or other thing which he or she reasonably believes to be in contravention of these Regulations,
  - (b) any such books, documents or records referred to in paragraph (6)(h) of this Regulation which the authorised officer reasonably believes may be required as evidence in any proceedings.
- (11) An authorised officer may, if the Director considers it necessary, be accompanied by a member of An Garda Síochána when exercising any powers conferred on an authorised officer by these Regulations.

*Where non-compliance suspected*

15. (1) Where an authorised officer suspects that it is probable that all or part of each of two or more measuring instruments of the same category and a particular model bearing the markings referred to in Regulation 11 do not meet the essential requirements relating to metrological performance imposed by these Regulations on a measuring instrument intended for a prescribed use or set out in the Directive for measuring instruments that are not referred to in column 1 of the table in Schedule 1, when correctly installed and used in accordance with the manufacturer's instructions, he or she shall notify the Director.
- (2) Where an authorised officer suspects that the CE marking or the supplementary metrology marking has been affixed unduly on or to a measuring instrument he or she shall notify the Director.

(3) The Director shall request the manufacturer or the manufacturer's authorised representative to make submissions to him or her on any notification made to him or her under paragraph (1) or paragraph (2), and may invite any other person or body (including any notified body) that he considers may have an interest in the matter to make submissions to him. In considering each such notification, the Director shall have regard to any report provided by the authorised officer and to any other information or documents which the Director considers relevant, and may consult with any person or body whom he or she considers appropriate.

(4) The Director shall consider every notification made to him or her under paragraph (1) for the purpose of forming an opinion on whether all or part of the measuring instruments of the category and model concerned bearing the markings referred to in Regulation 11 do not meet the essential requirements imposed by these Regulations or set out in the Directive as applicable, when correctly installed and used in accordance with the manufacturer's instructions. The Director shall, in considering such notification, have regard to whether it appears such non-compliance (if found) is systematic or incidental.

(5) Where the Director forms the opinion that all or part of the measuring instruments of the category and model concerned in a notification under paragraph (1) bearing the markings referred to in Regulation 11 do not meet the essential requirements relating to metrological performance imposed by these Regulations or set out in the Directive as applicable, when correctly installed and used in accordance with the manufacturer's instructions, he or she shall:

provide a report to the Minister which sets out his or her opinion, and which also includes: (a) a statement of the exact grounds upon which that opinion was formed, (b) an opinion as to whether such non-compliance is systematic or incidental and the exact grounds upon which that opinion was formed and (c) a recommendation as to the action to be taken by the Minister.

The Director shall provide a copy of such report to the manufacturer of the measuring instrument or the manufacturer's authorised representative.

(6) If, following consideration of a notification under paragraph (2), and having considered the submissions, if any, made to him or her, the Director is of the opinion that the CE marking or the supplementary metrology marking has been affixed unduly to the measuring instrument concerned, he or she may, subject to the provisions of these Regulations, by direction in writing given to the manufacturer of the measuring instrument or the manufacturer's authorised representative:

- (a) require that person to make the measuring instrument concerned conform as regards those provisions concerning the CE marking or supplementary metrology marking not covered by Article 19(1) of the Directive; and/or
- (b) require that person to end any infringement of any relevant provisions within such period and subject to such conditions as are specified in the direction,

and that person shall comply with the direction.

(7) Where in the opinion of the Director, a person has persisted in failing to comply with a direction given under paragraph (6), the Director shall provide a report to the Minister which sets out his or her opinion, and which also includes: (a) a statement of the exact grounds upon which that opinion was formed, and (b) a recommendation as to the action to be taken by the Minister.

(8) A person aggrieved by a direction given to him, her or it under paragraph (6) may appeal that direction to the Minister pursuant to the procedure prescribed in Regulation 20 by notice of appeal in writing sent to the Minister and copied to the Director within fourteen days of the giving to that person of notice of the direction.

(9) The Director may withdraw a direction given by him or her under paragraph (6).

*Reference of non-compliance to Minister*

16. (1) Where the Director has provided the Minister with a report in accordance with paragraph (5) of Regulation 15 or paragraph (7) of Regulation 15, and the Minister, having considered the Director's report and any information, documents or submissions he or she considers appropriate, agrees with the opinion of the Director:

- (a) the Minister may, by direction in writing, containing a statement of the exact grounds upon which such direction is given, transmitted to the person who is placing or has placed the measuring instruments concerned on the market or who is putting or has put the measuring instruments concerned into use-
  - (i) prohibit that person from placing or continuing to place on the market, or from putting or continuing to put into use, the measuring instruments concerned,
  - (ii) impose on that person such restrictions as he considers appropriate on his, her or its placing or continuing to place on the market or from putting into use the measuring instruments concerned,

or

- (iii) require that person to take specified steps to withdraw from the market or from use, as the case may be, any measuring instruments concerned already placed by him, her or it on the market or in use,

and that person shall comply with the direction, and

- (b) the Minister may request any notified body referred to in Regulation 12(1) to review any certificate, approval or report issued by such notified body in connection with any matter to which such direction relates, within a period specified by the Minister, and

(c) the Minister may provide a copy of the direction (and any other information or document he or she considers appropriate in the circumstances) to any competent authority or notified body of any Member State.

(2) Any direction given under paragraph (1) shall state whether the non-compliance to which the direction relates is systematic or incidental.

(3) Where the Minister gives a direction under paragraph (1), which contains a statement that states the non-compliance to which the direction relates is systematic, he or she shall immediately inform the Commission and provide the Commission with a copy of the direction, which includes the exact grounds upon which the direction is given.

(4) A person aggrieved by a direction given to him, her or it under paragraph (1) may appeal that direction to the Minister pursuant to the procedure prescribed in Regulation 20 by notice of appeal in writing sent to the Minister within fourteen days of the giving to that person of notice of the direction. Any direction given under paragraph (1) shall contain a statement to that effect.

(5) The requirement to comply with any direction given by the Minister under paragraph (1) which contains a statement that the non-compliance to which the direction relates is systematic may be suspended by the Minister pending receipt of the Commission's findings in accordance with Article 19(2) of the Directive.

(6) The Minister may withdraw a direction given by him or her under paragraph (1).

(7) When the Commission has issued its findings in accordance with Article 19 of the Directive in connection with any matter of which he or she has informed the Commission under this Regulation, the Minister shall take such steps as are appropriate having regard to such findings pursuant to his or her powers under these Regulations or under the Act.

*Non-compliance with directions*

17. (1) Where a person fails to comply with a direction given under Regulation 16, the Minister may—

- (a) apply summarily to the High Court for such orders as are necessary or appropriate to give full effect to the direction, and
- (b) take such other action, as he or she considers appropriate to restrict or prohibit the placing on the market of the measuring instrument in question or to ensure that it is withdrawn from the market or that its further use is restricted or prohibited.

*Administrative co-operation*

18 (1) The Legal Metrology Service shall be the competent authority in the State responsible for the functions identified in Article 18(2) and Article 18(3) of the Directive, and such functions shall be performed by the Director, who

may require any person for the time being assigned to or working in the Legal Metrology Service to perform any tasks relating to such functions.

(2) Without prejudice to the generality of paragraph (1), the Legal Metrology Service shall—

- (a) so far as is reasonably practicable, assist the competent authority (for the purposes of the Directive) of any other Member State when so requested in the fulfilment of that competent authority's obligations to carry out market surveillance,
- (b) provide to the competent authorities (for the purposes of the Directive) of the other Member States at such intervals, as it considers appropriate—
  - (i) information concerning the extent to which measuring instruments examined by authorised officers comply with the provisions of the Directive, and the results of such examinations;
  - (ii) copies of any EC type-examination and design-examination certificates and their annexes issued by every notified body referred to in Regulation 12(1), and any additions or amendments to, or withdrawals of, any such certificates;
  - (iii) any quality system approvals issued by any notified body referred to in Regulation 12(1), and information on any quality systems refused such approval or in respect of which approval is withdrawn;
  - (iv) any evaluation report established by any notified body referred to in Regulation 12(1), when such report is demanded by the competent authority (within the meaning of the Directive) of any other Member State;
- (c) make available to each notified body referred to in Regulation 12(1) such information relating to EC type-examination and design-examination certificates and quality system approvals, as it considers necessary.

*Procedure where adverse decision proposed*

19 (1) Where—

- (a) the Minister intends to revoke a designation in accordance with Regulation 12(5) or to issue a direction in accordance with Regulation 16(1), or
- (b) the Director intends to issue a direction in accordance with Regulation 15(6),



he or she shall in such case inform the person or body who would be the addressee of such revocation or direction of that intention and the reasons therefor and shall afford the person or body concerned a period of not less than twenty-one days to make further submissions or representations to him or her on the intended revocation or direction.

*Appeal procedure*

20. Where a person appeals a direction of the Director under Regulation 15(8), or appeals a direction of the Minister under Regulation 16(4) the procedure on such appeal shall be as follows—

(1) Any decision taken resulting in a restriction being imposed on the placing on the market or putting into service of an instrument shall be notified to the person concerned, stating the exact grounds for the decision and confirming the right to appeal against the decision under paragraph (2) and the time limit for bringing such an appeal.

(2) Any person aggrieved by a decision under paragraph (1) may, by notice in writing given to the Minister not later than 14 days after receipt by that person of notice of that decision, appeal to the Minister against the decision and the Minister, having considered any submission made to him or her by the person and any other interested parties and the report of any inquiry held under paragraph (3) in relation to the appeal or of any assessor appointed under paragraph (4) in relation thereto, may uphold, vary or reverse the decision under appeal.

(3) The Minister may appoint an officer to hold an inquiry in connection with an appeal under this Regulation and to report to the Minister on the findings and result of the inquiry. Such officer shall not have had any involvement in the preparation of the decision under appeal or in advising the Minister in respect of same.

(4) The Minister may appoint an assessor to assist him or her and to make a report to him or her in relation to an appeal under this Regulation or to assist an officer of the Minister in relation to an inquiry being held by the Minister under paragraph (2). An assessor shall not have had any involvement in the preparation of the decision under appeal or in advising the Minister in respect of same.

(5) A copy of the recommendations of any report submitted to the Minister pursuant to paragraphs (3) or (4) shall, on request, be made available to the person who has brought the appeal before the Minister and the Minister shall consider any submission made by that person in respect of such recommendations provided any such submission is submitted within a period to be fixed by the Minister on a case-by-case basis, which shall not be less than 14 days after the notification of the recommendation to the person concerned.

(6) Any person aggrieved by a decision of the Minister under these Regulations may appeal to the High Court against the decision and the court may vary, annul or confirm the decision.

*Offences*

21. (1) Any person who places on the market or causes to be placed on the market (including, for the avoidance of doubt, any person who causes to be offered for sale, whether by lease, rental or other type of agreement), or puts into use or causes to be put into use, any measuring instrument to which Regulation 6(1) applies, that does not meet the requirements specified in the said Regulation 6(1) for the measuring instrument in question, shall be guilty of an offence.

(2) Any person who places on the market or causes to be placed on the market (including, for the avoidance of doubt, any person who causes to be offered for sale, whether by lease, rental or other type of agreement), or puts into use or causes to be put into use, any measuring instrument to which Regulation 6(1) applies, that does not bear the markings referred to in Regulation 10(1), shall be guilty of an offence.

(3) Any person who purports to affix or causes to be affixed the CE marking or the supplementary metrology marking to a measuring instrument that does not comply with the requirements of these Regulations or the Directive, as applicable, shall be guilty of an offence.

(4) Any person who affixes a marking on or to a measuring instrument that is likely to deceive a third party as to the meaning and/or form of the CE marking, or the supplementary metrology, marking shall be guilty of an offence.

(5) Any person who affixes a CE marking in contravention of Regulation 10 shall be guilty of an offence.

(6) A person who—

- (a) obstructs or impedes an authorised officer in the exercise of his or her powers conferred by these Regulations, or does not comply with a requirement made by an authorised officer exercising powers conferred by these Regulations, or
- (b) fails, without reasonable cause, to give an authorised officer any such assistance or information which the authorised officer may reasonably require for the purpose of the exercise by the authorised officer of his or her powers under these Regulations, or
- (c) knowingly or recklessly makes a false or misleading statement, either verbally or in writing, to an authorised officer who is exercising his or her powers conferred by these Regulations,

shall be guilty of an offence.

(7) Where a person fails to comply with a direction given under Regulation 16, for the time being in force, he or she shall be guilty of an offence.

*Prosecution and penalties*

22. (1) A person guilty of an offence under these Regulations shall be liable, on summary conviction, to a fine not exceeding €3,000 or in the case of an individual, to imprisonment for a term not exceeding twelve months or to both such fine and such imprisonment.

(2) Any Court which has tried an offence under these Regulations may, at the conclusion of such trial, give such directions and make such orders as appear to it appropriate in respect of any measuring instrument to which such trial relates, which may include—

- (a) orders for the forfeiture and/or disposal of that measuring instrument;
- (b) orders directing the affixing of marking to, or the obliteration of markings from, that measuring instrument;
- (c) orders directing the person controlling that measuring instrument to take steps specified by the court in relation to that measuring instrument.

(3) Where the commission by any person of an offence under these Regulations, is due to the act or default of some other person, that other person shall also be guilty of the offence and may be charged with and convicted of the offence, whether or not proceedings are taken against the first-mentioned person.

(4) Where an offence, committed by a body corporate, is proved to have been committed with the consent or connivance of, or to be attributable to any neglect on the part of, any director, manager, secretary or other similar officer of the body corporate or any person purporting to act in any such capacity, that person, as well as the body corporate, shall be guilty of the offence.

(5) Where the affairs of a body corporate are managed by its members, paragraph (4) shall apply in relation to the acts and defaults of a member or an officer of the body in question in connection with responsibilities or functions of management conferred on him or her.

(6) Notwithstanding section 10(4) of the Petty Sessions (Ireland) Act 1851, proceedings for an offence under these Regulations may be instituted at any time:

- (a) within one year from the date on which the offence was committed, or
- (b) at any time within 6 months from the date on which evidence sufficient in the opinion of the Director to justify initiating the proceedings, comes to the Director's knowledge, not being later than 5 years from the date on which the offence concerned was committed.

(7) Summary proceedings for an offence under these Regulations may be brought and prosecuted by the Director.

*Further provision*

23. Where any measuring instrument is seized and detained under these Regulations, any person aggrieved by such seizure and detention may appeal to a Judge of the District Court under this Regulation as if section 30 of the Act applied to a seizure and detention under these Regulations as it applies to a seizure and detention under section 10(4) of the Act.

**SCHEDULE I****MEASURING INSTRUMENT CATEGORIES AND INSTRUMENT-SPECIFIC ESSENTIAL REQUIREMENTS****TABLE**

<b>Column 1 Measuring Instrument Category</b>	<b>Column 2 Schedule to these Regulations containing relevant Instrument- Specific Provisions</b>
Water meters for cold water	MI-001
Gas meters and volume conversion devices	MI-002
Active electrical energy meters	MI-003
Measuring systems for the continuous and dynamic measurement of quantities of liquids other than water <ul style="list-style-type: none"> <li>— fuel dispensers (not for liquefied gases)</li> <li>— measuring systems on road tankers for liquids of low viscosity (&lt;20 mPa.s)</li> <li>— measuring systems for (un)loading road tankers</li> <li>— measuring systems for milk</li> </ul>	MI-005
Automatic weighing instruments: <ul style="list-style-type: none"> <li>— automatic checkweigher</li> <li>— automatic catchweigher</li> <li>— weight labeller</li> <li>— weight/price labeller</li> <li>— automatic gravimetric filler</li> <li>— discontinuous totaliser (totalising hopper weigher)</li> <li>— continuous totaliser</li> </ul>	MI-006
Taximeters	MI-007
Material measures of length	MI-008A
Capacity serving measures	MI-008B
Dimensional measuring instruments <ul style="list-style-type: none"> <li>— length measuring instruments</li> <li>— area measuring instruments</li> <li>— multi-dimensional measuring instruments</li> </ul>	MI-009
Exhaust gas analysers	MI-010

## SCHEDULE II

### REPEALS

#### PART A COMPLETE REPEAL

Directive Number	Measuring Instrument Category	Relevant Statutory Instrument
75/410/EEC	Continuous totalisers	European Communities (Measuring Instruments) Regulations 1977 S.I. No. 328 of 1977
78/1031/EEC	Gravimetric fillers	European Communities (Automatic Check-Weighing and Weight Grading Machines) Regulations 1981 S.I. No. 150 of 1981
71/319/EEC	Meters for liquids other than water	European Communities (Measuring Instruments) Regulations 1973 S.I. No. 67 of 1973
71/348/EEC	Auxiliary devices for systems for liquids other than water	European Communities (Ancillary Equipment for Liquid Meters) Regulations 1975 S.I. No. 32 of 1975
77/313/EEC	Systems for liquids other than water	European Communities (Measuring Systems for Liquids other than Water) Regulations 1979 S.I. No. 173 of 1979
82/625/EEC	Adaptation to technical progress of 77/313	European Communities (Measuring Systems for Liquids other than Water) (Amendment) Regulations 1983 S.I. No. 121 of 1983
76/891/EEC	Electricity meters	European Communities (Electrical Energy Meters) Regulations 1978 S.I. No. 320 of 1978
82/621/EEC	Adaptation to technical progress of 76/891	N/a
73/362/EEC	Measures of length	European Communities (Weights and Measures of Length) Regulations 1975 S.I. No. 200 of 1975
78/629/EEC	Adaptation to technical progress of 73/362	European Communities (Material Measures of Length) Regulations 1979 S.I. No. 74 of 1979
85/146/EEC	Adaptation to technical progress of 73/362	European Communities (Material Measures of Length) Regulations 1986 S.I. No. 299 of 1986
77/95/EEC	Taximeters	European Communities (Taximeters) Regulations 1978 S.I. No. 315 of 1978

**PART B Partial Repeal**

<b>Directive Number</b>	<b>Measuring Instrument Category</b>	<b>Column 1 Relevant Statutory Instrument</b>	<b>Column 2 Extent of Repeal</b>
75/33/EEC	Cold water meters	European Communities (Cold-Water Meters) Regulations 1977 S.I. No. 320 of 1977	In so far as they relate to water meters intended to be used for the measurement of clean water in residential, commercial and light industrial installations
79/830/EEC	Hot water meters	European Communities (Hot-Water Meters) Regulations 1981 S.I. No. 172 of 1981	
71/318/EEC	Gas meters	European Communities (Measuring Instruments) Regulations 1973 S.I. No. 67 of 1973	In so far as they relate to gas meters intended to be used in residential, commercial and light industrial installations
74/331/EEC		European Communities (Measuring Instruments) (Amendment) Regulations 1975 S.I. No. 199 of 1975	
78/365/EEC		European Communities (Gas Volume Meters) Regulations 1979 S.I. No. 243 of 1979	
82/623/EEC		European Communities (Gas Volume Meters) (Amendment) Regulations 1983 S.I. No. 122 of 1983	

**SCHEDULE III****ESSENTIAL REQUIREMENTS**

A measuring instrument shall provide a high level of metrological protection in order that any party affected can have confidence in the result of measurement, and shall be designed and manufactured to a high level of quality in respect of the measurement technology and security of the measurement data.

The requirements that shall be met by measuring instruments are set out below and are supplemented, where appropriate, by specific instrument requirements listed in Schedule I that provide more detail on certain aspects of the general requirements.

The solutions adopted in the pursuit of the requirements shall take account of the intended use of the instrument and any foreseeable misuse thereof.

**Definitions**

‘climatic environments’ mean the conditions in which measuring instruments may be used. To cope with climatic differences between the Member States, a range of temperature limits has been defined.

‘critical change value’ means the value at which the change in the measurement result is considered undesirable;

a trading transaction is ‘direct sales’ if:

- the measurement result serves as the basis for the price to pay and;
- at least one of the parties involved in the transaction related to measurement is a consumer or any other party requiring a similar level of protection and;
- all the parties in the transaction accept the measurement result at that time and place.

‘disturbance’ means an influence quantity having a value within the limits specified in the appropriate requirement but outside the specified rated operating conditions of the measuring instrument. An influence quantity is a disturbance if for that influence quantity the rated operating conditions are not specified;

‘measurand’ means the particular quantity subject to measurement;

‘influence quantity’ means a quantity that is not the measurand but that affects the result of measurement;

‘material measure’ means a device intended to reproduce or supply in a permanent manner during its use one or more known values of a given quantity;

‘rated operating conditions’ means the values for the measurand and influence quantities making up the normal working conditions of a measuring instrument;

‘utility’ is regarded as a supplier of electricity, gas, heat or water.

## **Requirements**

### 1 Allowable Errors

1.1. Under rated operating conditions and in the absence of a disturbance, the error of measurement shall not exceed the maximum permissible error (MPE) value as laid down in the appropriate instrument-specific requirements.

Unless stated otherwise in the instrument-specific requirements, MPE is expressed as a bilateral value of the deviation from the true measurement value.

1.2. Under rated operating conditions and in the presence of a disturbance, the performance requirement shall be as laid down in the appropriate instrument-specific requirements.

Where the measuring instrument is intended to be used in a specified permanent continuous electromagnetic field the permitted performance during the radiated electromagnetic field amplitude modulated test shall be within MPE.

1.3. The manufacturer shall specify the climatic, mechanical and electromagnetic environments in which the measuring instrument is intended to be used, power supply and other influence quantities likely to affect its accuracy, taking account of the requirements laid down in the appropriate instrument-specific requirements.

## 1.3.1. Climatic environments

The manufacturer shall specify the upper temperature limit and the lower temperature limit from any of the values in Table 1 unless otherwise specified in the instrument-specific requirements, and indicate whether the measuring instrument is designed for condensing or non-condensing humidity as well as the intended location for the measuring instrument, i.e. open or closed.

	Temperature Limits			
<b>Upper temperature limit</b>	30°C	40°C	55°C	70°C
<b>Lower temperature limit</b>	5°C	- 10°C	- 25°C	- 40°C

Table 1

1.3.2. (a) Mechanical environments are classified into classes M1 to M3 as described below.

M1 This class applies to measuring instruments used in locations with vibration and shocks of low significance, e.g. for measuring instruments fastened to light supporting structures subject to negligible vibrations and shocks transmitted from local blasting or pile driving activities, slamming doors, etc.

M2 This class applies to measuring instruments used in locations with significant or high levels of vibration and shock, e.g. transmitted from machines and passing vehicles in the vicinity or adjacent to heavy machines, conveyor belts, etc.

M3 This class applies to measuring instruments used in locations where the level of vibration and shock is high and very high, e.g. for measuring instruments mounted directly on machines, conveyor belts, etc.

(b) The following influence quantities shall be considered in relation with mechanical environments:

- Vibration;
- Mechanical shock.

1.3.3. (a) Electromagnetic environments are classified into classes E1, E2 or E3 as described below, unless otherwise laid down in the appropriate instrument-specific requirements.

E1 This class applies to measuring instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in residential, commercial and light industrial buildings.

E2 This class applies to measuring instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.



E3 This class applies to measuring instruments supplied by the battery of a vehicle. Such measuring instruments shall comply with the requirements of E2 and the following additional requirements:

- voltage reductions caused by energising the starter-motor circuits of internal combustion engines
- load dump transients occurring in the event of a discharged battery being disconnected while the engine is running.

(b) The following influence quantities shall be considered in relation with electromagnetic environments:

- Voltage interruptions,
- Short voltage reductions,
- Voltage transients on supply lines and/or signal lines,
- Electrostatic discharges,
- Radio frequency electromagnetic fields,
- Conducted radio frequency electromagnetic fields on supply lines and/or signal lines,
- Surges on supply lines and/or signal lines.

1.3.4. Other influence quantities to be considered, where appropriate, are:

- Voltage variation,
- Mains frequency variation,
- Power frequency magnetic fields,
- any other quantity likely to influence in a significant way the accuracy of the measuring instrument.

1.4. When carrying out the tests as envisaged in these Regulations, the following paragraphs apply:

1.4.1. Basic rules for testing and the determination of errors

Essential requirements specified in 1.1 and 1.2 shall be verified for each relevant influence quantity. Unless otherwise specified in the appropriate instrument-specific requirements, these essential requirements apply when each influence quantity is applied and its effect evaluated separately, all other influence quantities being kept relatively constant at their reference value.

Metrological tests shall be carried out during or after the application of the influence quantity, whichever condition corresponds to the normal operational status of the measuring instrument when that influence quantity is likely to occur.

1.4.2. Ambient humidity

- According to the climatic operating environment in which the measuring instrument is intended to be used either the damp heat steady state (non-condensing) or damp heat cyclic (condensing) test may be appropriate.
- The damp heat cyclic test is appropriate where condensation is important or when penetration of vapour will be accelerated by

the effect of breathing. In conditions where non-condensing humidity is a factor the damp heat steady state is appropriate.

## 2. Reproducibility

The application of the same measurand in a different location or by a different user, all other conditions being the same, shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

## 3. Repeatability

The application of the same measurand under the same conditions of measurement shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

## 4. Discrimination and Sensitivity

A measuring instrument shall be sufficiently sensitive and the discrimination threshold shall be sufficiently low for the intended measurement task.

## 5. Durability

A measuring instrument shall be designed to maintain an adequate stability of its metrological characteristics over a period of time estimated by the manufacturer, provided that it is properly installed, maintained and used according to the manufacturer's instruction when in the environmental conditions for which it is intended.

## 6. Reliability

A measuring instrument shall be designed to reduce as far as possible the effect of a defect that would lead to an inaccurate measurement result, unless the presence of such a defect is obvious.

## 7. Suitability

7.1. A measuring instrument shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.

7.2. A measuring instrument shall be suitable for its intended use taking account of the practical working conditions and shall not require unreasonable demands of the user in order to obtain a correct measurement result.

7.3. The errors of a utility measuring instrument at flows or currents outside the controlled range shall not be unduly biased.

7.4. Where a measuring instrument is designed for the measurement of values of the measurand that are constant over time, the measuring instrument shall

be insensitive to small fluctuations of the value of the measurand, or shall take appropriate action.

7.5. A measuring instrument shall be robust and its materials of construction shall be suitable for the conditions in which it is intended to be used.

7.6. A measuring instrument shall be designed so as to allow the control of the measuring tasks after the instrument has been placed on the market and put into use. If necessary, special equipment or software for this control shall be part of the measuring instrument. The test procedure shall be described in the operation manual.

When a measuring instrument has associated software which provides other functions besides the measuring function, the software that is critical for the metrological characteristics shall be identifiable and shall not be inadmissibly influenced by the associated software.

## 8. Protection against corruption

8.1. The metrological characteristics of a measuring instrument shall not be influenced in any inadmissible way by the connection to it of another device, by any feature of the connected device itself or by any remote device that communicates with the measuring instrument.

8.2. A hardware component that is critical for metrological characteristics shall be designed so that it can be secured. Security measures foreseen shall provide for evidence of an intervention.

8.3. Software that is critical for metrological characteristics shall be identified as such and shall be secured.

Software identification shall be easily provided by the measuring instrument.

Evidence of an intervention shall be available for a reasonable period of time.

8.4. Measurement data, software that is critical for measurement characteristics and metrologically important parameters stored or transmitted shall be adequately protected against accidental or intentional corruption.

8.5. For utility measuring instruments the display of the total quantity supplied or the displays from which the total quantity supplied can be derived, whole or partial reference to which is the basis for payment, shall not be able to be reset during use.

## 9. Information to be borne by and to accompany the measuring instrument

9.1. A measuring instrument shall bear the following inscriptions—

- manufacturer's mark or name;
- information in respect of its accuracy;

plus, when applicable—

- information in respect of the conditions of use;
- measuring capacity;
- measuring range;
- identity marking;
- number of the EC type examination certificate or the EC design examination certificate;
- information whether or not additional devices providing metrological results comply with the provisions of the Directive on legal metrological control.

9.2. A measuring instrument of dimensions too small or of too sensitive a composition to allow it to bear the relevant information shall have its packaging, if any, and the accompanying documents required by the provisions of the Directive suitably marked.

9.3. The measuring instrument shall be accompanied by information on its operation, unless the simplicity of the measuring instrument makes this unnecessary. Information shall be easily understandable and shall include where relevant:

- rated operating conditions;
- mechanical and electromagnetic environment classes;
- the upper and lower temperature limit, whether condensation is possible or not, open or closed location;
- instructions for installation, maintenance, repairs, permissible adjustments;
- instructions for correct operation and any special conditions of use;
- conditions for compatibility with interfaces, sub-assemblies or measuring instruments.

9.4. Groups of identical measuring instruments used in the same location or used for utility measurements do not necessarily require individual instruction manuals.

9.5. Unless specified otherwise in an instrument-specific provision, the scale interval for a measured value shall be in the form  $1 \times 10^n$ ,  $2 \times 10^n$ , or  $5 \times 10^n$ , where  $n$  is any integer or zero. The unit of measurement or its symbol shall be shown close to the numerical value.

9.6. A material measure shall be marked with a nominal value or a scale, accompanied by the unit of measurement used.

9.7. The units of measurement used and their symbols shall be in accordance with the provisions of Community legislation on units of measurement and their symbols<sup>1</sup>.

9.8. All marks and inscriptions required under any requirement shall be clear, non-erasable, unambiguous and non-transferable.

<sup>1</sup>Directive 80/181/EEC as amended.

## 10. Indication of result.

10.1. Indication of the result shall be by means of a display or hard copy.

10.2. The indication of any result shall be clear and unambiguous and accompanied by such marks and inscriptions necessary to inform the user of the significance of the result. Easy reading of the presented result shall be permitted under normal conditions of use. Additional indications may be shown provided they cannot be confused with the metrologically controlled indications.

10.3. In the case of hard copy the print or record shall also be easily legible and non-erasable.

10.4. A measuring instrument for direct sales trading transactions shall be designed to present the measurement result to both parties in the transaction when installed as intended. When critical in case of direct sales, any ticket provided to the consumer by an ancillary device not complying with the appropriate requirements of these Regulations shall bear an appropriate restrictive information.

10.5. Whether or not a measuring instrument intended for utility measurement purposes can be remotely read it shall in any case be fitted with a metrologically controlled display accessible without tools to the consumer. The reading of this display is the measurement result that serves as the basis for the price to pay.

## 11. Further processing of data to conclude the trading transaction

11.1. A measuring instrument other than a utility measuring instrument shall record by a durable means the measurement result accompanied by information to identify the particular transaction, when:

- the measurement is non-repeatable and;
- the measuring instrument is normally intended for use in the absence of one of the trading parties;

11.2. Additionally, a durable proof of the measurement result and the information to identify the transaction shall be available on request at the time the measurement is concluded.

## 12. Conformity evaluation

A measuring instrument shall be designed so as to allow ready evaluation of its conformity with the appropriate requirements of these Regulations.

**SCHEDULE IV****TECHNICAL DOCUMENTATION**

1. The technical documentation shall render the design, manufacture and operation of the measuring instrument intelligible and shall permit an assessment of its conformity with the appropriate requirements of these Regulations.

2. The technical documentation shall be sufficiently detailed to ensure:
- the definition of the metrological characteristics,
  - the reproducibility of the metrological performances of produced measuring instruments when properly adjusted using appropriate intended means, and
  - the integrity of the measuring instrument.

3. The technical documentation shall include insofar as relevant for assessment and identification of the type and/or measuring instrument—

- (a) a general description of the measuring instrument;
- (b) conceptual design and manufacturing drawings and plans of components, sub-assemblies, circuits, etc;
- (c) manufacturing procedures to ensure consistent production;
- (d) if applicable, a description of the electronic devices with drawings, diagrams, flowdiagrams of the logic and general software information explaining their characteristics and operation;
- (e) descriptions and explanations necessary for the understanding of paragraphs(b), (c) and(d), including the operation of the measuring instrument;
- (f) a list of the standards and/or normative documents referred to in paragraph (1) of Regulation 8, applied in full or in part;
- (g) descriptions of the solutions adopted to meet the essential requirements referred to in paragraph (1) of Regulation 6 where the standards and/or normative documents referred to in paragraph (1) of Regulation 8 have not been applied;
- (h) results of design calculations, examinations, etc;
- (i) the appropriate test results, where necessary, to demonstrate that the type and/or measuring instruments comply with:
  - the requirements of these Regulations and the appropriate specific-instrument regulations under declared rated operating conditions and under specified environmental disturbances,
  - the durability specifications for gas and water meters as well as meters for liquids other than water.

(j) the EC type-examination certificates or EC design examination certificates in respect of measuring instruments containing parts identical to those in the design.

4. The manufacturer shall specify where seals and markings have been applied.

5. The manufacturer shall indicate the conditions for compatibility with interfaces and sub-assemblies, where relevant.

## **SCHEDULE V**

### **CRITERIA TO BE SATISFIED BY NOTIFIED BODIES**

The following criteria apply for the designation of bodies in accordance with Regulation 12.

1. The body, its director and staff involved in conformity assessment tasks shall not be the designer, manufacturer, supplier, installer or user of the measuring instruments that they inspect, nor the authorised representative of any of them. In addition, they may not be directly involved in the design, manufacture, marketing or maintenance of the measuring instruments, nor represent the parties engaged in these activities. The preceding criterion does not, however, preclude in any way the possibility of exchanges of technical information between the manufacturer and the body for the purposes of conformity assessment.

2. The body, its director and staff involved in conformity assessment tasks shall be free from all pressures and inducements, in particular financial inducements, that might influence their judgement or the results of their conformity assessment, especially from persons or groups of persons with an interest in the results of the assessments.

3. The conformity assessment shall be carried out with the highest degree of professional integrity and requisite competence in the field of metrology. Should the body subcontract specific tasks, it shall first ensure that the subcontractor meets the requirements of these Regulations, and in particular this Schedule. The body shall keep the relevant documents assessing the subcontractor's qualifications and the work carried out by him under these Regulations at the disposal of the Minister.

4. The body shall be capable of carrying out all the conformity assessment tasks for which it has been designated, whether those tasks are carried out by the body itself or on its behalf and under its responsibility. It shall have at its disposal the necessary staff and shall have access to the necessary facilities for carrying out in a proper manner the technical and administrative tasks entailed in conformity assessment.

5. The body's staff shall have—

(a) sound technical and vocational training, covering all conformity assessment tasks for which the body was designated;

(b) satisfactory knowledge of the rules governing the tasks which it carries out, and adequate experience of such tasks;

(c) the requisite ability to draw up the certificates, records and reports demonstrating that the tasks have been carried out.

6. The impartiality of the body, its director and staff shall be guaranteed. The remuneration of the body shall not depend on the results of the tasks it carries out. The remuneration of the body's director and staff shall not depend on the number of tasks carried out or the results of such tasks.

7. The body shall take out civil liability insurance if its civil liability is not covered by national law.

8. The body's director and staff shall be bound to observe professional secrecy with regard to all information obtained in the performance of their duties pursuant to these Regulations, except vis-à-vis the authority of the Minister.

## **SCHEDULE MI-001**

### **WATER METERS FOR COLD WATER**

The relevant requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to water meters intended for the measurement of volumes of clean, cold water in residential, commercial and light industrial use.

#### **DEFINITIONS**

##### **Water Meter**

An instrument designed to measure, memorise and display the volume at metering conditions of water passing through the measurement transducer.

##### **Minimum Flowrate (Q1)**

The lowest flowrate at which the water meter provides indications that satisfy the requirements concerning the maximum permissible errors (MPEs.)

##### **Transitional Flowrate (Q2)**

The transitional flowrate is the flowrate value occurring between the permanent and minimum flowrates, at which the flowrate range is divided into two zones, the 'upper zone' and the 'lower zone'. Each zone has a characteristic MPE.

##### **Permanent Flowrate (Q3)**

The highest flowrate at which the water meter operates in a satisfactory manner under normal conditions of use, i.e. under steady or intermittent flow conditions.

##### **Overload Flowrate (Q4)**

The overload flowrate is the highest flowrate at which the meter operates in a satisfactory manner for a short period of time without deteriorating.



## SPECIFIC REQUIREMENTS

### Rated Operating Conditions

The manufacturer shall specify the rated operating conditions for the instrument, in particular;

1. The flowrate range of the water.

The values for the flowrate range shall fulfil the following conditions:

$$Q_3/Q_1 \geq 10$$

$$Q_2/Q_1 = 1.6$$

$$Q_4/Q_3 = 1.25$$

Until 30 April 2009, the ratio  $Q_2/Q_1$  may be: 1.5, 2.5, 4 or 6.3.

2. The temperature range of the water.

The values for the temperature range shall fulfil the following conditions:

0.1°C to at least 30°C, or

30°C to at least 90°C.

The meter may be designed to operate over both ranges.

3. The relative pressure range of the water, the range being 0.3 bar to at least 10 bar at  $Q_3$ .

4. For the power supply: the nominal value of the AC voltage supply and/or the limits of DC supply.

### MPE

5. The MPE, positive or negative, on volumes delivered at flowrates between the transitional flowrate ( $Q_2$ ) (included) and the overload flowrate ( $Q_4$ ) is:

2% for water having a temperature  $\leq 30^\circ\text{C}$ ,

3% for water having a temperature  $> 30^\circ\text{C}$ .

6. The MPE, positive or negative, on volumes delivered at flowrates between the minimum flowrate ( $Q_1$ ) and the transitional flowrate ( $Q_2$ ) (excluded) is 5% for water having any temperature.

### Permissible Effect of Disturbances

- 7.1. *Electromagnetic immunity*

7.1.1. The effect of an electromagnetic disturbance on a water meter shall be such that:

- the change in the measurement result is no greater than the critical change value as defined in 7.1.3, or
- the indication of the measurement result is such that it cannot be interpreted as a valid result, such as a momentary variation that cannot be interpreted, memorised or transmitted as a measuring result.

7.1.2. After undergoing an electromagnetic disturbance the water meter shall:

- recover to operate within MPE, and
- have all measurement functions safeguarded, and
- allow recovery of all measurement data present just before the disturbance.

7.1.3. The critical change value is the smaller of the two following values:

- the volume corresponding to half of the magnitude of the MPE in the upper zone on the measured volume;
- the volume corresponding to the MPE on the volume corresponding to one minute at flowrate Q3.

## 7.2. Durability

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

7.2.1. The variation of the measurement result after the durability test, when compared with the initial measurement result, shall not exceed:

- 3% of the metered volume between Q1 included and Q2 excluded;
- 1.5% of the metered volume between Q2 included and Q4 included.

7.2.2. The error of indication for the volume metered after the durability test shall not exceed:

- $\pm 6\%$  of the metered volume between Q1 included and Q2 excluded;
- $\pm 2.5\%$  of the metered volume between Q2 included and Q4 included for water meters intended to meter water with a temperature between 0.1°C and 30°C,

- $\pm 3.5\%$  of the metered volume between Q2 included and Q4 included for water meters intended to meter water with a temperature between 30°C and 90°C.

### **Suitability**

8.1. The meter shall be able to be installed to operate in any position unless clearly marked otherwise.

8.2. The manufacturer shall specify whether the meter is designed to measure reverse flow. In such a case, the reverse flow volume shall either be subtracted from the cumulated volume or shall be separately recorded. The same MPE shall apply to both forward and reverse flow.

Water meters not designed to measure reverse flow shall either prevent reverse flow or shall withstand an accidental reverse flow without any deterioration or change in metrological properties.

### **Units of Measurement**

9. Metered volume shall be displayed in cubic metres.

### **CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

B followed by F, or  
B followed by D,  
or H1.

## **SCHEDULE MI-002**

### **SPECIFIC REQUIREMENTS FOR GAS METERS AND VOLUME CONVERSION DEVICES**

The relevant requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to gas meters and volume conversion devices defined below, intended for residential, commercial and light industrial use.

### **DEFINITIONS**

#### **Gas meter**

An instrument designed to measure, memorise and display the quantity of fuel gas (volume or mass) that has passed it.

#### **Conversion device**

A device fitted to a gas meter that automatically converts the quantity measured at metering conditions into a quantity at base conditions.

**Minimum flowrate ( $Q_{\min}$ )**

The lowest flowrate at which the gas meter provides indications that satisfy the requirements regarding maximum permissible error (MPE.)

**Maximum flowrate ( $Q_{\max}$ )**

The highest flowrate at which the gas meter provides indications that satisfy the requirements regarding MPE.

**Transitional flowrate ( $Q_t$ )**

The transitional flowrate is the flowrate occurring between the maximum and minimum flowrates at which the flowrate range is divided into two zones, the 'upper zone' and the 'lower zone'. Each zone has a characteristic MPE.

**Overload Flowrate ( $Q_r$ )**

The overload flowrate is the highest flowrate at which the meter operates for a short period of time without deteriorating.

**Base conditions**

The specified conditions to which the measured quantity of fluid is converted.

*PART I*

## SPECIFIC REQUIREMENTS — GAS METERS

**1. Rated operating conditions**

The manufacturer shall specify the rated operating conditions of the gas meter, taking into account:

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

Class	$Q_{\max}/Q_{\min}$	$Q_{\max}/Q_t$	$Q_r/Q_{\max}$
1.5	$\geq 150$	$\geq 10$	1.2
1.0	$\geq 20$	$\geq 5$	1.2

## 1.2. The temperature range of the gas, with a minimum range of 40°C.

## 1.3. The fuel/gas related conditions

The gas meter shall be designed for the range of gases and supply pressures of the country of destination. In particular the manufacturer shall indicate:

- the gas family or group;
- the maximum operating pressure.

## 1.4. A minimum temperature range of 50°C for the climatic environment.

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

## 2. Maximum permissible error (MPEs)

### 2.1. Gas meter indicating the volume at metering conditions or mass

Class	1.5	1.0
$Q_{\min} \leq Q < Q_t$	3%	2%
$Q_t \leq Q \leq Q_{\max}$	1.5%	1%

**Table 1**

When the errors between  $Q_t$  and  $Q_{\max}$  all have the same sign, they shall all not exceed 1% for class 1.5 and 0.5% for Class 1.0.

2.2. For a gas meter with temperature conversion, which only indicates the converted volume, the MPE of the meter is increased by 0.5% in a range of 30°C extending symmetrically around the temperature specified by the manufacturer that lies between 15°C and 25°C. Outside this range, an additional increase of 0.5% is permitted in each interval of 10°C.

## 3. Permissible effect of disturbances

### 3.1. Electromagnetic immunity

3.1.1. The effect of an electromagnetic disturbance on a gas meter or volume conversion device shall be such that:

- the change in the measurement result is no greater than the critical change value as defined in 3.1.3, or
- the indication of the measurement result is such that it cannot be interpreted as a valid result, such as a momentary variation that cannot be interpreted, memorised or transmitted as a measuring result.

3.1.2. After undergoing a disturbance, the gas meter shall:

- recover to operate within MPE, and
- have all measurement functions safeguarded, and
- allow recovery of all measurement data present just before the disturbance.

3.1.3. The critical change value is the smaller of the two following values:

- the quantity corresponding to half of the magnitude of the MPE in the upper zone on the measured volume;
- the quantity corresponding to the MPE on the quantity corresponding to one minute at maximum flowrate.

### 3.2. *Effect of upstream-downstream flow disturbances*

Under installation conditions specified by the manufacturer, the effect of the flow disturbances shall not exceed one third of the MPE.

## 4. **Durability**

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

### 4.1. *Class 1.5 meters*

4.1.1. The variation of the measurement result after the durability test when compared with the initial measurement result for the flow rates in the range  $Q_t$  to  $Q_{max}$  shall not exceed the measurement result by more than 2%.

4.1.2. The error of indication after the durability test shall not exceed twice the MPE in paragraph 2.

### 4.2. *Class 1.0 meters*

4.2.1. The variation of the measurement result after the durability test when compared with the initial measurement result shall not exceed one-third of the MPE in paragraph 2.

4.2.2. The error of indication after the durability test shall not exceed the MPE in paragraph 2.

## 5. **Suitability**

5.1. A gas meter powered from the mains (AC or DC) shall be provided with an emergency power supply device or other means to ensure, during a failure of the principal power source, that all measuring functions are safeguarded.

5.2. A dedicated power source shall have a lifetime of at least five years. After 90% of its lifetime an appropriate warning shall be shown.

5.3. An indicating device shall have a sufficient number of digits to ensure that the quantity passed during 8,000 hours at  $Q_{max}$  does not return the digits to their initial values.

5.4. The gas meter shall be able to be installed to operate in any position declared by the manufacturer in its installation instruction.

5.5. The gas meter shall have a test element, which shall enable tests to be carried out in a reasonable time.

5.6. The gas meter shall respect the MPE in any flow direction or only in one flow direction clearly marked.

## 6. Units

Metered quantity shall be displayed in cubic metre, or in kilogram.

## PART II

### SPECIFIC REQUIREMENTS — VOLUME CONVERSION DEVICES

A volume conversion device constitutes a sub-assembly of the second type according to the definition of sub-assembly given in Regulation 2.

For a volume conversion device, the essential requirements for the gas meter shall apply, if applicable. In addition, the following requirements shall apply:

### 7. Base conditions for converted quantities

The manufacturer shall specify the base conditions for converted quantities.

### 8. MPE

- 0.5% at ambient temperature  $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , 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 error of the gas meter is not taken into account.

### 9. Suitability

9.1. An electronic conversion device shall be capable of detecting when it is operating outside the operating range(s) stated by the manufacturer for parameters that are relevant for measurement accuracy. In such a case, the conversion device must stop integrating the converted quantity, and may totalise separately the converted quantity for the time it is operating outside the operating range(s).

9.2. An electronic conversion device shall be capable to display all relevant data for the measurement without additional equipment.

## PART III

### PUTTING INTO USE AND CONFORMITY ASSESSMENT

#### Putting into use

10. (a) Class 1.0 or Class 1.5 meters which have a  $Q_{\max}/Q_{\min}$  ratio greater than 150 may be used for measurement of gas in residential use.

(b) Class 1.5 meters shall be used for measurement of commercial and/or light industrial use.

11. The distribution operator shall ensure the requirements under paragraphs 1.2 and 1.3 are determined in order that the meter installed is appropriate for the accurate measurement of consumption that is foreseen or foreseeable.

### **CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are—

B followed by F, or  
B followed by D, or  
H1.

### **SCHEDULE MI-003**

#### **ACTIVE ELECTRICAL ENERGY METERS**

The relevant requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to active electrical energy meters intended for residential, commercial and light industrial use.

*Note:* Electrical energy meters may be used in combination with external instrument transformers, depending upon the measurement technique applied. However, this Schedule covers only electrical energy meters but not instrument transformers.

#### **DEFINITIONS**

An active electrical energy meter is a device which measures the active electrical energy consumed in a circuit.

$I$  = the electrical current flowing through the meter;

$I_n$  = the specified reference current for which the transformer operated meter has been designed;

$I_{st}$  = the lowest declared value of  $I$  at which the meter registers active electrical energy at unity power factor (polyphase meters with balanced load);

$I_{min}$  = the value of  $I$  above which the error lies within maximum permissible errors (MPEs) (polyphase meters with balanced load);

$I_{tr}$  = the value of  $I$  above which the error lies within the smallest MPE corresponding to the class index of the meter;

$I_{max}$  = the maximum value of  $I$  for which the error lies within the MPEs;

$U$  = the voltage of the electricity supplied to the meter;

$U_n$  = the specified reference voltage;



$f$  = the frequency of the voltage supplied to the meter;

$f_n$  = the specified reference frequency;

$PF$  = power factor =  $\cos\phi$  = the cosine of the phase difference  $\phi$  between  $I$  and  $U$ .

**SPECIFIC REQUIREMENTS**

**1. Accuracy**

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

**2. Rated operating conditions**

The manufacturer shall specify the rated operating conditions of the meter; in particular:

The values of  $f_n$ ,  $U_n$ ,  $I_n$ ,  $I_{st}$ ,  $I_{min}$ ,  $I_{tr}$  and  $I_{max}$  that apply to the meter. For the current values specified, the meter shall satisfy the conditions given in Table 1;

	<b>Class A</b>	<b>Class B</b>	<b>Class C</b>
For direct-connected meters			
$I_{st}$	$\leq 0.05 I_{tr}$	$\leq 0.04 I_{tr}$	$\leq 0.04 I_{tr}$
$I_{min}$	$\leq 0.5 I_{tr}$	$\leq 0.5 I_{tr}$	$\leq 0.3 I_{tr}$
$I_{max}$	$\geq 50 I_{tr}$	$\geq 50 I_{tr}$	$\geq 50 I_{tr}$
For transformer-operated meters			
$I_{st}$	$\leq 0.06 I_{tr}$	$\leq 0.04 I_{tr}$	$\leq 0.02 I_{tr}$
$I_{min}$	$\leq 0.4 I_{tr}$	$\leq 0.2 I_{tr}^*)$	$\leq 0.2 I_{tr}$
$I_n$	$= 20 I_{tr}$	$= 20 I_{tr}$	$= 20 I_{tr}$
$I_{max}$	$\geq 1.2 I_n$	$\geq 1.2 I_n$	$\geq 1.2 I_n$

\*) For Class B electromechanical meters  $I_{min} \leq 0.4 I_{tr}$  shall apply.

**Table 1**

The voltage, frequency and power factor ranges within which the meter shall satisfy the MPE requirements are specified in Table 2. These ranges shall recognise the typical characteristics of electricity supplied by public distribution systems.

The voltage and frequency ranges shall be at least:

$$0.9 U_n \leq U \leq 1.1 U_n$$

$$0.98 f_n \leq f \leq 1.02 f_n$$

power factor range at least from  $\cos\phi = 0.5$  inductive to  $\cos\phi = 0.8$  capacitive.

### 3. MPEs

The effects of the various measurands and influence quantities (a, b, c,...) are evaluated separately, all other measurands and influence quantities being kept relatively constant at their reference values. The error of measurement, that shall not exceed the MPE stated in Table 2, is calculated as:

$$\text{Error of measurement} = \sqrt{a^2+b^2+c^2}$$

When the meter is operating under varying-load current, the percentage errors shall not exceed the limits given in Table 2.

	Operating temperatures			Operating temperatures			Operating temperatures			Operating temperatures		
	+ 5°C... + 30°C			- 10°C... + 5°C or + 30°C... + 40°C			- 25°C...— 10°C or + 40°C... + 55°C			- 40°C...— 25°C or + 55°C... + 70°C		
Meter class	A	B	C	A	B	C	A	B	C	A	B	C
Single phase meter; polyphase meter if operating with balanced loads												
$I_{\min} \leq I < I_{tr}$	3.5	2	1	5	2.5	1.3	7	3.5	1.7	9	4	2
$I_{tr} \leq I \leq I_{\max}$	3.5	2	0.7	4.5	2.5	1	7	3.5	1.3	9	4	1.5
Polyphase meter if operating with single phase load												
$I_{tr} \leq I \leq I_{\max}$ , see exception below	4	2.5	1	5	3	1.3	7	4	1.7	9	4.5	2

*For electromechanical polyphase meters the current range for single-phase load is limited to  $5I_{tr} \leq I \leq I_{\max}$*

**Table 2 — MPEs in percent at rated operating conditions and defined load current levels and operating temperature**

When a meter operates in different temperature ranges the relevant MPE values shall apply.

### 4. Permissible effect of disturbances

#### 4.1. General

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

The meter shall comply with the electromagnetic environment E2 and the additional requirements in 4.2 and 4.3.

The electromagnetic environment and permissible effects reflect the situation that there are disturbances of long duration which shall not affect the accuracy beyond the critical change values and transient disturbances, which may cause a temporary degradation or loss of function or performance but from which

the meter shall recover and shall not affect the accuracy beyond the critical change values.

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

#### 4.2. Effect of disturbances of long duration

Disturbance	Critical change values in percent for meters of class		
	A	B	C
Reversed phase sequence	1.5	1.5	0.3
Voltage unbalance (only applicable to polyphase meters)	4	2	1
Harmonic contents in the current circuits *	1	0.8	0.5
DC and harmonics in the current circuit *	6	3	1.5
Fast transient bursts	6	4	2
Magnetic fields; HF (radiated RF) electromagnetic field; Conducted disturbances introduced by radio-frequency fields; and Oscillatory waves immunity	3	2	1

\* In the case of electromechanical electricity meters, no critical change values are defined for harmonic contents in the current circuits and for DC and harmonics in the current circuit.

**Table 3**

#### Critical change values for disturbances of long duration

##### 4.3. Permissible effect of transient electromagnetic phenomena

4.3.1. The effect of an electromagnetic disturbance on an electrical energy meter shall be such that during and immediately after a disturbance

- any output intended for testing the accuracy of the meter does not produce pulses or signals corresponding to an energy of more than the critical change value and in reasonable time after the disturbance the meter shall
- recover to operate within the MPE limits, and
- have all measurement functions safeguarded, and
- allow recovery of all measurement data present prior to the disturbance, and
- not indicate a change in the registered energy of more than the critical change value.

The critical change value in kWh is  $m \cdot U_n \cdot I_{\max} \cdot 10^{-6}$

( $m$  being the number of measuring elements of the meter,  $U_n$  in Volts and  $I_{\max}$  in Amps).

4.3.2. For overcurrent the critical change value is 1.5%.

## 5. Suitability

5.1. Below the rated operating voltage the positive error of the meter shall not exceed 10%.

5.2. The display of the total energy shall have a sufficient number of digits to ensure that when the meter is operated for 4,000 hours at full load ( $I = I_{\max}$ ,  $U = U_n$  and  $PF = 1$ ) the indication does not return to its initial value and shall not be able to be reset during use.

5.3. In the event of loss of electricity in the circuit, the amounts of electrical energy measured shall remain available for reading during a period of at least 4 months.

### 5.4. Running with no load

When the voltage is applied with no current flowing in the current circuit (current circuit shall be open circuit), the meter shall not register energy at any voltage between  $0.8 \cdot U_n$  and  $1.1 U_n$ .

### 5.5. Starting

The meter shall start and continue to register at  $U_n$   $PF = 1$  (polyphase meter with balanced loads) and a current which is equal to  $I_{st}$ .

## 6. Units

The electrical energy measured shall be displayed in kilowatt-hours or in megawatt-hours.

## 7. Putting into use

(a) For residential use, Class A meters may be used. For specified purposes, Class B meters may be required.

(b) For commercial and / or light industrial use, Class B meters may be used. For specified purposes, Class C meters may be required.

(c) The current range shall be determined by the distributor or the person legally designated for installing the meter, so that the meter is appropriate for the accurate measurement of consumption that is foreseen or foreseeable.

## CONFORMITY ASSESSMENT

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are—

B followed by F, or  
B followed by D, or  
H1.

**SCHEDULE MI-005****MEASURING SYSTEMS FOR THE CONTINUOUS AND DYNAMIC  
MEASUREMENT OF QUANTITIES OF LIQUIDS OTHER THAN  
WATER**

The relevant essential requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to measuring systems intended for the continuous and dynamic measurement of quantities (volumes or masses) of liquids other than water as given in Table 1. If appropriate, the terms ‘volume, and L’ in this Schedule can be read as ‘mass and kg’.

**DEFINITIONS****Meter**

An instrument designed to measure continuously, memorise and display the quantity at metering conditions of liquid 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 transducer(s) 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 liquid, with a view to make a correction and/or conversion.

**Conversion Device**

A part of the calculator which by taking account of the characteristics of the liquid (temperature, density, etc.) measured using associated measuring instruments, or stored in a memory, automatically converts:

- the volume of the liquid measured at metering conditions into a volume at base conditions and/or into mass, or
- the mass of the liquid measured at metering conditions into a volume at metering conditions and/or into a volume at base conditions

*Note:* A conversion device includes the relevant associated measuring instruments.

**Base conditions**

The specified conditions to which the measured quantity of liquid at metering conditions is converted.

**Measuring System**

A system that comprises the meter itself and all devices required to ensure correct measurement or intended to facilitate the measuring operations.

**Fuel dispenser**

A measuring system intended for the refuelling of motor vehicles, small boats and small aircraft.

**Self-service arrangement**

An arrangement that allows the customer to use a measuring system for the purpose of obtaining liquid for his own use.

**Self-service device**

A specific device that is part of a self-service arrangement and which allows one of more measuring systems to perform in this self-service arrangement.

**Minimum measured quantity (MMQ)**

The smallest quantity of liquid for which the measurement is metrologically acceptable for the measuring system.

**Direct indication**

The indication, either volume or mass, corresponding to the measure and that the meter is physically capable of measuring.

*Note:* The direct indication may be converted into another quantity using a conversion device.

**Interruptible/non interruptible**

A measuring system is considered as interruptible/non interruptible when the liquid flow can/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 instrument, in particular;

## 1.1. The flowrate range:

The flowrate range is subject to the following conditions:

(i) the flowrate range of a measuring system shall be within the flowrate range of each of its elements, in particular the meter.

(ii) meter and measuring system:

Specific measuring system	Characteristic of liquid	Minimum ratio of $Q_{\max}$ : $Q_{\min}$
Fuel dispensers	Not Liquefied gases	10 : 1
—Measuring systems on road tankers for liquid fuel —Measuring systems for milk	Liquid fuel or milk	4 : 1

**Table 1**

1.2. The properties of the liquid to be measured by the instrument by specifying the name or type of the liquid or its relevant characteristics, for example:

- Temperature range;
- Pressure range;
- Density range;
- Viscosity range.

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

1.4. The base conditions for converted values.

*Note:* Paragraph 1.4 is without prejudice to the Member States' obligations to require use of a temperature of either 15°C in accordance with Article 3(1) of Council Directive 92/81/EEC of 19 October 1992 on the harmonisation of the structures of excise duties on mineral oil<sup>1</sup> or, for heavy fuel oils, LPG and methane, another temperature pursuant to Article 3(2) of that Directive.

## 2. Accuracy classification and maximum permissible errors (MPEs)

2.1. For quantities equal to or greater than 2 litres the MPE on indications is:

	Accuracy Class 0.5
Measuring systems (A)	0.5%
Meters (B)	0.3%

**Table 2**

2.2. For quantities less than two litres the MPE on indications is:

Measured volume V	MPE
$V < 0.1 \text{ L}$	$4 \times$ value in Table 2, applied to 0.1 L
$0.1 \text{ L} \leq V < 0.2 \text{ L}$	$4 \times$ value in Table 2
$0.2 \text{ L} \leq V < 0.4 \text{ L}$	$2 \times$ value in Table 2, applied to 0.4 L
$0.4 \text{ L} \leq V < 1 \text{ L}$	$2 \times$ value in Table 2

<sup>1</sup>OJ L 316, 31.10.1992, p. 12. Directive repealed by Directive 2003/96/EC (OJ L 283, 31.10.2003, p. 51).

Measured volume V	MPE
$1 \text{ L} \leq V < 2 \text{ L}$	Value in Table 2, applied to 2 L

**Table 3**

2.3. However, no matter what the measured quantity may be, the magnitude of the MPE is given by the greater of the following two values:

- the absolute value of the MPE given in Table 2 or Table 3,
- the absolute value of the MPE for the minimum measured quantity ( $E_{\min}$ ).

2.4.1. For minimum measured quantities greater than or equal to 2 litres the following conditions apply:

**Condition 1**

$E_{\min}$  shall fulfil the condition:  $E_{\min} \geq 2 R$ , where R is the smallest scale interval of the indication device.

**Condition 2**

$E_{\min}$  is given by the formula:  $E_{\min} = (2MMQ) \times (A/100)$ , where:

- MMQ is the minimum measured quantity,
- A is the numerical value specified in line A of Table 2.

2.4.2. For minimum measured quantities of less than two litres, the above-mentioned condition 1 applies and  $E_{\min}$  is twice the value specified in Table 3, and related to line A of Table 2.

*2.5. Converted indication*

In the case of a converted indication the MPEs are as in line A of Table 2.

*2.6. Conversion devices*

MPEs on converted indications due to a conversion device are equal to  $\pm(A - B)$ , A and B being the values specified in Table 2.

Parts of conversion devices that can be tested separately

*(a) Calculator*

MPEs on quantities of liquid indications applicable to calculation, positive or negative, are equal to one-tenth of the MPEs as defined in line A of Table 2.

*(b) Associated measuring instruments*

Associated measuring instruments shall have an accuracy at least as good as the values in Table 4:

MPE on Measurements for measuring system of 0.5%	
Temperature	$\pm 0.5^\circ\text{C}$
Pressure	Less than 1 MPa: $\pm 50 \text{ kPa}$



MPE on Measurements for measuring system of 0.5%	
	From 1 to 4 MPa: $\pm 5\%$ Over 4 MPa: $\pm 200$ kPa
Density	$\pm 1$ kg/m <sup>3</sup>

**Table 4**

These values apply to the indication of the characteristic quantities of the liquid displayed by the conversion device.

(c) Accuracy for calculating function

The MPE for the calculation of each characteristic quantity of the liquid, positive or negative, is equal to two fifths of the value fixed in (b).

2.7. The requirement (a) in paragraph 2.6 applies to any calculation, not only conversion.

### 3. Maximum permissible effect of disturbances

3.1. The effect of an electromagnetic disturbance on a measuring system shall be one of the following:

- the change in the measurement result is not greater than the critical change value as defined in paragraph 3.2, or
- the indication of the measurement result shows a momentary variation that cannot be interpreted, memorised or transmitted as a measuring result. Furthermore, in the case of an interruptible system, this can also mean the impossibility to perform any measurement, or
- the change in the measurement result is greater than the critical change value, in which case the measuring system shall permit the retrieval of the measuring result just before the critical change value occurred and cut off the flow.

3.2. The critical change value is the greater of  $MPE/5$  for a particular measured quantity or  $E_{\min}$ .

### 4. Durability

After an appropriate 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 the durability test, when compared with the initial measurement result, shall not exceed the value for meters specified in line B of table 2.

## 5. Suitability

5.1. For any measured quantity relating to the same measurement, the indications provided by various devices shall not deviate one from another by more than one scale interval where devices have the same scale interval. In the case where the devices have different scale intervals, the deviation shall not be more than that of the greatest scale interval. However, in the case of a self-service arrangement the scale intervals of the main indicating device on the measuring system and the scale intervals of the self-service device shall be the same and results of measurement shall not deviate one from another.

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

5.3. Any percentage of air or gas not easily detectable in the liquid shall not lead to a variation of error greater than:

- 0.5% for liquids other than potable liquids and for liquids of a viscosity not exceeding 1 mPa.s, or
- 1% for potable liquids and for liquids of a viscosity exceeding 1 mPa.s.

However, the allowed variation shall never be smaller than 1% of MMQ. This value applies in the case of air or gas pockets.

### 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 the measured quantity.

5.4.2. The display of the quantity on which the transaction is based shall be permanent 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. Any percentage of air or gas in the liquid shall not lead to a variation of error greater than the values specified in paragraph 5.3.

### 5.5. *Fuel Dispensers*

5.5.1. Displays on fuel dispensers shall not be capable of being reset 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 price corresponding to  $E_{\min}$ .

However this difference need not 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 at the moment of the failure of the main power supply device.

## 7. Putting into use

Accuracy Class	Types of Measuring system
0.5	<ul style="list-style-type: none"> <li>— fuel dispensers (not for liquefied gases),</li> <li>— measuring systems on road tankers for liquid fuel</li> <li>— measuring systems for milk</li> </ul>

**Table 5**

*Note:* However, the manufacturer may specify a better accuracy for a certain type of measuring system.

## 8. Units of measurement

The metered quantity shall be displayed in millilitres, cubic centimetres, litres, cubic metres, grams, kilograms or tonnes.

## CONFORMITY ASSESSMENT

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are—

- B followed by F, or
- B followed by D, or
- H1, or
- G.

**SCHEDULE MI-006****AUTOMATIC WEIGHING INSTRUMENTS**

The relevant essential requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in Chapter I of this Schedule, apply to automatic weighing instruments defined below, intended to determine the mass of a body by using the action of gravity on that body.

**DEFINITIONS****Automatic weighing instrument**

An instrument that determines the mass of a product without the intervention of an operator and follows a predetermined programme of automatic processes characteristic of the instrument.

**Automatic catchweigher**

An automatic weighing instrument that determines the mass of pre-assembled discrete loads (for example pre-packages) or single loads of loose material.

**Automatic checkweigher**

An automatic catchweigher that subdivides articles of different mass into two or more subgroups according to the value of the difference of their mass and a nominal set-point.

**Weight labeller**

An automatic catchweigher that labels individual articles with the weight value.

**Weight/price labeller**

An automatic catchweigher that labels individual articles with the weight value, and price information.

**Automatic gravimetric filling instrument**

An automatic weighing instrument that fills containers with a predetermined and virtually constant mass of product from bulk.

**Discontinuous totaliser (totalising hopper weigher)**

An automatic weighing instrument that determines the mass of a bulk product by dividing it into discrete loads. The mass of each discrete load is determined in sequence and summed. Each discrete load is then delivered to bulk.

**Continuous totaliser**

An automatic weighing instrument that continuously determines the mass of a bulk product on a conveyor belt, without systematic subdivision of the product and without interrupting the movement of the conveyor belt.

## SPECIFIC REQUIREMENTS

### CHAPTER I

#### *Requirements common to all types of automatic weighing instruments*

##### 1. *Rated Operating Conditions*

The manufacturer shall specify the rated operating conditions for the instrument as follows:

###### 1.1. For the measurand:

The measuring range in terms of its maximum and minimum capacity.

###### 1.2. For the electrical supply influence quantities:

In case of AC voltage supply: the nominal AC voltage supply, or the AC voltage limits.

In case of DC voltage supply: the nominal and minimum DC voltage supply, or the DC voltage limits.

###### 1.3. For the mechanical and climatic influence quantities:

The minimum temperature range is 30°C unless specified otherwise in the following chapters of this Schedule.

The mechanical environment classes according to Schedule III, paragraph 1.3.2 are not applicable. For instruments which are used under special mechanical strain, e.g. instruments incorporated into vehicles, the manufacturer shall define the mechanical conditions of use.

###### 1.4. For other influence quantities (if applicable)—

— The rate(s) of operation.

— The characteristics of the product(s) to be weighed.

##### 2. *Permissible effect of disturbances — Electromagnetic environment*

The required performance and the critical change value are given in the relevant Chapter of this Schedule for each type of instrument.

##### 3. *Suitability*

3.1. Means shall be provided to limit the effects of tilt, loading and rate of operation such that maximum permissible errors (MPEs) are not exceeded in normal operation.

3.2. Adequate material handling facilities shall be provided to enable the instrument to respect the MPEs during normal operation.

3.3. Any operator control interface shall be clear and effective.

3.4. The integrity of the display (where present) shall be verifiable by the operator.

3.5. Adequate zero setting capability shall be provided to enable the instrument to respect the MPEs during normal operation.

3.6. Any result outside the measurement range shall be identified as such, where a printout is possible.

#### 4. Conformity assessment

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

For mechanical systems:

B followed by D, or  
B followed by E, or  
B followed by F, or  
D1, or  
F1, or  
G, or  
H1.

For electromechanical instruments:

B followed by D, or  
B followed by E, or  
B followed by F, or  
G, or  
H1.

For electronic systems or systems containing software:

B followed by D, or  
B followed by F, or  
G, or  
H1.

## CHAPTER II

### *Automatic Catchweigher*

#### 1. Accuracy Classes

1.1. Instruments are divided into primary categories designated by:

X or Y as specified by the manufacturer.

1.2. These primary categories are further divided into four accuracy classes:

XI, XII, XIII & XIV and

Y(I), Y(II), Y(a) & Y(b)

which shall be specified by the manufacturer.

## 2. Category X Instruments

2.1. Category X applies to instruments used to check pre-packages made up in accordance with the requirements of Council Directive 75/106/EEC of 19 December 1974 on the approximation of the laws of the Member States relating to the making-up by volume of certain pre-packaged liquids<sup>1</sup> and of Council Directive 76/211/EEC of 20 January 1976 on the approximation of the laws of the Member States relating to the making-up by weight or by volume of certain pre-packaged products<sup>2</sup> applicable to pre-packages.

2.2. The accuracy classes are supplemented by a factor (x) that quantifies the maximum permissible standard deviation as specified in paragraph 4.2.

The manufacturer shall specify the factor (x), where (x) shall be  $\leq 2$  and in the form  $1 \times 10k$ ,  $2 \times 10k$  or  $5 \times 10k$ , where k is a negative whole number or zero.

## 3. Category Y Instruments

Category Y applies to all other automatic catchweighers.

## 4. MPE

### 4.1. Mean error Category X / MPE Category Y instruments

Net Load (m) in verification scale intervals (e)								Maximum permissible mean error	Maximum permissible error
XI	Y(I)	XII	Y(II)	XIII	Y(a)	XIV	Y(b)	X	Y
$0 < m \leq 50,000$		$0 < m \leq 5,000$		$0 < m \leq 500$		$0 < m \leq 50$		$\pm 0.5 e$	$\pm 1 e$
$50,000 < m \leq 200,000$		$5,000 < m \leq 20,000$		$500 < m \leq 2,000$		$50 < m \leq 200$		$\pm 1.0 e$	$\pm 1.5 e$
$200,000 < m$		$20,000 < m \leq 100,000$		$2,000 < m \leq 10,000$		$200 < m \leq 1,000$		$\pm 1.5 e$	$\pm 2 e$

**Table 1**

### 4.2. Standard deviation

Maximum permissible value for the standard deviation of a class X (x) instrument is the result of the multiplication of the factor (x) by the value in Table 2 below.

<sup>1</sup>OJ L 42, 15.2.1975, p. 1. Directive as last amended by Directive 89/676/EEC (OJ L 398, 30.12.1989, p. 18).

<sup>2</sup>OJ L 46, 21.2.1976, p. 1. Directive as last amended by the EEA Agreement.

Net Load (m)	Maximum permissible standard deviation for class X(1)
$m \leq 50$ g	0.48%
$50 \text{ g} < m \leq 100$ g	0.24 g
$100 \text{ g} < m \leq 200$ g	0.24%
$200 \text{ g} < m \leq 300$ g	0.48 g
$300 \text{ g} < m \leq 500$ g	0.16%
$500 \text{ g} < m \leq 1,000$ g	0.8 g
$1,000 \text{ g} < m \leq 10,000$ g	0.08%
$10,000 \text{ g} < m \leq 15,000$ g	8 g
$15,000 \text{ g} < m$	0.053%

For class XI and XII ( $x$ ) shall be less than 1.  
 For class XIII ( $x$ ) shall be not greater than 1.  
 For class XIV ( $x$ ) shall be greater than 1.

**Table 2**

## 4.3. Verification scale interval — single interval instruments

Accuracy classes		Verification scale interval	Number of verification scale intervals $n = \text{Max}/e$	
			Minimum	Maximum
XI	Y(I)	$0.001 \text{ g} \leq e$	50,000	—
XII	Y(II)	$0.001 \text{ g} \leq e \leq 0.05 \text{ g}$	100	100,000
		$0.1 \text{ g} \leq e$	5,000	100,000
XIII	Y(a)	$0.1 \text{ g} \leq e \leq 2 \text{ g}$	100	10,000
		$5 \text{ g} \leq e$	500	10,000
XIV	Y(b)	$5 \text{ g} \leq e$	100	1,000

**Table 3**

## 4.4. Verification scale interval — multi - interval instruments

Accuracy classes		Verification scale interval	Number of verification scale intervals $n = \text{Max}/e$	
			Minimum value <sup>(1)</sup> $n = \text{Max}_i/e_{(i+1)}$	Maximum value $n = \text{Max}_i/e_i$
XI	Y(I)	$0.001 \text{ g} \leq e_i$	50,000	—
XII	Y(II)	$0.001 \text{ g} \leq e_i \leq 0.05 \text{ g}$	5,000	100,000
		$0.1 \text{ g} \leq e_i$	5,000	100,000
XIII	Y(a)	$0.1 \text{ g} \leq e_i$	500	10,000
XIV	Y(b)	$5 \text{ g} \leq e_i$	50	1,000

Where:  $i = 1, 2, \dots, r$

$i$  = partial weighing range

$r$  = total number of partial ranges

(1) For  $i = r$  the corresponding column of Table 3 applies with  $e$  replaced by  $e_r$ .

**Table 4**



### 5. Measurement Range

In specifying the measurement range for class Y instruments the manufacturer shall take account that the minimum capacity shall not be less than:

class Y(I):	100 e
class Y(II):	20 e for $0.001 \text{ g} \leq e \leq 0.05 \text{ g}$ and 50 e for $0.1 \text{ g} \leq e$
class Y(a):	20 e
class Y(b):	10 e
Scales used for grading, e.g. postal scales and waste weighers:	5 e

### 6. Dynamic Setting

6.1. The dynamic setting facility shall operate within a load range specified by the manufacturer.

6.2. When fitted, a dynamic setting facility that compensates for the dynamic effects of the load in motion shall be inhibited from operating outside the load range, and shall be capable of being secured.

### 7. Performance Under Influence Factors And Electromagnetic Disturbances

7.1. The MPEs due to influence factors are:

7.1.1. For category X instruments:

- For automatic operation; as specified in Tables 1 and 2,
- For static weighing in non-automatic operation; as specified in Table 1.

7.1.2. For category Y instruments

- For each load in automatic operation; as specified in Table 1,
- For static weighing in non-automatic operation; as specified for category X in Table 1.

7.2. The critical change value due to a disturbance is one verification scale interval.

7.3. Temperature range:

- For class XI and Y(I) the minimum range is  $5^{\circ} \text{ C}$ ,
- For class XII and Y(II) the minimum range is  $15^{\circ} \text{ C}$ .

## CHAPTER III

*Automatic Gravimetric Filling Instruments*1. *Accuracy classes*

1.1. The manufacturer shall specify both the reference accuracy class Ref(x) and the operational accuracy class(es) X(x).

1.2. An instrument type is designated a reference accuracy class, Ref(x), corresponding to the best possible accuracy for instruments of the type. After installation, individual instruments are designated for one or more operational accuracy classes, X(x), having taken account of the specific products to be weighed. The class designation factor (x) shall be  $\leq 2$ , and in the form  $1 \times 10^k$ ,  $2 \times 10^k$  or  $5 \times 10^k$  where k is a negative whole number or zero.

1.3. The reference accuracy class, Ref(x) is applicable for static loads.

1.4. For the operational accuracy class X(x), X is a regime relating accuracy to load weight and (x) is a multiplier for the limits of error specified for class X(1) in 2.2.

2. *MPE*2.1. *Static weighing error*

2.1.1. For static loads under rated operating conditions, the MPE for reference accuracy class Ref(x), shall be 0.312 of the maximum permissible deviation of each fill from the average; as specified in Table 5; multiplied by the class designation factor (x).

2.1.2. For instruments where the fill may be made up from more than one load (e.g. cumulative or selective combination weighers) the MPE for static loads shall be the accuracy required for the fill as specified in 2.2 (i.e. not the sum of the maximum permissible deviation for the individual loads).

2.2. *Deviation from average fill*

Value of the mass, m (g), of the fills	Maximum permissible deviation of each fill from the average for class X(1)
$m \leq 50$	7.2%
$50 < m \leq 100$	3.6 g
$100 < m \leq 200$	3.6%
$200 < m \leq 300$	7.2 g
$300 < m \leq 500$	2.4%
$500 < m \leq 1,000$	12 g
$1,000 < m \leq 10,000$	1.2%
$10,000 < m \leq 15,000$	120 g
$15,000 < m$	0.8%

*Note:* The calculated deviation of each fill from the average may be adjusted to take account for the effect of material particle size.

**Table 5**

### 2.3. Error relative to pre-set value (setting error)

For instruments where it is possible to pre-set a fill weight; the maximum difference between the pre-set value and the average mass of the fills shall not exceed 0.312 of the maximum permissible deviation of each fill from the average, as specified in Table 5.

### 3. *Performance Under Influence Factor And Electromagnetic Disturbance*

3.1. The MPE due to influence factors shall be as specified in paragraph 2.1.

3.2. The critical change value due to a disturbance is a change of the static weight indication equal to the MPE as specified in paragraph 2.1 calculated for the rated minimum fill, or a change that would give equivalent effect on the fill in the case of instruments where the fill consists of multiple loads. The calculated critical change value shall be rounded to the next higher scale interval ( $d$ ).

3.3. The manufacturer shall specify the value of the rated minimum fill.

## CHAPTER IV

### *Discontinuous Totalisers*

#### 1. *Accuracy Classes*

Instruments are divided into four accuracy classes as follows: 0.2, 0.5, 1 and 2.

#### 2. *MPEs*

Accuracy class	MPE of totalised load
0.2	$\pm 0.10\%$
0.5	$\pm 0.25\%$
1	$\pm 0.50\%$
2	$\pm 1.00\%$

**Table 6**

#### 3. *Totalisation scale interval*

The totalisation scale interval ( $d_t$ ) shall be in the range—

$$0.01\% \text{ Max} \leq d_t \leq 0.2\% \text{ Max}$$

#### 4. *Minimum Totalised Load ( $\Sigma_{\min}$ )*

The minimum totalised load ( $\Sigma_{\min}$ ) shall be not less than the load at which the MPE is equal to the totalisation scale interval ( $d_t$ ) and not less than the minimum load as specified by the manufacturer.

### 5. Zero Setting

Instruments that do not tare weigh after each discharge shall have a zero setting device. Automatic operation shall be inhibited if zero indication varies by:

- $1 d_t$  on instruments with automatic zero setting device;
- $0.5 d_t$  on instruments with a semi-automatic, or non-automatic, zero setting device.

### 6. Operator Interface

Operator adjustments and reset function shall be inhibited during automatic operation.

### 7. Printout

On instruments equipped with a printing device, the reset of the total shall be inhibited until the total is printed.

The printout of the total shall occur if automatic operation is interrupted.

### 8. Performance under influence factors and electromagnetic disturbances

8.1. The MPEs due to influence factors shall be as specified in Table 7 below.

Load (m) in totalisation scale intervals ( $d_t$ )	MPE
$0 < m \leq 500$	$\pm 0.5 d_t$
$500 < m \leq 2,000$	$\pm 1.0 d_t$
$2,000 < m \leq 10,000$	$\pm 1.5 d_t$

**Table 7**

8.2. The critical change value due to a disturbance is one totalisation scale interval for any weight indication and any stored total.

## CHAPTER V

### *Continuous Totalisers*

#### 1. Accuracy classes

Instruments are divided into three accuracy classes as follows: 0.5, 1 and 2.

#### 2. Measurement Range

2.1. The manufacturer shall specify the measurement range, the ratio between the minimum net load on the weighing unit and the maximum capacity, and the minimum totalised load.

- 2.2. The minimum totalised load  $\Sigma_{\min}$  shall not be less than
- 800 d for class 0.5,
- 400 d for class 1,
- 200 d for class 2.

Where d is the totalisation scale interval of the general totalisation device.

### 3. *MPE*

Accuracy class	MPE for totalised load
0.5	$\pm 0.25\%$
1	$\pm 0.5\%$
2	$\pm 1.0\%$

**Table 8**

### 4. *Speed of the belt*

The speed of the belt shall be specified by the manufacturer. For single-speed beltweighers, and variable-speed beltweighers having a manual speed setting control, the speed shall not vary by more than 5% of the nominal value. The product shall not have a different speed than the speed of the belt.

### 5. *General Totalisation Device*

It shall not be possible to reset the general totalisation device to zero.

### 6. *Performance under influence factors and electromagnetic disturbances*

6.1. The MPE due to influence factor, for a load not less than the  $\Sigma_{\min}$ , shall be 0.7 times the appropriate value specified in Table 8, rounded to the nearest totalisation scale interval (*d*).

6.2. The critical change value due to a disturbance shall be 0.7 times the appropriate value specified in Table 8, for a load equal to  $\Sigma_{\min}$ , for the designated class of the beltweigher; rounded up to the next higher totalisation scale interval (*d*).

**SCHEDULE MI-007****TAXIMETERS**

The relevant requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule apply to taximeters.

**DEFINITIONS****Taximeter**

A device that works together with a signal generator<sup>1</sup> to make a measuring instrument.

This device measures duration, calculates distance on the basis of a signal delivered by the distance signal generator.

Additionally, it calculates and displays the fare to be paid for a trip on the basis of the calculated distance and/or the measured duration of the trip.

**Fare**

The total amount of money due for a trip based on a fixed initial hire fee and/or the length and/or the duration of the trip. The fare does not include a supplement charged for extra services.

**Cross-over speed**

The speed value found by division of a time tariff value by a distance tariff value.

**Normal calculation mode S (single application of tariff)**

Fare calculation based on application of the time tariff below the cross-over speed and application of the distance tariff above the cross-over speed.

**Normal calculation mode D (double application of tariff)**

Fare calculation based on simultaneous application of time tariff and distance tariff over the whole trip.

**Operating position**

The different modes in which a taximeter fulfils the different parts of its functioning. The operating positions are distinguished by the following indications:

‘For Hire’: The operating position in which the fare calculation is disabled

‘Hired’: The operating position in which the fare calculation takes place on the basis of a possible initial charge and a tariff for distance travelled and/or time of the trip

‘Stopped’: The operating position in which the fare due for the trip is indicated and at least the fare calculation based on time is disabled.

<sup>1</sup>The distance signal generator is outside the scope of these Regulations.

## DESIGN REQUIREMENTS

1. The taximeter shall be designed to calculate the distance and to measure the duration of a trip.

2. The taximeter shall be designed to calculate and display the fare, incrementing in steps equal to the resolution fixed by the Member State in the operation position ‘Hired’. The taximeter shall also be designed to display the final value for the trip in the operating position ‘Stopped’.

3. A taximeter shall be able to apply the normal calculation modes S and D. It shall be possible to choose between these calculation modes by a secured setting.

4. A taximeter shall be able to supply the following data through an appropriate secured interface(s):

- operation position: ‘For Hire’, ‘Hired’ or ‘Stopped’;
- totaliser data according to paragraph 15.1;
- general information: constant of the distance signal generator, date of securing, taxi identifier, real time, identification of the tariff;
- fare information for a trip: total charged, fare, calculation of the fare, supplement charge, date, start time, finish time, distance travelled;
- tariff(s) information: parameters of tariff(s).

National legislation may require certain devices to be connected to the interface(s) of a taximeter. Where such a device is required; it shall be possible, by secured setting, to inhibit automatically the operation of the taximeter for reasons of the non-presence or improper functioning of the required device.

5. If relevant, it shall be possible to adjust a taximeter for the constant of the distance signal generator to which it is to be connected and to secure the adjustment.

## RATED OPERATING CONDITIONS

6.1. The mechanical environment class that applies is M3.

6.2. The manufacturer shall specify the rated operating conditions for the instrument, in particular:

- a minimum temperature range of 80°C for the climatic environment;
- the limits of the DC power supply for which the instrument has been designed.

**MAXIMUM PERMISSIBLE ERRORS (MPEs)**

7. The MPE, excluding any errors due to application of the taximeter in a taxi, are:

- For the time elapsed:  $\pm 0.1\%$   
     minimum value of mpe: 0.2s;
- For the distance travelled:  $\pm 0.2\%$   
     minimum value of mpe: 4 m;
- For the calculation of the fare:  $\pm 0.1\%$   
     minimum, including rounding: corresponding to the least significant digit of the fare indication.

**PERMISSIBLE EFFECT OF DISTURBANCES****8. Electromagnetic immunity**

8.1. The electromagnetic class that applies is E3.

8.2. The MPE laid down in paragraph 7 shall also be respected in the presence of an electromagnetic disturbance.

**POWER SUPPLY FAILURE**

9. In case of a reduction of the voltage supply to a value below the lower operating limit as specified by the manufacturer, the taximeter shall:

- continue to work correctly or resume its correct functioning without loss of data available before the voltage drop if the voltage drop is temporary, i.e. due to restarting the engine;
- abort an existing measurement and return to the position 'For Hire' if the voltage drop is for a longer period.

**OTHER REQUIREMENTS**

10. The conditions for the compatibility between the taximeter and the distance signal generator shall be specified by the manufacturer of the taximeter.

11. If there is a supplement charge for an extra service, entered by the driver on manual command, this shall be excluded from the fare displayed. However, in that case a taximeter may display temporarily the value of the fare including the supplementary charge.

12. If the fare is calculated according to calculation mode D a taximeter may have an additional display mode in which only the total distance and duration of the trip are displayed in real time.



13. All values displayed for the passenger shall be suitably identified. These values as well as their identification shall be clearly readable under daylight and night conditions.

14.1. If the fare to be paid or the measures to be taken against fraudulent use can be affected by the choice of functionality from a pre-programmed setting or by free data setting, it shall be possible to secure the instrument settings and data entered.

14.2. The securing possibilities available in a taximeter shall be such that separate securing of the settings is possible.

14.3. The provisions in paragraph 8.3 of Schedule III apply also to the tariffs.

15.1. A taximeter shall be fitted with non-resettable totalisers for all of the following values:

- The total distance travelled by the taxi;
- The total distance travelled when hired;
- The total number of hirings;
- The total amount of money charged as supplements;
- The total amount of money charged as fare.

The totalised values shall include the values saved according to paragraph 9 under conditions of loss of power supply.

15.2. If disconnected from power, a taximeter shall allow the totalised values to be stored for one year for the purpose of reading out the values from the taximeter to another medium.

15.3. Adequate measures shall be taken to prevent the display of totalised values from being used to deceive passengers.

16. Automatic change of tariffs is allowed due to the:

- distance of the trip;
- duration of the trip;
- time of the day;
- date;
- day of the week.

17. If properties of the taxi are important for the correctness of the taximeter, the taximeter shall provide means to secure the connection of the taximeter to the taxi in which it is installed.

18. For the purpose of testing after installation, the taximeter shall be equipped with the possibility to test separately the accuracy of time and distance measurement and the accuracy of the calculation.

19. A taximeter and its installation instructions specified by the manufacturer shall be such that, if installed according to the manufacturer's instructions, fraudulent alterations of the measurement signal representing the distance travelled are sufficiently excluded.

20. The general essential requirement dealing with fraudulent use shall be fulfilled in such a way that the interests of the customer, the driver, the driver's employer and the fiscal authorities are protected.

21. A taximeter shall be designed so that it can respect the MPEs without adjustment during a period of one year of normal use.

22. The taximeter shall be equipped with a real-time clock by means of which the time of the day and the date are kept, one or both can be used for automatic change of tariffs. The requirements for the real-time clock are:

- The timekeeping shall have an accuracy of 0.02%;
- The correction possibility of the clock shall be not more than 2 minutes per week. Correction for summer and wintertime shall be performed automatically;
- Correction, automatic or manually, during a trip shall be prevented.

23. The values of distance travelled and time elapsed, when displayed or printed in accordance with this Directive, shall use the following units:

Distance travelled:

- in the United Kingdom and Ireland: until the date which will be fixed by these Member States according to Article (1)(b) of Directive 80/181/EEC: kilometres or miles;
- in all other Member States: kilometres.

Time elapsed:

- seconds, minutes or hours, as may be suitable; keeping in mind the necessary resolution and the need to prevent misunderstandings.

## **CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

- B followed by F, or
- B followed by D, or
- H1.

## SCHEDULE MI-008A

### MATERIAL MEASURES of LENGTH

The relevant essential requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to material measures of length defined below. However, the requirement for the supply of a copy of declarations of conformity may be interpreted as applying to a batch or consignment rather than each individual instrument.

#### DEFINITIONS

Material measure of length

An instrument comprising scale marks whose distances are given in legal units of length.

#### SPECIFIC REQUIREMENTS

##### *Reference Conditions*

1.1 For tapes of length equal to or greater than five metres, the maximum permissible errors (MPEs) are to be met when a tractive force of fifty newtons or other force values as specified by the manufacturer and marked on the tape accordingly, or in the case of rigid or semi-rigid measures no tractive force is needed, is applied.

1.2 The reference temperature is 20°C unless otherwise specified by the manufacturer and marked on the measure accordingly.

##### *MPEs*

2. The MPE, positive or negative in mm, between two non-consecutive scale marks is  $(a + bL)$ , where:

— L is the value of the length rounded up to the next whole metre; and

— a and b are given in Table 1 below.

When a terminal interval is bounded by a surface, the MPE for any distance beginning at this point is increased by the value c given in Table 1.

Accuracy Class	a (mm)	b	c (mm)
I	0.1	0.1	0.1
II	0.3	0.2	0.2
III	0.6	0.4	0.3
D — special class for dipping tapes <sup>(1)</sup> Up to and including 30 m <sup>(2)</sup>	1.5	zero	zero
S — special class for tank strapping tapes For each 30 m length when the tape is supported on a flat surface	1.5	zero	zero

<sup>(1)</sup> Applies to the tape/dip weight combinations.

<sup>(2)</sup> If the nominal tape length exceeds 30 m, an additional mpe of 0.75 mm shall be permitted for each 30 m of tape length.

**Table 1**

Dip tapes may also be of Classes I or II in which case for any length between two scale marks, one of which is on the sinker and the other on the tape, the mpe is  $\pm 0.6$  mm when application of the formula gives a value of less than 0.6 mm.

The MPE for the length between consecutive scale marks, and the maximum permissible difference between two consecutive intervals, are given in Table 2 below.

Length <i>i</i> of the interval	MPE or difference in millimetres according to accuracy class		
	I	II	III
$i \leq 1$ mm	0.1	0.2	0.3
$1 \text{ mm} < i \leq 1$ cm	0.2	0.4	0.6

**Table 2**

Where a rule is of the folding type, the jointing shall be such as not to cause any errors, supplementary to those above, exceeding: 0.3 mm for Class II, and 0.5 mm for Class III.

### *Materials*

3.1 Materials used for material measures shall be such that length variations due to temperature excursions up to  $\pm 8^\circ\text{C}$  about the reference temperature do not exceed the MPE. This does not apply to Class S and Class D measures where the manufacturer intends that thermal expansion corrections shall be applied to observed readings where necessary.

3.2. Measures made from material whose dimensions may alter materially when subjected to a wide range of relative humidity, may only be included in Classes II or III.

*Markings*

4. The nominal value shall be marked on the measure. Millimetre scales shall be numbered every centimetre and measures with a scale interval greater than 2 cm shall have all scale marks numbered.

**CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

F1, or  
D1, or  
B followed by D, or  
H, or  
G.

**SCHEDULE MI-008B****CAPACITY SERVING MEASURES**

The relevant essential requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to capacity serving measures defined below. However, the requirement for the supply of a copy of declarations of conformity may be interpreted as applying to a batch or consignment rather than each individual instrument. Also, the requirement for the instrument to bear information in respect of its accuracy shall not apply.

**DEFINITIONS****Capacity serving measure**

A capacity measure (such as a drinking glass, jug or thimble measure) designed to determine a specified volume of a liquid (other than a pharmaceutical product) which is sold for immediate consumption.

**Line measure**

A capacity serving measure marked with a line to indicate nominal capacity.

**Brim measure**

A capacity serving measure for which the internal volume is equal to the nominal capacity.

**Transfer measure**

A capacity serving measure from which it is intended that the liquid be decanted prior to consumption.

**Capacity**

The capacity is the internal volume for brim measures or internal volume to a filling mark for line measures.

**SPECIFIC REQUIREMENTS**1. *Reference Conditions*

1.1. Temperature: the reference temperature for measurement of capacity is 20°C.

1.2. Position for correct indication: free standing on a level surface.

## 2. MPEs

	<b>Line</b>	<b>Brim</b>
<b>Transfer measures</b>		
< 100 ml	± 2 ml	- 0 + 4 ml
≥ 100 ml	± 3%	- 0 + 6%
<b>Serving measures</b>		
< 200 ml	± 5%	- 0 + 10%
≥ 200 ml	± 5 ml + 2.5%	- 0 + 10 ml + 5%

**Table 1**3. *Materials*

Capacity serving measures shall be made of material which is sufficiently rigid and dimensionally stable to maintain capacity within the MPE.

4. *Shape*

4.1. Transfer measures shall be designed so that a change of contents equal to the MPE causes a change in level of at least 2 mm at the brim or filling mark.

4.2. Transfer measures shall be designed so that the complete discharge of the liquid being measured will not be impeded.

5. *Marking*

5.1. The nominal capacity declared shall be clearly and indelibly marked on the measure.

5.2. Capacity serving measures may also be marked with up to three clearly distinguishable capacities, none of which shall lead to confusion one to the other.

5.3. All filling marks shall be sufficiently clear and durable to ensure that MPEs are not exceeded in use.

## 6. Capacity

Capacity serving measures intended to be used for the purpose of trade in Ireland may only comply with the relevant values of the Second Schedule to the Act as regards nominal capacity.

### **CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

A1, or  
 F1, or  
 D1, or  
 E1, or  
 B followed by E, or  
 B followed by D, or  
 H.

## **SCHEDULE MI-009**

### **DIMENSIONAL MEASURING INSTRUMENTS**

The relevant essential requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to dimensional measuring instruments of the types defined below.

### **DEFINITIONS**

#### **Length measuring instrument**

A length-measuring instrument serves for the determination of the length of rope-type materials (e.g. textiles, bands, cables) during feed motion of the product to be measured.

#### **Area Measuring Instruments**

An area measuring instrument serves for the determination of the area of irregular shaped objects, e.g. for leather.

#### **Multi-dimensional Measuring Instruments**

A multi-dimensional measuring instrument serves for the determination of the edge length (length, height, width) of the smallest enclosing rectangular parallelepiped of a product.

## **CHAPTER I**

### *Requirements common to all dimensional measuring instruments*

#### *Electromagnetic immunity*

1. The effect of an electromagnetic disturbance on a dimensional measuring instrument shall be such that:

- the change in measurement result is no greater than the critical change value as defined in paragraph 2.3; or
  - it is impossible to perform any measurement; or
  - there are momentary variations in the measurement result that cannot be interpreted, memorised or transmitted as a measuring result; or
  - there are variations in the measurement result severe enough to be noticed by all those interested in the measurement result.
2. The critical change value is equal to one scale interval.

## CHAPTER II

### *Length measuring instruments*

#### *Characteristics of the product to be measured*

1. Textiles are characterised by the characteristic factor K. This factor takes the stretchability and force per unit area of the product measured into account and is defined by the following formula:

$$K = \varepsilon (GA + 2.2 \text{ N/m}^2), \text{ where}$$

$\varepsilon$  is the relative elongation of a cloth specimen 1 m wide at a tensile force of 10 N,

GA is the weight force per unit area of a cloth specimen in  $\text{N/m}^2$ .

#### *Operating conditions*

##### 2.1. Range

Dimensions and K-factor, where applicable, within the range specified by the manufacturer for the instrument. The ranges of K-factor are given in Table 1:

<b>Group</b>	<b>Range of K</b>	<b>Product</b>
I	$0 < K < 2 \times 10^{-2} \text{ N/m}^2$	low stretchability
II	$2 \times 10^{-2} \text{ N/m}^2 < K < 8 \times 10^{-2} \text{ N/m}^2$	medium stretchability
III	$8 \times 10^{-2} \text{ N/m}^2 < K < 24 \times 10^{-2} \text{ N/m}^2$	high stretchability
IV	$24 \times 10^{-2} \text{ N/m}^2 < K$	very high stretchability

**Table 1**

2.2. Where the measured object is not transported by the measuring instrument, its speed must be within the range specified by the manufacturer for the instrument.

2.3. If the measurement result depends on the thickness, the surface condition and the kind of delivery (e.g. from a big roll or from a pile), corresponding limitations are specified by the manufacturer.



*MPEs*

## 3. Instrument

Accuracy class	MPE
I	0.125%, but not less than 0.005 $L_m$
II	0.25%, but not less than 0.01 $L_m$
III	0.5%, but not less than 0.02 $L_m$

**Table 2**

Where  $L_m$  is the minimum measurable length, that is to say the smallest length specified by the manufacturer for which the instrument is intended to be used.

The true length value of the different types of materials should be measured using suitable instruments (e.g. tapes of length). Thereby, the material which is going to be measured should be laid out on a suitable underlay (e.g. a suitable table) straight and unstretched.

*Other requirements*

4. The instruments must ensure that the product is measured unstretched according to the intended stretchability for which the instrument is designed.

## CHAPTER III

*Area measuring instruments**Operating conditions*

## 1.1. Range

Dimensions within the range specified by the manufacturer for the instrument.

## 1.2. Condition of the product

The manufacturer shall specify the limitations of the instruments due to the speed, and thickness of the surface conditions if relevant, of the product.

*MPEs*

## 2. Instrument

The MPE is 1.0%, but not less than 1 dm<sup>2</sup>.

*Other requirements*

## 3. Presentation of the product

In the case of pulling back or stopping the product, it should not be possible to have an error of measurement or the display must be blanked.

## 4. Scale interval

The instruments must have a scale interval of 1.0 dm<sup>2</sup>. In addition, it must be possible to have a scale interval of 0.1 dm<sup>2</sup> for testing purposes.

## CHAPTER IV

*Multidimensional measuring instruments**Operating conditions*

## 1.1. Range

Dimensions within the range specified by the manufacturer for the instrument.

## 1.2. Minimum dimension

The lower limit of the minimum dimension for all values of the scale interval is given in Table 1 below.

Scale interval (d)	Minimum dimension (min)(lower limit)
$d \leq 2 \text{ cm}$	10 d
$2 \text{ cm} < d \leq 10 \text{ cm}$	20 d
$10 \text{ cm} < d$	50 d

**Table 1**

## 1.3. Speed of the product

The speed must be within the range specified by the manufacturer for the instrument.

*MPE*

## 2. Instrument:

The MPE is  $\pm 1.0 \text{ d}$ .

**CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

For mechanical or electromechanical instruments:

F1, or  
 E1, or  
 D1, or  
 B followed by F, or  
 B followed by E, or  
 B followed by D, or  
 H, or  
 H1, or  
 G.

For electronic instruments or instruments containing software:

B followed by F, or  
 B followed by D, or

H1, or

G.

## SCHEDULE MI-010

### EXHAUST GAS ANALYSERS

The relevant requirements of Schedule III, the specific requirements of this Schedule and the conformity assessment procedures listed in this Schedule, apply to exhaust gas analysers defined below intended for inspection and professional maintenance of motor vehicles in use.

#### DEFINITIONS

##### **Exhaust gas analyser**

An exhaust gas analyser is a measuring instrument that serves to determine the volume fractions of specified components of the exhaust gas of a motor vehicle engine with spark ignition at the moisture level of the sample analysed.

##### **Gas Components**

The gas components determined by an exhaust gas analyser are carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>) and hydrocarbons (HC).

The content of hydrocarbons has to be expressed as concentration of n-hexane (C<sub>6</sub>H<sub>14</sub>), measured with near-infrared absorption techniques.

The volume fractions of the gas components are expressed as a percentage (% vol) for CO, CO<sub>2</sub> and O<sub>2</sub> and in parts per million (ppm vol).

Moreover, an exhaust gas analyser calculates the lambda value from the volume fractions of the components of the exhaust gas.

##### **Lambda**

Lambda is a dimensionless value representative of the burning efficiency of an engine in terms of air/fuel ratio in the exhaust gases. It is determined with a reference standardised formula.

**SPECIFIC REQUIREMENTS****Instrument Classes**

1. Two classes (0 and I) are being defined for exhaust gas analysers. The relevant minimum measuring ranges for these classes are shown in Table 1.

Parameter	Classes 0 and I
CO fraction	from 0 to 5% vol
CO <sub>2</sub> fraction	from 0 to 16% vol
HC fraction	from 0 to 2,000 ppm vol
O <sub>2</sub> fraction	from 0 to 21% vol
$\lambda$	from 0.8 to 1.2

**Table 1 — Classes and measuring ranges**

**Rated operating conditions**

2. The values of the operating conditions shall be specified by the manufacturer as follows:

2.1. For the climatic and mechanical influence quantities:

- A minimum temperature range of 35°C for the climatic environment;
- The mechanical environment class that applies is M1.

2.2. For the electrical power influence quantities:

- The voltage and frequency range for the AC voltage supply;
- The limits of the DC voltage supply.

2.3. For the ambient pressure:

- The minimum and the maximum values of the ambient pressure are for both classes:  $p_{\min} < 860$  hPa,  $p_{\max} > 1,060$  hPa.

**Maximum permissible errors (MPEs)**

3. The MPEs are defined as follows:

3.1. For each of the fractions measured, the maximum error value permitted under rated operating conditions according to paragraph 1.1 of Schedule III is the greater of the two values shown in Table 2. Absolute values are expressed in % vol or ppm vol, percentage values are percent of the true value.

Parameter	Class 0	Class I
CO fraction	± 0.03% vol ± 5%	± 0.06% vol ± 5%
CO <sub>2</sub> fraction	± 0.5% vol ± 5%	± 0.5% vol ± 5%
HC fraction	± 10 ppm vol ± 5%	± 12 ppm vol ± 5%
O <sub>2</sub> fraction	± 0.1% vol ± 5%	± 0.1% vol ± 5%

**Table 2 MPEs**

3.2. The MPE on lambda calculation is 0.3%. The conventional true value is calculated according to the formula defined in point 5.3.7.3 of Annex I of Directive 98/69/EC of the European Parliament and the Council relating to measures to be taken against air pollution by emissions from motor vehicles and amending Council Directive 70/220/EEC<sup>1</sup>.

For this purpose, the values displayed by the instrument are used for calculation.

Permissible effect of disturbances

4. For each of the volume fractions measured by the instrument, the critical change value is equal to the MPE for the parameter concerned.

5. The effect of an electromagnetic disturbance shall be such that:

- either the change in the measurement result is not greater than the critical change value laid down in paragraph 4;
- or the presentation of the measurement result is such that it cannot be taken for a valid result.

#### Other requirements

6. The resolution shall be equal to or of one order of magnitude higher than the values shown in Table 3.

	CO	CO <sub>2</sub>	O <sub>2</sub>	HC
Classes 0 and I	0.01% vol	0.1% vol	(1)	1 ppm vol

(1) 0.01% vol for measurand values below or equal to 4% vol, otherwise 0.1% vol.

**Table 3 Resolution**

The lambda value shall be displayed with a resolution of 0.001.

7. The standard deviation of 20 measurements shall not be greater than one third of the modulus of the MPE for each applicable gas volume fraction.

8. For measuring CO, CO<sub>2</sub> and HC, the instrument, including the specified gas handling system, must indicate 95% of the final value as determined with calibration gases within 15 seconds after changing from a gas with zero content,

<sup>1</sup>OJ L 350, 28.12.1998, p. 17.

e.g. fresh air. For measuring O<sub>2</sub>, the instrument under similar conditions must indicate a value differing less than 0.1% vol from zero within 60 seconds after changing from fresh air to an oxygen-free gas.

9. The components in the exhaust gas, other than the components whose values are subject to the measurement, shall not affect the measurement results by more than the half of the modulus of the MPEs when those components are present in the following maximum volume fractions:

6% vol CO,

16% vol CO<sub>2</sub>,

10% vol O<sub>2</sub>,

5% vol H<sub>2</sub>,

0.3% vol NO,

2,000 ppm vol HC (as n-hexane),

water vapour up to saturation.

10. An exhaust gas analyser shall have an adjustment facility that provides operations for zero-setting, gas calibration and internal adjustment. The adjustment facility for zero-setting and internal adjustment shall be automatic.

11. For automatic or semi-automatic adjustment facilities, the exhaust gas analyser shall be unable to make a measurement as long as the adjustments have not been made.

12. An exhaust gas analyser shall detect hydrocarbon residues in the gas handling system. It shall not be possible to carry out a measurement if the hydrocarbon residues, present before any measurement, exceed 20 ppm vol.

13. An exhaust gas analyser shall have a device for automatically recognising any malfunctioning of the sensor of the oxygen channel due to wear or a break in the connecting line.

14. If the exhaust gas analyser is capable to operate with different fuels (e.g. petrol or liquefied gas), there shall be the possibility to select the suitable coefficients for the Lambda calculation without ambiguity concerning the appropriate formula.

**CONFORMITY ASSESSMENT**

The conformity assessment procedures referred to in Regulation 7 that the manufacturer can choose between are:

B followed by F, or  
B followed by D, or  
H1



GIVEN under my Official Seal,  
17 April 2007

MICHEÁL MARTIN  
Minister for Enterprise, Trade and Employment.

## EXPLANATORY NOTE

*(This note is not part of the Instrument and does not purport to be a legal interpretation).*

These Regulations come into effect on the signing thereof and implement Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on the harmonisation of the laws of Member States relating to Measuring Instruments.

They provide for the free movement within the Community of certain instruments and set out essential requirements, which must be met for instruments intended for certain specified uses. These Regulations implement the provisions of the Directive relating to the following categories of instrument:

- Water Meters For Cold Water
- Gas Meters And Volume Conversion Devices
- Active Electrical Energy Meters
- Measuring Systems For The Continuous And Dynamic Measurement Of Quantities Of Liquids Other Than Water
- Automatic Weighing Instruments
- Taximeters
- Material Measures Of Length
- Capacity Serving Measures
- Dimensional Measuring Instruments
- Exhaust Gas Analysers

They provide that the essential requirements of the Directive may be met through adoption by a manufacturer of the appropriate normative document, subject to the procedure stipulated in Article 16(1) of the Directive, containing technical specifications. They also provide for the appointment of notified bodies to carry out the various functions such as type-approval, verification and quality system approval and set out the obligations on manufacturers and the conditions under which they may issue a declaration of conformity and attach the CE mark and the Supplementary Metrology Mark to instruments.

The Regulations contain provisions for the withdrawal from the market or imposition of restrictions on the placing on the market of instruments bearing the CE mark and the Supplementary Metrology Mark that do not meet the requirements of the Regulations.



Regulations that applied to the classes of instruments within the scope of these Regulations are repealed. The Regulations also provide for an appeals procedure, market surveillance, powers of inspectors & authorised officers and penalties for offences.

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