STATUTORY INSTRUMENTS

1990 No. 792

ELECTRICITY

The Meters (Certification) Regulations 1990

Made - - - -	*29th March 1990*
Coming into force -	*31st March 1990*

The Director General of Electricity Supply in exercise of the powers conferred by sections 31 and 60 of, and paragraphs 5 and 13(a) of Schedule 7 to, the Electricity Act 1989(b) and of all other enabling powers, and with the consent of the Secretary of State in accordance with paragraph 13 of Schedule 7 to that Act, hereby makes the following Regulations:–

Citation and commencement

1. These Regulations may be cited as the Meters (Certification) Regulations 1990 and shall come into force on 31st March 1990.

Interpretation

2.—(1) In these Regulations–

"the Act" means the Electricity Act 1989;

"approved" means approved by or under regulations made under paragraph 2 of Schedule 7 to the Act;

"authorised examiner" means a person who is authorised in accordance with regulation 6;

"authorised manufacturer" means a person who is authorised in accordance with regulation 4;

"authorised repairer" means a person who is authorised in accordance with regulation 5;

"directions" means any directions issued by the Director under paragraph 6(1) of Schedule 7 to the Act;

"meter examiner" means a person appointed under paragraph 4 of Schedule 7 to the Act;

"permitted margins of error" means the margins of error referred to in regulation 8.

(2) Unless the context otherwise requires, any reference in these Regulations to a numbered regulation or Schedule is a reference to the regulation in or the Schedule to these Regulations bearing that number; and any reference in a regulation or a Schedule to a numbered paragraph is a reference to the paragraph of that regulation or Schedule bearing that number.

Certified meter

3. Subject to regulation 12, a meter shall not be regarded as certified for the purposes

(a) *See* the definitions of "prescribed" and "regulations".
(b) 1989 c.29.

of the Act until a certificate in respect of that meter has been issued by a meter examiner or an authorised examiner in accordance with these Regulations and that meter shall continue to be regarded as certified for those purposes until that certificate has been revoked under regulation 10.

Authorised manufacturer

4.—(1) Any person who manufactures meters and satisfies the Director that–

(a) he owns or has available to him apparatus for the examination, testing and regulation of meters which complies with directions;

(b) in respect of each manufacturing unit which he specifies in writing to the Director, he operates a quality assurance system in respect of any meter manufactured by him at that unit which conforms to the standard contained in British Standard BS 5750 Part I 1987; and

(c) he would be capable of complying with the conditions set out in paragraph (2),

may be authorised as a manufacturer by the Director for the purpose of these Regulations in respect of any one or more manufacturing units described in his authorisation for a period not exceeding three years but so that any authorisation may be renewed from time to time.

(2) An authorisation granted by the Director to a person who satisfies the provisions of paragraph (1) shall be subject to the following conditions–

(a) that the authorisation will only apply in respect of meters which have been manufactured at a manufacturing unit described in his authorisation and have been examined, tested and regulated using the apparatus referred to in sub-paragraph (a) of paragraph (1);

(b) that the authorised person will operate at all times at each manufacturing unit described in his authorisation a quality assurance system which conforms to the standard referred to in sub-paragraph (b) of paragraph (1) and will maintain a record in permanent form of the system which he operates and of the actions taken to comply with that system in respect of the meter or meters which he intends to submit for certification in accordance with regulation 7;

(c) that the authorised person shall secure that each meter referred to in sub-paragraph (b) of this paragraph shall be examined and tested in accordance with the provisions of Schedule 1;

(d) that the authorised person shall cause every meter in respect of which a certificate has been issued under regulation 8 or 9 to be so stored while it remains under his control and so packaged for delivery when it is to be dispatched from his control as to prevent, so far as reasonably practicable, damage which would cause it to operate in a manner which would not conform with the permitted margins of error; and

(e) that the authorised person will permit the Director or any person duly authorised by him to have access to any manufacturing unit described in his authorisation and to examine and test all apparatus and to inspect all records referred to in this paragraph at all reasonable times for the purpose of ensuring that the authorised person is complying with the conditions of his authorisation.

(3) An authorisation under this regulation may be terminated at any time by the Director upon giving not less than 28 days notice to the authorised person if–

(a) he is breach of any condition of his authorisation or of his duty to comply with directions and (in the case of a breach which is capable of being remedied) has failed to remedy that breach as soon as reasonably practicable after notice has been given to him by the Director specifying the breach; or

(b) he has failed to pay any fee payable by him in accordance with regulation 11.

(4) For the purpose of this regulation–

(a) a person shall be treated as a manufacturer of a meter if he has caused the meter to be assembled so as to comply with the conditions of his authorisation but has not himself manufactured every component part of the meter;

(b) "assembled" includes the carrying out of repairs or modifications to a meter

within a period of twelve months after the date upon which a certificate in respect of that meter was first issued under regulation 8 or 9; and

(c) "manufacturing unit" means one or more premises at which meters are assembled but excluding any premises or that part of any premises which are used for the cleaning and repair of meters which have previously been used for measuring the quantity of electricity supplied.

Authorised repairer

5.—(1) Any person who repairs meters and satisfies the Director that–

(a) he owns or has available to him apparatus for the examination, testing and regulation of meters which comply with directions;

(b) in respect of each repair unit which he specifies in writing to the Director, he operates a quality assurance system in respect of any meters repaired by him at that unit which conforms to the standard contained in British Standard BS 5750 Part II 1987; and

(c) he would be capable of complying with the conditions set out in paragraph (2),

may be authorised as a repairer by the Director for the purpose of these Regulations in respect of any one or more repair units described in his authorisation for a period not exceeding three years but so that any authorisation may be renewed from time to time.

(2) Any authorisation granted by the Director to a person who satisfies the provisions of paragraph (1) shall be subject to the following conditions–

(a) that the authorisation will only apply in respect of meters which have been repaired at a repair unit described in his authorisation and examined, tested and regulated using the apparatus referred to in sub-paragraph (a) of that paragraph;

(b) that the authorised person will operate at all times at each repair unit described in his authorisation a quality assurance system which conforms to the standard referred to in sub-paragraph (b) of paragraph (1) and will maintain a record in permanent form of the system which he operates and of the actions taken to comply with that system in respect of the meter or meters which he intends to submit for certification in accordance with regulation 7;

(c) that the authorised person will cause each meter which is repaired at a repair unit described in his authorisation to be repaired to a standard and using such materials as would reasonably be expected to enable it to operate within the permitted margins of error for not less than 10 years;

(d) that the authorised person shall secure that each meter referred to in sub-paragraph (b) of this paragraph shall be examined and tested in accordance with the provisions of Schedule 1;

(e) that the authorised person shall cause every meter in respect of which a certificate has been issued under regulation 8 or 9 to be so stored while it remains under his control and so packaged for delivery when it is to be dispatched from his control as to prevent, so far as reasonably practicable, damage which would cause it to operate in a manner which would not conform with the permitted margins of error; and

(f) that the authorised person will permit the Director or any person duly authorised by him to have access to any repair unit described in his authorisation and to examine and test all apparatus and to inspect all records referred to in this paragraph at all reasonable times for the purpose of ensuring that the authorised person is complying with the conditions of his authorisation.

(3) An authorisation under this regulation may be terminated at any time by the Director upon giving not less than 28 days notice to the authorised person if–

(a) he is in breach of any condition of his authorisation or of his duty to comply with directions and (in the case of a breach which is capable of being remedied) has failed to remedy that breach as soon as reasonably practicable after notice has been given to him by the Director specifying the breach; or

(b) he has failed to pay any fee payable by him in accordance with regulation 11.

(4) For the purpose of this regulation "repair unit" means one or more premises at which meters which have previously been used for measuring the quantity of electricity

supplied are cleaned repaired tested or regulated but excluding any premises or that part of any premises which are used for the manufacture or assembly of meters.

Authorised examiner

6.—(1) A public electricity supplier, an authorised manufacturer or an authorised repairer may nominate a competent person for the purpose of this regulation.

(2) If the Director is satisfied that a person nominated under paragraph (1)–

(a) is competent to carry out the functions contained or referred to in regulation 8; and

(b) is not employed by the person nominating him to carry out any task relating to the manufacture or repair of meters,

the Director may appoint that person to be an authorised examiner for the purposes of certifying meters in accordance with these Regulations.

(3) For the purpose of sub-paragraph (b) of paragraph (2) a person shall not be treated as carrying out such a task unless he is required to examine, test or regulate a meter prior to the time at which that meter is submitted to him in accordance with regulation 7.

(4) An authorisation granted by the Director to a person who satisfies the provisions of paragraph (2) shall be subject to the following conditions–

(a) that the authorisation will only apply in respect of meters which have been manufactured or repaired (as the case may be) by the person by whom he was nominated under paragraph (1);

(b) that, where regulation 9 applies, he will examine and test not less than the number of meters selected in accordance with a sampling procedure determined by the Director having regard to national or international sampling procedures or plans;

(c) that he will send to the Director not less than seven days after the expiry of each month a report stating the number of meters which have been submitted to him in accordance with regulation 7 and the number of meters in respect of which a certificate has been issued under regulation 8 or 9 during the preceding month; and

(d) that he will retain a copy of each certificate issued by him for a period of not less than one year from the date of issue and will produce the copy to the Director if requested to do so.

(5) An authorisation under this regulation may be terminated at any time by the Director upon giving not less than 28 days notice to the authorised person if–

(a) he is in breach of any condition of his authorisation and (in the case of a breach which is capable of being remedied) has failed to remedy that breach as soon as reasonably practicable after notice has been given to him by the Director specifying the breach;

(b) he fails to exercise proper care and attention in performing his functions under regulation 8 or 9; or

(c) where the authorised person is unable (otherwise than temporarily) to perform his functions under regulations 8 or 9.

(6) Where–

(a) a person nominated under paragraph (1) and authorised under paragraph (2) is temporarily unable for any reason to act as an authorised examiner;

(b) the person by whom he was nominated has nominated another person under paragraph (1) who has been authorised under paragraph (2); and

(c) the person referred to in sub-paragraph (a) of this paragraph is again able to act as an authorised examiner;

the Director may give not less than 28 days notice in writing to the authorised person referred to in sub-paragraph (b) of this paragraph terminating his authorisation.

Application for certification

7.—(1) A person who requires a meter to be certified for the purposes of the Act may

submit the meter to an authorised examiner who is authorised to certify a meter submitted by that person, or to a meter examiner.

(2) Each meter which is submitted for certification shall be accompanied by a report signed by an authorised manufacturer, an authorised repairer or a public electricity supplier.

(3) A report for the purpose of paragraph (2) shall contain the statements and information specified in Schedule 2 which is appropriate to the type of meter to which it relates including, where that meter is designed to operate with a transformer, the statements and information relating to the transformer.

Procedure for certification

8.—(1) Subject to regulation 9, a meter which is submitted to a meter examiner or an authorised examiner shall not be certified by him unless he is satisfied that the meter–

(a) is of an approved pattern or construction;

(b) is accompanied by the report referred to in paragraph (2) of regulation 7;

(c) has been tested in accordance with the provisions of Schedule 3 and conforms to the standards described in that Schedule; and

(d) that the meter can reasonably be expected to operate within the permitted margins of error for a period of not less than ten years from the date upon which it is certified.

(2) The permitted margins of error shall be an error not exceeding 2.5 per centum plus or 3.5 per centum minus at any load at which the meter is designed to operate.

(3) Where the examiner is satisfied that a meter complies with paragraph (1), he shall issue a certificate of compliance specifying the serial number of the meter.

(4) Each certificate under paragraph (3) shall be numbered in the sequence in which it is issued.

(5) A certificate signed by the examiner by whom it is issued under paragraph (3) shall be conclusive evidence that the meter has been certified for the purpose of these Regulations.

Batch certification

9.—(1) Where–

(a) a number of meters have been submitted to an examiner at the same time by the same person;

(b) that person is a public electricity supplier, an authorised manufacturer or an authorised repairer;

(c) each meter is of an approved pattern or construction and is accompanied by the report referred to in paragraph (2) of regulation 7; and

(d) the examiner has examined and tested a sufficient number of the meters to satisfy himself that it provides a reasonable test of all of them,

he may issue a certificate in respect of all the meters so submitted to him specifying or identifying the serial number of each meter and that shall be a certificate for every meter so specified.

(2) Where a certificate is issued under this regulation, a copy of the certificate which is stated to be a true copy of the original certificate and is signed by an examiner, a public electricity supplier, an authorised manufacturer or an authorised repairer shall be sufficient evidence that each meter, the serial number of which is specified or identified in that copy certificate, was duly certified for the purpose of these Regulations.

Revocation of certification

10.—(1) A meter in respect of which a certificate has been issued under regulation 8 or 9 shall be a certified meter for the purpose of these Regulations until–

(a) the approval of the type or pattern of construction of that meter is revoked in the prescribed manner;

(b) it is or becomes installed in a manner which is not an approved manner of installation;

(c) the certificate in respect of that meter or of meters of that type is revoked in the prescribed manner; or

(d) any alteration is made to the meter other than the making of any alteration to the demand indicator mechanism in a maximum demand meter.

(2) For the purpose of sub-paragraphs (a) and (c) of paragraph (1) the prescribed manner shall be by or under regulations made under paragraph 2 or 5 of Schedule 7 to the Act.

Fees

11.—(1) Any person who submits a meter for certification under regulation 7 shall pay to the Director in accordance with paragraph (3)–

(a) in respect of each meter submitted for certification by a meter examiner a fee of 29 pence; or

(b) in respect of each meter submitted for certification by an authorised examiner a fee of 17 pence.

(2) Within seven days after the last day of each calendar month in which a person has submitted a meter to a meter examiner or an authorised examiner under regulation 7, he shall deliver to the Director a statement of the number of meters which he has submitted during the preceding month.

(3) Within thirty days of the delivery of the statement referred to in paragraph (2), he shall pay to the Director a fee calculated in accordance with paragraph (1) in respect of the meters referred to in that statement.

Transitional

12. Any meter which has been certified under the provisions of section 50 of the Schedule to the Electric Lighting (Clauses) Act 1899**(a)** shall be a certified meter for the purpose of these Regulations for the remainder of the period of certification applicable to that meter immediately prior to the coming into force of these Regulations or until the happening of an event described in regulation 10 relating to that meter, whichever first occurs.

S. C. Littlechild
28th March 1990 — The Director General of Electricity Supply

I consent

John Wakeham
29th March 1990 — Secretary of State for Energy

SCHEDULE 1 — Regulations 4(2)(c) and 5(2)(d)

TESTING AND TESTING METHODS FOR ALTERNATING CURRENT WATTHOUR METERS

Pre-heating

1.—(1) The following tests shall not be carried out until the voltage circuits of meters under test and the voltage circuit of working standard integrating meters have been energised for a period of one hour or half an hour if a current of not less than 2 Ampere is applied to the current circuit of

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(a) 1899 c.19.

the meters, save that the non-registration and starting current tests may be carried out during the pre-heating period.

(2) Sub-paragraph (1) shall not apply to a meter which is capable of full operation as soon as it is energised.

Non-registration test

Induction meters

2.—(1) Meters shall be tested to ensure that when the current circuits are open and a voltage of 110% of the marked voltage is applied to the voltage circuits, rotors cease to rotate before completing one complete revolution.

Static meters

(2) Meters shall be tested for non-registration by one of the following methods–

Method 1

(a) (i) When subjected to the test conditions specified in paragraph 2(1), meters shall not emit more than one output pulse over a minimum time period determined in paragraph (ii);

(ii) Minimum test period=60000/k minutes, where k=number of pulses per kWh emitted by a meter.

Method 2

(b) When static meters are fitted with inhibiting circuits, they may be tested for non-registration with a current, which is less than the threshold current in respect of a meter of that type, applied to the current circuits and a voltage of 100% of the marked voltage applied to the voltage circuits of the meters under test. Meters shall not emit more than one output pulse over a minimum time period determined as follows–

$$\text{Minimum test period} = \frac{126000}{V \times I \times k} \text{ minutes}$$

where V=marked voltage, I=total current and k=number of pulses emitted per kWh by a meter.

Method 3

(c) The period calculated for Method 1 or Method 2 may be halved, provided that the meters under test do not emit any output pulses during the period of the test.

Accuracy tests

3.—(1) Apparatus used for determining the errors of meters during these tests shall comply with the directions.

(2) The rate of advance of a meter over a test period shall be obtained by reading the electro-mechanical register or electronic display on or connected to meters or by monitoring the rotation of a disc or pulse output of a meter.

(3) For any test load, the load applied to a rotating integrating working standard meter shall not be less than 25% or more than 125% of its full load rating.

(4) For a working standard wattmeter, the applied load shall not be less than 40% or more than 100% of its full scale or range reading.

Methods of test

Method A test

4.—(1) A long period dial test where the advance of a kWh display, which is part of or connected to a meter under test, is compared with the advance of a precision kilowatt-hour meter.

Method B test

(2) A short period test where the rate of advance of a meter under test is compared to the rate of advance of a precision kilowatt-hour meter.

Method C test

(3) A short period test where the calculated rate of advance of a meter under test is compared to actual rate of advance for constant power conditions over a specified test period.

Conditions for testing

5.—(1) The tests shall be carried out in accordance with Table 1.

Meter position

(2) Meter position requirements given in Table 1 apply to induction meters only. Tolerance applies to vertical wall on which meter base is mounted and a horizontal reference line or edge on the meter e.g. lower edge of terminal block.

Voltage and current supplies for polyphase meters

(3)(a) The order of the phases shall correspond to the sequence shown on the connection diagram.

(b) The voltages shall be balanced so that the voltage between any line and neutral or between any two lines shall not differ by more than 1.5% from the mean of the corresponding voltages.

(c) The currents shall be balanced so that the currents in the conductors shall not differ by more than 2.5% from the mean of these currents.

(d) The phase displacement between the current and corresponding phase to neutral voltage shall not differ from other current and voltage phase displacements by more than 3° at any power factor under any specified load conditions.

External magnetic induction

(4) The test given in Table 1 in respect of external magnetic induction shall be carried out during commissioning or after major modification or refurbishing of a meter testing system. The tests consists of determining the errors at 0.1Ib unity power factor with the meters normally connected and then determining the errors for–

(a) single phase meters after reversing both current and voltage connections for which half the difference between the two errors is the value of the variation.

(b) polyphase meters by making two additional measurements after each of the connections to the current circuits and to the voltage circuits are changed over 120° but with the phase sequence unaltered for which the greatest difference between each error determined and the mean of the three errors is the value of the variation.

Dial tests

(5) Where all the errors of repaired meters are determined by Method B or Method C test, an additional test in accordance with Method A shall be carried out. The Method A test shall be carried out at one of the loads used for the Method B or Method C test and the error obtained by the Method A test shall not differ by more than 0.6% from the error obtained for this load by the Method B or Method C test.

Duration of test

(6) For any of the above methods of test, the duration of the test shall continue until the error of meters can be calculated within a tolerance not greater than ±0.2%.

Conditions for mixing methods of test

(7) Method A tests may be used for intermediate and high loads, at unity and 0.5 power factor, and Method B or Method C tests for the low load, provided that an additional Method B or Method C test is carried out at one of the test load values used for the Method A tests.

Test loads

6.—(1) Every repaired meter shall be tested at each of the loads specified in Table 2.

(2) All new meters shall be calibrated and tested at a sufficient number of load points so as to ensure that meter errors are not greater than the limits specified in paragraph 9.

(3) A test will also be carried out on new meters for starting in accordance with Test No 7 of Table 2.

(4) The ratio accuracy shall be determined for voltage transformers that are intended for use with meters but are not tested with a meter.

(5) Current transformers intended for use with meters but not tested with a meter shall be tested from 5% to 100% of rated current.

Multi-rate meters

Induction meters

7.—(1) (a) All multi-rate induction meters shall be tested on one rate in accordance with paragraphs 5 and 6 and on each and every other rate at a low load using Method A, Method B or Method C tests and at a high load using Method A test.

(b) The difference in errors measued on one rate shall not differ from the errors measured on any other rate, for the same load conditions, by more than 1%.

Static meters

(2) (a) All multi-rate static meters shall be tested on one rate in accordance with paragraphs 5 and 6.

(b) For repaired multi-rate static meters where–

(i) the total units is the sum of all the rates, a further test shall be carried out on each and every other rate at a high load using Method A;

(ii) the total units are recorded on one register, only this register is required to be tested in accordance with paragraphs 5 and 6.

Polyphase meters

8.—(1) Every polyphase meter shall be tested on a circuit having a phase relationship for which the meters were designed. However, three phase, four wire polyphase meters may be tested without current in the neutral conductor.

(2) When testing polyphase meters, 3 single phase or 2 single phase working standard precision kilowatt-hour meters or working standard watthour meters as appropriate may be used instead of polyphase working standard instruments.

Margins of error

9.—(1) The maximum error permitted for both single phase and polyphase whole current and transformer operated meters, tested with transformers connected, shall not exceed plus or minus 1.5% for tests 1, 2, 3 and 4 given in Table 2.

(2) The maximum error permitted for both single phase and polyphase transformer operated meters, tested without transformers connected, shall not exceed plus or minus 1.0% for tests 1, 2, 3 and 4 inclusive given in Table 2.

(3) For polyphase whole current and transformer operated meters, tested with transformers connected, the maximum error shall not exceed plus 1.7% or minus 2.7% for tests 5 and 6 given in Table 2.

(4) For polyphase transformer operated meters, tested without transformers connected, the maximum error shall not exceed plus 1.2% or minus 2.2% for tests 5 and 6 given in Table 2.

(5) Where current and voltage transformers, which are intended to be used with meters, are not tested connected to a meter then the total error of the transformers at any load point throughout the rated range shall not exceed 0.5%; unless by matching transformers to meters enables the total error of meter and transformers to meet the requirements of paragraphs 9(1), 9(2), 9(3) and 9(4) above.

Insulation property test

10. Each meter shall be tested to demonstrate that the insulation of the meter is of a sufficient standard to enable the meter to operate safely and correctly in the conditions in which it could reasonably be expected to be installed and operated.

TABLE 1

Influence quantities	*Reference value*	*Tolerance*
Ambient temperature	Reference temperature or, if not indicated, 23°C.	>15°C to <30°C
Meter position	Vertical	±3°
Voltage	Reference voltage	±1.5%
Frequency	Reference frequency 50Hz	±0.5%
Voltage and current waveform	Sinusoidal form	Distortion factor <5%
External magnetic induction at the reference frequency (paragraph 5.4)	Zero	Induction value that does not produce a relative error variation of more than ±0.3%

TABLE 2

Test No. & load	*Power factor*	*Basic/ maximum*	*Test load in terms of marked current* *Maximum continuous*	*Long range*	*Short range*	*Meter type*	*Polyphase meter load*
1 (high)	1	Imax	100%	100%–200% (Note 1)	100%–125% (Note 1)	Single & polyphase	Balanced
2 (intermediate)	1	Ib or 125%Ib	Any load between 25%–75% of the value specified for Test No. 1			Single & polyphase	Balanced
3 (low)	1	5%Ib	1.67% (note 2)	5%	5%	Single & polyphase	Balanced
4 (inductive)	0.5	Ib or Imax	100%	The same value selected for Test No. 1		Single & polyphase	Balanced
5 (element)	1	Ib	100%	The same value selected for Test No. 1		Polyphase	One phase loaded in turn
6 (inductive) (element)	0.5	Ib	100%	The same value selected for Test No. 1		Polyphase	One phase loaded in turn
7 (starting-current)	1	0.5%Ib to 1.0%Ib	0.5% to 1.0%	0.5% to 1.0%	0.5% to 1.0%	Single & polyphase	Balanced

Note 1 Where a range is given, any value within that inclusive range may be selected.
Note 2 For maximum continuously rated prepayment meters, the low load test value may be twice the value shown.
Note 3 For test no. 4 & 6, the inductive power factor shall be between 0.45 and 0.55 inclusive.

SCHEDULE 2

Regulation 7(3)

REPORT ON METER TESTS

Reports for meters examined and tested

1. In respect of each meter to which the report refers a statement that–
   (a) the meter referred in the report is accurately described and whether it is a new or repaired meter;
   (b) the meter has been examined and tested in accordance with Schedule 1;
   (c) the uncertainty of measurement was not greater than ±0.4% at unity power factor or greater than ±0.6% at 0.5 inductive power factor;
   (d) no meter error was greater than ± 1.5% at any load for single phase meter and polyphase meters on balanced loads;
   (e) the meter did not register when energised on voltage only; and
   (f) paragraph 1(2) of Schedule 1 did or did not apply (as the case may be).

2. In respect of each meter to which the report refers, particulars of–
   (a) the name of the company responsible for the manufacture or repair of the meter;
   (b) the name and address of the manufacturing or repair unit where the meter was examined and tested;
   (c) the number of the report and the PCS identification marks impressed on the meter seals in accordance with the provisions of directions;
   (d) the declared system voltage on which the meter is to be used;
   (e) the make and type of the meter, stating the nominal frequency if other than 50Hz;
   (f) the marked current and voltage rating of the meter;
   (g) the serial number of the meter;

3. A report may include the errors obtained at each test load and an end of test meter reading.

4. In the case of a meter intended for use and tested with a transformer or transformers, the following additional information shall be included in the report–

(1) the make, output rating, serial number and classification of each transformer to be used with the meter;

(2) for a polyphase meter, the phase to which each transformer was connected;

(3) particulars and electrical burdens of any other meter, instrument or external attachments that are to be used in conjunction with a transformer operated meter.

5. Subject to paragraph 6, where a transformer intended for use with meters but tested separately from those meters, a statement that–

(1) the transformer referred to in the report is accurately described and whether it is a new or used transformer;

(2) the transformer has been examined and tested in accordance with Schedule 1;

(3) the uncertainty of measurement was not greater than ±0.1%;

(4) no transformer error was greater than ±0.5% at any load from 5% to 100% of full load when connected to maximum rated burden or if known, the working burden;

6. Where a transformer is intended for use with a meter identified by a specific serial number, a statement that the aggregate error of that meter and the transformer was not greater than the amounts specified in paragraph 1(d) shall be substituted for the statement required under paragraph 5(4).

7. A report for a transformer shall also include the following information–

(1) the name and address of the manufacturing or repair unit where the transformer was examined and tested;

(2) the make and type of the transformer, stating the nominal frequency if other than 50Hz;

(3) the marked current or voltage ratio of the transformer and the working or maximum permissible burden that can be connected to the transformer;

(4) the serial number of the transformer.

8. The meter or transformer errors obtained at each test load may also be included on these reports.

9. Before a meter or a transformer are submitted for certification, the report on the meter or transformer should be verified and signed by the person in charge of production or by a person nominated by him.

SCHEDULE 3

Regulation 8(1)(c)

CERTIFICATION TESTS AND TESTING METHODS FOR ALTERNATING CURRENT WATTHOUR METERS

Pre-heating

1.—(1) The following tests shall not be carried out until the voltage circuits of meters under test and the voltage circuit of working standard integrating meters have been energised for a period of one hour or half an hour if a current of not less than 2 Ampere is applied to the current circuit of the meters, save that non-registration may be carried out during the pre-heating period.

(2) Sub-paragraph (1) shall not apply to a meter which the examiner is satisfied is capable of full operation as soon as it is energised.

Non-registration test

Induction meters

3.—(1) Meters shall be tested to ensure that when the current circuits are open and a voltage of 110% of the marked voltage is applied to the voltage circuits, rotors cease to rotate before completing one complete revolution.

Static meters

(2) Meters shall be tested for non-registration by one of the following methods–

Method 1

(a) (i) When subjected to the test conditions specified in paragraph 2(1), meters shall not emit more than one output pulse over a minimum time period determined in paragraph (ii);

(ii) Minimum test period=60000/k minutes, where k=number of pulses per kWh emitted by a meter.

Method 2

(b) When static meters are fitted with inhibiting circuits, they may be tested for non-registration with a current, which is less than the threshold current in respect of a meter of that type, applied to the current circuits and a voltage of 100% of the marked voltage applied to the voltage circuits of the meters under test. Meters shall not emit more than one output pulse over a minimum time period determined as follows–

$$\text{Minimum test period} = \frac{126000}{V \times I \times k} \text{ minutes}$$

where V=marked voltage, I=total current and k=number of pulses per kWh emitted by a meter.

Accuracy tests

3.—(1) Apparatus used for determining the errors of meters during these tests shall comply with the directions.

(2) The rate of advance of meters over a test period shall be obtained by reading the electro-mechanical register or electronic display on or connected to meters and by monitoring the rotation of the disc or pulse output of meters.

(3) For any test load applied to the meters under test, the load applied to a working standard integrating meter shall not be less than 25% or more than 125% of its full load rating.

(4) For a working standard wattmeter, the applied load shall not be less than 40% of its full scale or range reading.

Methods of test

Method A test

4.—(1) A long period dial test where the advance of a kWh display, which is part of or connected to a meter under test, is compared with the advance of a precision kilowatt-hour meter.

Method B test

(2) A short period test where the rate of advance of a meter under test is compared to the rate of advance of a precision kilowatt-hour meter.

Method C test

(3) A short period test where the calculated rate of advance of a meter under test is compared to the actual rate of advance for constant power conditions over a specified test period.

Conditions for testing

5.—(1) The tests shall be carried out in accordance with Table 1 below.

Ambient temperature

(2) Tests may be carried out at a temperature outside the temperature range given in Table 1, but within the range 15°C to 30°C, providing a correction is made in relation to the reference temperature by using the mean temperature co-efficient of the meters under test and of the working standard meter(s) used for determining meter errors.

Meter position

(3) Meter position requirements given in Table 1 applies to induction meters only. Tolerance applies to vertical wall on which the meter base is mounted and a horizontal reference line or edge on the meter e.g. lower edge of the terminal block.

Voltage and current supplies for polyphase meters

(4) (a) The order of the phases shall correspond to the direct sequence shown on the connection diagram.

(b) The voltages shall be balanced so that the voltage between any line and neutral or between any two lines shall not differ by more than 1.5% from the mean of the corresponding voltages.

(c) The currents shall be balanced so that the currents in the conductors shall not differ by more than 2.5% from the mean of these currents.

(d) The phase displacement between the current and corresponding phase to neutral voltage shall not differ from other current and voltage phase displacements by more than 3° at any power factor under any specified load conditions.

External magnetic induction

(5) The test given in Table 1 in respect of external magnetic induction shall be carried out during commissioning or after major modification or refurbishing of a meter testing system. The test consists of determining the errors at 0.1Ib unity power factor with the meters normally connected and then determining the errors for:

(a) single phase meters after reversing both current and voltage connections, for which half the difference between the two errors is the value of the variation.

(b) polyphase meters by making two additional measurements after each of the connections to the current circuits and to the voltage circuits are changed over 120° but with the phase sequence unaltered, for which the greatest difference between each error determined and the mean of the three errors is the value of the variation.

Dial tests

(6) Where all the errors of meters are determined by Method B or Method C test, an additional test in accordance with Method A shall be carried out. The Method A test shall be carried out at one of the loads used for the Method B or Method C test. The error obtained by the Method A test shall not differ from the error obtained by the Method B or Method C test, at the same load value as the Method A test, by more than 0.6%.

Duration of test

(7) For any of the above methods of test, the duration of the test shall continue until the error of meters to be calculated within a tolerance of not greater than ±0.2%.

Conditions for mixing methods of test

(8) Method A tests may be used for intermediate and high loads, at unity and 0.5 power factor, and Method B or Method C tests for the low load, provided that an additional Method B or Method C test is carried out at one of the test load values used for the Method A tests.

Test loads

6.—(1) Every meter shall be tested at each of the loads specified in Table 2.

(2) The ratio accuracy shall be determined for voltage transformers intended for use with meters but are not tested with a meter.

(3) Current transformers intended for use with meters but not tested with a meter shall be tested from 5% to 100% of rated current.

Multi-rate meters

Induction meters

7.—(1) (a) All multi-rate induction meters shall be tested on one rate in accordance with paragraphs 5 and 6. In addition, a further test shall be carried out on each and every other rate at a low load using Method A, Method B or Method C tests and at a high load using Method A test.

(b) The difference in errors measured on one rate shall not differ from the errors measured on any other rate, for the same load conditions, by more than 1%.

(c) Every rate change mechanism shall be tested for correct operation with an applied voltage of 90% of the marked voltage of the meter.

Static meters

(2) (a) All multi-rate static meters shall be tested on one rate in accordance with paragraphs 5 and 6.

(b) On multi-rate static meters, where the total units is the sum of all the rates, a further test shall be carried out on each and every other rate at a high load using Method A.

(c) On multi-rate static meters, where the total units is recorded on one register, only this register is required to be tested in accordance with paragraphs 5 and 6.

Polyphase meters

8.—(1) Every polyphase meter shall be tested on a circuit having a phase relationship for which the meters were designed. However, three phase, four wire polyphase meters may be tested without current in the neutral conductor.

(2) When testing polyphase meters, it is permissible to use, as appropriate, 3 single phase or 2 single phase working standard precision kilowatt-hour meters or working standard watthour meters instead of polyphase working standard instruments.

Margins of error

9.—(1) The maximum error permitted for single and polyphase whole current meters and for single and polyphase transformer operated meters, when tested with transformers connected, shall not exceed plus or minus 1.9% for tests 1, 2, 3 and 4 given in Table 2.

(2) The maximum error permitted for both single phase and polyphase transformer operated meters, when tested without transformers connected, shall not exceed plus or minus 1.4% for tests 1, 2, 3 and 4 given in Table 2.

(3) For polyphase whole current and transformer operated meters, when tested with transformers connected, the maximum error shall not exceed plus 2% or minus 3% for tests 5 and 6 given in Table 2.

(4) For polyphase whole current and transformer operated meters, when tested without transformers connected, the maximum error shall not exceed plus 1.5% or minus 2.5% for tests 5 and 6 given in Table 2.

(5) Where current and voltage transformers, which are intended to be used with meters, are not tested connected to a meter then the total error of the transformers at any load point throughout

the rated range shall not exceed 0.5%; unless by matching transformers to meters enables the total error of meter and transformers to meet the requirements of paragraphs 9(1), 9(2), 9(3) and 9(4) above.

TABLE 1

Influence quantities	*Reference value*	*Tolerance*
Ambient temperature	Reference temperature or, if not indicated, 23°C.	±2°C
Meter position	Vertical	±3°
Voltage	Reference voltage	±1.5%
Frequency	Reference frequency 50Hz	±0.5%
Voltage and current waveform	Sinusoidal form	Distortion factor <5%
External magnetic induction at the reference frequency	Zero	Induction value that does not produce a relative error variation of more than ±0.3%

TABLE 2

Test No. & load	*Power factor*	*Basic/ maximum*	*Test load in terms of marked current* *Maximum continuous*	*Long range*	*Short range*	*Meter type*	*Polyphase meter load*
1 (high)	1	Imax	100%	100%–200% (Note 1)	100%–125% (Note 1)	Single & polyphase	Balanced
2 (intermediate)	1	Ib or 125%Ib	Any load between 25%–75% of the value specified for Test No. 1			Single & polyphase	Balanced
3 (low)	1	5%Ib	1.67% (note 2)	5%	5%	Single & polyphase	Balanced
4 (inductive)	0.5	Ib or Imax	100%	The same value selected for Test No. 1		Single & polyphase	Balanced
5 (element)	1	Ib	100%	The same value selected for Test No. 1		Polyphase	One phase loaded in turn
6 (inductive) (element)	0.5	Ib	100%	The same value selected for Test No. 1		Polyphase	One phase loaded in turn

Note 1 Where a range is given, any value within that inclusive range may be selected.
Note 2 For maximum continuously rated prepayment meters, the low load test value may be twice the value shown.
Note 3 For test no. 4 & 6, the inductive power factor shall be between 0.45 and 0.55 inclusive.

EXPLANATORY NOTE

(This note is not part of these Regulations)

These Regulations set out the procedure for enabling meters used for the purpose of measuring the quantity of electricity supplied to customers to be certified. They continue, with modifications, the provisions relating to certification contained in the Electric Lighting (Clauses) Act 1899, the Electricity Supply (Meters) Act 1936 (c.20) and the Electricity Act 1957 (c.48) (which provisions are repealed on 31st March 1990, the date when these Regulations come into force).

Regulations 1 and 2 provide for the citation, commencement and interpretation of the Regulations. Regulation 3 sets out the circumstances in which a meter is a certified meter.

Regulations 4 and 5 (which introduce Schedule 1) set out the procedure for persons who manufacture or repair meters to be authorised by the Director in relation to the certification procedure, the conditions imposed on an authorisation and the circumstances in which it can be revoked. Regulation 6 provides for persons nominated by authorised manufacturers or repairers to be authorised as examiners by the Director for certification purposes, the conditions imposed on an authorisation and the circumstances in which it can be revoked.

Regulation 7 (which introduces Schedule 2) sets out the procedure to be followed when applying for a meter to be certified. Regulation 8 (which introduces Schedule 3) sets out the procedure for certification of individual meters and regulation 9 the procedure for batch certification.

Regulation 10 provides for the circmstances in which a certification may be revoked. Regulation 11 provides for fees to be payable for applications for certification and regulation 12 sets out transitional provisions for existing meters certified under the earlier legislation, which has been repealed.

Copies of the British Standards referred to in the Regulations may be obtained from the British Standards Institution,

Linford Wood,
Milton Keynes,
MK14 6LE.