SOUTH AUSTRALIA

ELECTRICAL PRODUCTS REGULATIONS, 1990

REGULATIONS UNDER THE ELECTRICAL PRODUCTS ACT, 1988

Electrical Products Regulations, 1990

being

No. 60 of 1990: *Gaz*. 10 May 1990, p. 1306[1]

as varied by

No. 233 of 1990: *Gaz*. 29 November 1990, p. 1645[2]
No. 10 of 1991: *Gaz*. 31 January 1991, p. 308[3]
No. 229 of 1993: *Gaz*. 21 October 1993, p. 1789[4]
No. 141 of 1995: *Gaz*. 29 June 1995, p. 3143[5]

[1] Came into operation 1 June 1990: reg. 2.
[2] Came into operation 1 December 1990: reg. 2.
[3] Came into operation 1 February 1991: reg. 2.
[4] Came into operation (except reg. 3(c)) 21 October 1993: reg. 2(1); reg. 3(c) came into operation 1 May 1994: reg. 2(2).
[5] Came into operation 1 July 1995: reg. 2.

Note: Asterisks indicate repeal or deletion of text. For further explanation see Appendix.

Citation

1. These regulations may be cited as the *Electrical Products Regulations, 1990*.

Commencement

2. Except as otherwise provided, these regulations will come into operation on 1 June, 1990.

Revocation

3. (1) All regulations made under the *Electrical Articles and Materials Act, 1940*, are revoked.

(2) This regulation will take effect on 1 December 1990.

Interpretation

4. In these regulations—

"the Act" means the *Electrical Products Act, 1988*:

"Australian Standard" means a standard published by the Standards Association of Australia as for the time being in force, and "AS" followed by a number means the particular Australian Standard as so designated by the Standards Association of Australia:

"comparative energy consumption", in relation to a domestic appliance, means the number of kilowatt hours per year used by the appliance when tested to the applicable Australian Standard:

"energy efficiency", in relation to a domestic appliance, means the comparative energy consumption and the energy rating of the appliance:

"energy rating", in relation to a domestic appliance, means the energy rating of the appliance determined in accordance with Part C of schedule 3:

"prescribed class" means—

(a) in relation to electrical products—a class of electrical products for the time being declared by the Governor by proclamation under section 4 of the Act;

(b) in relation to domestic appliances—a class of domestic appliances for the time being declared by the Governor by proclamation under section 4 of the Act.

Minister may fix fees

4A. The Minister may fix administration or application fees for the purposes of these regulations and may waive or refund any such fee.

Application for authorisation to label electrical products

5. (1) Authorization to label electrical products of a prescribed class for the purposes of section 5(1) of the Act may be granted by the Minister only where the Minister is satisfied—

(a) that the electrical products conform with the safety standards contained in an Australian Standard that applies to the electrical products;

or

(b) if there is no such applicable Australian Standard—that the electrical products conform with such other standards as the Minister determines to be appropriate for the purpose of assessing the safety of the products.

(2) An application for authorisation to label electrical products—

(a) must be made to the Minister in the manner and form required by the Minister; and

(b) must be accompanied by—

(i) a written report from a body approved by the Minister, detailing tests conducted by the body on a sample or samples of the electrical product in respect of compliance with safety standards and the results obtained; and

(ii) one sample of the electrical product (or a sample length of one metre if the electrical product is a flexible cord); and

(iii) certification (in the form required by the Minister) that the electrical products form a regular line of manufacture and that each electrical product in the line accords with the sample tested and the sample provided; and

(c) must be accompanied by the appropriate fee fixed by the Minister.

(3) The Minister may require the applicant to provide further information or a further sample of the product, or both, before proceeding to determine the application.

(4) Notwithstanding the other provisions of this regulation, the Minister may, on an application under subregulation (2) by a person for an authorization to label electrical products in respect of which such an authorization has been previously granted to another person—

(a) dispense with the requirement for testing of the product;

and

(b) grant an authorization (and issue a certificate of authorization) to the applicant in the same terms and for the balance of the period for which the previous authorization was granted.

Application for authorisation for energy efficiency labels for domestic appliances

6. (1) An application for authorization to label domestic appliances of a prescribed class so as to indicate their energy efficiency for the purposes of section 5(2) of the Act must—

(a) be made to the Minister in writing in a form approved by the Minister; and

(b) be accompanied by the appropriate fee fixed by the Minister; and

(c) be accompanied by a written report from a body approved by the Minister, detailing tests conducted by the body on a sample or samples of the domestic appliance in respect of the energy efficiency of the appliance and the results obtained; and

(d) be accompanied by a sample of the label for which authorization is sought, designed in accordance with the form set out in Part B of schedule 3, showing the energy rating and comparative energy consumption of the domestic appliances as indicated by the results of the tests referred to in paragraph *(c)*.

(2) The application must specify whether the applicant seeks authorization in respect of—

(a) domestic appliances of one type only;

or

(b) domestic appliances of different types that are distinguishable by having different models or catalogue numbers or other distinguishing features but that have the same energy rating and comparative energy consumption.

(3) The Minister may require the applicant to provide further information or a sample of the appliance, or both, before proceeding to determine the application.

(4) Notwithstanding the other provisions of this regulation, the Minister may, on an application under subregulation (1) by a person for an authorization to label domestic appliances in respect of which such an authorization has been previously granted to another person—

(a) dispense with the requirement for testing of the appliance;

and

(b) grant an authorization to the applicant in the same terms as the previous authorization.

Testing of electrical products and domestic appliances

7. (1) The Minister may, in relation to an application under regulation 5 or 6—

(a) determine what bodies are approved for the purposes of conducting tests of the electrical products to which the application relates;

(b) determine that a test report submitted by the applicant is inadequate for the purposes of determining the application.

(2) If the Minister determines that a test report submitted by an applicant is inadequate, the Minister may—

(a) refuse the application and refund the application fee; or

(b) postpone the determination of the application until the Minister receives a test report that is, in the opinion of the Minister, adequate; or

(c) cause the electrical product to be tested and charge the applicant the costs incurred by the Minister in doing so.

(3) After determining an application under regulation 5 or 6, the Minister must notify the applicant in writing to collect any samples and other materials provided to the Minister.

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(7) The Minister may, at any time, cause tests to be carried out on an electrical product that—

(a) is labelled in pursuance of the Act and these regulations or an authority conferred by a corresponding law;

and

(b) is offered or exposed for sale by a trader.

(8) If an electrical product tested under subregulation (7)—

(a) does not conform with the applicable Australian Standard or other standards by reference to which it was authorised to be labelled under the Act or a corresponding law; or

(b) in the case of a domestic appliance—has an energy rating that is less, or a comparative energy consumption that is more, than the respective values shown on the label affixed to the appliance,

the Minister may, by application in proceedings for an offence against the Act or these regulations or by action in a court of competent jurisdiction, recover from the trader by whom the product was offered or exposed for sale the costs incurred in purchasing the product and having it tested.

Labelling of electrical products

8. (1) Where the Minister grants an authorization to label on an application under regulation 5, the Minister must issue to the applicant a certificate of authorization in a form determined by the Minister.

(2) The certificate of authorization must provide and has the effect that the person to whom it is issued is authorized by the Minister to affix to electrical products of a class defined in the certificate labels on which the letter "S" appears followed by a number allocated by the Minister for electrical products of that class.

(3) Subject to this regulation, any such label must be affixed to a conspicuous place on the exterior of the electrical product.

(4) The Minister may, if the applicant satisfies the Minister that it is not reasonably practicable to comply with subregulation (3), authorize the applicant—

(a) to affix the label to a container in which the electrical product is sold;

or

(b) to use the registered trade mark of the product as the label,

and, in either case, the Minister must amend the certificate of authorization so that it records the method of labelling so authorized.

(5) Where a certificate of authorization is lost, stolen, destroyed, mutilated or defaced, the Minister may, if satisfied that it is necessary to issue a duplicate certificate of authorization, and on payment of the appropriate fee fixed by the Minister, issue a duplicate certificate of authorization.

Register of authorised electrical products

9. (1) The Minister is to keep a register recording in relation to each authorization to label granted on an application under regulation 5—

(a) relevant details of the applicant;

(b) the definition of the class of electrical products to which the authorization relates;

(c) the number allocated by the Minister that is to appear on the label for electrical products of that class;

and

(d) such other information as the Minister considers relevant.

(2) The register may be inspected, on payment of the appropriate fee fixed by the Minister, at an office designated by the Minister.

(3) A person may obtain a certified copy or a photocopy of an entry in the register on payment of the appropriate fee fixed by the Minister.

Labelling of domestic appliances

10. (1) Where the Minister grants an authorization to label on an application under regulation 6, the applicant is authorized to affix to domestic appliances of a class defined by the Minister labels designed in the form set out in Part B of schedule 3 showing—

(a) the energy rating and comparative energy consumption determined by the Minister as applying to domestic appliances of that class;

and

(b) the trade name and model designation of the appliances.

(2) Any such label must be affixed to a conspicuous place on the exterior of the domestic appliance.

Register of authorised domestic appliances

11. (1) The Minister is to keep a register recording in relation to each authorization to label granted on an application under regulation 6—

(a) relevant details of the applicant;

(b) the definition of the class of domestic appliances to which the authorization relates;

(c) a copy of the authorized label for domestic appliances of that class;

and

(d) such other information as the Minister considers relevant.

(2) The register may be inspected, on payment of the appropriate fee fixed by the Minister, at an office designated by the Minister.

(3) A person may obtain a certified copy or a photocopy of an entry in the register on payment of the appropriate fee fixed by the Minister.

Modifications to products

12. (1) An authorisation to label an electrical product given under these regulations does not authorise the labelling of an electrical product that constitutes a modified version of the product (as tested for the purposes of the authorisation) unless the modifications have been approved in writing by the Minister.

(2) The Minister may—

(a) grant approval for the purposes of subregulation (1) if satisfied that the modifications do not affect or significantly affect any characteristics of the product that were relevant to the determination of the application for authorization to label;

or

(b) require that a new application for authorization to label be made under regulation 5 or 6, or both, as the case may require, in respect of the product in its modified form.

(3) The Minister may, waive any of the requirements of regulation 5 or 6 (including the whole or part of any fee payable under that regulation) in relation to any application for authorization to label made in respect of an electrical product that constitutes a modified version of a product for which an authorization to label had been previously granted.

Changes in particulars to be notified to Minister

13. (1) Where the person granted an authorization to label on an application under regulation 5 or 6 changes his or her name or address, the person must notify the Minister in writing of the change within 21 days of the change occurring.

(2) Where there is any change to the trade name or model designation of domestic appliances to which an authorization to label granted on an application under regulation 6 relates—

(a) the person granted the authorization must notify the Minister in writing of the change within 21 days of the change occurring;

and

(b) the Minister may, on application in writing by that person and payment of the appropriate fee fixed by the Minister, authorize variation of the label to be affixed to the appliances so that it reflects that change.

(3) A person who fails to give notice to the Minister as required by subregulation (1) or (2) is guilty of an offence.

Penalty: $500.

Duration and cancellation of authorisation

14. (1) Subject to this regulation, an authorization to label granted on an application under regulation 5 continues in force for the period of five years from the date on which it is granted.

(2) The Minister may, on application in writing made before the expiry of an authorization referred to in subregulation (1) by the person granted such an authorization, extend the period for which the authorization is to remain in force.

(3) An authorization to label granted on an application under regulation 6 continues in force until cancelled.

(4) Where the Minister prohibits the sale or use (or both sale and use) of electrical products pursuant to section 6 of the Act—

(a) the Minister must cancel any authorization or authorizations to label that relate to those products;

and

(b) the person granted any such authorization must, within 21 days after receiving from the Minister written notice of the cancellation, return to the Minister any certificate of authorization held by the person in relation to those products.

(5) A person who fails to comply with subregulation (4)*(b)* is guilty of an offence.

Penalty: $500.

(6) The Minister may, by notice in writing to the person granted an authorization to label on an application under regulation 6, cancel the authorization if the Minister is satisfied that domestic appliances to which the authorization relates that are offered or exposed for sale by any trader do not meet the energy rating or comparative energy consumption shown on the authorized label for those appliances.

(7) The Minister must, before cancelling an authorization pursuant to subregulation (6), give the person granted the authorization a reasonable opportunity to show cause why the authorization should not be cancelled.

(8) Cancellation of an authorization pursuant to subregulation (6) has effect on a date specified in the notice which must be a date not less than 21 days from the date of service of the notice.

Examination and purchase of products by authorized persons

15. (1) If requested by an authorized person, a trader must—

(a) make all electrical products of a class specified by the authorized person that are in the trader's possession available for examination by the authorized person;

(b) inform the authorized person of the date when the trader obtained an electrical product;

(c) inform the authorized person of the person from whom the trader obtained an electrical product;

(d) produce to the authorized person all vouchers, invoices and accounts in respect of an electrical product that are in the trader's possession.

Penalty: $1,,000.

(2) Any trader who refuses to sell to an authorized person an electrical product that the authorized person is seeking to purchase, for the same price as the product is sold to other purchasers (or, if this cannot be identified, for a fair price offered by the authorized person), is guilty of an offence.

Penalty: $1,,000.

Offences

16. (1) A person must not affix a label to an electrical product for the purposes of the Act except as authorized by the Minister and in accordance with these regulations.

Penalty: $1,,000.

(2) A person must not, while an electrical product is being offered or exposed for sale by a trader, alter, interfere with or obscure from view any label affixed to the product for the purposes of the Act or a corresponding law.

Penalty: $1,,000.

(3) A trader must not offer or expose an electrical product for sale if a label affixed to the product for the purposes of the Act or a corresponding law is not readily legible by any purchaser or prospective purchaser.

Penalty: $1,,000.

(4) A trader must not display on or near a domestic appliance that is being offered or exposed for sale by the trader any sign or notice that—

(a) contains information conflicting with the information contained in a label affixed to the domestic appliance for the purposes of the Act or a corresponding law;

or

(b) is likely to mislead a purchaser or prospective purchaser as to matters to which information contained in any such label relates.

Penalty: $1,,000.

(5) A person must not make any statement that is false or misleading in a material particular in furnishing any information or preparing any test report in or for the purposes of an application under these regulations.

Penalty: $1,,000.

(6) A person who obstructs, hinders or interferes with an authorized person carrying out duties pursuant to the Act or these regulations is guilty of an offence.

Penalty: $1,,000.

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11.

SCHEDULE 3

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PART B

Form of label for domestic appliances class 1, 2, OR 3

[Label appears in
Gaz. 10.5.90, p. 1306]

Form of label for domestic appliances class 4

(a) an example of a label for a "cooling only" air conditioner

[Label appears in
Gaz. 31.1.91, p. 308]

(b) an example of a label for a reverse cycle air conditioner

[Label appears in
Gas. 31.1.91, p. 308]

(c) an example of a label for a reverse cycle air conditioner that carries a warning related to using a "boost" heating element

[Label appears in
Gaz. 31.1.91, p. 308]

Form of label for domestic appliances class 5

[Label appears in
Gaz. 31.1.91. p. 308]

Form of label for domestic appliances class 6

[Label appears in
Gaz. 31.1.91, p. 308]

Form of label for domestic appliances class 7

[Label appears in
Gaz. 31.1.91, p. 308]

SCHEDULE 3

PART C

CALCULATION OF ENERGY RATINGS, EFFICIENCY RATINGS AND STAR RATINGS

Calculation 1

Class 1, 2, 3 of Domestic Appliances

The energy rating is to be derived from formula (1) below, and the result rounded off to one decimal place. The formula includes the following adjustment factors:

(i) Defrost Energy Adjustment Factors, a and b

These factors are applied to compensate for the fact that defrost energy is included in the AS2575.2 test results for refrigerators incorporating frost free freezer compartments and auto defrost (frost free and cyclic defrost) fresh food compartments, whereas defrost energy is not included in the test results for refrigerators incorporating manual defrost freezer or fresh food compartments.

(ii) Freezer Volume Adjustment Factor, d

This factor is applied to freezer volume, so that total refrigerator gross volume can be expressed in terms of a fresh food compartment equivalent. The application of this adjustment factor, recognises the different tasks performed by the fresh food and freezer compartments, and weights the freezer volume accordingly.

The Energy Rating Formula is—

$$\text{Energy rating (Wh/litre/24 hours)} = \frac{W + (Vf \times a) + (Vff \times b)}{Vff + (Vf \times d)} \quad (1)$$

Where W = Total energy consumption as determined in accordance with Appendix B of AS2575.2 testing in Watt hours per 24 hours (Wh/24 hrs).

Vf = Frozen food compartment rated gross volume as per AS1430.

Vff = Fresh food compartment rated gross volume as per AS1430.

a = Freezer defrost energy adjustment factor. (See Table 1 below).

b = Fresh food compartment energy adjustment factor. (See Table below).

d = Freezer Volume adjustment factor = $\frac{32° - Tav}{32° - Tff}$ (See Table 1 below).

Tav = Freezer or other "specialized" food compartment temperature in degrees celsius in accordance with AS2575.2.

Tff = Fresh food compartment temperature in degrees celsius.

Adjustment factors for the various AS1430 classes of refrigerators and freezers are presented in Table 1.

Table 1—Adjustment Factors

AS 1430 Class	a (Wh/*l*/24hr)	b (Wh/*l*/24hr)	Tav (°C)	Tff (°C)	d
1	0	0	N/A	3	0
2	0	0.1	-2	3	1.2
3	0	0.15	-9	3	1.4
4	0.2	0	-15	3	1.6
5	0	0	-15	3	1.6
6	0.2	0	-15	N/A	1.6
7	0	0	-15	N/A	1.6

Example—Class 4 Refrigerator/Freezer

W = 1020 kWh/yr
= 2795 Wh/24hr
Vf = 94 *l*
Vff = 240 *l*
a = 0.2 Wh/*l*/24hr
b = 0
d = 1.6
Vf × a = 94 × 0.2 = 18.8 Wh/24hr
Vff × b = 240 × 0 = 0
Vf × d = 94 × 1.6 = 150.4 *l*

$$\text{Energy Rating} = \frac{W + (Vf \times a) + (Vff \times b)}{Vff + (Vf \times d)}$$

$$= \frac{2\ 795 + 18.8 + 0}{240 + 150.4}$$

= 7.2 Wh/*l*/24hr

METHOD OF REPRESENTING ENERGY RATING ON LABELS

(i) The Continuous Rating Band

The digits (1 to 5) shown on the rating component of the label do not represent directly the Wh/litre/24 hours figure calculated from the formula in appendix 1 of the Australian Standard 2575.2. When graphing the Wh/litre/24 hours figure in a continuous manner, the following arithmetic scale is to be used:

Number Shown on Dial—Equivalent Wh/litre/24 hours

1 = 10 Wh/l/24hrs
2 = 8.5
3 = 7.0
4 = 5.5
5 = 4.0
6* = 2.5

*(Although 6 is not actually shown on the dial, its position is the top of the box containing the "Y" in ENERGY).

Results rounded to the nearest one decimal place are graphed by arithmetic interpolation between the figures.

(ii) Allocation of Stars

Star allocation is to be based on the adjusted Wh/litre/day energy consumption as calculated from formula 1 in this schedule and made in the following way:

less than or equal to 2.5 Wh/litre/day—	6 Stars spaced evenly across the dial
2.6 to 4.0 Wh/litre/day—	5 Stars placed evenly up to the pointer 5
4.1 to 5.5 Wh/litre/day—	4 Stars placed evenly up to the pointer 4
5.6 to 7.0 Wh/litre/day—	3 Stars placed evenly up to the pointer 3
7.1 to 8.5 Wh/litre/day—	2 Stars placed evenly up to the pointer 2
Greater than or equal to 8.6 Wh/litre/day—	1 Star placed evenly up to the pointer 1

Note that although the red band is a continuous scale, stars only appear once the threshold Wh/litre/day ratings are reached.

Calculation 2

Class 4 of Domestic Appliances: Refrigerative air conditioners

The Refrigerative air conditioner must be tested in accordance with AS 1861.1.

Cooling

Energy Efficiency Rating = (CCOP × 5) - 8.5

Where CCOP = the cooling co-efficient of performance

Energy Efficiency Rating	Star Rating (blue band)
Less than 2.00	1
2.00-2.99	2
3.00-3.99	3
4.00-4.99	4
5.00-5.99	5
Greater than or equal to 6.00	6

Heating

Energy Efficiency Rating = (HCOP × 5) - 9.5

Where HCOP = the heating co-efficient of performance

Energy Efficiency Rating	Star Rating (red band)
Less than 2.00	1
2.00-2.99	2
3.00-3.99	3
4.00-4.99	4
5.00-5.99	5
Greater than or equal to 6.00	6

Calculation 3

Class 5 of Domestic Appliances: Dishwashers

The dishwasher must be tested in accordance with AS 2007; at least 3 test runs must be conducted and the total energy consumption of each run averaged.

The result Et = Average Test Energy

Energy consumption rate per year is based on one operation of the appliance per day.

Ea = Energy consumption rate = Et × 365

Energy consumption rate per place setting, (EP), is thus:

EP = Ea/Np

where Np is the number of place settings.

The number of stars the determined energy efficiency rating represents is as follows:

Energy Efficiency Rating = (EP × (-0.1)) + 8

Energy Efficiency Rating	Star Rating
Less than 2.00	1
2.00-2.99	2
3.00-3.99	3
4.00-4.99	4
5.00-5.99	5
Greater or equal to 6.00	6

*Example (refer to applicable label in Schedule 3 Part B)

Energy consumption rate = 410 kWh/year

No. of place settings = 12

$EP = \frac{410}{12} = 34.2$

Energy Efficiency Rating = (34.2 × (-0.1)) + 8
= 4.58

Star Rating = 4

Note that the red band on the label extends to 4.58. Only the four complete stars are shown.

Calculation 4

Class 6 of Domestic Appliances: Clothes Dryers

The clothes dryer must be tested in accordance with AS 2442.

A ENERGY EFFICIENCY RATING

The energy efficiency rating is represented on the label as a continuous red band with a minimum energy efficiency rating of one.

Energy efficiency rating = $8(1.5 - E_x)$ [this should read E_s]

Where E_s is the specific energy consumption of that rotary clothes dryer.

Specific energy consumption $E_s = F_f(E_t/m_r)$ in kWh/kg of water removed.

where E_t = total energy consumption at the end of the drying cycle in kilowatt hours.

m_r = mass of moisture removed from clothes in kilograms.

F_f = the field use factor. It accounts for the over drying of clothes and is equal to 1.1 for timer/manual controlled clothes dryers or 1.0 for automatic dryness controlled clothes dryers.

(Note: E_t and m_r used above are the *average* of the total energy consumption and mass of moisture removed, calculated in accordance with Schedule 4.)

Example: A 5 kg clothes dryer controlled by a timer consumes a total of 4.21 kWh of electrical energy and removes 4.41 kg of water.

$E_s = F_f(E_t/m_r)$
$= 1.1\ (4.21/4.41)$
$= 1.05$ kWh/kg of water removed.

Energy efficiency rating $= 8(1.5 - E_s)$
$= 8(1.5 - 1.05)$
$= 3.60$

B STAR RATING

Energy Efficiency Rating	Star Rating
Less than 2.00	1
2.00-2.99	2
3.00-3.99	3
4.00-4.99	4
5.00-5.99	5
greater than or equal to 6.00	6

With the example given in section A, the red band extends to 3.60 with three complete stars being shown.

C ENERGY CONSUMPTION RATE

The energy consumption rate represents the energy consumed by the clothes dryer per year (150 full loads per year). It appears in the box in the centre of the label.

Energy consumption rate = $150 \times F_f \times E_t$ in kWh per year

Where E_t is the total consumption at the end of the drying cycle.

The example for the clothes dryer shown before gives:

Energy consumption rate $= 150 \times 1.1 \times E_t$
$= 150 \times 1.1 \times 4.21$
$= 694$ kWh per year

Calculation 5

Class 7 of Domestic Appliances: Washing Machines

The washing machine must be tested in accordance with AS 2040.

A COMPARATIVE ENERGY CONSUMPTION RATE

The comparative energy consumption rate is determined by multiplying the total energy consumption (E_T) by 365. The total energy consumption is the addition of the following components:

E_e = the electrical energy consumption, as reported in the test report, in kWh

E_h = the energy equivalent of the imported hot water where applicable, and calculated in accordance with the following formula:

$E_h = Q_h (t_h - 20)/860$ in kWh

where Qh is the cycle's hot water consumption in litres and t_h is the hot water supply temperature in °C.

E_c = the energy equivalent of the imported cold water, where the water supply temperature differs from 20°C and calculated in accordance with the following formula:

$E_c = Q_c (t_c - 20)/860$ in kWh

where Q_c is the cycles cold water consumption in litres and t_c the cold water supply temperature in °C.

The total energy consumption formula is:

$E_T = E_e + E_h + E_c$ in kWh.

$$= E_e + \frac{Q_h (t_h - 20)}{860} + \frac{Q_c (t_c - 20)}{860}$$

The Comparative Energy Consumption is equal to:

$E_T \times 365$

where E_T is the total energy consumption of that clothes washing machine in kWh.

B ENERGY EFFICIENCY RATING

The energy efficiency rating is calculated from the clothes washing machine specific energy consumption (e_s).

The specific energy consumption (e_s) is equal to:

$e_s = (E_T + E_m)/md$ in kWh/kg.

where E_T = total energy consumption is calculated in Part Q, in kWh.

m_d is the mass of the bone dry test load in kg.

E_m = the energy equivalent of moisture not removed from the test load at the end of the final spin dry cycle and calculated in accordance with the formula below:

$E_m = F_s M_s$ in kWh

where F_s = 0.21 and is an empirical factor accounting for the energy required to remove the remaining moisture by evaporation and the annual use of clothes drying machines, in kWh/kg.

M_s is the remaining mass of water in the test load after the end of the final spin dry cycle in kg.

The energy efficiency rating is represented by the red band in the dial part of the energy rating label.

energy efficiency rating = 6.9 (1-e_s)

where e_s is the specific energy consumption as calculated above in kWh/kg.

Where a clothes washing machine also incorporates a cycle to dry the clothes by evaporation and this cycle can be chosen without the need to remove the clothes, then the specific energy consumption will be multiplied by a factor of:

$$\frac{\text{(Rated capacity of washing section)}}{\text{(Rated capacity of clothes drying section)}}$$

This modified specific energy consumption will be used for all calculations of energy efficiency rating and star rating.

C STAR RATING

Energy Efficiency Rating	Star Rating
less than 2.00	1
2.00-2.99	2
3.00-3.99	3
4.00-4.99	4
5.00-5.99	5
greater or equal to 6	6

Example: A 5.5 kg rated automatic clothes washing machine has the following averaged results after completing a test run on each of the three machines:

M_s = 3.92 kg
E_e = 0.15 kWh
E_h = 1.63 kWh
E_c = 0 kWh
E_m = 0.21 × 3.92
= 0.82 kWh
m_d = 5.09 kg

A Total Energy Consumption is

E_T = 0.15 + 1.63
= 1.78 kWh

The comparative energy consumption is 1.78 × 365
= 650 kWh per year.

B Energy Efficiency Rating

Specific energy consumption is

e_s = $(E_T + E_m)/m_d$
= 1.78 + 0.82/5.09
= 0.51 kWh/kg

Energy Efficiency Rating is

Rating = 6.9 (1-e_s)
= 6.9 (0.49)
= 3.37

C This clothes washing machine will receive three complete stars with the red band extending to 3.37 on the dial.

SCHEDULE 4

Methods, Test Reports and Minimum Performance Requirements: Class 6 of Domestic Appliances: Clothes Dryers

METHODS FOR DETERMINATION OF MOISTURE REMOVAL AND ENERGY CONSUMPTION

This part of the schedule sets out three methods for the determination of moisture removal and energy consumption which replace Appendix B and C of AS 2442. These methods are consistent with those stated in that standard except for the following primary differences:

(1) the moisture in the load is required to be reduced to 6 ± 1 per cent and;

(2) rotary clothes dryers controlled by automatic dryness controls will be operated until the drying cycle automatically terminates.

For rotary clothes dryers controlled by timers the following methods may be used for the determination of moisture removal and energy consumption:

(1) method A;

or

(2) method B, if platform scales of sufficient accuracy are available (± 10g).

For rotary clothes dryers controlled by automatic dryness controls, method C will be used for the determination of moisture removal and energy consumption.

METHOD A

Determination of Moisture Removal and Energy Consumption

A1 SCOPE.

This is the preferred method for evaluating the performance of a household rotary clothes dryer in removing moisture from a specified damp load to reach a specified dryness. In particular it sets out a method of calculating the specific energy consumption (E_s) in kilowatt hours per kilogram of moisture removed.

(Note: Where platform scales of sufficient accuracy are available some test laboratories may find it more convenient to use the test method B as an alternative to that described in paragraph A4.2).

A2 EQUIPMENT.

A2.1 Description.

The following equipment is required:

(a) scales or balance;

(b) platform scale which can be locked out of balance (optional) (see paragraph A4.2.2);

(c) stabilised voltage supply, instruments for measuring elapsed time, temperature, relative humidity and electrical instruments including a watt hour meter.

A2.2 Accuracy of instruments.

Measuring instruments must have an accuracy within the limits stated below:

Instrument	Accuracy
Mass	
(a) scales or balance	± 5g
(b) platform scales	± 10g
wet and dry bulb temperature	± 0.5°C

Electrical measurements—as specified for Class 0.5 instruments in AS 1024 or AS 1042.

A3 METHOD OF LOADING.

A standard damp load, prepared in accordance with paragraph A3 or Appendix A of the specifications, must be loaded into the dryer in accordance with the manufacturer's instructions. If no instructions are given, the garments must be shaken individually and loaded loosely.

A4 PROCEDURE.

A4.1 Operation of dryer.

A4.1.1 Dryers controlled by timers.

For dryers controlled by timers the dryer must be operated at maximum temperature setting, with the timer set at maximum time until the moisture in the load has been reduced to 6 ± 1 per cent.

The timer may be reset, if necessary, to allow the required moisture content to be achieved; the number of resets must be recorded. The dryer must not be operated into any cool-down period.

A4.2 Preferred test method (method B is an alternative method).

A4.2.1 Principle of test method.

The amount of energy required to reduce the standard damp load to 6 ± 1 per cent moisture content is determined by means of a trial run or from experience.

Test runs are then carried out, terminating when the energy determined in the trial run has been consumed and the percentage moisture content of the load is then calculated.

A total of three runs is required (not necessarily consecutive) in which the final moisture content is determined as being within 6 ± 1 per cent.

A4.2.2 Trial run.

A suitable procedure for a trial run is as follows:

(a) place the dryer on a platform scale with all power and recording leads connected and record the mass of the dryer;

(b) load the dryer in accordance with paragraph A3;

(c) record the combined mass of the dryer and the clothes load, the initial watt hour meter reading (in kilowatt hours) and the time, lock the platform scale and start the dryer;

(d) stop the dryer twice at about 30 minute intervals, unlock the scale, quickly record the combined mass, the watt hour meter reading and the time, then restart the dryer;

(e) calculate the percentage moisture content of the load for these two readings and plot them on a graph against energy consumption (a typical graph is illustrated in fig. A1, points A and B being the readings taken—extrapolate the curve AB to obtain a figure of 6 per cent moisture content (point C on fig. A1) and estimate the amount of energy required to obtain this, e.g. quantity X on fig. A1);

(f) stop the dryer finally when the energy figure estimated from the graph is reached, e.g. quantity X on fig. A1 and record the combined mass, the watt hour meter reading and the time;

(Note: Termination on a time basis is also permissible (see paragraph A4.2.3*(c)*.))

(g) remove the load from the dryer and confirm the net mass of the load on the scale or balance to within 5g;

(h) calculate the percentage moisture content of the load and plot on the graph, e.g. point D of fig. A1. If the value obtained is outside 6 ± 1 per cent, extrapolate the curve ABD in order to obtain the estimated value of energy consumption to give a moisture content of 6 per cent, e.g. point E and quantity Y on fig. A1.

[Graph appears in
Gaz. 31.1.91, p. 308]

LEGEND:

A and B - points plotted from first and second reading
C - extrapolation of curve AB for 6 per cent moisture content
D - actual moisture content at end of trial run
E - extrapolation of curve ABD for 6 per cent moisture content
X - estimated energy consumption to reach point C
Y - estimated energy consumption to reach point E

Fig. A1. TYPICAL GRAPH TO ESTIMATE AMOUNT OF ENERGY REQUIRED TO OBTAIN MOISTURE CONTENT OF 6 ± 1 per cent

A4.2.3 Test run.

For the test run the procedure, which is repeated three times, must be as follows:

(a) with the dryer at room temperature load in accordance with paragraph A3;

(b) record the mass of the clothes load, the initial watt hour meter reading and the time and start the dryer;

(c) stop the dryer when the energy consumption determined in step *(h)* of paragraph A4.2.2 has been reached, e.g. quantity Y on fig. A1 and record the watt hour meter reading and the time;

(Note: Alternatively, an energy consumption or a drying time determined from experience may be used to terminate the test run, provided that the final moisture content is within 6 ± 1 per cent.)

(d) remove the load from the dryer and determine with minimum delay the net mass of the load on the balance or scales to within 5 g;

(e) calculate the percentage moisture content of the load. (If in any run the moisture content is outside 6 ± 1 per cent, the run must be rejected.)

A5 DATA RECORDING AND ANALYSIS.

A5.1 Recording data.

The following data must be recorded for each run:

(a) mass of clothes load in bone dry condition (m_d) in kilograms;

(b) mass of damp clothes load (m_w) in kilograms;

(c) mass of clothes load at the end of drying cycle (m_f) in kilograms;

(d) total energy consumption at the end of drying cycle (E_t) in kilowatt hours;

(e) the drying time duration (T);

(f) laboratory temperature, in degrees Celsius, and relative humidity, per cent;

(g) number of resets of timer to achieve required moisture content.

A5.2 Calculations for each test run.

The data in table A1 must be calculated for each test run made in accordance with paragraph A4.2.3.

A5.3 Calculations for three test runs.

The average values for the three test runs must be calculated for:

(a) the specific energy consumption (E_s), in kilowatt hours per kilogram of moisture removed;

(b) the final percentage moisture content of the load (M_c).

TABLE A1

DATA TO BE CALCULATED

	Data	Unit	Symbol	Formula
(a)	Mass of moisture removed from clothes	kg	m_r	$m_w - m_f$
(b)	Moisture content of clothes at end of drying cycle ...	%	M_c	$100\ (m_f - m_d)/m_d$
(c)	Specific energy consumption required to remove each kilogram of moisture ..	kWh.h/kg	E_s	E_t/m_r

METHOD B

Alternative Method for Determination of Moisture Removal and Energy Consumption

B1 SCOPE.

This section sets out an alternative method to that given in paragraph A4.2 of section A for determination of moisture removal and energy consumption of a rotary clothes dryer. It may be more convenient for some test laboratories, depending on the availability of platform scales of sufficient accuracy (at least ± 10g).

The principal variations from the method A are as follows:

(a) the dryer is subject to brief stoppages during the drying cycle;

(b) the exhaust air temperature is monitored;

(c) the final mass of the clothes load is not determined by separate weighing.

B2 TRIAL RUN.

A trial run is conducted as follows:

(a) place the dryer on the platform scale, with all power and recording leads suitably connected;

(b) determine the mass of the empty dryer and to this value add 106 per cent of the value of the mass of the test load in a bone-dry condition (see A2.4 in A of the specifications)—record this total mass (ms_1);

(c) prepare and load a standard damp load into the dryer in accordance with paragraph A3 of method A;

(d) record the total mass (ms_2) of the dryer plus damp load, the initial watt hour meter reading (in kilowatt hours to the nearest 0.001 kW.h) and the time;

(e) lock the platform scale, start the dryer and record the exhaust air temperature against elapsed drying time;

(Note: It is advantageous to record the exhaust air temperature using a chart recorder with a chart speed of approximately 75 mm/h. If a chart recorder is not used the temperature should be plotted against elapsed drying time as shown in fig. B3.)

(f) the exhaust air temperature graph will start to level off after about 10 min.—during the period that the temperature reading is reasonably level, stop the dryer twice, unlock the platform scale and record the mass of dryer and load (ms_3), kilowatt hour meter reading and times;

(Note: It is important to keep the time taken for these readings to a minimum.)

(g) when the exhaust air temperature begins to rise more rapidly, stop the machine at 5 minute intervals, unlock the platform scale and record mass, kilowatt hours and time until the mass of the dryer plus the load is equal to or less than the mass obtained in *(b)*, i.e. ms_1;

(h) plot the mass of dryer and load, in kilograms, against time, in minutes, as shown on fig. B3 and interpolate from the curve the actual time required to dry the load to a moisture content of 6 per cent;

(i) plot the reading on the energy meter in kilowatt hours, against time, in minutes as shown in fig. B4—from the actual time determined in step *(h)* determine the actual energy consumption required to dry the load to a moisture content of 6 per cent.

B3 TEST RUN.

The procedure for the test run must be as follows:

(a) allow the dryer to cool to ambient temperature and repeat steps *(b)* to *(e)* of paragraph B2;

(b) when the exhaust air temperature begins to rise rapidly, near the end of the cycle, repeat step *(g)* of paragraph B2;

(c) using the graphs plotted in the trial run, paragraph B2, steps *(h)* and *(i)*, determine the actual time (T) and energy consumption (E_t) required to dry the load to a moisture content of 6 per cent;

(d) repeat steps *(a)*, *(b)* and *(c)* twice.

[Graph appears in
Gaz. 31.1.91, p. 308]

Fig. B3 TYPICAL GRAPHS OF MASS OF DRYER AND LOAD AND EXHAUST AIR TEMPERATURE vs ELAPSED DRYING TIME

[Graph appears in
Gaz. 31.1.91, p. 308]

Fig. B4. READING ON KILOWATT HOUR METER vs ELAPSED DRYING TIME

METHOD C

Determination of Moisture Removal and Energy Consumption for Rotary Clothes Dryers Controlled by Automatic Dryness Controls

C1 SCOPE.

This method must be used for the determination of moisture removal and energy consumption of rotary clothes dryers which are automatically terminated by a controller that is other than time based.

The principal variations from method A and method B are as follows:

(a) the dryer is required to be operated until the drying cycle automatically terminates;

and

(b) graphical determination of energy consumption is not required.

C2 EQUIPMENT.

As described in paragraph A2 of method A.

C3 METHOD OF LOADING.

As described in paragraph A3 of method A.

C4 PROCEDURE.

C4.1 Operation of dryer

The dryer must be operated at the maximum temperature setting until the automatic dryness control terminates the drying cycle. If the automatic dryness control allows the user to select degrees of dryness, then the automatic dryness control is to be set at a level recommended by the manufacturer/importer so that the moisture content of the standard damp load is reduced to at least 7 per cent.

The dryer must not be operated into any cool-down period.

C4.2 Test method

Method A or method B may be chosen to determine the moisture removed and energy consumption of the rotary clothes dryer, however, no trial run or stopping of the dryer is required. Hence, there is no need to plot graphs as described in both methods.

Three test runs are then carried out, terminating when the drying cycle automatically terminates and calculating the moisture content of the load.

If 7 per cent moisture level cannot be achieved, then the automatic dryness control must be manually overridden and tested as a time terminated machine using method A or method B. In this case, the determined energy consumption must be calculated according to the procedure outlined in schedule 3 for time terminated machines (i.e. the field use factor $F_f = 1.1$).

C5 DATA RECORDING AND ANALYSIS.

The data recorded and calculations undertaken are to be the same as paragraph A5 of method A. However, the times recorded and calculated to dry the standard load from 100 per cent to the final moisture content will replace 6 per cent moisture content in paragraph A5.1 *(e)*.

APPENDIX

LEGISLATIVE HISTORY

Regulation 4:	definition of "comparative energy consumption" varied by 10, 1991, reg. 3 definition of "prescribed class" varied by 141, 1995, reg. 3(a), (b)
Regulation 4A:	inserted by 141, 1995, reg. 4
Regulation 5(1):	varied by 141, 1995, reg. 5(a)
Regulation 5(2):	varied by 10, 1991, reg. 4; substituted by 141, 1995, reg. 5(b)
Regulation 6(1):	varied by 10, 1991, reg. 5; 141, 1995, reg. 6(a), (b)
Regulation 6(3):	varied by 141, 1995, reg. 6(c)
Regulation 6(4):	varied by 141, 1995, reg. 6(d)
Regulation 7(1):	varied by 141, 1995, reg. 7(a), (b)
Regulation 7(2):	varied by 10, 1991, reg. 6; substituted by 141, 1995, reg. 7(c)
Regulation 7(3):	varied by 141, 1995, reg. 7(d)
Regulation 7(4) - (6):	revoked by 141, 1995, reg. 7(e)
Regulation 7(7):	varied by 141, 1995, reg. 7(f)
Regulation 7(8):	substituted by 141, 1995, reg. 7(g)
Regulation 8(1), (2) and (4):	varied by 141, 1995, reg. 8(a)
Regulation 8(5):	varied by 141, 1995, reg. 8(a), (b)
Regulation 9(1):	varied by 141, 1995, reg. 9(a)
Regulation 9(2) and (3):	substituted by 141, 1995, reg. 9(b)
Regulation 10(1):	varied by 141, 1995, reg. 10
Regulation 11(1):	varied by 141, 1995, reg. 11(a)
Regulation 11(2) and (3):	substituted by 141, 1995, reg. 11(b)
Regulation 12(1):	substituted by 141, 1995, reg. 12(a)
Regulation 12(2):	varied by 141, 1995, reg. 12(b), (c)
Regulation 12(3):	varied by 141, 1995, reg. 12(d)
Regulation 13(1):	varied by 10, 1991, reg. 7(a); 141, 1995, reg. 13(a)
Regulation 13(2):	varied by 10, 1991, reg. 7(b); 141, 1995, reg. 13(a), (b)
Regulation 13(3):	varied by 141, 1995, reg. 13(a)
Regulation 14(2):	varied by 10, 1991, reg. 8; 141, 1995, reg. 14(a)
Regulation 14(4), (6) and (7):	varied by 141, 1995, reg. 14(b)
Regulation 16(1):	varied by 141, 1995, reg. 15
Schedule 1:	varied by 10, 1991, reg. 9; revoked by 141, 1995, reg. 16
Schedule 2:	varied by 233, 1990, reg. 3; 10, 1991, reg. 10; 229, 1993, reg. 3;revoked by 141, 1995, reg. 16
Schedule 3	
Part A:	varied by 10, 1991, reg. 11(a); revoked by 141, 1995, reg. 17
Part B	
Heading:	inserted by 10, 1991, reg. 11(b)
Forms of labels 4 - 7:	inserted by 10, 1991, reg. 11(c) (Sched. 1)
Part C	
Heading:	substituted by 10, 1991, reg. 11(d)
Calculations 2 - 5:	inserted by 10, 1991, reg. 11(e) (Sched. 2)
Schedule 4:	inserted by 10, 1991, reg. 12 (Sched. 3)