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British Standard Specification for
**Safety of household and
similar electrical appliances**

Part 102. Particular requirements
Section 102.5 Dishwashers

(Implementation of CENELEC HD 267 S2)

Sécurité des appareils électrodomestiques et analogues
Partie 102. Règles particulières
Section 102.5 Lave-vaisselle

Sicherheit von Elektrogeräten für den Haushalt und ähnliche Zwecke
Teil 102. Besondere Anforderungen
Abschnitt 102.5 Geschirrspülmaschinen

British Standards Institution

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Foreword

This Section of BS 3456 : Part 102 has been prepared under the direction of the Light Electrical Engineering Standards Committee. It is aligned with the CENELEC * Harmonization Document for dishwashers, HD 257 S2, which in turn is based on IEC † Publication 335-2-5 (1979—Second edition). Its number is directly related to the number of the equivalent Section of the IEC publication.

It is a revision of BS 3456 : Section 2.27 : 1973 and BS 3456 : Section 3.4 : 1979 which are withdrawn in accordance with the CENELEC Internal Regulations.

It gives the particular requirements for dishwashers and is to be read in conjunction with BS 3456 : Part 101 : 1987 'General requirements' which it supplements or modifies. The many references to Part 1 should be read as references to BS 3456 : Part 101 which is the implementation of the CENELEC Harmonization Document for the general requirements, HD 251 S3. In the original IEC text of the particular requirements the precise line numbers in the IEC Part 1 are given. The lines in Part 101 of BS 3456 are not numbered but sufficient information has been included in these particular requirements for the relevant matter in Part 101 to be identified. For ease of production the text of the IEC standard has been used, but it has been modified as described below.

The CENELEC modifications that appear in HD 257 S2 have been included in the text in the appropriate position and are indicated by a single side line in the margin of the page. References are included to items of the original IEC text which are given in appendix X together with the justifications in the CENELEC Harmonization Document for the modifications.

A complete list of all national deviations to the CENELEC Harmonization Document is given in appendix Y.

* CENELEC= European Committee for Electrotechnical Standardization.

† IEC= International Electrotechnical Commission.

In this British Standard the following print types are used to differentiate between requirements, test specifications and explanatory matter.

Requirements: in roman type.

Test specifications: in italic type.

Explanatory matter: in small roman type.

The CENELEC Harmonization Document was approved by the CENELEC Technical Board on 11 September 1984.

Cross-references

International standards	Corresponding British Standards
IEC 335-1 : 1976 HD 251 S3 : 1982	BS 3456 Specification for safety of household and similar electrical appliances Part 101 : 1987 General requirements (Technically equivalent)
ISO 4046-1978	BS 3203 : 1979 Glossary of paper, board, pulp and related terms (Identical)
HD 274 S1-1985	BS 6614 : 1985 Specification for safety devices and water supply connections for washing machines and dishwashers connected to the water supply mains (Technically equivalent)

The Technical Committee has reviewed the specific requirements of IEC 252 to which reference is made in 19.1 and 19.6 and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for IEC 252 is BS 5267 : 1976 'Capacitors for single phase a.c. motors'.

The Technical Committee has reviewed the specific requirements for water level switches of IEC 328 to which reference is made in 24.1 and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for IEC 328 is BS 3955 : 1986 'Specification for electrical controls for household and similar general purposes'.

The Technical Committee has reviewed the specific requirements for place settings and serving pieces of IEC 436 to which reference is made in 2.2.30 and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for IEC 436 is BS 3999 'Methods of measuring the performance of household electrical appliances' : Part 11 : 1972 'Dishwashing machines'.

The Technical Committee has reviewed the specific requirements for flat quick-disconnect terminations of IEC 760 to which reference is made in appendix Y and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for IEC 760 is BS 5057 : 1973 'Specification for snap-on connectors'.

The Technical Committee has reviewed the specific requirements for crimp connections of CEE Recommendation 6 to which reference is made in 28.3 and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for CEE Recommendation 6 is BS 5057 : 1973 'Specification for snap-on connectors'.

The Technical Committee has reviewed the specific requirements of CEE Publication 15 to which reference is made in appendix X and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for CEE Publication 15 is BS 3535 : 1962 'Specification for safety isolating transformers for industrial and domestic purposes'.

Product approval. Attention is drawn to the fact that products conforming to this British Standard may be approved by the British Electrotechnical Approvals Board for the purposes of participation in the CENELEC Certification Agreement and in the CB Scheme of the IECEE. (Details of the BEAB approval mark scheme are given on the inside back cover.)

Compliance with a British Standard does not of itself confer immunity from legal obligations.

British Standard Specification for

Safety of household and similar electrical appliances

Part 102. Particular requirements

Section 102.5 Dishwashers

1. Scope

This clause of Part 1 is applicable except as follows:

1.1 *Replacement:*

This standard applies to household electric dishwashers intended for washing and rinsing dishes and cutlery, with or without means for water heating or for drying.

This standard does not take into account the special hazards which exist in places where there are young children or aged or infirm persons without supervision; in such cases, additional requirements may be necessary.

This standard does not apply to:

dishwashers designed exclusively for industrial or commercial purposes;

dishwashers intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

For dishwashers intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary.

For dishwashers intended to be used in tropical countries, special requirements may be necessary.

Attention is drawn to the fact that in many countries additional requirements are specified by the national authorities responsible for health and water supplies, and for the protection of labour.

2. Definitions

This clause of Part 1 is applicable except as follows:

2.2.30 *Replacement:*

Normal load denotes the load obtained when the dishwasher is subjected to the sequence of operation described in Sub-clause 11.7, the dishwasher being filled with the maximum quantity of water for which it is designed, without detergents or rinsing agents and without place settings, serving pieces, etc., unless it is apparent that these place settings, etc., will affect the test results. In the latter case, the dishwasher is loaded with the maximum number of place settings, etc. specified by the manufacturer.

If place settings and serving pieces have to be used they must be in accordance with those specified in Appendix A of IEC Publication 436, second edition, 1981.

NOTE. For information see X.2.

3. General requirement

This clause of Part 1 is applicable.

4. General notes on tests

This clause of Part 1 is applicable except as follows:

4.3 Paragraph 1.

Replacement:

The tests are carried out in the order of the clauses of Part 1, except that the test of Sub-clause 15.101 is made before that of Sub-clause 15.4.

4.5 Replacement:

If the test results are influenced by the temperature of the ambient air, the room temperature is, in general, maintained at $20 \pm 5^\circ\text{C}$. If, however, the temperature attained by any part of the dishwasher is influenced to any appreciable extent by the temperature of the water or by a temperature-sensitive device, the test is repeated at a room temperature of $23 \pm 2^\circ\text{C}$, but only if all three of the following conditions are applicable:

- the temperature of the water is within 6 deg C (6 K) of the boiling point, or the temperature of the water or any part of the dishwasher is limited by a thermal control;*
- the room temperature during the test is less than 21°C ; and*
- the difference between the temperature rise of that part and the limit specified does not exceed 25 deg C (25 K) minus the room temperature.*

4.12 Not applicable.

5. Rating

This clause of Part 1 is applicable.

6. Classification

This clause of Part 1 is applicable.

See Sub-clauses 22.1 and 22.2.

7. Marking

This clause of Part 1 is applicable except as follows:

7.1 Item (h). Not applicable.

After item (j).

Addition:

- (k) the maximum number of place settings for which the dishwasher is designed, unless this is indicated in the instruction sheet;*
- (l) the maximum permissible water-level, for dishwashers without automatic water-level control;*
- (m) the maximum permissible inlet water pressure, in pascals, bars or newtons per square centimetre, for dishwashers intended to be connected to the water supply mains, unless this is indicated in the instruction sheet;*
- (n) the minimum permissible inlet water pressure, in pascals, bars or newtons per square centimetre, if to be observed for the correct operation of the dishwasher, unless this is indicated in the instruction sheet.*

Addition:

Dishwashers designed to stand on a draining board must be marked with the symbol for drip-proof or splash-proof construction.

7.2 Not applicable.

7.10 *Addition:*

If the "off" position is indicated only by a word, this word shall be "off" in the official language(s) of the country in which the dishwasher is to be sold.

The common modification "The 'off' position shall not be indicated by words only" specified in HD 251 S3 is not applicable.

NOTE. For information see X.3.

7.12 First sentence, and second sentence up to and including the word 'not'.

Replacement:

Dishwashers shall be accompanied by an instruction sheet which gives instructions for installation, operation and care of the dishwasher. It shall also give instructions for the installation of the components necessary for the connection of the dishwasher to the water supply mains. If a stationary dishwasher is not

NOTE. For information see X.4.

8. **Protection against electric shock**

This clause of Part 1 is applicable except as follows:

8.2 Not applicable.

9. **Starting of motor-operated appliances**

This clause of Part 1 is applicable.

10. **Input and current**

This clause of Part 1 is applicable except as follows:

10.1 Test. Paragraph 1, second sentence, after the word 'meter'.

Replacement:

and is determined as the mean value of the input occurring during the period with the highest total input.

10.2 *Addition:*

During the measurement of the current, starting surges are neglected.

11. **Heating**

This clause of Part 1 is applicable except as follows:

11.2 Paragraph 1 and paragraph 3, item (c). Not applicable.

Addition:

Dishwashers not intended for building-in are tested away from the walls of the test corner, unless a heater is provided for drying.

The dishwasher is connected to a source supplying water at any convenient pressure within the range specified by the manufacturer, the temperature of the water at the inlet being:

$60 \pm 5^\circ\text{C}$ or that indicated in the instruction sheet, whichever is the higher, for water inlets intended for hot water only,

$15 \pm 5^\circ\text{C}$ for water inlets intended for cold water only.

If the dishwasher has one inlet which is intended for either hot or cold water, the temperature of the water at the inlet is that which gives the most unfavourable result.

11.6 Addition:

However, dishwashers provided with a programme controller or a timer are operated at the voltage specified for motor-operated appliances.

11.7 Replacement:

Dishwashers provided with a programme controller or a timer are operated for two complete cycles with the programme which gives the highest temperature rises. A rest period of 15 min, with the door or cover open, is inserted between the two cycles.

Other dishwashers are operated for two cycles with that programme recommended by the manufacturer which gives the highest temperature rises or for two periods having each a duration of 15 min, whichever gives the longer operating time. A rest period of 15 min, with the door or cover open, is inserted between the two cycles or periods.

At the conclusion of the specified sequence of operation, emptying pumps which are driven by a separate motor and switched on and off manually, are subjected to three operating periods, the operating periods being separated by a rest period of 15 min; the duration of each operating period is equal to 1.5 times the period necessary for emptying the dishwasher when filled to the maximum normal water level, the level of the water discharge being:

NOTE. For information see X.5.

- 90 cm above the floor for dishwashers standing on the floor;
- equal to the maximum height above the supporting surface, as indicated by the manufacturer, for other dishwashers.

12. Operation under overload conditions of appliances with heating elements

This clause of Part 1 is not applicable.

13. Electrical insulation and leakage current at operating temperature

This clause of Part 1 is applicable except as follows:

13.1 Test. Paragraph 2. Not applicable.

13.2 Paragraph 8, items (2), (3) and (4).

Replacement:

- for stationary Class I dishwashers ... 3.5 mA or 1 mA per kW rated input, whichever is the greater, with a maximum of 5 mA

14. Radio and television interference suppression

This clause of Part 1 is applicable.

15. Moisture resistance

This clause of Part 1 is applicable except as follows:

15.3 Replacement:

Appliances subject to spillage of liquid in normal use shall be so constructed that such spillage does not affect their electrical insulation, even should an inlet valve fail to close.

Compliance is checked by the following tests.

Appliances provided with an appliance inlet are fitted with an appropriate connector and flexible cable or cord, appliances with Type X attachment are fitted with the lightest permissible type of flexible cable or cord of the smallest cross-sectional area specified in Sub-clause 26.2 and other appliances are tested as delivered.

Dishwashers intended to be filled with water by the user are completely filled with water containing approximately 1% NaCl, and a further quantity, equal to 15% of the capacity of the dishwasher or 0.25 l, whichever is the greater, is poured in steadily over a period of 1 min.

Other dishwashers are operated until the maximum normal water level is reached, and a detergent as specified in Appendix AA is then added, the concentration being 5 g per litre of water in the dishwasher. The inlet valve is held open and the filling continued for 15 min after first evidence of overflow, or until a further protective system operates to stop the inflow.

Dishwashers provided with a working surface are subjected to the following additional treatment.

A quantity of 200 cm³ of water containing approximately 1% NaCl is poured steadily, from a height of approximately 5 cm, onto the middle of the working surface over a period of 15 s.

Immediately after this treatment, the appliance shall withstand an electric strength test as specified in Sub-clause 16.4 and inspection shall show that water which may have entered the appliance does not impair compliance with this standard; in particular, there shall be no trace of water on insulation for which creepage distances are specified in Sub-clause 29.1.

Immediately after this, the test of Sub-clause 15.101 is made.

15.4 Replacement:

Appliances shall be proof against humid conditions which may occur in normal use.

Compliance is checked by the humidity treatment described in this sub-clause, followed immediately by the tests of Clause 16.

Cable entries, if any, are left open; if knock-outs are provided, one of them is opened.

Electrical components, including detachable heating elements, covers and other parts which can be removed without the aid of a tool, are removed and subjected, if necessary, to the humidity treatment with the main part.

The humidity treatment is carried out in a humidity cabinet containing air with a relative humidity of $93 \pm 2\%$. The temperature of the air, at all places where samples can be located, is maintained within 1 deg C (1 K) of any convenient value between 20 °C and 30 °C.

Before being placed in the humidity cabinet, the sample is brought to a temperature between t and $t + 4$ °C.

The sample is kept in the cabinet for:

- 2 days (48 h) for ordinary appliances;
- 7 days (168 h) for drip-proof, splash-proof and watertight appliances.