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**Gospodinjski in podobni električni aparati - Varnost - Posebne zahteve za  
komercialne električne prenosne pomivalne stroje**

Household and similar electrical appliances - Safety - Particular requirements for  
commercial electric conveyer dishwashing machines

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English version

**Household and similar electrical appliances –  
Safety –  
Particular requirements for commercial electric  
conveyor dishwashing machines**

Appareils électrodomestiques  
et analogues –  
Sécurité –  
Règles particulières pour  
les lave-vaisselle à convoyeur  
à usage collectif

Sicherheit elektrischer Geräte  
für den Hausgebrauch und  
ähnliche Zwecke –  
Besondere Anforderungen  
für Transportspülmaschinen  
für den gewerblichen Gebrauch

This European Standard was approved by CENELEC on 2004-12-07. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 61, Safety of household and similar electrical appliances. It covers safety aspects which are related to conveyor dishwashing machines. A first draft was submitted to the Unique Acceptance Procedure in July 2003. Due to a negative advice from the MD Consultant, received during the ongoing UAP, CENELEC TC 61 agreed in its meeting in Athens in November 2003 to review the draft. An ad-hoc meeting between the MD consultant and the WG responsible for EN 50416 in March 2004 resolved all concerns of the MD Consultant.

A second draft was submitted to the formal vote and was approved by CENELEC as EN 50416 on 2004-12-07.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-12-01

This standard has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements, which is referred to as Part 1. It was established on the basis of the 2002 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This standard, supplements or modifies the corresponding clauses of Part 1, so as to convert it into the European Standard: Safety requirements for commercial electric conveyor dishwashing machines.

When a particular subclause of Part 1 is not mentioned in this standard, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 98/37/EEC. See Annex ZZ.

NOTE 1 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 2 The following print types are used:

- requirements: in roman type;
- test specifications: in italic type;
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

There are no special national conditions causing a deviation from this European Standard, other than those listed in Annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

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## Introduction

This European Standard has been prepared to provide a means of conforming to essential safety requirements of the Machinery Directive 98/37/EC. Other requirements and other EU Directives may be applicable to the machines falling within the scope of this standard.

Pressurized components incorporated in machines within the scope of this standard are pressure equipment which is classified no higher than category I of the Pressure Equipment Directive. According to Article 1, item 3.6 of the Pressure Equipment Directive this equipment is excluded from its scope.

The requirements of Annex CC of this standard do not support a relevant ER of the Machinery Directive 98/37/EC.

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## 1 Scope

This clause of EN 60335-1 is replaced by the following.

This European Standard deals with the safety of electrically operated **conveyor dishwashing machines** for washing plates, dishes, glassware, cutlery and similar articles (e.g. trays, food containers), with or without means for water heating or forced hot air drying, not intended for household use, their **rated voltage** being not more than 250 V for single-phase machines connected between one phase and neutral and 480 V for other machines. The spraying pressure shall not exceed 1 MPa.

NOTE 101 These machines are used for example in restaurants, canteens, hospitals, and commercial enterprises such as bakeries, butcheries, etc.

NOTE 102 Examples of such machines are

- **flight type dishwashers,**
- **rack conveyor dishwashers.**

These machines are designed to be connected to hot and/or cold water supply.

NOTE 103 Requirements to avoid backsiphonage of non-potable water into the public water supply are specified in Annex CC.

Machines making use of steam or hot water for heating purposes are also within the scope of this standard.

This standard does not apply to

- machines which are moveable,
- gas heating appliances which are part of conveyor dishwashing machines,
- machines intended for disinfection,
- machines intended to be used on board of sea-going vessels and aircraft,
- machines designed exclusively for industrial purposes, for example machines used in the food industry for cleaning receptacles that serve as packaging for final products (e.g. bottle-cleaning machines), and machines used in manufacturing processes,
- separately driven transport devices not confined in the machine,
- machines intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

## 2 Normative references

This clause of EN 60335-1 is applicable except as follows.

Addition:

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EN 563:1994 + A1:1999, *Safety of machinery – Temperatures of touchable surfaces – Ergonomics data to establish temperature limit values for hot surfaces*

EN 954-1:1996, *Safety of machinery – Safety related parts of control system – General principles for design*

EN 50242:<sup>1)</sup>, *Electric dishwashers for household use – Methods for measuring the performance*

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<sup>1)</sup> In preparation.



EN 61770:1999, *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets (IEC 61770:1998)*

EN ISO 12100-1:2003, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)*

ISO 1817:1999, *Rubber, vulcanised – Determination of the effect of liquids*

### 3 Definitions

This clause of EN 60335-1 is applicable except as follows.

#### 3.1.4 Addition:

The **rated power input** is the sum of the power inputs of all the individual elements in the machine that can be on at one time; where there are several such combinations possible, that giving the highest power input is used in determining the **rated power input**.

#### 3.1.9 Not applicable

#### 3.101

##### **conveyor dishwashing machine (rack or flight type)**

a machine in which the various processes e.g. washing, rinsing etc., are carried out, the load being moved through the various operations automatically

#### 3.101.1

##### **rack conveyor dishwasher**

a machine in which the load is being moved through the various operations in racks

#### 3.101.2

##### **flight type dishwasher**

a machine, equipped with an endless conveyor which is so designed that the load can be placed directly on that conveyor

#### 3.102

##### **indicated level**

a mark on the machine to indicate the maximum liquid level for correct operation

#### 3.103

##### **blocking device**

a device to ensure that the vertical lift door does not close completely after the **locking device** is released.

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#### 3.104

##### **locking device**

a device to ensure that the vertical lift door remains open

### 4 General requirement

This clause of EN 60335-1 is applicable.

## 5 General conditions for the tests

This clause of EN 60335-1 is applicable except as follows.

### 5.3 Addition:

*The tests of 22.6 are carried out before the tests of Clause 19.*

**5.101** *Machines are tested as **motor-operated appliances**, even if they incorporate a heating element.*

*Machines incorporating means for heating water, but that may also be operated without the heating elements being energized, are tested without the heating elements energized should this be more unfavourable.*

**5.102** *Machines, when assembled in combination with or incorporating other appliances, are tested in accordance with the requirements of this standard. The other appliances are operated simultaneously in accordance with the requirements of the relevant standards.*

## 6 Classification

This clause of EN 60335-1 is applicable except as follows.

### 6.1 Replacement:

Machines shall be **class I** with respect to protection against electric shock.

*Compliance is checked by inspection and by the relevant tests.*

### 6.2 Modification:

Replace the requirement paragraph with the following.

Machines shall be at least IPX4 with respect to protection against harmful ingress of water.

## 7 Marking and instructions

This clause of EN 60335-1 is applicable except as follows.

### 7.1 Addition:

Machines shall be marked in addition with

- the year of production,
- the serial number,
- the water supply pressure or range of pressures, in kilopascals (kPa), for machines intended to be connected to a water supply, unless this is indicated in the instruction sheet,
- the maximum permissible steam supply pressure, in kilopascals (kPa), unless this is indicated in the instruction sheet,
- the maximum permissible hot water supply pressure, in kilopascals (kPa), unless this is indicated in the instruction sheet,
- the maximum permissible water, steam and hot water supply temperatures in degrees Celsius, unless this is indicated in the instruction sheet.

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If the reversal of a motor could result in a hazard, the direction of rotation shall be clearly and visibly indicated on the motor.

**7.6 Addition:**



symbol 5021 of IEC 60417-1] equipotentiality

**7.12 Addition:**

The meaning of symbol 5021 of IEC 60417-1 shall be explained.

**7.12.1 Replacement:**

The machine shall be accompanied by instructions detailing any special precautions necessary for installation. The maximum level of the water discharge outlet shall be indicated in the instructions. Instructions for cleaning, shall be given. They shall include a warning that the machine is not to be cleaned with a water jet. When cleaning the machine the electrical supply source shall be switched off.

For machines that are permanently connected to fixed wiring and for which leakage currents may exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instructions shall give recommendations regarding the rating of **protective devices**, such as residual-current devices, to be installed.

*Compliance is checked by inspection.*

**7.101** Machines intended to be filled by hand or a manually operated tap shall be marked with an **indicated level**.

*Compliance is checked by inspection.*

**7.102** Equipotential bonding terminals shall be marked with symbol 5021 of IEC 60417-1.

These indications shall not be placed on screws, removable washers or other parts that can be removed when conductors are being connected.

*Compliance is checked by inspection.*

## **8 Protection against access to live parts**

This clause of EN 60335-1 is applicable.

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

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This clause of EN 60335-1 is applicable except as follows.

**9.101** Fan motors providing a cooling effect in order to comply with the requirements of Clause 11 shall start under all voltage conditions that may occur in use.

*Compliance is checked by starting the motor three times at a voltage equal to 0,85 times **rated voltage**, the motor being at room temperature at the beginning of the test.*

*The motor is started each time under the conditions occurring at the beginning of normal operation or, for automatic machines, at the beginning of the normal cycle of operation, the motor being allowed to come to rest between successive starts. For machines provided with motors having other than centrifugal starting switches, this test is repeated at a voltage equal to 1,06 times **rated voltage**.*

*In all cases, the motor shall start and it shall function in such a way that safety is not affected and overload protection devices of the motor shall not operate.*

*The electrical supply source must be such that during the test the drop in voltage does not exceed 1 %.*

## 10 Power input and current

This clause of EN 60335-1 is applicable except as follows.

### 10.1 Addition:

NOTE 101 A representative period is the period with the highest total power input.

## 11 Heating

This clause of EN 60335-1 is applicable except as follows.

### 11.2 Addition:

*Machines intended to be fixed to the floor and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means are installed in accordance with the instructions.*

### 11.5 Addition:

*Conveyor dishwashing machines shall be supplied at **rated voltage**. In this case the addition to 11.8 applies.*

### 11.7 Replacement:

*Machines are operated until steady conditions are established.*

*At the conclusion of the test and with the machine at maximum temperature, motor-driven emptying pumps that employ separate motors and that are manually switched on and off are subjected to an operating period equal to 1,5 times the period for emptying the container(s) when filled to the **indicated level**, the level of the water discharge outlet being the maximum indicated in the instructions.*

### 11.8 Addition:

*For **conveyor dishwashing machines** tested at **rated voltage**, the relevant values shown in Table 3 are reduced by 10 %.*

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## 12 Void

## 13 Leakage current and electric strength at operating temperature

This clause of EN 60335-1 is applicable except as follows.

### 13.1 Addition:

*Conveyor dishwashing machines shall be supplied at **rated voltage**. In this case the permissible leakage current allowed is reduced by 10 %.*