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AMENDMENT 1
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Amendment 1

Household and similar electrical appliances – Safety –

Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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FOREWORD

This amendment has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

The text of this amendment is based on the following documents:

FDIS	Report on voting
61/2745/FDIS	61/2790/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Replace the second sentence of the second paragraph by the following:

It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

1 Scope

Add the following note:

NOTE 106 This standard also covers **automatic drives**.

3 Definitions

3.101 *Delete the word "***inherent***" in the note.*

3.102 *Replace the existing text by the following:*

entrapment protection system
part of the **drive** that protects against trapping which could result in the human body being squeezed or crushed by the door

NOTE 1 Trapping in the garage is covered by the manual release of 20.109.

NOTE 2 An **entrapment protection system** may be incorporated in the motor assembly or may be installed separately. It may consist of one or more devices, such as pressure sensitive edges, passive infrared, active light sensing devices or a **biased-off switch**.

3.103 *Replace the existing text by the following:*

automatic drive
drive that operates the door in at least one direction without intentional activation by the user

5 General conditions for the tests

5.2 *Add the following sentence after the first sentence of the addition:*

An artificial load may be used to simulate the door for some of the tests.

Add the following subclause:

5.5 *Addition:*

Wicket doors are kept closed during the tests.

6 Classification

6.2 *Replace the text of the addition by the following:*

Drives intended to be exposed to outdoor conditions shall be at least IPX4.

6.101 *Delete this subclause.*

7 Marking and instructions

7.1 *Replace the text of the addition by the following:*

Modification:

Drives shall be marked with the **rated power input**.

Addition:

Drives supplied without a door shall be marked with the **rated load** in N or in Nm.

7.12 *Replace the second dashed item of the addition by the following:*

– watch the moving door and keep people away until the door is completely opened or closed (not necessary for **automatic drives**);

Replace the last dashed item of the addition by the following two dashed items:

– information concerning the adjustment of the door and drive (when applicable);

– disconnect the supply when cleaning or carrying out other maintenance.

Add the following paragraph:

Instructions for **automatic drives** shall state the substance of the following:

WARNING: Automatic door – The door may operate unexpectedly, therefore do not allow anything to stay in the path of the door.

7.12.1 *Replace the second paragraph of the addition by the following two paragraphs:*

The installation instructions shall include details for the installation of the **drive** and its associated components.

For **drives** supplied without a door, the installation instructions shall indicate the type, size and mass of doors for which the **drive** is intended to be used.

Add the following dashed items:

– necessary information for the safe handling of a drive weighing more than 20 kg. This information shall describe how to use the handling means, such as hooks and ropes;
– the drive must not be used with a door incorporating a wicket door (unless the **drive** cannot be operated with the wicket door open);
– after installation, ensure that parts of the door do not extend over public footpaths or roads.

7.101 *Replace the existing text by the following:*

Drives shall be supplied with a label suitable for permanent fixing. For **automatic drives**, the label shall state the substance of the following:

WARNING: Automatic drive – Keep away from the area of the door since it may operate unexpectedly.

For other **drives**, the label shall include a warning sign having a height of at least 60 mm. The label shall also include the substance of the following:

WARNING: Keep children away when the door is moving.

NOTE An example of a suitable warning sign is shown in Figure 102.

Compliance is checked by inspection and measurement.

7.102 *Replace the existing text by the following:*

Drives that use contact sensing as an **entrapment protection system** shall be supplied with a label that states the substance of the following:

WARNING: Risk of entrapment – Regularly check and, if necessary, adjust to ensure that, when the door contacts a 40 mm high object placed on the floor, the door reverses or the object can be freed.

Compliance is checked by inspection.

Add the following new subclause:

7.104 If the **drive** is intended to be installed by the user, the packaging shall indicate the type of door, including its size and mass, that the **drive** is intended to operate and, if applicable, that the **drive**

– is intended to be installed at least 2,5 m above the floor or other access level;
– can be used with doors having openings greater than 50 mm in diameter;
– is intended for automatic operation.

Compliance is checked by inspection.

11 Heating

11.7 *Replace the text of the replacement by the following:*

***Drives** for continuous operation are operated for consecutive cycles until steady conditions are established.*

***Automatic drives** are operated without rest periods for 3 cycles or 4 min, whichever is longer.*

NOTE A cycle is based on the maximum size of door the **drive** is intended to operate.

*Other **drives** are operated as follows:*

– ***drives** supplied without a door are operated without rest periods for a minimum of 2 min unless the rated operating time is longer;*

– ***drives** supplied with a door are operated without rest periods for 3 cycles.*

15 Moisture resistance

Replace the existing text by the following:

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

*Parts of **drives** intended to be exposed to outdoor conditions are subjected to the tests specified for IPX4 appliances.*

15.1.2 *Addition*:

*IPX4 tubular **drives** are installed in a tube that is open at both ends and has the largest diameter specified in the instructions. The tube has a length twice that of the motor and is mounted on a support as in normal use. The support is rotated at a speed of 1 r/min.*

19 Abnormal operation

Add the following subclause:

19.1 *Addition:*

***Drives** are also subjected to the test of 19.101.*

19.10 *Replace the existing text by the following*:

Addition:

*For **drives** having a manual release, the test is repeated with the **drive** released.*

The test is carried out for one cycle of operation if this is longer than 1 min.

19.13 *Replace the text of the addition by the following*:

For each fault condition in 19.11.2, if the appliance is still operating, it shall comply with 20.102 to 20.106.

Add the following subclause:

19.101 ***Drives**, other than those for continuous operation, are supplied at **rated voltage** and operated continuously under **normal operation**.*

20 Stability and mechanical hazards

20.2 *Replace the text of the addition by the following:*

NOTE 101 Moving parts of **drives** intended to be installed at a height of at least 2,5 m above the ground are considered to be positioned so that adequate protection is provided.

NOTE 102 Chains moving at less than 0,2 m/s are not considered to be dangerous moving parts.

20.101 *Replace the requirement by the following:*

Drives shall prevent doors from closing unexpectedly during normal use.

Add the following sentence to the second paragraph of the test specification.

*Automatic operation of **automatic drives** is rendered inoperative.*

Replace the existing text of subclauses 20.102 to 20.108 by the following:

20.102 **Drives** controlled by a **biased-off switch** shall stop when the actuating member of the switch is released.

Compliance is checked by the following test.

*The **drive** is installed with a door and supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**. It is operated to close the door. When the actuating member of the switch is released,*

– *if the closing force exerted by the door does not exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop;*
– *if the closing force exerted by the door exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop before it has travelled more than 50 mm vertically;*

The test is repeated during the opening movement of the door.

20.103 **Drives** incorporating an **entrapment protection system** with sensing devices which prevent the door coming into contact with an obstacle shall not cause injury resulting from a moving door.

Compliance is checked by the following test.

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*An obstacle having dimensions of approximately 80 mm x 300 mm and a height of 100 mm is placed on the ground and centrally along its 300 mm length across the door opening. The **drive** is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

NOTE The obstacle is normally made of rough wood and painted white but other materials and colours may be used to simulate the most unfavourable conditions.

*The obstacle is positioned centrally in the door opening and is then raised in increments up to 300 mm from the height of the door, but not higher than 2,5 m. At each increment, the **drive** is operated to close the door. The door shall stop within 50 mm or reverse its movement without contacting the obstacle.*

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the ground.

*The **drive** is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The **entrapment protection system** shall cause the door to reverse its movement.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

*During the tests any **biased-off switch** is held closed.*

20.104 **Drives** incorporating an **entrapment protection system** with sensing devices which rely on the door contacting an obstacle shall not cause injury resulting from a moving door.

*Compliance is checked by the test of 20.104.1. For **automatic drives** and **drives** with a closing force exceeding 400 N compliance is also checked by the test of 20.104.2 for a closing movement.*

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*During the tests any **biased-off switch** is held closed.*

20.104.1 *Any non-contact **entrapment protection system** is rendered inoperative.*

*The **drive** is operated to close the door from the fully open position and the **entrapment protection system** shall limit the vertical component of the average closing force to*

– *150 N during the first 5 s after the force has exceeded 25 N and*
– *25 N thereafter;*

or

– *400 N during the first 0,75 s after the force has exceeded 150 N,*
– *150 N during a further period of 4,25 s and*
– *25 N thereafter;*

or

– *800 N during the first 2 s after the force has exceeded 150 N for doors that do not swing outward,*
– *600 N during the first 2 s after the force has exceeded 150 N for doors that swing outward,*

– *150 N during a further period of 3 s and*

– *25 N thereafter.*

The force is measured by means of an instrument that incorporates a rigid plate having a diameter of 80 mm and a spring having a ratio of 500 N/mm ± 50 N/mm. The spring acts on a sensing element that is connected to an amplifier having a rise and fall time not exceeding 5 ms. The measuring instrument shall be accurate to within 5 %.

The force is measured on the bottom edge of the door at the following heights above the ground:

– *50 mm;*

– *300 mm;*

– *500 mm;*

– *2 500 mm, or 300 mm below the maximum opening height of the door if this is less than 2 800 mm.*

At each height, the force is measured at the following locations:

– *in the centre of the bottom edge of the door;*

– *200 mm from each end of the bottom edge of the door.*

The test is carried out three times and the arithmetic average closing force is calculated for each location.

NOTE The door may reverse its movement after contacting the obstacle.

20.104.2 *An obstacle having dimensions of approximately 80 mm x 300 mm and a height of 100 mm is placed on the ground and centrally along its 300 mm length across the door opening. The* ***drive*** *is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the ground.

The ***drive*** *is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The* ***entrapment protection system*** *shall cause the door to reverse its movement.*

20.105 **Drives** shall prevent entrapment in the opening direction.

Compliance is checked by the following test.

The force exerted by the ***drive*** *is set at the maximum value according to the instructions. A test piece having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass of 20 kg ± 0,5 kg is fixed centrally to the outside of the door, with the 300 mm edge adjacent to the bottom edge of the door.*

The ***drive*** *is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the* ***rated voltage*** *and operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.*

20.106 **Entrapment protection systems** shall provide an adequate level of protection in the event of a failure within the system installation wiring.

*Compliance is checked by the following test, unless the **entrapment protection system** is a **biased-off switch**.*

*The **drive** is installed with a door and supplied at **rated voltage**. The **drive** is operated to close the door. During the movement, a short circuit or open circuit is simulated in the system installation wiring.*

*Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or reverse and stop at the fully open position. After completing its movement the door may be controlled by a supplementary **biased-off switch.***

*If the **entrapment protection system** continues to operate normally, the test is repeated with one additional fault simulated.*

The test is repeated during the opening movement of the door.

20.107 A mechanical fault in the **drive** shall not result in a hazardous condition.

Compliance is checked by inspection and if necessary by test.

*The inspection shall evaluate which parts can affect the safety of operation and whether they are likely to break or become loose. These parts may be within the **drive** or used for connecting the **drive** to the door.*

NOTE Examples of parts which are evaluated are screws, pins, shafts, wheels, chains and supporting parts.

*If the inspection cannot determine whether the **drive** will continue to operate normally or stop its movement when the part has failed, the following test is carried out.*

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*The faults are introduced one at a time and the **drive** is operated as in normal use.*

*Unless the **drive** and the door continue to operate normally,*

– *the **drive** shall stop operating by the end of the cycle, and*
– *further operation shall not be possible, and*
– *the speed of the door shall not increase by more than 20 %.*

20.108 During the movement of the **drive** in either direction, the actuation of a manual control shall stop the movement if there is no separate button for the stop function.

If the control has a single button for controlling the movement, further actuation shall reverse the direction of movement.

If the control has three buttons for controlling the movement, one button shall be a stop button.

Compliance is checked by a manual test.

NOTE The test may be carried out without a door.

20.110 *Replace the existing text by the following:*

Drives shall not restart automatically after the movement has stopped unintentionally.

NOTE 1 Unintentional stopping may be caused by interruption of the power supply or by operation of a **thermal cut-out**.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The supply is then interrupted for at least 2 s. After the supply is restored, the **drive** shall not restart. However **automatic drives** may restart, provided they function as in normal use.*

*The appliance is operated again and operation of a **thermal cut-out** is simulated. After the fault condition has been removed, the **drive** shall not restart. However **automatic drives** may restart, provided they function as in normal use.*

NOTE 2 The test may be carried out without a door.

22 Construction

Add the following:

22.40 Not applicable.

22.103 *Replace the existing text by the following:*

If the **entrapment protection system** is a **biased-off switch**, it shall only be possible to activate the **drive** when operating the switch within sight of the door.

Compliance is checked by inspection and test.

22.104 *Replace the existing text by the following:*

Drives shall not be provided with a control which renders the **entrapment protection system** inoperative. A malfunctioning **entrapment protection system** can only be overridden by a **biased-off switch** in sight of the door but not on its first activation.

NOTE 1 The **biased-off switch** can be the control used to operate the **drive** as in normal use.

Compliance is checked by inspection and the following test.

*Each **entrapment protection system** is tested for proper operation and that it is not overridden when the **entrapment protection system** is fully functional. For each test, a fault is introduced in the **entrapment protection system**. The **biased-off switch** shall not override the malfunctioning **entrapment protection system** on its first activation.*

*Portable remote controls shall be checked to ensure that they do not override a malfunctioning **entrapment protection system** unless they can only activate the **drive** in sight of the door.*

NOTE 2 Releasing the **biased-off switch** is the same as introducing an obstruction.

NOTE 3 It is acceptable for the activation of a **biased-off switch** to override a malfunctioning **entrapment protection system** on the second activation but not on the first activation which will act as an obstruction.

22.106 *Replace the existing text by the following:*

All manual controls that operate the door shall have the same markings to indicate the functions.

Compliance is checked by inspection.

NOTE The control may be for remote operation or for wall mounting.

22.107 *Replace the existing text by the following:*

It shall only be possible to open and close the door by use of a manual control unless an **automatic drive** is provided.

Compliance is checked by inspection and test.

Add the following subclause:

22.108 A **drive** for a door incorporating a wicket door shall be constructed so that the **drive** cannot be operated when the wicket door is open.

Compliance is checked by inspection and by the following test.

*The **drive** is installed with a door incorporating a wicket door and is supplied at **rated voltage**. The wicket door is opened and the **drive** is operated so as to open the door. The door shall not open.*

29 Clearances, creepage distances and solid insulation

Replace the existing text by the following:

This clause of Part 1 is applicable except as follows.

29.2 *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.