

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Hand-held motor-operated electric tools – Safety –
Part 2-16: Particular requirements for tackers

Outils électroportatifs à moteur – Sécurité –
Partie 2-16: Règles particulières pour les agrafeuses

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HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

Part 2-16: Particular requirements for tackers

FOREWORD

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International Standard IEC 60745-2-16 has been prepared by subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

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

FDIS	Report on voting
61F/703/FDIS	61F/711/RVD

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

This second edition cancels and replaces the first edition published in 1993 and constitutes a technical revision. Main changes include Clause 8: Markings and instructions, introducing

detailed safety warnings; Clause 11: Input and current, introducing specification for rated current and input; Clause 12: Heating, with a modified test cycle; Clause 17: Endurance, with testing based on actuation numbers rather than on time; Clause 18: Abnormal operation, introducing an overload test of Part 1 slightly modified for tackers; Clause 19: Mechanical hazards, with requirements for actuating the tool dependant on the kind of actuation system.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part 2 is to be used in conjunction with the latest edition of IEC 60745-1. It was established on the basis of the fourth edition (2006) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60745-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60745-1, so as to convert that publication into the IEC standard: Particular requirements for tackers.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 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 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;* [IEC 60745-2-16:2008](http://standards.iteh.ai/catalog/standards/sist/6559fd06-64b2-4e0b-a86c-5d9470e82796/iec-60745-2-16-2008)
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A list of all parts of the IEC 60745 series, under the general title: *Hand-held motor-operated electric tools – Safety*, can be found on the IEC website.

The committee has decided that the contents of this 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.

HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

Part 2-16: Particular requirements for tackers

1 Scope

This clause of Part 1 is applicable, except as follows:

Addition:

This standard applies to tackers intended for general use. This standard does not apply to tackers intended for industrial production applications.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable, except as follows:

3.101 tacker

tool in which energy is applied to loaded fasteners, e.g. metal pins, nails or staples, for the purpose of driving the latter into wood, plastic, fabric or similar material

3.102 actuation system

use of a trigger, workpiece contact and/or other operating control, separately or in some combination or sequence, to actuate the tool

3.103 single sequential actuation

actuation system in which there is more than one operating control to be activated in a specific sequence to actuate the tool. Additional actuation is possible, when a specific operating control, other than a workpiece contact, is released and re-activated

3.104 full sequential actuation

actuation system in which there is more than one operating control to be activated in a specific sequence to actuate the tool. Additional actuation is only possible, when all operating controls are released and re-activated in the same sequence

3.105 contact actuation

actuation system in which there is more than one operating control and the operating controls can be activated in any sequence to actuate the tool. Additional actuation is possible, when any operating control is released and re-activated

3.106**selective actuation**

actuation system that allows discrete selection of two or more of the following actuation systems: single sequential actuation, full sequential actuation or contact actuation. One or more of the selections is single sequential actuation or full sequential actuation

3.107**automatic reversion actuation**

actuation system with more than one operating control that can be activated in any sequence to actuate the tool. Regardless of the initial sequence, the actuation system is designed to automatically revert to single sequential actuation, full sequential actuation, neutral or off

3.108**actuate**

to cause movement of the tool component(s) intended to drive a fastener

3.109**operating control**

control that separately, or as part of an actuation system, is able to cause the actuation of a tool

3.110**workpiece contact**

operating control element or assembly on the tool intended to be activated by the material to be fastened

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4 General requirements

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This clause of Part 1 is applicable. <https://standards.iteh.ai/catalog/standards/sist/6559fd06-64b2-4e0b-a86c-5d9470e82796/iec-60745-2-16-2008>

5 General conditions for the tests

This clause of Part 1 is applicable, except as follows:

5.101 *Tests that are to be conducted by operating the tool without fasteners may subject the tool to abnormal stresses. In order to avoid this, a suitable test fixture may be supplied or a different method of operation suggested.*

6 Void**7 Classification**

This clause of Part 1 is applicable.

8 Marking and instructions

This clause of Part 1 is applicable, except as follows:

8.1 Addition:

- for tools with selective actuation or automatic reversion actuation: markings indicating which actuation system is enabled at any time.

8.12.1 Addition:

The specific tool safety warnings for tackers are given in 8.12.1.101. The term tacker in these warnings may be replaced by a specific tool designation, such as stapler, nailer, etc.

8.12.1.101 Safety instructions for tackers

Tacker safety warnings

- **Always assume that the tool contains fasteners.** Careless handling of the tacker can result in unexpected firing of fasteners and personal injury.
- **Do not point the tool towards yourself or anyone nearby.** Unexpected triggering will discharge the fastener causing an injury.
- **Do not actuate the tool unless the tool is placed firmly against the workpiece.** If the tool is not in contact with the workpiece, the fastener may be deflected away from your target.
- **Disconnect the tool from the power source when the fastener jams in the tool.** While removing a jammed fastener, the tacker may be accidentally activated if it is plugged in.
- **Use caution while removing a jammed fastener.** The mechanism may be under compression and the fastener may be forcefully discharged while attempting to free a jammed condition.

NOTE This warning may be omitted for tackers that do not utilize a stored potential energy to drive the fasteners.

- **When fastening electrical cables, make sure the cables are not energized. Hold the tacker only by insulated gripping surfaces. Use only fasteners designed for electrical cable installations. Inspect that the fastener has not damaged the insulation of the electrical cables.** A fastener that damages the insulation of electric cables can lead to electric shock and fire hazards.

NOTE This warning to be provided for tackers suitable for fixing electric cables.

- **Do not use this tacker for fastening electrical cables.** It is not designed for electric cable installation and may damage the insulation of electric cables thereby causing electric shock or fire hazards.

NOTE This warning is to be provided for tackers not suitable for fixing electric cables.

8.12.2 b) Addition:

- 101) types and dimensions, or manufacturer's reference numbers, of the recommended fasteners;
- 102) information on the operation and the operating controls of the tool;
- 103) information on how to operate the tool safely in order to minimise the risk of personal injury to the operator or other person who may be in the vicinity;
- 104) information whether or not the tacker is suitable for fixing electric cables;
- 105) if applicable, information on the fasteners to be used for fixing electric cables.

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable, except as follows:

Replacement:

The rated current shall be within $\pm 20\%$ of the measured current. The rated input may be calculated from the rated current.

For tools marked with one or more rated voltage ranges, the test is made at both the upper and lower limits of the ranges, unless the marking or the rated power input is related to the mean value of the relevant voltage range, in which case the test is made at a voltage equal to the mean value of that range.

Compliance is checked by the following test.

The tool is operated without fasteners at a rate of one actuation every 1 s or as limited by tool design. The measured current is the r.m.s. value over a period of 10 s.

12 Heating

This clause of Part 1 is applicable, except as follows:

12.2 Modification:

The tool is operated without fasteners for 10 cycles or until temperatures stabilise, whichever is achieved first. Each cycle consists of the tool operating at a rate of one actuation every 1 s or as limited by tool design for 1 min and a rest period of 3 min with the tool switched off. The temperature rises are measured at the end of the "on" period. At the manufacturer's option, the tool may be operated continuously until thermal stabilisation.

13 Leakage current

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Electric strength

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable, except as follows:

17.2 Replacement:

The tool is operated without fasteners at the cycle rate as specified in 12.2 for 10 000 actuations at a voltage equal to 1,1 times rated voltage and then for another 10 000 actuations at a voltage equal to 0,9 times rated voltage.

The tool may be switched on and off by means of a switch other than that incorporated in the tool.

During this test, if applicable, replacement of the carbon brushes is allowed, and the tool is oiled and greased as in normal use.

If the temperature rise of any part of the tool exceeds the temperature rise determined during the test of 12.1, forced cooling or rest periods are applied.

During these tests, overload protection devices shall not operate.

During the test, replacement of any mechanical components that fail without impairing safety is allowed.

18 Abnormal operation

This clause of Part 1 is applicable, except as follows:

18.12 Replacement:

A class I tool employing class II construction (see 5.10) or a class II tool shall be able to operate under extreme overload conditions without impairing protection against electric shock.

Compliance is checked by the following test on a separate sample.

All fuses, thermal cut-outs, and overload protectors and the like specified in 18.1 that are accessible to the user without the aid of a tool shall be shorted.

The sample is connected to a minimum 12 kVA circuit. The armature/rotor of the tool is stalled or, for solenoid designs, the solenoid is continuously energised, for 15 min or until the tool open-circuits or flame appears. If either condition occurs, immediately de-energise the tool and if flame appears, extinguish with CO₂ extinguisher. The leakage current between live parts and accessible parts, measured in accordance with Clause 13, is monitored throughout the test and after the test until leakage current has stabilized or decreases. Leakage current shall not exceed 2 mA.

After the tool is cooled to room temperature, an electric strength test per Clause 15 is performed between live parts and accessible parts as follows:

- if a tool does not operate after 15 min, apply a 1 500 V electric strength test;
- if a tool operates after 15 min, apply a 2 500 V electric strength test.

19 Mechanical hazards

This clause of Part 1 is applicable, except as follows:

19.101

The tool shall be provided with a user-operated trigger such that the tool cannot be actuated when the trigger is in a released position (i.e. in an “off” position) and either:

a) have a workpiece contact so that it is not possible to operate the tool unless both the trigger and the workpiece contact have been activated,

or

b) be so designed that the fasteners have a speed in free air at the point they leave the tool no greater than 15 m/s, and have a mass no greater than 0,3 g.

In addition, it shall not be possible to eject fasteners consecutively without first either operating the trigger or the workpiece contact.

Compliance is checked by inspection, measurement and by practical tests in all possible positions of use of the tool.

19.102 The tool shall either:

- be manufactured with an actuation system meeting the requirements of single sequential, full sequential, selective or automatic reversion actuation, or
- have a workpiece contact designed such that, in addition to the force due to its weight distribution, the tool shall be pressed against the workpiece with a force of at least 50 % of the tool weight, this force need not exceed 5 N, to activate the release of the fastener. The mass of the tool is measured without supply cord and fasteners.

Compliance is checked by measurement and manual test, while the tacker is placed on a horizontal surface in such orientation that the workpiece contact activation is in the vertical direction.

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19.103 For tools required to have workpiece contact, it shall not be possible to actuate the tool when lifting it by the trigger from any resting position.

Compliance is checked by the following test.

The tool is loaded with the minimum number of fasteners and is placed on a level surface. A force of 25 % of the tool mass is applied to the top of the tool. The force is then removed and the tool is raised by the trigger using a 12 mm rod at the midpoint of the trigger. Means shall be provided to ensure that the tool does not tip laterally by more than 10° during the test.

The tool shall not actuate during the test.

The force of 25 % of the tool mass is calculated using the tool mass without supply cord or fasteners.

19.104 Tools manufactured with selective actuation shall be shipped with either single sequential actuation, full sequential actuation, neutral or off selected.

Compliance is checked by inspection.

19.105 Workpiece contacts shall be designed to possess sufficient protection against premature failure in normal use, if such failure would cause actuation of the tool by the operation of the trigger alone.

Compliance is checked through failure analysis or by the following test.

The workpiece contact is cycled 50 000 times under conditions of its maximum travel. At the conclusion of this conditioning, the tool shall not actuate by the use of the trigger alone in any orientation. Operation of the tool during the conditioning is not required unless not doing so changes the force or travel on the workpiece contact.

20 Mechanical strength

This clause of Part 1 is applicable.

21 Construction

This clause of Part 1 is applicable, except as follows:

21.18.1 Replacement:

There shall be no means of locking the switch or the workpiece contact in the “on” position.

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is applicable.

24 Supply connection and external flexible cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

This clause of Part 1 is applicable.

27 Screws and connections

This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

29 Resistance to heat, fire and tracking

This clause of Part 1 is applicable.

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