

TECHNICAL REPORT

IEC
TR 62112

First edition
2001-10

Safety of hand-held motor-operated electric tools – Particular requirements for drills – Test procedure concerning dynamic forces at sudden stalling

*Sécurité des outils électroportatifs à moteur –
Règles particulières pour les perceuses –
Procédure d'essai des forces dynamiques
lors d'un calage soudain*



Reference number
IEC/TR 62112:2001(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** (www.iec.ch)

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (www.iec.ch/catlg-e.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications (www.iec.ch/JP.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: custserv@iec.ch
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

TECHNICAL REPORT

IEC
TR 62112

First edition
2001-10

Safety of hand-held motor-operated electric tools – Particular requirements for drills – Test procedure concerning dynamic forces at sudden stalling

*Sécurité des outils électroportatifs à moteur –
Règles particulières pour les perceuses –
Procédure d'essai des forces dynamiques
lors d'un calage soudain*

© IEC 2001 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

K

For price, see current catalogue

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – PARTICULAR REQUIREMENTS FOR DRILLS – TEST PROCEDURE CONCERNING DYNAMIC FORCES AT SUDDEN STALLING

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this technical report may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62112, which is a technical report, 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 technical report is based on the following documents:

Enquiry draft	Report on voting
61F/282/CDV	61F/342/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

This document, which is purely informative, is not to be regarded as an International Standard.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

IECNORM.COM: Click to view the full PDF of IEC TR 62112:2001

Withdrawn

INTRODUCTION

In IEC 60745-2-1, *Safety of hand-held motor-operated electric tools – Part 2: Particular requirements for drills*, the allowed degree of static stalling torque of a clutch at the locked driven spindle is given in clause 18.101 for different shaped tools. Because of a lack of knowledge about dynamic behaviour at sudden stalling, it was not possible there to define any limits or a test procedure.

A working group was therefore instituted to determine requirements and test specifications concerning dynamic forces in clutches, and a round-robin-test was initiated.

The work proceeded in three steps:

1. design of a test rig and installation of measuring devices: the influence of an operator on the torque at the handles was evaluated;
2. measurement of maximum torque that can be held at the handles at sudden stalling;
3. design of a loading device that simulates the hand-arm-system and of a test rig.

This technical report defines test procedures and limits for dynamic forces interfering in a sudden stalling. It presents a type-test concerning normal and correct use. It does not exclude the possibility that incorrect operation may lead to injuries when clutches are designed according to this proposal.

SAFETY OF HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – PARTICULAR REQUIREMENTS FOR DRILLS – TEST PROCEDURE CONCERNING DYNAMIC FORCES AT SUDDEN STALLING

1 Scope

This technical report deals with test specifications for the dynamic behaviour of drills and impact drills after sudden stalling of the rotating drillbit.

2 Definitions

2.1

stalling

sudden stoppage of the drillbit

2.2

stalling device

device (e.g. brake) which would cause the drillbit to stop suddenly

3 Test rig

The machine is positioned vertically down in a test rig, rotatable around its drill-spindle (see figures 1 and 2). The lower bearing is designed as a stalling device for the "drill". The stalling device (e.g. a brake) has to jam the drillbit within an angle of 30°.

An additional mass and a spring at the handle simulate the operator by acting with a torque against the angular displacement of the machine. This displacement is the measured quantity of the test, which must not exceed 65°. At this angle a maximum torque is acting according to an acceptable force at the handle.

The additional mass, as defined in table 1, is coupled to the handle of the tile machine and represents the hand-arm mass. It is to be fastened in the centre of the position where the hand normally holds the grip, i.e. on the radius a (single hand support) or a_2 (double-hand support). The spring is connected on a second radius r_z , simulating a certain hand force on radius a or a_2 respectively.

The torque produced by the spring is linear, within a tolerance of 5 % of the maximum torque rising with the angular displacement. At the beginning there is a preload of 5 N in order to keep the machine in 0° position against a stop before stalling the drillbit. The generated load moment at 65° displacement is shown in table 1.

For the position of the fastening point of the tile spring on the test rig, see figures 1 and 2. The fixing radius r_z is a function of a or a_2 respectively (see figure 3).

The characteristics of the springs are also determined in table 1.

The original additional handle can be exchanged by a special measuring handle, if necessary. The fixing means of the measuring handle, spring fixing points and upper bearing point (exceeding the original parts) are restricted with respect to the momentum of inertia to 15 % of the momentum of inertia of the whole machine including additional mass.

4 Operating conditions

The tool is switched on by means of an external switch while the tool switch is fixed in the ON position.

The mechanical gears are adjusted to the lowest speed. The electronic speed regulators are adjusted to their maximum speed value.

It is recommended to operate the power tool without the striking action.

5 Test procedure

If the machine has reached a stable number of revolutions, the drillbit is jammed by activating the stalling device. Thereby the jamming of the drillbit must take place within an angle of 30°. The machine has passed the test successfully if the maximum angle of displacement is 65° or less, before switching off the machine.

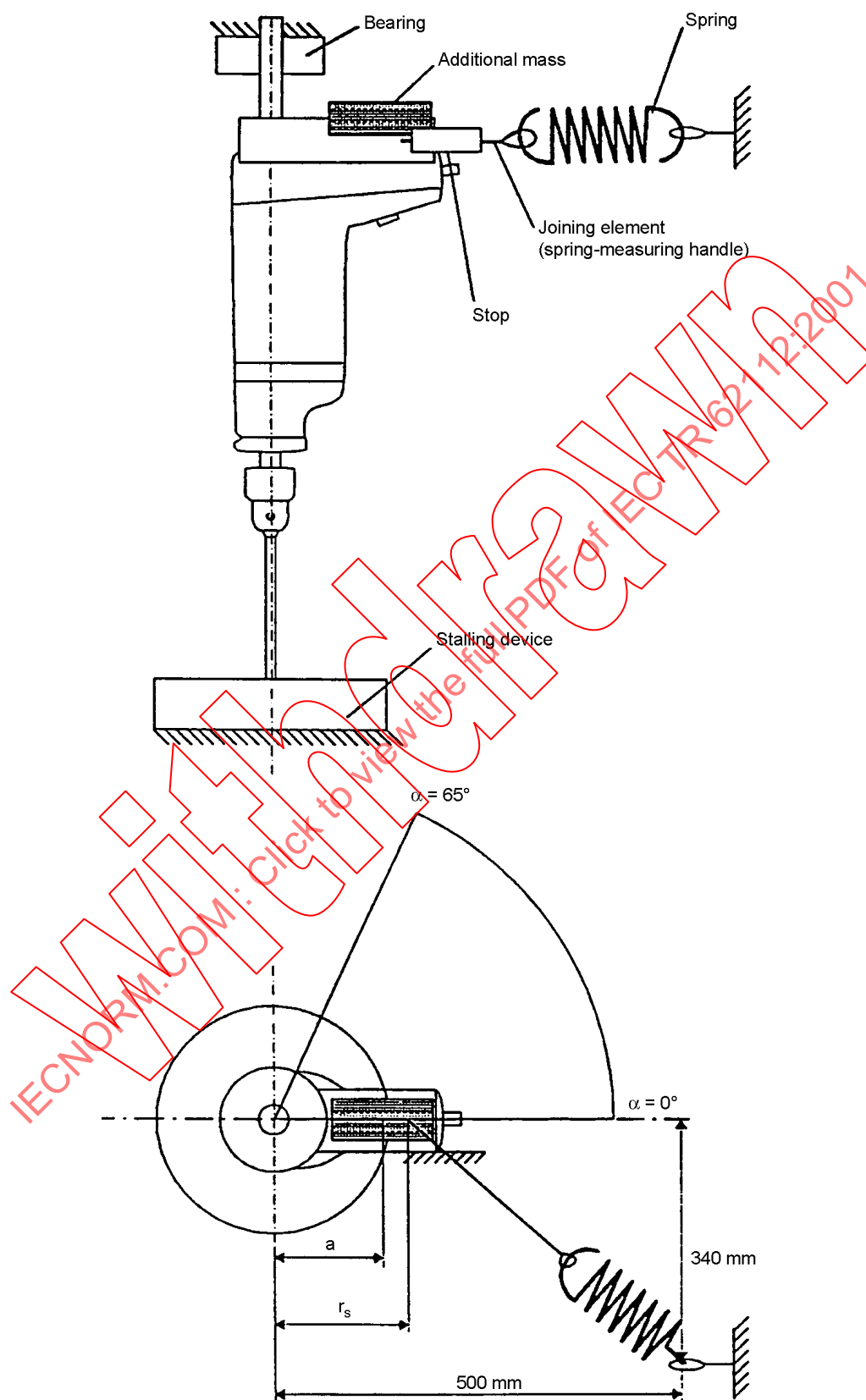
Five successful consecutive tests in time intervals of 1 min are necessary to fulfil the requirements of this standard.

6 Test report

The minimal information required in a test report includes:

1. tool type;
2. manufacturer;
3. single-hand or double-hand machine;
4. number of successful tests.

A model test report is given in table 2.



IEC 1880/01

Figure 1 – Test rig for single-hand machines

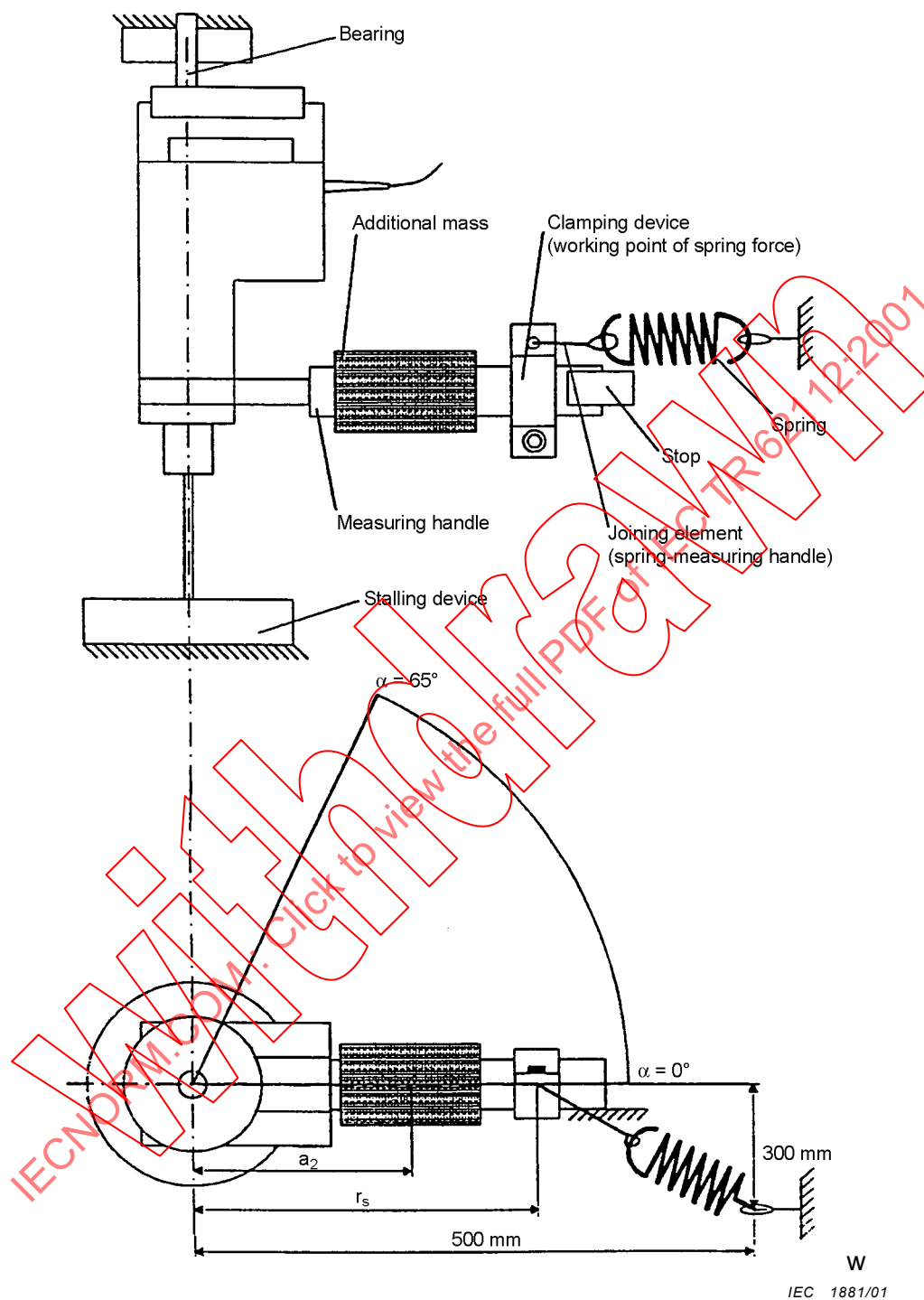
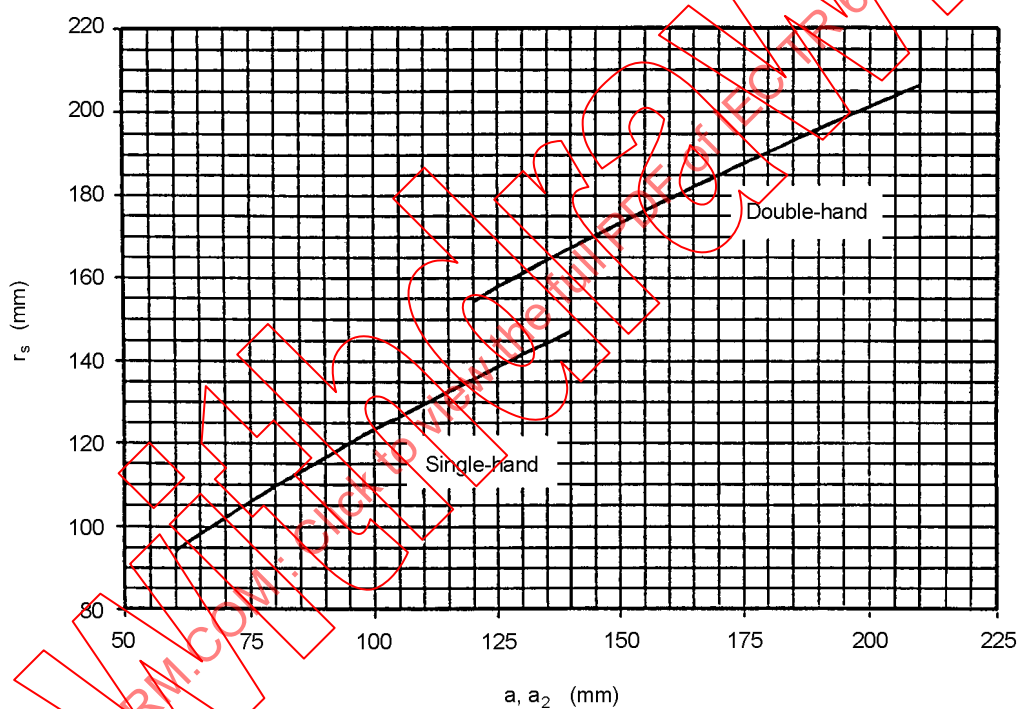


Figure 2 – Test rig for double-hand machines

Table 1 – Test parameter

Kind of machine	Single-hand	Double-hand
Additional mass	1 kg	2 kg
Spring rate c	0,5 N/mm	1,0 N/mm
Maximum length of unloaded spring, including fixing elements	490 mm	419 mm
Minimum linear range of spring	155 mm	219 mm
Spring preload	5 N	5 N
Load moment at 65° displacement	$80 \times a$ N·mm	$200 \times a_2$ N·mm



IEC 1882/01

Figure 3 – Values of r_z for single- and double-hand machines

Table 2 – Model test report for drills and impact drills

General	
Tested by:	Reported by:
Date:	
Power tool tested	
Tool type:	Manufacturer:
Model No.:	Serial No.:
Mass, [kg]:	
Operating conditons	
Mechanical gear:	Electronic speed setting:
Single-hand test:	Double-hand test:
Additional mass:	
Radius:	
a_1 :	a_2 :
r_z :	
Results	
Number of successful tests ($\alpha \leq 65^\circ$):	Number of failed tests ($\alpha > 65^\circ$):
Maximum displacement: $\alpha \approx$	
Standard passed: yes no	